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Law.Tax

Renewable Energy

December 2020

Contents

Introduction

This guide includes contributions from some of the most active lawyers in the renewables sector across the globe. 2020 has been a year of unprecedented challenge and has seen great change to economies and societies worldwide. Almost 5 years on from the signing of the Paris Agreement, the world has witnessed the alarming consequences of systemic threats via the spread of the COVID-19 pandemic. Contrary to the predictions of some commentators, the need to shift to a sustainable energy sector and to decarbonise existing energy systems has grown ever more apparent.

The messages from governments and institutions worldwide have a common theme – renewable energy generation will remain fundamental to decarbonising energy systems, which will in turn be essential to achieving sustainability goals and ultimately tackling climate change. Programmes for investment in and innovation of renewable energy across the globe are becoming ever more ambitious. As such, the conversation is no longer about costs or technological maturity, but rather whether countries are developing a sufficiently long and sizeable pipeline of projects to feed the almost insatiable desire of banks, investors and developers to deploy capital and debt in the sector. Securing the transition to a clean energy system has become less about actively facilitating or subsidising the sector and more about removing the legal, political and structural barriers to deployment.

Key global trends

Offshore wind marches on

Offshore wind offers a scale that no other form of renewable energy can provide and is playing a key role in energy transition strategies across those countries that have embraced the technology. Now considered a mature technology, over 150 new offshore wind projects were deployed globally in the last 10 years, with the industry set to become worth around USD 1trn over the next two decades. Such remarkable growth has been driven by improvements in technology and supply chains, increased political support and cost of capital, making the technology less reliant on support mechanisms.

For some time, offshore wind was considered almost synonymous with northern Europe. The world's first offshore wind farm was erected off the coast of Denmark in 1991 and over the last 30 years, several of the world's largest commercial offshore wind farms have found their homes in the North and Atlantic seas. Whilst Europe remains the world leader in offshore wind in terms of capacity and experience at present, markets elsewhere are looking to realise the potential of their waters and gain a head of steam.

For example, China is leading the Asian offshore wind market, achieving a new record in 2019 of installing 2.4GW of offshore wind in a single year. The global offshore wind market is predicted to grow by 13% per year over the next two decades with the majority of growth coming outside of Europe, from China and other emerging markets, such as Taiwan and Brazil.

Experienced European investors and developers continue to play a key role in the expansion of offshore wind markets overseas, leading or partnering on local projects and exporting valuable lessons learned. Such export of expertise is a huge boost to new markets, but often needs to be balanced against national ambitions to establish local supply chains, to bring communities and workers along by catalysing the development of a domestic offshore wind industry.

The International Energy Agency reports that offshore wind provides less than 1% of global power generation despite, by some estimates, having the potential to generate more than 18 times the global electricity demand today, per year. Of course, not all of this potential is economically feasible, but it is clear that as the need to decarbonise energy systems around the world becomes more urgent, we are still only scratching the surface of the potential this technology can deliver.

Floating offshore wind gains momentum
What was once considered a research and development area, floating offshore wind is expected to play a key role in the growth of the offshore wind sector over the next few years as projects reach commercial viability. Floating offshore wind is a natural complement to fixed bottom offshore wind, with many synergies between the two technologies, such as turbine design and construction. The technology is maturing quickly and, as of 2019, almost 66MW of floating wind was installed globally: 33MW in the UK, 19MW in Japan and 10MW in Portugal. Europe has had first mover advantage in recent years, however, countries with technology and innovation at the heart of their economies such as Japan and South Korea, are hot on its heels.

As with any renewable technology in its infancy, challenges to deployment remain; for example, capital and financing availability, suitability of infrastructure and supply chains and necessary cost reductions to achieve commercialisation. However, the right support frameworks and political will seem to be emerging, and the industry is optimistic that these challenges can be overcome. There is also, as yet, no convergence in the technologies, with many foundation types in particular vying for market share. As optimal shallow water sites become increasingly scarce in some geographies, there is a significant opportunity and prize for these technologies to play for.

Emerging markets drive deployment
Demonstrable cost reductions and environmental benefits are making renewable technologies an increasingly attractive opportunity for countries looking to meet sustainability goals, decarbonise their energy system and reduce reliance on electricity imports. Over the last decade, China and Europe have served as the two largest markets for renewable energy projects, however, the role of emerging markets in driving global renewable energy deployment is compelling. While Europe and China will continue to lead the market, China is still dominated largely by domestic players and it is anticipated that much of the action will play out in emerging markets that have spent the latter part of the decade implementing frameworks to incentivise investment.

BloombergNEF reports that, in 2018, 107GW of new clean energy capacity was added in emerging markets, with solar accounting for 66GW and wind 29GW. India and Brazil are now considered among the world's major renewable energy players, with Vietnam, Kenya, South Africa and Turkey also scaling up deployment.

Subsidy regimes remain important drivers to growth in these markets, providing investors with not only secure revenue streams but also long-term confidence in market viability. However, with two-thirds of the world's population living in a country where onshore renewables are the cheapest option for new electricity generation, renewable energy subsidies often deliver power at below market price. Projects are being deployed at scale because it makes commercial and political sense to do so.

Similar to the growth of international offshore wind markets, the experience of the European market has been key to the expansion of renewables in emerging markets at all levels, from supporting the evolution of regulatory frameworks, developing supply chains and infrastructure and ensuring compatibility with international financing arrangements. What is clear is that as markets for renewable energy take off across the globe, such success will not be delivered in isolation.

Closing of the price gap
The value proposition offered by renewable technologies is becoming more and more persuasive. In October 2020, the International Energy Agency reported that solar projects now offer some of the lowest cost electricity ever seen. Over half of the new renewable capacity deployed in 2019 worldwide achieved lower electricity costs than new coal, with solar showing the sharpest cost reductions over the last decade at 82%, followed by onshore wind at 40% and offshore wind at 29%.

However, challenges remain. Renewable energy projects have high upfront costs and, in markets without liquid and stable power prices and/or other political or market risks, this can be a disincentive. As such, routes to market offering secure revenue streams (such as PPAs and auctions) are of major importance in delivering price parity between renewables and fossil fuel generation. Around 70 countries use auctions for renewable energy contracts, including Chile, Peru and Poland, which has been instrumental in increasing competition to bring prices down and close this gap.

Political targets are steering the markets
More and more governments are following through on renewable energy promises and the pledges are becoming progressively ambitious. For example, the Austrian government has a goal of sourcing 100% of its electricity from renewable sources by 2030, Spain has pledged 75% of renewable electricity in its energy system by 2030 and France is targeting 1/3 of electricity generation from renewables by 2030.

Over 160 countries have adopted at least one type of renewable energy target, ranging from government announcements to legally binding obligations with quantifiable metrics and compliance mechanisms. Such targets serve as important guiding principles at policy level, informing investment decisions and allowing players to identify trends and opportunities for growth.

The EU's "man on the moon moment"
In December 2019 the European Commission announced the content of its European Green Deal which will serve as the EU's blueprint for transitioning to a low carbon economy. Described as Europe's "man on the moon

moment" by EU Commission President Ursula von der Leyen, the Green Deal will involve a complete overhaul of the European economy from finance and taxation to energy generation and transport. All EU legislation is potentially up for review to ensure alignment with these objectives and a raft of draft legislation reforming everything from emission standards to taxation is expected in 2021. Amongst an array of bold targets, the European Commission has pledged 459GW of offshore wind capacity by 2050 and the implementation of a new EU renewable energy financing mechanism.

The Green Deal is good news for the renewable energy industry and, more importantly, such EU climate leadership will be crucial to putting pressure on other countries to make bolder climate commitments.

Putting a price on carbon

Politicians frequently talk about "putting a price on carbon" to tackle the impacts of climate change and, with the EU's proposed carbon border adjustment mechanism and talks of a carbon tax by the incoming Biden administration, these conversations are growing louder.

Over 40 countries now use some form of carbon pricing, such as a carbon tax or an emissions trading system. Across these jurisdictions carbon pricing varies massively, from less than USD 1 to USD 119 per tonne of CO_2. Commentators across the globe stress the importance of effective and consistent carbon prices and that, on average, markets are failing to reflect the costs and risks of emitting greenhouse gases.

Experts suggest that the effective implementation of carbon pricing will have a strikingly positive impact on the energy transition and will incentivise investment in low-carbon energy generation as it will be even more cost-effective to do so. As such, many in the industry are closely watching the ambitions and actions of high emitters, such as the US, in this space.

The role of corporates

The power of the purchaser

Corporate PPAs are an attractive option as they provide developers with longer term financial certainty and businesses with "green kudos", as well as attractively priced energy. As mentioned, renewables projects typically need revenue certainty to secure investment and financing due to the volatility of wholesale market prices. There is growing interest in the corporate PPA route as an alternative way to secure financing for projects beyond the established US and UK markets, with deal activity increasing in Europe and South America in particular. Corporate renewable energy purchases totalled 19.5GW in 2019 – a new record and 40% higher than the previous year. These PPAs are estimated to have a total value of USD 20–30bn and represent approximately 10% of the world's total renewable energy investment in 2019, with this share expected to grow even further.

This new record is mainly thanks to increased demand from large tech companies, who accounted for almost a quarter of the renewable energy sold to global companies in 2019. The increasing tendency of large businesses to adopt evidence-based climate targets has been a major factor here and it is predicted that these commitments will support almost USD 100bn in clean energy investments over the next decade.

Moreover, the role of corporates is extending beyond purchasing of power, as we are seeing companies fund and develop their own renewable energy projects and take up other active roles in the electricity sector.

Oil and gas majors pivoting to renewables

There are many pressures and complexities forcing traditional oil and gas majors to rethink their strategies and expand their current energy mix. Some of these are inter-related, for example consumer pressures which threaten to damage corporate brands and similar pressures on investors and their investment decisions. These pressures, as well as the declining costs of renewables and government regulations, are all major drivers of the current energy transition, alongside new risk allocation strategies. These strategies are seeking to respond to, among other things, oil price volatility and changing geopolitical risks related to traditional oil and gas production and the location of such resources.

On average, investment by oil and gas companies outside their core business areas has been less than 3% of total capital expenditure. However, as these drivers come to the fore, we are seeing impressive commitments from oil and gas majors in respect of low carbon technologies. As the International Energy Agency notes, the largest outlays have been in solar and wind as well as non-core business activities such as electricity distribution, electric vehicle charging and research and development. In addition, the oil and gas industry recognise the critical value it can deliver to enable capital-intensive technologies to reach maturity such as offshore wind, green hydrogen and carbon capture, utilisation and storage.

Sustainable finance opportunities

The increased focus on sustainability in the finance industry has boosted investment in low-carbon technologies, particularly renewable energy. Legislation recently passed by the EU requires financial institutions to disclose how well their investments support (or at least do not inhibit) environmental objectives, with a similar regime being developed by UK regulators. The effect of such measures will require certain financial institutions to further integrate sustainability risks into their investment strategies, while also combatting "greenwashing" by disclosing detailed sustainability metrics (including carbon reduction).

As the regulatory framework for sustainable finance develops, innovative products are being delivered to the market at significant pace. An example of this is the establishment of new categories of benchmark, such as the Climate Transition Benchmark and Paris Aligned Benchmark, which are explicitly linked to climate targets. In the transactional banking sector, the development of green and sustainability-linked products in bond and loan markets present opportunities for renewable energy assets which are considered traditional "green investments".

As financial institutions are increasingly being held to account for where their money goes, we are seeing huge behavioural change across the financial system driven not only by external pressures (e.g. the Paris Agreement, investors, regulation or politics) but also a cultural and strategic shift within institutions to respond to the transition to a low-carbon and sustainable economy.

Tomorrow's world: obstacles and opportunities

COVID-19

It is almost impossible to talk about any development in 2020 without also discussing the impacts of COVID-19. The outbreak of COVID-19 was declared a pandemic by the World Health Organisation on 11 March 2020 and less than three weeks later, almost every country in the world had implemented some form of restriction on movement, with many moving into full "lockdowns". Considered to be the worst economic downturn since the great depression, the impacts of the lockdowns on society and the economy are both dramatic and far reaching, and still yet to be fully quantified.

The International Energy Agency reported that the responses to the pandemic caused more disruption to the energy sector than any other event in recent history, impacting everything from supply and demand to the development and construction of power projects.

However, renewable electricity was largely unaffected by the lockdowns and restrictions, partly due to the fact that, quite simply, wind and solar farms are much more passive assets compared to gas-fired power stations and generally require fewer operating staff.

As governments around the world now look to spend their way to economic recovery, many consider that such spending should be directed to give the world a chance to build a fairer and greener economy, and one that is more resilient to systemic threats such as pandemics and climate change. As such, many recovery packages propose measures aimed at decarbonising energy systems. For example, the UK government has pledged GBP 160m to increase the country's offshore wind capacity to 40GW by 2030, the German government is providing EUR 50bn in support for future-proof green technologies and in Colombia, renewable energy will form one of the country's "three pillars" of economic recovery. Looking ahead, we expect renewable energy deployment to play a vital role in rebuilding economies around the world and mitigating climate change risk.

Realising the repowering opportunity

A significant proportion of the installed onshore wind capacity across the world (particularly in Europe) will come to the end of its operational life between 2020 and 2030, and yet, for many developers, planning authorities and governments, repowering remains an afterthought.

We tend to think of wind technologies as finite assets; however, the possibility of repowering may mean that these assets are more enduring than their designated 20/25-year lifespan, which will in turn impact project values. As Bloomberg notes, an old project isn't so much a discounted future cash flow as it is an embedded option – a right to do something else in the future. With grid connection and planning already in place, this provides developers with an opportunity to do more with the technology of the future. Or, provided the legal and regulatory frameworks are facilitative, with significant cost benefits, and options to replace old turbines with new equipment at a fraction of the initial cost and benefit from improved performance.

Looking forward, governments will need to consider whether more streamlined permitting processes for repowering (including on community engagement) make sense (e.g. guidance on visual impacts caused by taller turbines). The Zeewolde onshore wind farm in the Netherlands is a successful example of this. The project is jointly owned by the developer and local residents and will have its 220 old turbines being replaced by 91 new ones, resulting in almost three times more power generation.

In terms of financing, longer term PPAs offer an attractive model for funding repowered projects, with gains being realised through efficiency, availability and capacity increases. In aid of this, the German government has introduced a repowering strategy to retain around 16GW of wind power that will lose subsidy support from 2021, supported by PPAs that permit companies to source electricity from old wind farms.

As developers gear up to strategize on how best to handle existing ageing fleets, this is expected to become an active space with repowered projects playing an important role in delivering on net-zero ambitions.

Making grid and space work

Governments across the globe are implementing significant programmes to deal with the challenges of high renewable (particularly non-dispatchable) penetration into energy systems. However, integration of such decentralised energy into power grids remains a challenge in all countries that have moved forward with significant renewables programmes, with the International Energy Agency reporting that grids could prove to be "the weak link" in the transformation of the power sector.

As the volume of intermittent generation coming online increases, a rethinking of power systems is likely to be needed in order to deliver more resilient and flexible systems that make best use of available resources to meet demand. As always in the modern world, technology offers part of the solution. The implementation of smart grid technologies will be a fundamental enabler that will allow operators to balance supply and demand more effectively, together with enhanced information and communication systems. The development of flexibility markets and storage technologies is also proving crucial in this regard. In many liberalised electricity markets, electricity transmission and distribution are regulated activities, as such, grid investment will require effective and stable regulatory frameworks with appropriate incentives and goals. IRENA notes that no insurmountable technical constraints exist for the transformation of grids in this regard, but the economic, political and regulatory environments will be critical to this achievement. Land availability – on and offshore – also remains a challenge. Typically, in the development stages of a project, a site's specific impacts will be considered, these being environmental, visual, wake effects, among others. However, with a patchwork of projects being deployed across the land and oceans, a holistic view of making best use of our natural resource – space – should be in the contemplation of policy makers and future renewable project developers.

Conclusion

The pace of the renewables transition is gaining momentum across the globe. The industry has been spurred on by falling costs and rising innovation, 'net-zero' commitments and the enhanced focus on building back better and greener out of the pandemic. Renewables have earned their place in energy systems and are seen as an integral part of our future. In the following chapters of this guide, our renewables experts will walk you through the specifics to consider when looking at renewable opportunities in each jurisdiction covered. Our contributors and teams remain at your disposal to help guide our clients through this exciting and growing sector.

Munir Hassan
Head of CMS Energy & Climate Change Group

Sustainable finance

Authors: Laura Houët, Caroline Barr and Chinyelu Oranefo

A market and regulatory revolution

The opportunities for the renewables sector presented by the finance industry's incredible shift towards sustainability must not be overlooked. Although financial institutions have increasingly been focusing on sustainability in the last couple of years, the impact of upcoming sustainable finance legislation will cement this position and present a wealth of potential new exposure for renewables across a number of areas.

The finance facing aspect of the EU Green Deal began in 2018 when the EU announced the launch of its "Action Plan for Financing Sustainable Growth". The cornerstone of the Action Plan was the development of a taxonomy of "environmentally sustainable activities", under which financial institutions will be compelled to report on the extent to which their investments are "taxonomy-aligned" and, therefore, do no significant harm to environmental objectives. That taxonomy has now developed into a suite of sustainable finance legislation with wide-ranging impact, largely focused on disclosure, across the European financial markets.

While Brexit means that, in the main, there will be limited direct impact on financial institutions in the UK, in practice any UK based bank or asset manager operating on a pan-European basis will be affected and experience market pressure to conform. In addition, the government has confirmed that the UK will be developing its own disclosure and taxonomy framework and there will be industry pressure for this to closely follow the EU standard.

Asset management industry and benchmark administrators

The EU's sustainable finance legislation has, for benchmark administrators, led to new products such as Climate Transition Benchmarks and Paris Aligned Benchmarks (CTBs and PABs) which have very specific carbon targets, as well as requiring disclosure on the ESG impacts for all published benchmarks. For fund managers, including pension funds and insurance products, particular disclosure frameworks have been implemented to highlight funds which have a sustainability strategy or objective, while requiring all funds to disclose sustainability risks and principal adverse impacts of sustainability factors.

Across both areas there is, for the first time, mandated disclosure of detailed sustainability metrics (including Scope 1, 2, and 3 emissions and exposure to certain sectors including renewables) for all products – whether or not they have a sustainability focus. The legislation is aimed at behaviour modification – pushing the finance industry to more sustainable investment and holding them to account for this. There are links in both areas to the taxonomy's "environmentally sustainable activities" to further drive the transition towards renewable energy and away from carbon intensive activities.

We are already seeing institutions increase their range of sustainable products and, in order to comply with their new disclosure requirements, pushing for more comprehensive reporting from companies on their sustainability performance. Without these metrics – or where these metrics are not aligned with the product's strategy – it will be increasingly difficult for institutions to invest in such companies or include them in their benchmarks.

Transactional banking

On the transactional banking side, the development of the Loan Market Association's Green Loan Principles and Sustainability-Linked Loan Principles have underpinned developments to date. The growth in the bond and loan markets in green, sustainability-linked and transition products, makes it is feasible that financial institutions may move towards structuring renewable assets in specifically labelled sustainability finance products as they seek to demonstrate or consolidate their "green" credentials.

Risks and opportunities for the renewables sector

The opportunities here for the renewables sector are huge. There is a clear political, regulatory and market push to move towards sustainable and low-carbon investments. As such, renewable energy will be an attractive asset within climate transition products and more widely to demonstrate the industry's commitment to carbon reduction.

However, there will also be some additional effort that comes with the placing of environmentally themed projects at centre stage. For example, whilst it is reasonable to assume that renewables fall within the EU, UK or indeed any other sustainability taxonomy's definition of "environmentally sustainable economic activities", there will still be work to be done in order to ensure that the relevant requirements of the benchmark, fund or financing are met.

Similarly, whilst a renewable energy business may feel confident about its climate-related risk profile, it will not be immune from the indirect reporting disclosures that will be placed on it by financial institutions looking to meet their own increased disclosure obligations.

The sector should be aware of these indirect impacts and ensure that it is well prepared to provide the metrics the finance industry will require.

Tax incentives and measures

Authors:
Heino Büsching, Toufic Schilling, Marta Burgos Murillo, Diego de Miguel, Celine Cloche-Dubois, Eva Aubry, Marie Dedoubat, Carlo Gnetti

Governments around the world are pledging ambitious commitments in support of the transition to a clean energy system. In order to facilitate investment in low-carbon energy sources, such as renewables, and meet such ambitions, many governments are incentivising investment by creating attractive fiscal frameworks, including tax incentives and measures in order to steer both business and consumer behaviours.

This chapter provides a snapshot of the key taxation principles and considerations applicable to renewable energy generation.

Additional tax burdens vs. tax incentives

In order to boost investment in certain sectors, many governments choose to use tax incentives as a means of increasing the profitability of an investment, however this tool is used cautiously, to prevent the loss of tax base and to ensure compliance with state aid restrictions.

A common method of using fiscal tools to support the energy transition is to impose an additional tax burden on fossil fuels, and sometimes nuclear energy, and in turn implement tax incentives for renewables. This is intended to create a profitability advantage in favor of clean energy sources.

Directive 2003/96/EC determines which products are to be subject to harmonised taxation rules and enables member states to exempt certain energy products from taxation or to apply reduced tax rates. Article 15 of the Directive allows member states to give favorable tax treatment to electricity produced from renewable sources. Several EU member states have made use of this option by exempting electricity generated by renewables from taxation in certain circumstances, although they have

fallen short of granting complete tax exemptions (partly due to restrictions on state aid). For example, in Spain, the Directive has been implemented mainly through Law 38/1992, of December 28, on Special Taxes, which establishes an additional tax burden on hydrocarbons, certain means of transport, and electricity and coal.

In terms of providing incentives for electricity from renewable sources, Germany, for example, has established a tax exemption for electricity consumed by the owners of renewable generation facilities whose installed capacity does not exceed a defined threshold of megawatts (self-consumption scenarios) and Italy grants financial incentives and tax credits for investments in renewable energy.

Intelligent use of tax revenues

In addition to increasing the tax burden on energy generated from fossil fuel and nuclear sources and providing tax incentives for renewable generation, how governments use the taxes they levy can have a significant impact on the energy transition in their jurisdictions. Used smartly, the tax burden on non-renewable energy sources can used to finance the expansion of renewable generation.

In Germany, investors are granted a fixed feed-in tariff for flowing electricity renewable energy into the public grid in order to minimise investment risks. Potential differences between electricity production costs and the market price are financed by a levy, which all electricity consumers pay through a share of their electricity procurement costs. Following the common approach internationally, these feed-in tariffs are increasingly determined by tenders, which are intended to strengthen competitiveness. From 2021, the carbon dioxide pricing system already in place for the energy sector and energy-intensive industry under the European Emissions Trading Scheme is also to be extended to the transport and construction sectors. The German government also wants to reinvest these revenues in climate protection measures.

In France, environmental taxes generate significant revenues and the revenues collected are often allocated to finance public environmental policies. This form of carbon tax – which taxes certain activities and products based on their carbon content – is gaining momentum worldwide. However, to date the carbon tax has been relatively inefficient because of the substantial drop in oil prices which has offset the increase in taxation.

Tax implications in the structuring of acquisitions

The tax incentives for renewable energy investments, in so far as they relate to the target business, will affect the profitability of a corporate acquisition. In principle, these tax incentives should not influence the tax structure of the investment. Rather, the tax structuring of the investment typically depends on factors such as how the target is financed or whether it is to be held for the long term or sold in the short term. Different taxation systems (transparent and non-transparent taxation) at local, national and international level must be reconciled for a tax-optimised structure.

In Spain, acquisitions of renewable energy projects are usually constituted by means of the incorporation of new Spanish non-transparent entities. These special purpose vehicles (SPVs) are specifically created to undertake individual projects, their only purpose being to generate renewable energy. The SPV, which usually adopts the legal form of a Sociedad Limitada (limited liability company) might be directly or indirectly held by the foreign investors.

This structure ensures that the management of the target is both transparent and separate from the other activities or investments that the investors may have, and of course this structure limits the eventual losses that might be incurred in the development of the project. Likewise, the Spanish SPV, as the owner of the project, will carry out all the procedures required to obtain permits, raise the funding and agree the necessary contracts with public institutions and private entities. In addition, the SPV, as a newly constituted company, might benefit from certain local tax reliefs, such as business activity tax, during the first two years from the commencement of its activity (subject to certain conditions).

Similarly to Spain, in Italy, investments and acquisitions relating to renewable energy projects are usually carried out by means of new Italian non-transparent SPVs that can be financed with debt for interest expense deduction (under certain limitations) or equity for the notional interest deduction (less appealing because of the low notional interest rate granted on the new equity).

In France, renewable energy projects are often conducted through an ad hoc project company (SPV) whose sole purpose is the construction, ownership and operation of the project. The SPV is then required to provide project financing and to subcontract to third parties the construction, operation and maintenance of the project. The SPV may contract a classic senior bank debt but may also have recourse to complementary financing such as bridge loans.

Albania

Authors: Mirko Daidone and Evis Zaja (September 2019)

1. Brief overview of renewables sector

Its geographical location in southeast Europe and its natural resources make Albania one of the best-placed countries in Europe to use and exploit renewable power and resources. Around 97% of domestically generated electricity in Albania comes from hydropower. This reflects the Albanian government's long-standing focus on developing hydropower as its main renewable energy source, even though it could tap into other sources of renewable energy.

According to a European Commission report published on 28 January 2016, "Albania has a surface of 28,748km^2 and a hydrographical distribution of 44,000km^2 or 57% more than state territory. The country has the potential to produce 16 to 18 TWh of hydro energy but so far it has exploited one-third of the potential." In 2009, the Albanian government endorsed contracts for the construction of 103 hydropower plants with a total capacity of 1,000MW, and total investments in the energy sector totalled EUR 3.1bn. Albania continues to emphasise hydropower today.

The government has also introduced to promote and improve Albania's renewable energy sector as a hole. In 2017 a new law promoting renewable energy was enacted, and in 2018 the Council of Ministers adopted Decision No. 179, dated 28 March 2018 "On the approval of the National Renewable Energy Action Plan (NREAP) 2018–2020".

2. Recent developments in the renewables sector

Law No. 7/2017 "On promoting the use of energy from renewable sources" aims to encourage the increase of energy production from renewable sources in order to ensure sustainable development in the Republic of Albania in accordance with its obligations under Energy Community Treaty. This relatively recent legislation is also partly in line with Directive 2009/28/EC, the EU's Renewable Energy Directive.

The Decision of Council of Ministers No. 179 of 28 March 2018 "On the approval of the National Renewable Energy Action Plan (NREAP) 2018–2020" approved the national action plan for the timeframe 2018–2020. This DCoM aims to achieve a level of 38% consumption of renewable energy sources by 2020. To reach this national objective, an increase in installed electricity generators based on renewable sources is estimated to reach 798MW with the consumption of electricity deriving from renewable sources amounting to at least 2,044GWh.

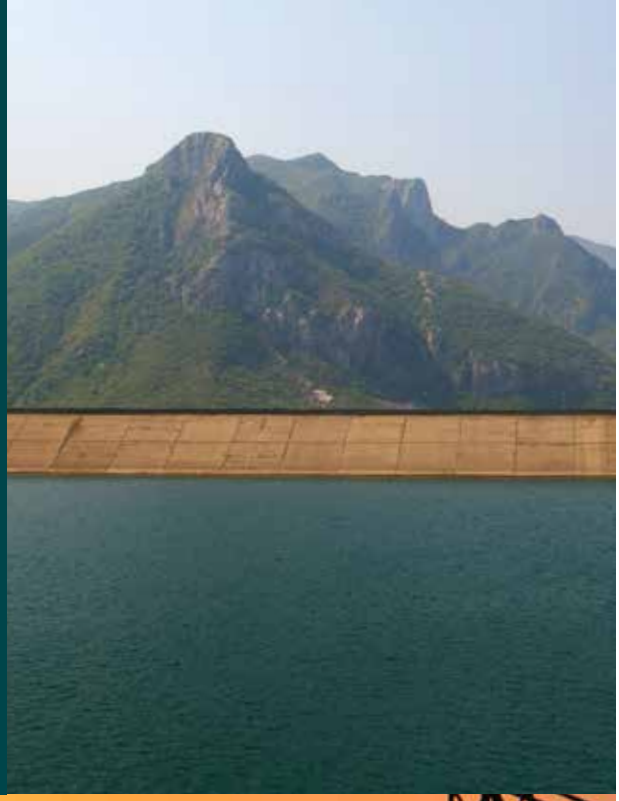
The law introduced incentives for the renewable energy sector, aimed at achieving the 38% national. These include:

1) **Contract for difference:** this model contract is provided to energy producers following a competitive process. It is calculated as the difference between the winning bid by the renewable energy producer for the feed-in tariff (fixed price) and the electricity market price (reference price). Preferred producers are those who generate renewable energy – in the case of hydropower with an installed capacity of up to 15MW for one generating unit – and qualify through the competitive process to benefit from supporting schemes in accordance with the provisions of the Law No. 7/2017. Ultimately, the incentive is provided as an award for reaching the specified price, in addition to the reference price. Under Law No. 7/2017, the definition of "reference price" is the market price of the following day, which is based on the organised electricity market or in a comparable electricity market. The reference price is calculated by ERE (the Albanian Energy Regulator) on a yearly basis. The contract is approved by the Council of Ministers through the Renewable Energy Operator and has a maximum duration of 15 years.

   Apart from the competitive process and application procedure a capacity threshold also applies. Support under the contract for difference will not be provided in the following cases:
   - if the producer has an installed energy capacity that reaches up to 2MW.
   - if the producer has an installed energy capacity for wind energy that reaches up to 3MW.
   - for demonstration projects.

   For producers of renewable energy through wind power, the purchase price is defined by ERE under the methodology proposed by the Minister and approved by the Council of Ministers. The methodology outlines the criteria for calculating the price based on reasonable return on investment value, according to the type of technology used.

2) **Specific incentive for renewable energy generated by hydropower plants:** the purchase price of electricity from hydro sources with an installed capacity of up to 2MW is set out by ERE, in accordance with the methodology proposed by the Minister and approved by the Council of Ministers. The methodology for calculating this price is:
   - Annual purchase price (ALL/kWh) = the annual average market price of the following day (HUPX DAM), of electricity in the band profile (baseload) of the relevant year of the Hungarian stock (HUPX) of electricity in EUR cents/kWh x bonus for promoting renewable energy to the amount



of 1.30 x average exchange rate in EUR/ALL of the last year.
- In any case, the price will not be lower than 7,448 ALL/kWh (the price approved by ERE in 2016).

Existing producers with priority who obtain the hydropower certificate before 31 December 2020 will be eligible to benefit from the support scheme according to the contract for difference, pursuant to the articles of Law No. 7/2017 and the procedures approved by ERE. These hydroelectricity producers are eligible if they obtain their certificate before the end of 2020, regardless of the signing date of their agreement with the Ministry of Infrastructure and Energy. The hydropower certificate will be issued by the Ministry of Infrastructure and Energy, pursuant to the instructions of the Minister.

Producers operating hydropower plants with an installed energy capacity greater than 2MW can invest through public-private partnerships based on concession, as this is also the most commonly used method of investment in hydropower.

3) **Origin guarantees:** producers may obtain an origin guarantee from ERE for energy generated by renewable energy sources. As Albania is a contractual party to the Energy Community Treaty, ERE also recognises the origin guarantees issued by a country in the EU or any country which is a contractual party to the Energy Community Treaty.

3. Forthcoming developments/opportunities in the renewables sector

Considering Albania's favourable geographical location and climate, there is a potential for further development and opportunities in solar, geothermal, wind and biomass energy in the renewables sector, especially when hydropower plants are not functional.

Solar

Albania has an average of 2,400 hours of sun around 240–300 sunny days per year – there is significant potential to exploit solar energy, especially as it does not raise any pollution or other environmental risks. The potential solar energy that could be generated per annum is calculated at approximately 1,500–1,700kWh/m^2.

Wind

The country has vast areas with high wind energy potential, especially along Albania's 345km coastline. It is estimated that the total potential of wind energy is 2,000MW and 5% of the total electricity produced in the next five years will be solely from wind energy.

Geothermal

Whilst there are natural thermal resources or wells, which could prove useful in assessing the full potential of geothermal energy in Albania, this is still in the feasibility stage and there have been no recent developments in the advancement of this renewable energy source.

Biomass

Albania does not produce biofuels and no biomass energy plants have been developed to date. However, biomass has potential, as 36% of the total surface of Albania is covered by forests. Agricultural residues alone can reach an energy potential of about 6Mtoe. Furthermore, waste from the biggest Albanian cities is increasing every year and the most recent biomass potential calculation is estimated at around 2,300GWh/year.

4. Incentives and financing

Feed-in tariff

Currently, support in the renewable energy sector is advanced using feed-in tariffs. As stipulated under Law No. 7/2017, (as outlined in section 2 above) renewable energy plants are eligible if they meet the requirements for support through the feed-in tariff. The requirements for the eligibility of the tariff are:

- wind energy plants must exceed an installed energy capacity of 3MW.
- hydropower plants must exceed an installed energy capacity of 15MW.
- photovoltaic plants must exceed an installed energy capacity of 2MW.

Once these requirements are met, the tariff will be granted for a period of 15 years and public utilities are obliged to purchase energy from these renewable sources for the tariff set by ERE. The costs of the energy tariff for these renewable sources are borne by the final consumers.

Angola

Author: Filipa Tavares de Lima (September 2019)

1. Brief overview of renewables sector

Between 2008 and 2014, energy consumption in Angola recorded an annual average growth rate of 15.5%. Total Angolan energy consumption reached 9.48TWh in 2014, even in conditions where many Angolans do not have access to electricity or use power generators.

Energy consumption in Angola is mostly urban and residential. It is estimated that the residential sector accounts for 45% of total generation, followed by services (roughly 32%) and industry (around 9%). According to studies carried out in 2015, only 30% of the population had access to electricity (46% in urban areas and 18% in rural areas).

Strong growth in energy consumption is anticipated up to 2025, foreseeably reaching a load of 7.2GW. This envisaged growth is based on the provision of energy to 60% of the population, an increase in residential consumption and the country's industrialisation.

In 2013, over 70% of the electricity produced in Angola was hydro-based. Recent investment in large hydroelectric plants includes Laúca with a capacity of 2,060MW and Cambambe II with 700MW (adding to the 200MW of Cambambe I). Various other hydroelectric projects are being developed, particularly Caculo Cabaça (already under construction with 2,172MW), Jamba-Ya-Mina, Jamba-Ya-Oma and Baynes.

As one of the richest African countries in natural resources and with the country's hydropower potential among the highest in Africa, the renewable energy sector in Angola is currently not diverse.

Recent developments indicate that the Angolan state is looking for investments in the energy sector, approximately USD 3bn by 2022 in order to increase production from 3,334MW to 7,500MW, with 500MW of the increase reserved for private investment in renewable energies.

2. Recent developments in the renewables sector

The Angolan government has a very ambitious energy project to be implemented by 2025. Within the "Angola 2025" strategy the government issued the "National Strategy for the New Renewable Energies", which provides an in-depth look at the goals that the Angolan state wishes to meet by 2025.

The strategy seeks to contribute to the National Energy Security Policy and Strategy (enacted in 2011), promoting the diversification of national energy, and to the Program

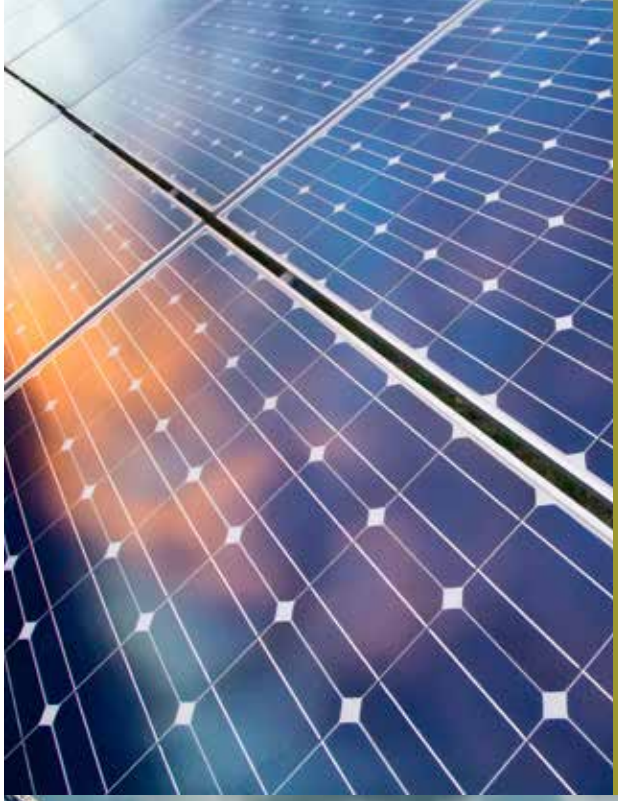
of Integrated Rural Development and Poverty Combat, and the promotion of growth and employment. Internationally, Angola considers that this strategy contributes to its climate change commitments and is in line with its participation in SADC (Southern African Development Community) and IRENA (International Renewable Energy Agency).

The Angolan government's target is that in 2025 at least 7.5% of the electricity generated in the country (equivalent to an installation of 800MW) will come from new renewable energies (major hydroelectric projects are not included). In order to reach this goal, the Angolan authorities identified three goals:

- Improve access to energy services in rural areas based on renewable energy (e.g. the "Solar Villages" programme, creation of distribution networks and service providers throughout the territory).
- Develop the use of new grid-connected renewable technologies – with targets and guidelines for each type of renewable energy and the promotion of investment.
- Promote and accelerate public and private investment – e.g. the creation of specific legislation for renewables, a system of tariffs such as "feed-in" for projects up to 10MW, and credit lines to stimulate private sector initiatives in rural areas.

In order to promote investment in the renewables sector by 2025, the Angolan government is considering implementing the following actions:

- Approve specific laws for new renewable energies.
- Approve pre-defined subsidised tariffs for renewable projects to be grid-connected of up to 10MW and review the tax system.
- Allocate an amount of at least Kz 1bn per year to the National Electricity Fund (FUNEL) by 2025 to support rural electrification programmes based on renewable energies, and establish subsidised credit lines for the purchase of individual systems or the launch of productive activities.
- Ensure the establishment of at least one training centre for renewable energies.
- Launch a media campaign about renewable energy and its advantages, particularly as a means of bringing basic energy services to rural areas and boosting solar thermal energy.



3. Forthcoming developments/opportunities in the renewables sector

The Angolan government has conducted a thorough assessment of the potential of Angola in the renewable energy sector. Highlights include:

- **Solar energy:** solar radiation is high and constant throughout the territory, with 55GW of generation potential. According to Angolan government studies, Angola has a high potential solar resource, with a global annual horizontal solar radiation between 1,370 and 2,100kWh/m^2/year.
- **Hydropower (up to 10MW):** hydroelectric potential is currently estimated at 18GW, with numerous rivers with adequate flows and falls identified to support smaller projects (up to 10MW) throughout the territory. The river basins of Kwanza, Cunene, Catumbela and Queve (representing 86% of the estimated potential) were identified as the best targets for this technology. Several other rivers throughout the territory have conditions for smaller size projects.
- **Biomass energy:** Angola's forests, the existing forest polygons, the favourable agricultural areas for the planting of sugar cane or other crops with energy potential, the farming of livestock and municipal solid waste, all have the potential to generate energy in excess of 3GW. The Central Region (the provinces of Huambo, Bie and Benguela) and the Eastern Region (the provinces of Moxico, Lunda Sul and Lunda Norte) are the most favourable zones in terms of forestry and agro-industry resources.
- **Wind energy:** recently completed studies concluded that the wind in the southwest and on the Atlantic slope, along to the north-south axis, present favourable conditions for the installation of more than 3GW of wind farms.
- **Other renewables:** geothermal signs of average enthalpy in the centre of the country and an extensive ocean coastline also constitute potential resources to be developed.

Rural electrification based on renewable energies

The Angolan government has a project under way to provide power in locations not covered by the national grid or by isolated systems. Rural electrification should be completed through mini-grids or individual systems, with different service levels and different levels of involvement of the public sector in order to maximise the number of beneficiaries.

The remote rural areas far from the grid may be subdivided into two main categories:

- Zones of influence: communal centres, the larger villages (more than 2,000 inhabitants) and those along the main roads. About 500 zones of influence throughout the country have been identified.
- Scattered areas: smaller villages and settlements isolated and away from main roads, where there are often farming communities with some organisational and trade skills.

The implementation of renewable energy sources in these remote areas is currently being considered.

The main goal of the Angolan government is to diversify investment in renewable energy through a growing role of this type of energies, including small hydropower plants.

Strategic goals for renewable energy

Three strategic goals have been set out for renewable energy in order to meet the main challenges:

- Improve access to energy in rural areas using renewable sources. The goal is to support rural development and relieve poverty, as well as to guarantee that communities living in non-electrified areas gain access to safer and better quality energy sources.
- Develop the use of the new renewable technologies connected to the grid, enhancing the establishment of new markets and reducing regional asymmetries. The goal for grid-connected renewable energies is to develop the national renewable resources that provide electricity, taking advantage of opportunities for replacing fossil fuels, avoiding investments in grids or enhancing new sectors that will generate wealth and employment.
- Promote and accelerate private and public investment in new renewable energy. The goal is to generate effective conditions for investment in the new renewable energy sources that mitigates the distortion introduced by fossil fuels subsidies, offering a suitable payback on investment, an appropriate mitigation of risks and regulation, procedures and communication that ease the implementation and commit investors.

Austria

Authors: Johannes Trenkwalder and Marco Selenic (July 2020)

1. Brief overview of renewables sector

Energy sourced from renewables is becoming increasingly important in Austria. According to the Energy Report, 2019 prepared by the Ministry of Agriculture, Regions and Tourism, roughly 82% of the energy generated in Austria was derived from renewable sources in 2018. Biomass accounts for 55% of all renewable energy and hydropower for 33%. However, the importance of wind and solar generation (6.6%) is also steadily increasing. The country's topography supports the trend towards the generation and consumption of renewable energy, as does the legislative framework, which is mostly based on EU legislation.

The driving force for the support of renewable energy within the legislative framework is currently the Green Electricity Act 2012 (*Ökostromgesetz 2012*), which is being continually amended to further increase the share of renewable energy. In May 2018, the Austrian Federal Government adopted a climate and energy plan for Austria: #mission2030. The #mission2030 plan imposed national targets for the renewable energy sector, such as increasing the overall share of renewables to 45–50% by 2030.

However, after early elections in 2019, the newly established Federal Government, with participation of the Green Party for the first time, released an even more ambitious government agenda stating that Austria should be **climate-neutral by 2040**. The programme also focuses on issues such as the greening of the tax system, the decarbonization of the heating and transport sectors and the goal of 100% renewable electricity by 2030.

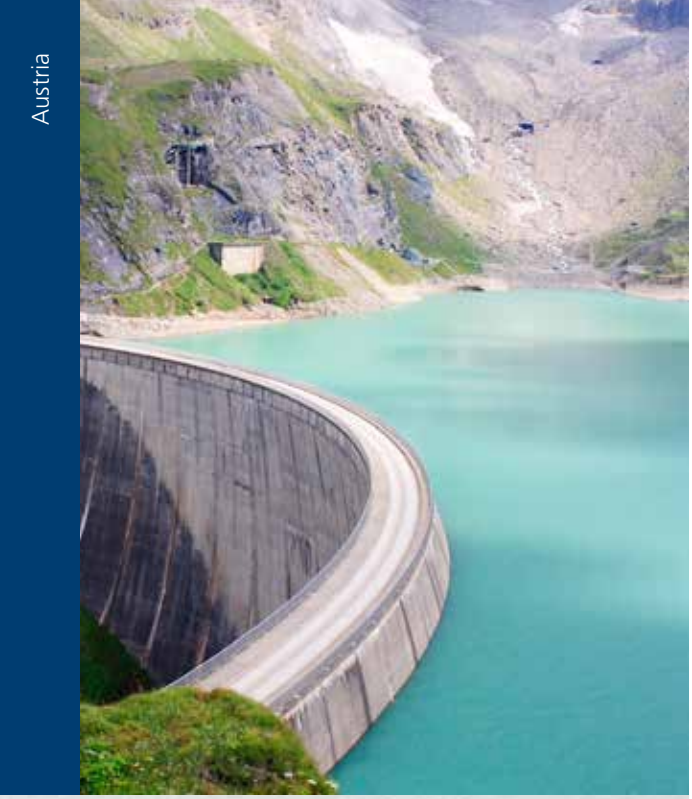
2. Recent developments in the renewables sector

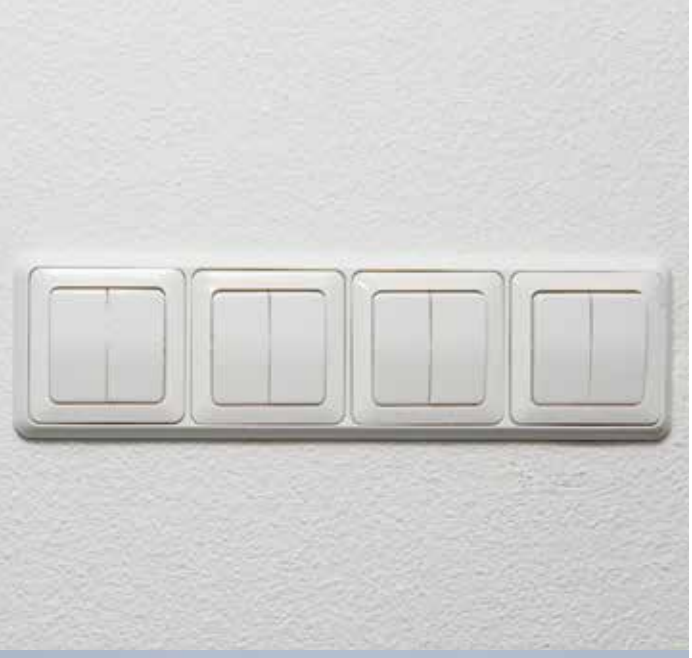
Small Green Electricity Act Amendment (*"kleine Ökostromnovelle"*)

In 2016, the legislator passed the Small Electricity Act Amendment (*"kleine Ökostromnovelle"*) which introduced technical and administrative amendments to the existing green electricity support scheme in Austria. It only sought to make such amendments which were covered by the already-approved subsidy scheme, and thus would not need to comply with the new EU state aid regime. The main amendments were:

One-Stop-Shop approval procedure

As of 1 January 2018, the Green Electricity Clearing and Settlement Agency (*"Ökostromabwicklungsstelle"*, OeMAG) would decide on applications for the approval of solar, wind and small hydropower plants and conclude contracts on subsidies for these plants. Only commodity-dependent plants (biomass and biogas) would still need to obtain approval from the competent provincial governor before applying for a contract with OeMAG.





Furthermore, the European Renewable Energy Directive (RED II) would require an extended "One Stop Shop" system, which would not only be responsible for approving and subsidising projects in the field of renewable energy, but also many space planning issues. The intention is that OeMAG will also have the corresponding instruments at its disposal to be able to fulfil this role.

Extension of the expiry period for applications for the approval of wind, hydropower and commodity-dependent plants

The expiry period for applications for approval was extended from three to five years as of the date of lodging the application for approval of wind, hydropower and commodity-dependent plants. Wind power plants only need to be put into operation within 48 months (instead of 36 months).

Solar power applicants must demonstrate to OeMAG that they have ordered the respective (entire) solar power plant within three months of lodging the application. Once the solar power plant has been approved, it needs to be operational within nine months (instead of twelve months).

Amendments regarding investment subsidies

Investment subsidies must comply with the General Block Exemption Regulation (EU) No. 651/2014. As of 2017, subsidies for small hydropower plants have been increased from EUR 16m to EUR 20m per year. By contrast, the investment subsidies for solar power plants were limited to EUR 15m for the years 2018 and 2019.

New renewable plants registry

The amendment of the Green Electricity Act also establishes a renewable plants registry. This is kept by OeMAG and includes all approved plants.

Green Electricity Act Amendment 2019
In October 2019, the Green Electricity Act 2012 was amended again. The main goal was the reduction of waiting lists for subsidies. For this purpose, the additional annual support volume from 2021 was brought forward to 2020 and for solid biomass plants an additional EUR 8.7m was made available. Another EUR 30m were made available for medium-sized hydropower investment and at the same time the amount of subsidies was increased from 10% to 15% or from a maximum of EUR 400/kW to EUR 650/kW and a maximum total of EUR 6m per plant to EUR 10m. For the years 2020 to 2022, additional funding of EUR 36m was provided for both photovoltaics and storage.

Impact of COVID-19
The final impact of the COVID-19 pandemic remains to be seen, but recent economic policies suggest that the Federal Government's plan to support the struggling economy is very much in line with the interests of the renewables sector.

Financial measures:
The stimulus package announced in June 2020 will encompass the following financial measures (until 2022):

- EUR 750m for a renovation plan, thermal renovation, and support for "getting out of oil" technologies, climate-friendly local and district heating as well as for modern heating systems;
- EUR 250m for the expansion of renewable energy;
- EUR 300m for innovations in climate protection and future technologies;
- EUR 100m for tax reductions on repairs; and
- EUR 200m for climate protection in urban areas.

Investment subsidy for green technologies
The investment subsidy for green technologies provides for a tax credit of 14% of investments in certain "future technologies". In addition to digitalization and investments in health care, eco-investments will receive special support for six months from September 2020. The intention is to make climate-friendly investments such as investment in renewable energies, energy efficiency the reduction of air pollutants more attractive for business.

3. Forthcoming developments/opportunities in the renewables sector

Renewable Expansion Act (*Erneuerbaren-Ausbaugesetz*)
With the intention of implementing the measures outlined in #mission2030 and in the Austrian climate and energy plan, the former Federal Government presented an outline of the Austrian Renewable Expansion Act (*Erneuerbaren Ausbau Gesetz,* EAG), which aimed to positively shape the Austrian clean energy system. The new draft under the current Federal Government is expected to be submitted for review in July 2020. The Renewable Expansion Act will then come into force at the beginning of 2021. According to the government agenda, the key aspects of the Renewable Expansion Act will include:

- Measures to secure climate-neutrality by 2040.
- 100% renewable electricity by 2030.
- Installation of photovoltaic systems on 1m roofs (Austria has approx. 2,19m buildings).
- Exploring the possibility of creating "Renewable Energy Communities" and "Citizens' Energy Communities" for increased decentralisation of energy supplies.

In addition to the adoption of the Renewable Expansion Act, it is also intended to (i) further develop the current Energy Efficiency Act, (ii) continue to lobby against nuclear energy at EU-level, (iii) foster a technology strategy, further digititalisation and innovation measures (development of integrated energy systems, E-mobility, Smart Grids and especially hydrogen technology) and (iv) help the Austrian economy to transfer to a more climate-friendly approach with a "*Green Deal*".

Belgium

Author: Ivan-Serge Brouhns (October 2018)

Offshore wind (federal legislation)

1. Brief overview of the renewables sector (offshore wind)

With several offshore wind farms, Belgium is amongst Europe's top offshore wind markets; only the UK, Denmark and Germany produce more offshore wind energy. The operational wind farms have a total capacity of 877MW and several more are planned and under construction. The offshore wind farms will produce 10% of Belgium's energy consumption in 2020, and are essential to meeting the country's renewable energy target of 13% of final energy consumption by 2020.

2. Recent developments in the renewables sector

At the federal level, the transmission system operator is required to purchase Green Energy Certificates (GEC) at a guaranteed minimum price. One GEC is awarded per MWh produced. The transmission system operator performs this public service obligation and therefore must purchase GECs awarded by the federal energy regulator from the renewable energy operator. For installations with a financial close before 1 May 2014, the guaranteed minimum GEC price is EUR 107/MWh for generation resulting from the first 216MW of installed capacity and EUR 90/MWh for generation resulting from installed capacity above the first 216MW.

For installations with a financial close between 1 May 2014 and 30 April 2016, the minimum price is calculated as follows: EUR 138/MWh – (a reference price for electricity – a correction factor of 10%).

Recently a new regulation came into effect and determines that when the financial close takes place from 4 March 2017, the minimum GEC price will be determined by the Belgian government. Two wind farms where the financial closing took place before this new regulation came into effect were awarded minimum prices at EUR 124/MWh and EUR 129.80/MWh.

3. Forthcoming developments/opportunities in the renewables sector (offshore wind)

The Belgian offshore wind market has significant potential in the short term, with several projects due to reach financial close in 2017/2018. As assets achieve commercial operation, there are likely to be opportunities for investment in generating assets.

Whilst domain concessions for all the existing project zones for wind farms have been awarded, it remains to be seen whether the Belgian government will see fit to designate further zones in the future in order to meet its climate change commitments.

Flanders region

1. Brief overview of the renewables sector

Until now only 6% of the energy consumed in the Flemish region is produced by renewable energy sources (RES). Renewable electricity is mainly produced from wind, solar and biomass.

Flanders still has a long way to go towards meeting the renewable energy target imposed on Belgium for 2020 (13%), and has a particularly low proportion of green heating and cooling.

2. Recent developments in the renewables sector

The region of Flanders uses a quota system and a certificate trading scheme to support renewable energy. In general, all renewable energy generation technologies are eligible for the quota system. The green electricity certificates (GEC) are issued by the Flemish regulatory authority (VREG). GECs issued to production devices with a commissioning date before 2013 represent the supported production of 1MWh net electricity from renewable resources. GECs for production devices commissioned since 2013 represent 1MWh multiplied by a technology-and-capacity-specific banding factor that reflects the amount of support needed to pay back the investment in a reasonable production period without over-subsidising.

3. Forthcoming developments/opportunities in the renewables sector

The government of Flanders recently approved a new ambitious wind energy plan – Wind Power 2020. It aims for the construction of no fewer than 280 additional wind turbines in the region by 2020. Together, these wind mills will generate around 1,563GWh of energy, bringing Flanders' total wind energy supply to 2,913GWh. As such, Flanders wants to reach the climate and energy targets set out in the Paris Agreement of 2015. The Flemish government wants to eliminate as many restrictions as possible to ease the establishment of wind turbines in big industrial areas, as well as at the four seaports in the region: Antwerp, Ghent, Zeebrugge and Ostend.

Brussels region

1. Brief overview of the renewables sector

Around 5% of the energy consumed in Brussels is generated by renewable sources, most of it from biomass production (42%). There are no wind turbines in operation in Brussels due to the urban environment.

2. Recent developments in the renewables sector

As in the two other regions and at the federal level, green certificates (GCs) are granted to the producers of green energy. The transmission system operator, Elia, is required to purchase GCs at a guaranteed minimum price of EUR 65. However, the market price of GCs in Brussels is higher than the guaranteed minimum price – around EUR 82 and up to EUR 110 in 2017. This is because of the increase of the surrendering level of the GC imposed on energy suppliers (8.2% in 2016). To reduce this increase, the government reduced the surrendering level for 2017 to 7.8% and is considering opening the market to GCs issued in the other regions.

3. Forthcoming developments/opportunities in the renewables sector

At the end of 2016, the Brussels Environment Minister launched a master plan for 2020 in accordance with the European 20-20-20 targets, including around 43 measures to be implemented. One of these measures aims to operate photovoltaic (PV) panels on public buildings and to increase electricity production from renewable sources up to 2,500MWh/year. Other measures include: developing an energy management system (demand side management) for SMEs and the non-market sector, with a goal of 3,800MWh/year; and a funding mechanism with a budget around EUR 9m to support individual green production (PV panels) and energy efficiency-oriented building renovations.

Walloon region

1. Brief overview of the renewables sector

In Wallonia around 10% of the consumed electricity is produced from RES, mostly from onshore wind turbines and biomass, with solar PV as the third biggest source. The goal for 2020 is to reach at least 13% of electricity consumption from green energy sources.

2. Recent developments in the renewables sector

A green certificates (GC) market is in place in the Walloon region to encourage the production of electricity from renewable sources. There is a surplus of GCs in the Walloon market due, among other things, to the high allowance of GC for individual PVs and the fast development of onshore wind turbine parks. In order to soothe the system, the Walloon government decided to charge the transmission system operator to set aside GCs via a new company, Solar Chest. The final goal is to release these GCs later, when the GC market is able to absorb them. In addition, the support of each sector is based on actual costs in order to avoid excessive profits and to redress the imbalance between supply and demand as soon as possible.

3. Forthcoming developments/opportunities in the renewables sector

Several onshore wind turbine projects are being developed in the Walloon region.

The development of onshore wind parks is the priority, with an objective of 50 new wind turbines per year by 2020.

Bosnia and Herzegovina

Author: Indir Osmić and Zlatko Mašović (August 2020)

1. Brief overview of the renewables sector

Thanks to its geographical position in Europe, Bosnia and Herzegovina (BiH) has enormous hydropower electricity potential and is well placed to generate renewable energy from wind power plants, biomass and solar energy. BiH's potential for the production of electricity from renewable sources mostly lies in water and wind – hydroelectric power plants and wind power plants are therefore the main focus of the government's energy strategies and most of the state incentives and subsidies are directed to them. For this reason, BiH has a high proportion of renewable resources in its total energy consumption compared with other European countries.

BiH's complex constitutional structure requires energy legislation to be adopted at both the state and entity level. Therefore, the State Regulatory Commission for Electricity (*Državna regulatorna komisija za električnu energiju*) (DERK) has jurisdiction over the transfer of electricity, operations of the transfer system and international trade of electricity, as well as the production, distribution and supply of electricity to consumers in the Brčko district. Since 2005, the Independent Systems Operator in BiH (*Nezavisni operator sistema u BiH*) (NOSBiH) has been managing the country's electricity transfer system and is responsible for ensuring continuity of the electricity supply according to defined quality standards. Another organisation – the Company for the Transfer of Electric Power in BiH (*Elektroprenos – Elektroprijenos BiH a.d. Banja Luka*) (Elektroprijenos BiH) – is a body competent for the transfer of electricity and the related activities of electricity companies in BiH, including matters relating to the electric power grid.

At the entity level, in the Federation of BiH (F BiH), the Regulatory Commission for Energy in F BiH (*Regulatorna komsija za energiju u FBiH*) (FERK) is responsible for the supervision and regulation of the production, distribution and supply of electricity and for relations between the buyers of electricity in the electricity market. Its responsibilities also cover renewable energy sources through its supervision of the Operator for Renewable Energy Sources and Efficient Cogeneration (*Operator za obnovljive izvore energije i efikasnu kogeneraciju*) (OIEIEK), which was established in 2013 to create the institutional structure for production incentive systems and the redemption of electricity from plants using renewable energy sources and efficient cogeneration. In Republika Srpska (RS), the Regulatory Commission for Energy of RS (*Regulatorna komisija za energetiku RS*) (RERS) is responsible for the supervision and

regulation of the production, distribution and supply of electricity and for relations between the buyers of electricity in the electricity market, and for renewable energy sources. RS is in the process of establishing an operator of the incentive system for the electricity renewables sector – in the interim, Elektroprivreda RS is performing this role.

BiH has adopted several important strategic documents referring to renewable energy sources. These include the *Action plan for using the renewable energy sources of BiH for the period until 2020* (NREAP BiH), adopted by the BiH's Council of Ministers in 2016. NREAP BiH is based on the responsible entities' action plans for the use of renewable energy sources. These action plans are in line with the entities' law on renewables and efficient cogeneration, and with the *Energy framework strategy of BiH until 2035 (OES BiH)*, adopted by BiH's Council of Ministers in 2018.

According to the entities' action plans, indicative targets for producing energy from renewable energy sources in existing and new generation capacities in 2020 are:

F BiH

- hydro energy: 1,566MW and 4,066GWh
- solar: 12MW and 18GWh
- wind energy: 230MW and 575GWh
- biomass: 10.23MW and 61GWh

RS

- hydro energy: 1,134.22MW and 3,632.08GWh
- solar: 4.20MW and 5GWh
- wind energy: 100MW and 200GWh
- biomass: 25.50MW and 56.38GWh.

In line with EU Directive 2009/28/EC, BiH has an obligation to reach its target of a 40% share of renewable sources in total final energy consumption by 2020 for the entire territory of Bosnia and Herzegovina. Each of the entities in BiH and the Brčko district has its own target to reach in order to fulfil the state's target. The 2020 sector targets required to achieve the overall 40% state goal are: electricity – 56.9%; heating and cooling – 52.4%; and transport – 10%.

These sectors are therefore the main areas for reaching the target of renewable sources in gross final consumption, and it is predicted that the required increases in renewables will need to be 9.1% in heating and cooling, 6.6% in electricity, and 10% in transport. Current predictions for reaching the target identify heating and cooling as having the biggest gross consumption of renewable energy, followed by electricity and then transport.

Today, almost all the country's renewable electricity comes from hydroelectric power plants and there is a reasonable expectation of increased electricity generation from wind power plants. Incentives for renewables are offered for hydroelectric power plants (up to 10MW), wind power plants, solar energy plants and biomass plants. By 2035, it is expected that the incentive system will result in the share of electricity produced by wind power plants overtaking that of small hydroelectric power plants.

The F BiH's renewable energy incentives use a feed-in tariff model, under which the producer must obtain the status of privileged producer of electricity and meet other prescribed requirements. All the technologies in the system are based on a feed-in tariff. In contrast, RS has various models of feed-in tariff, premiums and net metering which require producers to fulfil prescribed conditions in accordance with the respective laws: the feed-in tariff is used for technologies up to 1MW or up to 10MW, depending on the technology; premiums apply for technologies over 10MW or over 30MW (also depending on the technology); and net metering is used for small producers, up to 50kW.

2. Recent developments in the renewables sector

BiH continues to develop the renewable energy sources sector and is working towards global guidelines and goals. In the past few years, BiH has started to adopt renewables legislation, especially for wind power plants, as the country has significant potential for this source of renewable energy, as well as hydroelectric power plants. The country's renewables legislation regulates the subsidies for using renewable energy sources and for building renewable energy plants according to the available quotas. By 2020, hydroelectric and wind power plants with a total capacity of 345MW resulting in total production of 1,197GWh of electricity will be included in the system of incentives. BiH is also starting to recognise opportunities and create a favourable investment climate to realise the unused potential of renewable energy sources.

To further these efforts, the Council of Ministers of BiH adopted the following strategic documents:

- *National emission reduction plan of BiH*, adopted in 2015 *(Nacionalni plan smanjenja emisija za BiH)*
- *Action plan for using renewable energy in BiH,* adopted in 2016 *Akcioni plan za korištenje obnovljive energije u BiH*)
- *Action plan for energy efficiency in BiH for period 2016–2018*, adopted in 2017 (*Akcioni plan za energetsku efikasnost u BiH za period 2016–2018*)
- *Energy framework strategy of BiH until 2035*, adopted in 2018 (*Okvirna energetska strategija BiH do 2035. godine*)

The action plans prescribe the measures for increasing the use of renewable energy sources in order to achieve renewable energy consumption targets. These measures include:

- continuous development and improvement of action plans at the state and entities' level;
- promotion of possibilities locally, regionally and worldwide;
- reporting on the promotion and use of renewables to relevant bodies;
- changes in the activities of BiH's energy sector.

One of the recent positive examples of the usage of renewable energy sources is the wind power plant at Mesihovina, the first wind power plant constructed in BiH with 22 wind turbines, installed power of 50.6MW producing an annual output of approx. 165.17GWh. Additionally, currently under intense construction, the wind power plant at Podveležje will have 15 wind turbines with an installed power of 48MW that will produce an annual output of approximately 130GWh and it is expected to be operational by the first quarter of 2021. Another potential wind power plant project, on Hrgud mountain, has planned power of 48MW and average annual production of 126GWh from 16 wind turbines. The feasibility study review phase for this project, following a one-year wind potential assessment, has been completed.

Regarding solar power plants, the solar power plant at Trebinje is scheduled to be constructed with an installed power of 73MW and an estimated annual production of 101.5GWh, after obtaining the necessary permits and approvals.

3. Forthcoming developments/opportunities in the renewables sector

In May 2020, the Government of F BiH accepted the recommendations and conclusions set out in the Declaration on the Protection of the Western Balkans' Rivers, as proposed by the Federal Ministry of Environment and Tourism.

In relation to this, the House of Representatives of the Parliament of F BiH in mid-2020 adopted the conclusion of a complete ban on the construction of small hydropower plants in the entire territory of F BiH (Conclusion). The Government of F BiH, within the next three months, is committed to analysing the existing laws relating to the construction of small hydropower plants and to refer to parliamentary procedure the amendments to the laws by which the rivers and environment will be protected. Under the same Conclusion, it is required that all previously issued approvals for small hydropower plants that have been constructed and those that are under construction, are revised and to provide the information on that matter to the Parliament of F BiH.

In RS, as of mid-2020, the relevant bodies have not adopted any decisions in relation to the ban on construction of small hydropower plants, although the initiatives do exist.

As renewables are expected to increase, it will therefore be necessary to implement future legislative changes aimed at improving and developing the technical infrastructure. While wind power is recognised as having great potential, solar energy is still not considered as such in BiH. In that regard, the south of the country has a major opportunity to produce energy from solar power – one of the globally increasing sources of renewable energy and there are several ongoing projects in this sector. The possibilities for the use of solar energy are unlimited but, as the construction of solar plants requires substantial investment, BiH's relevant legislation needs to be amended to simplify and expedite the procedure with the aim of ensuring that solar plant projects are practical and cost effective.

Therefore, ongoing improvement and development of the renewable energy sector will be made in accordance with the strategic priorities and guidelines at both state and entities' level as well as Directive 2009/28/EC.

This will include the adoption of new action plans from 2020, better promotion of the use of renewables and further development of a favourable investment climate.

Brazil

Author: Ted Rhodes (July 2020)

1. Brief overview of the renewables sector

Brazil has a well-established renewable energy sector. Hydropower is particularly strong, accounting for more than 64% of Brazil's installed capacity. Energy generated from biomass (primarily through the burning of sugar cane waste) accounts for a further 8% of capacity, and over 9% is generated by wind. Perhaps surprisingly, only a relatively small percentage of installed capacity (around 1.5%) comes from solar generation, but this is growing rapidly, and there are around 3,870 operational solar photovoltaic plants in Brazil. Overall, around 83% of Brazil's installed capacity for electrical energy comes from renewable sources, and 75% of the 7,246MW of new capacity added in 2019 came from renewable energy.

Before the COVID-19 crisis, energy demand was forecast to grow by 4.2% in 2020, but the crisis has thrown that trend into reverse, and demand is now expected to decrease substantially. New renewable generation projects, and particularly solar, have also been adversely affected by the steep devaluation of the Brazilian real. That has increased the cost relative cost of imported equipment, which is normally priced in US dollars, while generation revenues are in local currency. However, these impacts are likely to be short-lived, with long-term electricity demand expected to maintain its growth trajectory.

In recent years, several periods of drought have compromised Brazil's hydropower generation capability. This has led the government to take steps to diversify the energy matrix. In this context, the Brazilian government has identified the importance of renewables in the country's capacity expansion. With above-average wind quality and geographical areas that experience up to to 6kWh/m^2 of solar radiation, Brazil demonstrates huge untapped potential for further development of wind and solar energy generation.

2. Recent developments in the renewables sector

The past few years have seen elevated levels of M&A activity and new investment into the Brazilian renewables sector, including from private equity and infrastructure funds. This demonstrates continued confidence in the growth potential of the sector, despite recent political and economic difficulties. For example, Canadian multinational, Brookfield Renewable, which has a long track record in Brazilian wind and hydro power, made its first acquisitions in the solar sector in 2020. Brookfield acquired the largest photovoltaic project in Latin America, of 1.2GW in Minas Gerais state, and announced its intention to invest up to BRL 4.5bn in Brazilian solar projects by 2023.

The wind sector in Brazil (concentrated in the north-eastern states of Rio Grande do Norte, Ceará and Bahia) continues to grow strongly and is attracting healthy levels of investment. The average capacity factor of Brazilian wind farms is 50%, around double the global average.

In 2019, the Global Wind Energy Council announced that Brazil had the fifth-largest installed capacity for wind power in the world (and the largest in Latin America) after increasing capacity by 1.9GW in the year 2018. Over 600 wind farms provide an estimated installed capacity of 15GW, and the government aims to expand wind energy capacity to nearly 27GW by 2027.

The development of renewable energy sources has also been aided by improvements to the country's energy transmission system and reforms to the process of gaining access to the grid ahead of project development.

3. Forthcoming developments / opportunities in the renewables sector

The Ministry of Mines and Energy (MME), in conjunction with the Energy Research Office, has developed the "Ten Year Energy Expansion Plan to 2029" (PDE). The PDE forecast an increase in the installed electricity generation capacity of 75.5GW during that ten year period, with the majority of that increase to come from wind, solar and distributed generation. Hydropower is expected to decline as a percentage of electricity generation, from around 71% in 2020 to around 61% in 2021, but that will be offset by an increase in other renewables from 19% to 29% over the same period. Although significant new gas-fired power projects are planned, these are mainly to be used as back-up for the increased use of intermittent renewables, so the contribution of non-renewable sources is expected to remain relatively stable, at around 10%.

The latest A-4 energy auction was held in June 2019, for generation projects to commence operation on 1 January 2023. A total of 401.6MW of renewable energy generation capacity was contracted, over half of which (211MW) was for solar, which set a new world record low price of BRL 67.48/MWh. However, due to the COVID-19 crisis and temporary demand reduction, the MME has indefinitely postponed further power auctions, which had been scheduled for 2020.

Solar power remains an under-developed source of renewable energy in Brazil, despite Brazil having an average solar radiation far exceeding that of many of the leading countries that generate solar power. However, the Brazilian Association for Photovoltaic Solar Energy (Absolar) has said that installed solar energy capacity continued to expand during the COVID-19 pandemic; increasing by 30% in the first half of 2020, to a total of almost 6GW. This is expected to be one of the fastest growing sources of generation capacity over the coming years.

4. Incentives and financing

Renewables projects may qualify the Special Incentive Regime for the Development of Infrastructure (REIDI), which suspends the application of certain taxes (PIS and COFINS) on goods and services employed in the development of those projects. Many components used in solar generation projects also benefit from a zero rate of importation tax (II).

Discounts on the transmission system usage rate (TUST) and distribution system usage rate (TUSD) of 50% are also available for solar, wind and biomass generation projects whose capacity is 300MW or lower. However, the federal government is currently considering cancelling these discounts.

On the other hand, certain states, including Rio de Janeiro and Minas Gerais, have granted exemptions from state ICMS tax for distributed generation projects of up to 5MW.

The Brazilian development bank, BNDES, offers financing for renewable energy projects that achieve minimum levels of local content, and used to provide the majority of financing for these renewable generation projects in Brazil. However, over recent years, BNDES interest rates, which were previously heavily subsidised, have been converging with normal commercial lending rates, and the maximum levels of BNDES loans have been reduced, so the advantages of this source of funding have been reduced. Instead, we have seen a growth in the use of tax-incentivised infrastructure bonds.



Bulgaria

Authors: Kostadin Sirleshtov, Dimitar Zwiatkow and Borislava Piperkova (November 2020)

1. Brief overview of renewables sector

In 2002, Bulgaria ratified the Kyoto Protocol to the United Nations Framework Convention on Climate Change, which imposed certain targets on Bulgaria to reduce greenhouse gas emissions by decreasing reliance on conventional energy sources and encouraging renewable energy production.

In 2003, Bulgaria adopted the Energy Act (EA) seeking to develop its renewable energy sector. This act established general conditions for efficient use and generation of energy from renewable sources, but contained no concrete investment incentives.

Bulgaria joined the European Union on 1 January 2007 and, as part of the accession process, accepted mandatory obligations for the development of renewable energy production. Bulgaria undertook the obligation to achieve an 11% share of electricity from renewable energy sources (RES) in national gross consumption of electricity by 2010.

Accordingly, in 2007, Bulgaria adopted the Renewable and Alternative Energy Sources and Biofuels Act to establish a system for producing electricity from RES and to create a favourable investment climate. Under this law, electricity from RES was supported primarily through a feed-in tariff (FiT) scheme. Eligible producers of electricity from RES were entitled to enter into long-term power purchase agreements (PPAs) with the Public Supplier, the State-owned National Electricity Company, EAD or directly with end-suppliers. The suppliers were required by law to purchase all RES-generated electricity, other than that sold on the free market and that which was used for the plants' own consumption.

The FiTs were subject to annual review by the Bulgarian Energy and Water Regulatory Commission (EWRC or the Regulator). The law provided a formula by which the Regulator calculated the applicable FiT rate, creating a certain amount of transparency in the system, where FiTs could not decrease by more than 5% per year.

Thus, as of 2008, RES investors in Bulgaria were guaranteed long-term PPAs for the purchase of all the electricity they produced at preferential prices that would not decrease by more than 5% per year.

In 2009, the European Parliament and Council issued Directive 2009/28/EC, which provided that 22.1%

of overall energy consumption within the EU should be produced from RES. Bulgaria's target was to achieve 16% of its total energy consumption from RES by 2020. The FiT program that Bulgaria developed under the 2007 legislation did not attract enough investment in the renewable energy sector for Bulgaria to meet its new EU obligations. Therefore, at the beginning of 2011, the government approved a draft Energy from Renewable Sources Act (ERSA) to create a more favourable investment climate and to achieve the new EU targets. On 3 May 2011 ERSA entered into force and promoted an attractive and stable FiT support program for renewable energy projects. ERSA confirmed that once a particular FiT applied to an eligible plant, that plant was entitled to the specified tariff for the full duration of its PPA (20 years for solar, geothermal and biomass, 15 years for hydro up to 1MW and 12 years for wind). ERSA also specifically provided that suppliers were required to purchase all electricity produced from RES at the fixed FiT, other than the electricity that producers elected to sell on the free market and that used for the plants' own consumption.

Thus, the 2011 incentive program resulted in substantial investment and enabled Bulgaria to be ahead of schedule to meet its EU targets by 2013. Furthermore, Bulgaria was ranked second among the top ten emerging markets for renewable energy.

When Bulgaria realised in July 2012 that it would reach its target ahead of schedule and that the incentives programme would continue to attract more investment in the renewables sector, it decided – along with many other European countries – to take measures to withhold further investment, especially in solar and wind. This led to the gradual decrease of the FiTs until their final revocation for RES projects to be developed after 27 December 2013, which in practice put an end to RES investments in Bulgaria for the coming years.

Between 2016 and 2018, the Bulgarian government adopted certain changes to encourage small roof-top power plants and power plants with installed capacity up to 4MW by limiting the FiT application only to these small producers.

In mid-2018, the government changed the legislation in order to arrange for producers with total installed capacity of 4MW and above 4MW to enter into feed-in premium agreements and terminate the long-term PPAs. Such premiums are arranged to be paid by the newly established Bulgarian Energy Security Systems Fund (ESSF).

Currently, only producers with installed capacity up to 1MW can be subject to FiT and this threshold is likely to decrease to 0.5MW.

2. Recent developments in the renewables sector

In the summer of 2012, Bulgaria began to implement several measures that negatively altered the incentives scheme promised to RES projects under the regulatory framework described above. Changes to the scheme were made almost every year between 2012–2015, negatively affecting the stability of the legal framework and the confidence of investors in the Bulgarian energy market.

Some of the most important changes include:

- In September 2012 the Regulator adopted a decision, which introduced a retroactive temporary grid access fee for all RES, where for some projects the fee reached 39% of their FiT;
- On 1 January 2014 Bulgaria introduced a fee on the revenues of PV and wind farms at the rate of 20% of their FiT (without VAT). This fee was pronounced unconstitutional by the Constitutional Court in July 2014. However, the producers were still unable to recover part of the fees paid after it was declared unconstitutional. The end of July 2019 was the deadline for claiming reimbursement of the 20% fee withheld for the period July-August 2014.
- Bulgaria also reduced the amount of energy that could be purchased at preferential FiT prices to the quantity of electricity produced on average by the same category of plants minus the producer's own electricity consumption (e.g. 1,188MWh per annum for most PV plants). Thus, electricity produced in excess of that threshold could only be sold on the free market.
- In July 2015, Bulgaria further reduced the investors' FiT payment rights by requiring RES producers to pay a monthly fee to the ESSF amounting to 5% of their revenue, with VAT excluded;

The above measures led to numerous court proceedings from RES producers against the competent authorities in Bulgaria, the majority of which ended with a positive outcome for the producers. Certain big investors have already started international arbitration proceedings against Bulgaria.

Since June 2014, the operation of a balancing market has been introduced, and RES producers are required to become part of a balancing group and pay monthly settlements to the coordinator of their balancing group. Since 2015, the situation with existing RES has gradually become more stable and, as a result, there has been an increase in M&A activity in the market.

In May 2018, the Bulgarian government announced that producers with total installed capacity of 4MW and above would enter into feed-in premium agreements with the ESSF. The ESSF will pay the producers up to the net specific production for the respective power plant. Once the agreements had come into force (1 January 2019), long-term PPAs would be terminated. It was agreed that the ESSF would compensate the difference between the FiT and the estimated market price as determined by the Regulator and depending on the energy source. Furthermore, since July 2019, these rules have applied to producers with total installed capacity of 1MW and above. The agreements were scheduled to be concluded by October 2019. Following this change, around 370 power plants would sell electricity on the free market. By the middle of 2021, it is expected that all RES producers with installed capacity of 0.5–1MW will sign feed-in premium agreements.

Since mid-2018, every producer that receives any premium under the feed-in premium agreements shall pay the ESSF a monthly fee of 5% of income resulting from the sale of electricity from RES.

Since mid-2019, any deals with producers with a total installed capacity of 1MW and above shall be conducted via the organised fund market at a freely negotiated price. However, such an option will not be available to power plants that come into operation after 1 January 2019.

3. Forthcoming developments/opportunities in the renewables sector

The Bulgarian Energy Strategy (2020–2030) (the Energy Strategy) is a key political document with legal and regulatory importance, scheduled to be adopted by the government and the Bulgarian Parliament by the end of this year. A draft is already being circulated for approval by local authorities. It sets the main priorities for the development of the energy sector until 2030. The Energy Strategy is focusing on some future trends such as the development of the electric car market, as well as systems for energy storage. The use of eco-cars, including those charged with electric energy produced from renewable energy sources is one more step towards the Bulgarian "green" cities of the future and the infrastructure necessary for them. It is therefore expected that the legislation will see the introduction of some obligations for the electricity distribution companies to develop stations for electric cars, as well as further energy storage capabilities for both producers and electricity distributors. Along with that, the efforts of Bulgaria in the years ahead will also be focused on the 'Smart Grid' systems.

Now the opportunities related to RES projects are mainly connected to refinancing of RES projects with view to the decreased interest rates and also related to the increase in M&A activity in the sector. In 2017, CMS advised on the largest renewable energy refinancing in Bulgaria. Currently, CMS is advising on the sale of the biggest photovoltaic project in Bulgaria.

There is also a trend of developments in the free market, but the market is still picking up. There are certain incentives for new RES projects to be developed on the free market in Bulgaria and we expect that there will be a substantial growth of the installed capacities in the coming years. CMS Sofia is currently advising several greenfield PV and wind projects and was instrumental in putting in operation of the first subsidy-free RES project on the Bulgarian market in 2019.

The Bulgarian integrated plan on energy and climate for 2021–2030 (the Integrated Plan) provides for the development of the RES sector to 27% of the gross end consumption and therefore the Bulgarian Government is expecting that PV installed capacity in Bulgaria will triple by 2030.

Several amendments and supplements of the EA are intended in order to put smaller PV projects (between 0.5 and 1MW) on the free market – approximately 94MW in total. They shall enter into the feed-in premium agreements with ESSF by mid-2021. The amendments aim to put cold reserve on auction principle and to further ease the liberalisation of the energy market. As an incentive for new RES producers, it is intended for the abolition of the obligation to pay a 5% contribution on the revenues of electricity producers from renewable energy sources from January 1,2021 onwards. The aim is to stimulate the production of green energy by regulating measures to promote production of electricity from renewables.

Chile

Authors: Luis Felipe Arze and Aldo Poblete (September 2019)

1. Brief overview of the renewables sector

Chile's unique geographical conditions are increasingly more favourable to the development of energy projects based on non-conventional renewable energies (NCRE) – including biomass, hydropower, geothermal, wind and solar.

The progress of NCRE has been faster than predicted. Lower cost and construction times for these projects, along with their contribution to the reduction of global emissions in the electricity sector, show that NCREs have great growth potential in Chile's electricity matrix.

During the last ten years, Chile turned from coal plants to cleaner energies. During 2018, renewable energies accounted for an average of 18.2% of the energy matrix (with a peak of 20.7%). And while the goal is to reach 20% in 2025, that goal could be met sooner.

In 2019, Chile was ranked as the most attractive country for clean energy investment, according to the "Climatescope 2018" report by Bloomberg New Energy Finance. The study covered 103 developing nations and Chile was the top scorer. The annual survey analyses variables such as opportunities, fundamentals and experience.

Chile has achieved this leadership position for several reasons, including: a very good business environment; government policies that have made it possible to improve the entry of new NCRE players to the market, making it more competitive; and a commitment to de-carbonization of the matrix.

2. Recent developments in the renewables sector

In 2019, the Chilean government unveiled a key milestone in the energy sector: a plan for the gradual withdrawal of more than 5,300MW in installed coal capacity in Chile, which will be replaced mostly with NCRE. It is an ambitious plan that, in addition to the challenge it implies for all players, will require significant investment in both generation and transmission.

The government has said that by 2040 – when all coal-fired plants must be closed according to the plan – the investment will amount to between USD 13bn and USD 25bn in new generation capacity alone. The difference is explained by the forecasting of demand: in a scenario of greater growth, the investment will be at the top of the range and vice versa. But, if the investment that will be required in transmission is added, the costs could increase by between 10% and 20%. This means the total investment would vary between USD 15bn and USD 30bn.

The development of NCRE in the country has faced several problems due to a lack of transmission capacity. However, in June of this year, and thanks to an investment of more than USD 1bn, the "Cardones-Polpaico" electrical transmission line was introduced. This line improves the country's energy security, advances the decarbonisation of the matrix, and completes the interconnection of the National Electrical Power Grid, thereby enabling the large-scale entry of renewable energies into the energy matrix.

Specifically, this line would allow about 1,300MW of NCRE to be transferred from north to south. In addition, the line will feed the demand of around 5.7m homes with green energy. Every hour of solar energy prevents nearly 1,430trn of CO_2 from being emitted. The line also avoids the problem of the decoupling of marginal costs due to transmission restrictions.

3. Forthcoming developments/opportunities in the renewables sector

Decrease in NCRE costs

According to the International Renewable Energy Agency, the total costs (entire useful life) of photovoltaic solar energy projects have fallen by around 73% since 2010. Total installed costs of solar power concentration projects have dropped 33% in the same period. The installation costs of wind projects on land have reduced by 22%.

Potential in NCRE

Chile has enormous potential for the development of renewable energy, which is estimated at 1.865mMW for solar, wind and hydropower. The Atacama Desert has one of the best levels of solar radiation in the world.

Energy policy

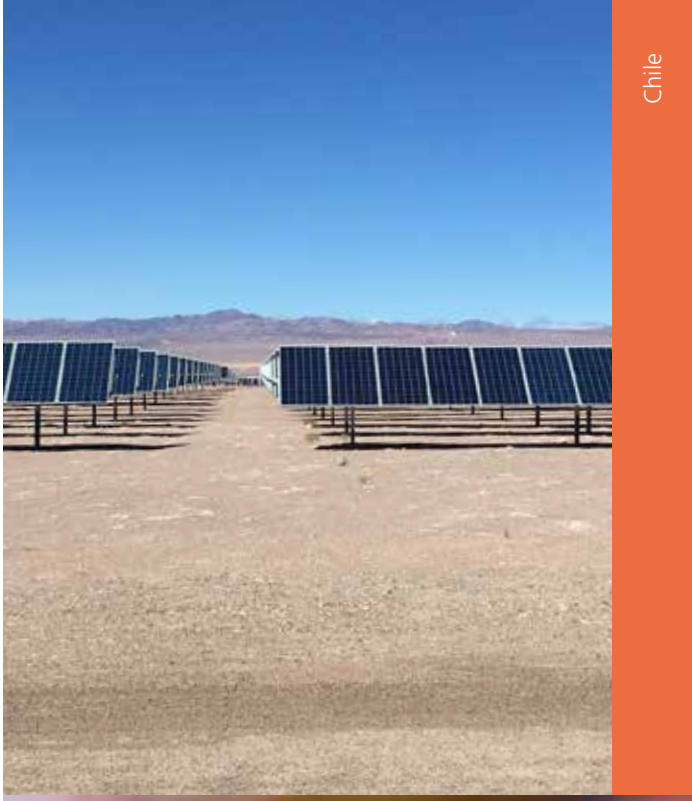
The Chilean government developed a determined short-, medium- and long-term public policy in the 2050 Energy Agenda. It includes goals, a new role for the government, carbon taxes and an extensive legislative agenda, and brought certainty to investments in the sector.

Tenders

Chile's auction system for time blocks has been praised and imitated in other countries. There are two time blocks: hourly and quarterly. Although auctions have been defined as technologically neutral, they were established in a way that gives advantages to technologies such as solar in the daytime blocks, and hydro and wind in the seasonal (quarterly) blocks. This format allows intermittent technologies to maximise their potential without having to incorporate the still expensive energy storage technologies.

Increased mining activity

The Chilean government has given assurances that, in 2019, mining activity would register an increase with the completion of large investment projects.



The portfolio of mining projects in the country is at its highest level in three years. According to the Chilean Copper Commission's Investment Cadastre of Chilean Mining for 2018–2027, current activity involves 44 initiatives with a total value of more than USD 65bn.

In addition, the cadastre of projects to be developed in Chile will reach USD 63bn for the five-year period between 2018–2022. That is USD 4bn more than in the previous report in which mining involves the greatest amount of resources for the period, reaching USD 18.66bn, equivalent to 30% of the total projects.

In terms of estimated employment, the mining sector continues to lead the way, with a peak requirement of 27,000 workers for October 2019.

Lithium

The lithium industry has been gaining strength in the country. Chile is the second-largest lithium producer in the world, with an annual output of 14,100trn. According to Reuters data, Chilean exports of lithium carbonate reached USD 949m in 2018 and forecasts predict that global demand for lithium will quadruple by 2025. The portfolio of initiatives exceeds USD 1.8bn.

In 2019, the Chilean government signed an agreement with the leading lithium mining company, Albermarle Corp, to give the manufacturers access to cheaper lithium and attract the industry to manufacture their batteries for electric cars in Chile. Chile expects manufacturers to start installing lithium processing plants by the end of the year and, as a result, to become a centre for manufacturing rechargeable batteries for electric vehicles.

Reform of the Environmental Impact Assessment System

This year, a new government bill to reform the Environmental Impact Assessment System (SEIA) entered the Chamber of Deputies, the lower house of Chile's bicameral Congress. The purpose of this initiative is to speed up the granting of permits and give greater legal certainty to companies.

Creation of the Sustainable Project Management Office

Under the Ministry of Economy, the Sustainable Project Management Office formally functions as the Secretary General of the Advisory Board on Sustainable Projects, created on 14 May 2018. The board is composed of the undersecretaries of the economy, defence, public works, health, agriculture, mining, national assets, energy, environment and culture portfolios.

The Sustainable Project Management Office carries out the following activities:

- **Support for investors** – the office acts as the first point of contact between project owners and the state and coordinates project evaluation with the various responsible state agencies. It provides support for the owners of investment projects during the entire process, coordinating between them and the offices of evaluation.
- **Project monitoring** – the office has an updated list of investment projects that are engaged in the environmental or industry-wide authorisation process, which allows it to monitor them transparently, both for the general public and for those involved in the public and private sector.
- **Proposals and recommendations** – the office proposes regulatory or management process modifications, to increase the efficiency of the process and maintain the environmental requirements and good relationships between the projects and the communities.

4. Favourable climate for investors

Macroeconomic stability, growth prospects and low levels of risk are among the most promising factors of the Chilean economy.

Chile was the first South American economy to become a member of the OECD, is leading Latin America in competitiveness and has a solid basis for economic dynamism, with sustained policies that have allowed it to have the best GDP per capita in South America. It is a nation with a dynamic business environment, and keeps maintaining its leadership position in Latin America.

Chile has signed a significant amount of Free Trade Agreements with various nations. Chile's free trade agreements allow access to 86.3% of global GDP under privileged tariff conditions, reaching 4.3bn potential consumers. Chile also has agreements with 32 economies to avoid double taxation.

In addition, Chile produces 28% of the world's copper and has 54% of the world's lithium reserves. It has become the ideal environment for clean energy, placing itself at the forefront in the fight against climate change in the region. The country leads Latin America in the Global Connectivity Index – GCI 2018 (Huawei).

China

Author: Vera Zhang (September 2020)

1. Brief overview of the renewables sector

Energy production is key to China's economic development. Coal and oil-based energy consumption has raised serious energy security and environmental concerns. In recent years, China has actively promoted the optimisation of energy structures. With medium and long-term goals and policies in place, the renewable energy industry has developed rapidly and China has become the world's largest renewable energy market, cutting its coal dependence.

China has progressed substantially in the development of renewables in recent years. Further to the introduction to the Renewable Energy Law in 2005 and the revision of the same in 2009, China has published a series of supporting policies to establish a standardisation committee in the hydropower, wind power and photovoltaic ("PV") fields. The ability to certify, construct and explore has been continually strengthened to support the large-scale development of renewable energy industries such as hydropower. In April 2020, China's National Energy Administration ("NEA") released the draft Energy Law ("Draft Energy Law") to solicit public comments and this clearly stipulates that renewable energy development will be prioritised.

China is a leader in renewables production and aims to increase renewables share in its total energy production and consumption. China's renewables mainly come from hydropower, wind and solar energy. China is one of the world's largest producers of wind and solar energy. Since 2013, China's solar energy industry has become the largest solar power market in the world. According to an article published by the International Energy Agency, China is expected to contribute 40% and 36% of the world's growth in wind and solar energy respectively, in the next five years.

China is promoting renewable energy and is at an early stage of transition from fossil energy to renewable energy. The 14th Five-Year Plan, which lays out the blueprint for economic and development aims for the period 2020–2025, has launched the idea of an energy revolution with the aim of developing a clean, low-carbon, safe and efficient energy system by 2050.

China encourages foreign investment into the renewables sector. The NDRC and the Ministry of Commerce have jointly released an updated Catalogue of Industries for Encouraged Foreign Investment ("Catalogue") for public comments. The Catalogue lists renewable energy,

among others, as an encouraged industry for foreign investment, allowing foreign investors to establish their wholly-owned enterprises in developing the renewable energy sector in China.

2. Recent developments in the renewables sector

China's investments in renewable energy in 2019 dropped 8% due to a combination of market changes and policy shifts. 2020 has witnessed a downturn of the economy in many sectors and the renewable energy sector has, inevitably, also been impacted by the pandemic.

COVID-19 has lowered electricity demand. Wind capacity has been hit hardest with a drop of 30.47%. Despite this, policies implemented so far in 2020 have demonstrated the Chinese government's determination to develop renewable energy. The Draft Energy Law is one of the most important measures and it has codified certain renewable energy policies that will promote the development of this sector. The Draft Energy Law has raised the development of renewable energy to a strategic position, which means its development shall be prioritised, whilst the development of fossil energy shall be with a reasonable pace. This has raised the development of renewable energy to a new strategic and structural level as a national law. The Draft Energy Law has also set up a system for mandatory obligation to consume renewable energy, which is a substantial change and expands the consumption obligation from grid companies to a wider number of participants including supply, sale and consumers.

In 2019, China added 25.74m kW of new wind power installations, and the national average curtailment rate was 4%, down 3 percentage points year on year. The installed capacity of photovoltaic power generation was increased by 30.11m kW, and the national average abandonment rate was 2%, down 1 percentage point year on year. By the end of 2019, the cumulative grid-connected installed capacity of wind power and photovoltaic power reached 210m kW and 204m kW respectively. In 2019, China's wind power and photovoltaic power generation develop steadily and orderly on the whole. Among them, the growth rate of wind power has increased year-on-year, while the growth rate of photovoltaic power generation has slowed down. The technology of wind power and photovoltaic industry has made continuous progress, and the phenomenon of power abandoning has been effectively controlled.

China is a market leader in renewable-related technologies, such as electric storage systems. The renewable energy technologies have become increasingly cost-competitive and have seen rapid cost reductions for solar and wind power. In fact, wind and solar power have entered the post-subsidy era and nationwide subsidies are also being phased out. China's strategy to develop renewable energy also includes further development in renewable

technologies. The Opinion on Accelerating the Regulatory and Policy System of Green Production and Consumption released in March 2020 by the NDRC emphasised the promotion of various green industries, technologies, goods, and services, including increasing policy support for distributed energy, smart grids, energy storage technology, and multi-energy synergies alongside flexible consumption to reduce overall costs and increase the reliability of clean energy.

The current energy strategy has been shifted from expanding renewables production capacity to renewables consumption. The draft guidance on Establishing a Sound, Long-term Mechanism for Clean Energy Consumption, issued in May 2019, emphasised renewable energy consumption. China intends to coordinate renewable obligations and green certificates, and to encourage participation of renewables in spot markets and ancillary services markets.

China has been granting government subsidies to renewable energy sector since 2011, but in recent years the government has become stricter in regulating the usage of subsidies. For example, the NEA reduced the total subsidies available for new solar PV plants in 2020 from CNY 2.6bn, as announced in November 2019, to CNY 1.5bn in February 2020.

3. Forthcoming developments/opportunities in the renewables sector

China is at the centre of global energy transformation. Renewable energy plays a vital role in China's plan to solve the challenges of energy security, climate change and severe air and water pollution. China's 14th Five-Year Plan, which lays out the blueprint for the economy and development targets for the period 2021 – 2025, will prioritise the development of renewable energy and focus on pilot projects in innovative areas such as renewable consumption in certain emerging industries.

With the renewable energy technologies becoming more cost-competitive, the subsidies in this sector will be phased out gradually. The emissions trading scheme (ETS) will be refined and renewables will move towards grid parity. In the coming 14th Five-Year Plan period, wind and solar power are set to achieve full power grid parity.

In the United Nations 75th anniversary General Assembly, China announced that it would hit peak emissions before 2030 and reach carbon neutrality by 2060. Though what is meant exactly by carbon neutrality and what actions China will take to get there remain unclear, renewable energy will play an important role.

We expect that the curtailment in renewables will be reduced, leading to an increase in the utilisation of renewables. We also expect that technology innovations such as battery storage and green hydrogen will be seen as renewable solutions.

Colombia

Author: Daniel Rodriguez Bravo (September 2020)

1. Brief overview of the renewables sector

Colombia is rich in renewable energy sources. Some 70% of the country's primary energy supply comes from hydropower. However, despite its plentiful hydropower resources and generation capacity, the energy sector continues to experience many challenges, including security of supply and carbon emissions due to climate change, drought seasons (*Fenómeno del Niño*) and the use of diesel, coal and gas-based generation.

According to various studies, Colombia is endowed with significant potential for:

- hydropower energy – 56,000MW
- solar energy – 4.5kWh/m^2/day throughout the year, across the country
- biomass energy – 5,000–7,000MW
- wind energy – 50,000MW, with 80% in the Caribbean coastal region.
-

The country has moderate geothermal energy reserves – approximately 50–70GW of potential, in two regions. Notwithstanding its strong potential for non-conventional sources of energy generation, there has been a distorted perception of the capacity and reliability of non-hydro renewables compared to hydro, and of the high costs of installing and maintaining these technologies compared to conventional fuel generation.

In general terms, Colombia has a low-level public awareness and knowledge of the benefits of renewable energy and energy efficiency. However, as will be discussed below, recently there has been an increase in the generation of this type of energy thanks to a new regulation that provides incentives for companies to enter this market.

Said measures have proved to be effective since, in 2019, Colombia rose in the Energy Transition Index (ETI)[1] and is now recognised as the second most advanced country in LATAM in the implementation of renewable energy. This shows there have been important advances in this matter during the last couple of years.

[1] The ETI is a is a fact-based ranking made by the World Economic Forum for governments and businesses to plan the measures needed for successful energy transition (from non-renewable to renewable energies). It is carried out annually in 115 countries worldwide and evaluates not only their actual energy system performance, but also their readiness for energy transition.

2. Significant efforts to change the energy mix and promote efficiency

In recent years, the Colombian government has enacted several laws, regulations and commitments intended to significantly increase awareness, development and use of renewable energy in the energy mix and promote the efficient management of energy. The main renewable energy and energy efficiency regulations and incentives include:

- Law 1665 of 2013 – adoption of the International Renewable Energy Agency (IRENA) statute;
- Law 1715 of 2014 – renewable energy law which creates the Fund for Renewable Energy and Efficient Management of Energy;
- Law 1955 of 2019 (National Development Plan 2018–2022) – It contains different provisions in relation to renewable energies:
  - One of the main objectives of this Government is to achieve better quality in the provision of residential public utilities. In order to do so, the Colombian government states it is a priority to promote the generation of non-conventional energy by maintaining and increasing the incentives and benefits for companies that work in this field;
  - It allocates a budget of COP 24,600,000,000 (aprox. USD 6,622,500) for the development of the renewable energies sector;
  - Law 1955 of 2019 modifies Law 1715 of 2014 to increase the benefits of income tax reduction for non-conventional renewable energy generators from five to 15 years;
  - It adds some tariff codes to easily receive custom tariff reductions on the import of solar panels and other items related to renewable energy generation;
- National Energy Generation Plan – guidelines for the generation of all types of energy from 2015 to 2050. It shows short and long-term strategies and objectives in relation to conventional and non-conventional renewable energy in Colombia.
- Generation-Transmission 2016–2030 Reference Expansion Plan – establishes guidelines for energy generation and transmission;
- Indicative Action Plan (PAI) 2017–2022 to develop the Energy Rational and Efficient Use Programme (PROURE) – promotes energy efficiency and other forms of non-conventional energies;
- Decree 829 of 2020 – regulates the grant of tax-related incentives for non-conventional renewable energy generation. It also states that UPME (the Colombian Mining and Energy Planning Agency) will be the only authority in charge of evaluating if these benefits are applicable in each case;
- Resolution 20203040003525 of 2020 (Ministry of Transportation) – introduces some modifications regarding the rules of operation of ports in order to permit private ones to participate in the transportation of freight related to non-renewable energy generation from third parties.

3. Incentives to encourage renewable energy use and development

To raise the competitiveness of renewable energy in the country, the Colombian government has adopted measures and incentives to promote independent power producers (IPPs).

Annual income tax reduction

Individuals and entities subject to income tax that make investments in the research, development, production and consumption of renewable energy are eligible for annual income tax reduction up to 50% of the total investment value for the 15 fiscal years after the investment is made.

VAT exemption

The acquisition of equipment, elements, machinery and services required for the pre-investment and investment in renewable energy production and consumption, as well as the assessment and evaluation of potential resources, are exempt from VAT.

Tariff exemption

Individuals and entities that import equipment, machinery, material and other supplies required and exclusively destined for renewable energy projects are eligible for a fee waiver on import customs.

Accelerated depreciation

Renewable energy-based power producers that invest in equipment, machinery and construction work required for pre-investment, investment and the operation of renewable energy projects after the enactment of Law 1715 of 2014 are eligible for the accelerated depreciation regime incentive at an annual rate of up to 20%.

4. New projects are a reality

Government incentives, together with other benefits, have had a significant impact on the sector in the last few years. As mentioned earlier, Colombia is now the second most advanced country in LATAM in the implementation of renewable energy according to the ETI.

Various new, large-scale projects are going to be executed in the next couple of years after the government made an auction (through the electricity generation reliability mechanism) to award 14 new non-conventional renewable energy projects to private entities. These projects will significantly increase the generation of such types of energy from 1% in 2018 to 12% in 2022.

In addition, since 2016, another 400 initiatives for the generation of non-renewable energy have been approved by UPME. These are contributing to the growth of non-conventional renewable energy in the country.[2]

5. Forthcoming developments/opportunities in the renewables sector

A significant number of new projects and developments (particularly related to solar energy) are expected in the near future. Some of these projects have already been registered at UPME and represent investment opportunities in the renewables sector:

- Proyecto solar La Loma (ENEL)
- Parques eólicos Tumawind y Chemesky (ENEL)
- Celsia Solar Yumbo
- Celsia Solar Bolívar
- Proyecto Sebastosol
- Planta SC Solar San Martín
- CSF Continua San Felipe (Trina Solar, awarded in the aforementioned government auction)
- CSF Continua Cartago (Trina Solar, awarded in the aforementioned government auction)
- Proyecto Parque Solar El Campano (Trina Solar, awarded in the aforementioned government auction)
- Acacia 2 (Celsia, awarded in the aforementioned government auction)
- Camelia (Celsia, awarded in the aforementioned government auction)
- Parque Eólico Casa Eléctica
- Generación de Energía Eólica Alpha
- Generación de Energía Eólica Beta

Two years ago, the Colombian government approved the Generation-Transmission 2016–2030 Reference Expansion Plan which establishes guidelines for energy generation and transmission. The plan estimates that, over the next 15 years, Colombia will incorporate an additional 5,362MW of electrical power into the system, 2,025MW of which will be produced by renewable energies. It is clear that the Government is working and investing to achieve this goal.

As well as these specific projects, the Colombian government has also established a fund to promote, at an aggregate level, investment in non-conventional renewable energy sources, plans, programmes and projects through different financing mechanisms.

This fund is called the FENOGE (Fondo de Energías Renovables y Gestión Eficiente de la Energía). FENOGE was created by article 10 of Law 1715 of 2014 to finance renewable energy and energy efficiency programmes, with the aim of reducing greenhouse gas emissions.

FENOGE is regulated by Colombia's Ministry of Mines and Energy and it is administered and managed by a trust company duly authorised by the Colombian Finance Superintendence, selected by the Ministry of Mines and Energy. CMS Colombia advised the Ministry of Mines and Energy based on an advisory contract with the Global Green Growth Institute

[2] As explained by the Minister of Mines and Energy, in an interview for the newspaper, La República (https://www.larepublica.co/economia/hay-mas-de-420-proyectos-de-energias-renovables-que-ya-tienen-el-aval-de-la-upme-2897686).

Croatia

Authors: Marija Mušec and Mia Kanceljak (July 2020)

1. Brief overview of the renewables sector

Croatia has adopted the new Energy Development Strategy which covers the period up until 2030 with a view to 2050. The document describes two possible scenarios – a conservative development scenario "S2" and the more ambitious scenario "S1". Scenario S2 predicts that renewable energy in the overall gross consumption of energy will increase its share from 21% to 31.5% by 2030 and 46,3% by 2050. If achieved, this outcome would mean that Croatia would exceed its targets set by the EU Directive 2018/2001. S1 predicts the same share of renewable energy in overall gross consumption of energy by 2030, but differs in its predictions for 2050, by when it envisages a renewable share of 56.2%.

Key statistics

In recent years, Croatia has produced more electricity from renewables than from fossil sources. The share of renewables varies depending on hydrological conditions, as most electricity in Croatia is generated from large hydropower plants.

Croatia has already exceeded its target of 20% renewable energy in final energy consumption. The Directive (EU) 2018/2001 proposed increasing the RES share to at least 32% by 2030. Eurostat's data shows that Croatia achieved a 29% RES share in 2015, yet since then the share has steadily decreased, and in 2017 it was 27.25%.

In 2011, 45% of electricity was produced from RES, including large hydropower plants. This share increased to 49.5% in 2012, rose to 65.2% in 2013, and reached 74.2% in 2014. There was a decrease to 68% in 2015, and a further significant decrease to 47% in 2017. In these years, large hydropower plants accounted for between 42% and 67.3% of the total energy generated and between 80% and 90% of the RES total. Other renewable sources – small hydropower plants, wind energy, solar energy, biomass, biogas and photovoltaic systems – rose from 3% to 19.6% of annual RES electricity.

Legislative framework

In January 2016 a new Act on Renewable Energy Sources and Highly Effective Cogeneration came into force. It introduced a new incentive system for RES and highly effective cogeneration in Croatia, featuring a market premium and a guaranteed purchase price for RES facilities up to 500kW.

The incentive system envisaged that an eligible electricity producer would sell electricity on the electricity market and receive a market premium from the electricity market operator (HROTE) for the net electricity delivered from the production plant to the power grid. Eligible producers with production plants of installed power up to and including 500kW would enter into a power purchase agreement with the HROTE for the purchase of electricity with a guaranteed purchase price.

The right to the incentive depends on the outcome of tenders conducted by the HROTE. Since the introduction of the new law in January 2016, the Croatian government adopted secondary legislation regarding the tender procedures and percentage of RES energy that distributors of electric energy are required to buy from the HROTE. In 2020 new quotas were enacted, thus completing the regulatory framework for the new incentive system. These quotas cover the period from 2020–2022.

Solar power plant quotas are set at 625MW of connecting power, while wind turbine quotas are set at 1.05GW (1050MW) of connecting power.

These quotas cover market premium and guaranteed purchase price incentives.

By the end of this year, we expect the Croatian Energy Market Operator (HROTE) to announce Annual Programs for tendering quotas. Alongside these, HROTE will issue public calls for expression of interest for incentives.

One of the causes of stagnation in the development of renewables in Croatia during the period 2016–2019 was a shortage of funds for financing the incentives for electricity produced from RES. In Croatia, the end user's monthly electricity bill includes a fee that is used to fund the promotion of electricity from RES. In August 2017, the Croatian government increased the fee for promotion of renewables from HRK 0.035/kWh to HRK 0.105/kWh (VAT excluded). With the new quotas and the HROTE-managed auctions of guarantees of origin of electric energy, the shortage of funds was rectified. As a result, the Croatian market is currently experiencing a boost in development of RES projects.

The Croatian transmission system operator (HOPS) is currently preparing documentation for the construction of two major substations and an alternative transmission route to the coastal region of Croatia which harbours most of the country's RES potential. This will allow the integration of large-scale RES projects in the country's coastal region.

2. Recent developments in the renewables sector

In 2016 the installed power of all production power plants in Croatia amounted to 5,060MW, with new RES power plants connected to the grid during 2016 contributing to an increase of 228MW from 2015. Consequently, the total produced electricity shows a growing share of electricity produced from RES and high efficiency cogeneration. The security of electricity supply is satisfactory, and electricity consumption in comparison with 2015 recorded a modest increase (1.7%).

Hydropower plants (43.5%) account for the largest proportion of the installed power of power plants in Croatia, followed by thermal power plants (38.8%), wind power plants (9.5%), a nuclear power plant (50% of NE Krško – 6%), biomass power plants (1.2%), and solar power plants (1%).

In recent years, Croatian local authorities and the Environmental Protection and Energy Efficiency Fund have encouraged and co-financed many residential (off-grid) projects for solar energy and biomass boilers to produce heat and/or electricity. There has also been the European Commission-approved co-financing of the Croatian and Slovenian transmission and distribution system operators for the SINCRO.Grid project. A sum of EUR 40.5m – 51% of the total project value – was made available through the Connecting Europe Facility (CEF). The project was signed in mid-2017 between Croatia and Slovenia and will be completed in 2021. The next development phase of the Croatian electric grid will include implementation of electricity meters and computerisation of grid control. HEP (a national energy company) plans to invest HRK 230m in order to install 2.4m advanced electricity meters and establish a central information system for the energy grid.

3. Forthcoming developments/opportunities in the renewables sector

Croatia has great potential to transform to an energy-efficient, sustainable, renewable-based economy. Its small population, relatively low energy demands, ample sun and wind resources, large areas of forest and large existing hydropower plant capacity are all positive factors. However, Croatia is not yet fully exploiting its potential in renewables, especially in solar and wind energy. The geographical location of the Croatian coast has significant advantages for using solar and wind energy sources. To date, however, there have not been any projects for offshore wind power plants.

The Croatian Energy Development Strategy envisaged installation of 100MW in small hydropower plants by 2020. To date, however, only one hydropower plant has been built, with an installed power of 220 kW. As environmental protection is a big factor in planning a hydropower project, most of Croatia's remaining hydropower potential could be challenged by biodiversity impacts. For example, almost all Croatian rivers are planned for inclusion in the EU's Natura 2000 system of protected habitats.

As most large hydropower plants were built decades ago, the HEP will invest almost HRK 3.2bn in revitalising Croatia's largest hydroelectric power plants, increasing their installed power by around 150MW by 2022. HEP is currently investing in the construction of HE Kosinj, the largest hydroelectric power plant project in Croatia in the last 20 years, worth HRK 3.7bn. Currently, the construction of access roads is under way, while the development of the main dam project and the construction of tunnel connecting accumulation with lower level systems (turbines) are in a tender process. HEP plans to invest HRK 3.6bn in order to increase the RES share of production in its portfolio from 35% to 50% by 2030. HEP started construction of two large-scale renewable power plants – the Korlat wind power plant with connecting power of 50MW and, to date, the largest Croatian solar power plant – Cres with connecting power of 6.5MW. These power plants will operate without any incentives. HEP remains the largest investor in electric energy in Croatia, as well as the largest producer and supplier.

Nationwide projects to improve the energy efficiency of buildings are proceeding at a fast pace, with HRK 1.5bn contracted to date, translating into improved energy efficiency of 1,300 public buildings and 17,000 households.

Czech Republic

Authors: Lukas Janicek and Lukas Vymola (July 2020)

1. Brief overview of the renewables sector

Key statistics

Energy generated from renewable energy sources (RES) currently represents about 12% of the Czech Republic's energy mix. Around 35% of overall energy production is nuclear, with the remaining 53% coming from fossil fuels (primarily lignite). Despite this, the share of energy from renewable sources in gross final energy consumption represents approximately 15%.

Electricity generation from renewables is led by biogas, biomass and solar (around 25% each), followed by water (around 18%). The rest is covered by other RES, especially wind projects.

The Czech Republic committed itself to produce at least 13% of consumed electricity from RES by 2020, in line with the national target set out by EU Directive 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources. In addition, the Czech government approved the National Renewable Energy Action Plan that set a target of 15.3% of energy from renewable sources in gross final energy consumption by 2020. The country has effectively met this target and it is projected that the level of energy from renewable sources in gross final energy consumption should reach 15.6% by the end of 2020.

The EU has set a target of 32% of gross final energy consumption from RES by 2030. The Czech Republic proposes to contribute to this EU-wide target by raising its RES share of gross final energy consumption to 22% by 2030. These targets are set and proposed in accordance with EU Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the governance of the energy union and climate action.

Operational support

Operational support has always been the main incentive for developing RES. The support scheme was introduced in 2005 and its main principles are still in place, although currently the level of support for new larger installations is very limited, or effectively non-existent. In the Czech Republic, producers of electricity from RES can choose either the "feed-in tariff" or the "green bonus" scheme. Under the "feed-in tariff", producers sell electricity to obligatory purchasers at a fixed minimum price. Under the "green bonus" scheme, producers sell electricity on the electricity market for the market price and are entitled to receive an additional fixed amount. It is possible to switch between the two schemes during the project's lifetime. The feed-in tariff and the green bonus are set annually by the Czech Energy Regulatory Office. The level of feed-in tariff depends on the year in which the project was put into operation, and is

guaranteed for a certain number of years, as prescribed by law. The level of the green bonus is linked to the level of the feed-in tariff as it takes into account the market price for electricity in the given year.

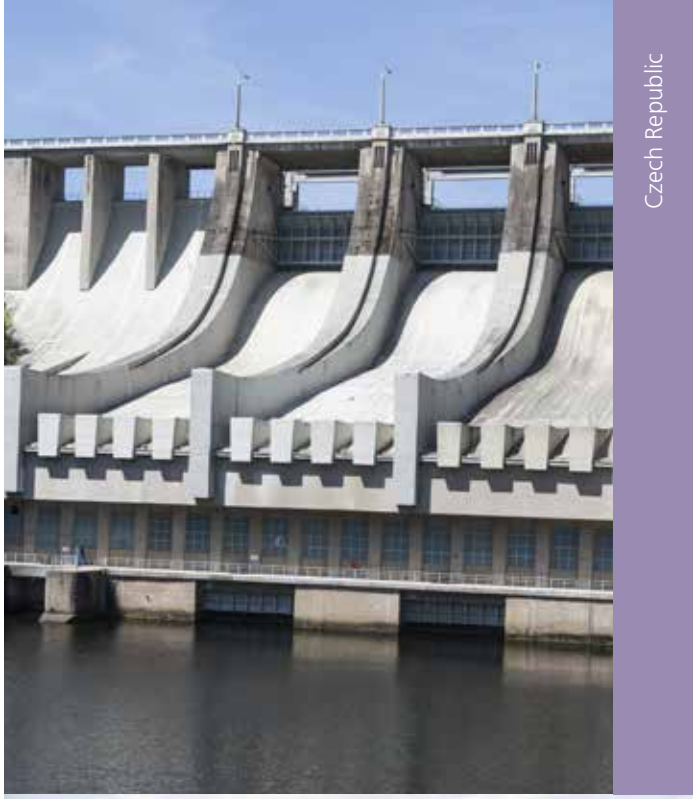
In April 2020, an amendment to the Czech law governing the RES subsidy in the Czech Republic – Act no. 165/2012 Coll., on the Subsidy of Renewable Sources of Energy, as amended (the "Draft RES Amendment") – was approved by the Czech government. At the moment, this draft legislation has been put to parliament for further discussion. If finally adopted in the current form, the Draft RES Amendment will have a significant impact on the system of subsidising RES in the Czech Republic. It proposes abandoning the feed-in tariff system and keeping in place only hourly green bonuses for the RES with installed capacity of less than 1MW. For sources with installed capacity of more than 1MW (6MW for wind sources), the Draft RES Amendment proposes introducing an auction system whereby the bidder delivering the agreed-upon capacity with the lowest subsidy offer will be granted the subsidy. It is anticipated that this new system will apply to any new energy sources put into operation in 2021 or later. The Draft RES Amendment also addresses the issue of "overcompensation". The legislative procedure concerning the adoption of the Draft RES Amendment is ongoing and the final form of the Draft RES Amendment is yet to be decided.

2. Recent developments in the renewables sector

Czech support scheme confirmed as compatible with EU state aid rules

In 2016 and 2017, the European Commission (EC) issued a series of decisions approving support schemes for various types of renewables, including the controversial support scheme for renewables commissioned between 2006–2012, ie in the years where a significant portion of existing solar and wind sources were developed. Broadly speaking, the EC declared that, from a state aid rules perspective, the support schemes are compatible with the EU's internal market.

That said, the EC's decisions also suggest that the Czech government should adopt measures to control the so-called "overcompensation" in respect of some of the support schemes. Specifically, projects put into operation between 2006 and 2012 would be deemed to be "overcompensated" if their internal rate of return (IRR) was not reasonable, ie if it exceeded the limits indicated in the EC's decision (IRR 6.3–7% for hydro and wind; 6.3–8.4% for photovoltaic; or 7–9.5% for biomass).



Czech governmental plans to control overcompensation

In September 2017 the Czech government looked into taking measures to control the overcompensation outlined by the EC. The government's plan is expected to be implemented through the Draft RES Amendment. The Draft RES Amendment proposes the introduction of a mechanism for assessing the adequacy of the state subsidy for any RES put into operation between 1 January 2006 and 31 December 2015. The proposed regulation aims to identify cases of overcompensation and, if such cases are discovered, to provide a mechanism for eliminating the overcompensation or for clawing back the overcompensated amounts (e.g. by decreasing future subsidies, by shortening the period for which the subsidy is granted, etc.). The Draft RES Amendment proposes specific limits for energy sources under which the subsidy is considered adequate (specifically, an IRR of 6.3% for photovoltaic; 7% for hydro, wind and geothermal; 9.5% for biomass and 10.6% for biogas). The Draft RES Amendment also introduces sectoral inspections by public authorities to check IRR indicators after the energy source has been operating for ten years. The control mechanism should not apply to subsidies up to the de minimis level pursuant to EU Regulation 1407/2013 of 18 December 2013.

3. Forthcoming developments/opportunities in the renewables sector

Long-term targets

The Czech Republic's 2020 target for the RES share of gross final energy consumption has been effectively met. The latest version of the Czech government's Energy Conception indicates that by 2040 the share of renewables in total electricity production will be 18–25%.

The Czech public generally supports the EU targets for decreasing greenhouse gas emissions. In the Czech context, this can be achieved through supporting renewables and by building new nuclear blocks in the two existing nuclear power plants as well as by energy savings. Both nuclear power and energy savings are supported by the Czech government.

The discussion on building new nuclear blocks has been ongoing for several years. The Czech government has been actively taking a number of steps towards realising the construction of a new nuclear block at the nuclear power plant in Dukovany and financing this construction (addressing, among other matters, limits arising from the EU state aid rules). It has been announced that the tender for the construction of a new nuclear block at the Dukovany nuclear power plant should begin in 2020 and be completed by the end of 2022. The construction itself is expected to start in 2029 at the latest with the project being completed by 2036.

Support for new renewable projects

Support for developing larger installations is currently very limited. This, together with relatively low electricity prices, suggests that there will not be much activity in the development of larger projects in the near future.

However, two clear current trends have emerged for developing small-scale renewable sources, such as rooftop solar installations and investment in energy storage. The Czech government introduced several measures and support schemes for these trends, including grants for rooftop solar installations used for electricity and/or heat production, as well as hybrid solar systems with battery storage. Renewable energy and energy storage are also indirectly supported by grants for the purchase of electric cars by municipalities or by some SMEs. There is also potential for development of a (unsubsidised) market for corporate renewable PPAs, which may take advantage of falling costs for construction of certain renewable energy sources (e.g. solar), although such a market does not currently exist.

Secondary market with existing projects

Installed capacity in the Czech renewable energy sector, in particular the 2,000MW of photovoltaic energy commissioned in 2009–2010 with the tariff guaranteed for 20 years, represent attractive investment opportunities for infrastructure investors. The EC's long-awaited completion of the state aid notification procedure has brought more certainty to the market. Since 2016, there has been increased activity in the sale and purchase of large-scale projects or portfolios of smaller photovoltaic projects and wind farms. However, the Draft RES Amendment is already encouraging a cautious approach among investors and it remains to be seen how such a bill will affect this trend once it has been enacted, especially given the proposed overcompensation control of projects put into operation in previous years.

Egypt

Authors: Dr Fatma Salah and Heba Elkady (September 2019)

1. Brief overview of the renewables sector

The development of the renewable energy industry has become a priority for the Egyptian government over recent years. Egypt's current energy strategy aims at increasing the share of renewable energy, a target expected to be met largely by scaling up renewable energy projects.[1]

Egypt has adopted an integrated sustainable energy strategy to 2035, which aims to increase the contribution of renewable energy to 42% of the aggregate power capacity generated in Egypt by 2035.[2]

The Egyptian government is making extensive progress towards becoming a significant player in the renewable energy industry. It has long recognised the need for reform of the electricity sector in order to attract private sector investment in power generation.[3]

To achieve this goal, the government has taken several steps to reform the legislative environment for the energy sector and increase the investment incentives for renewable energy projects.

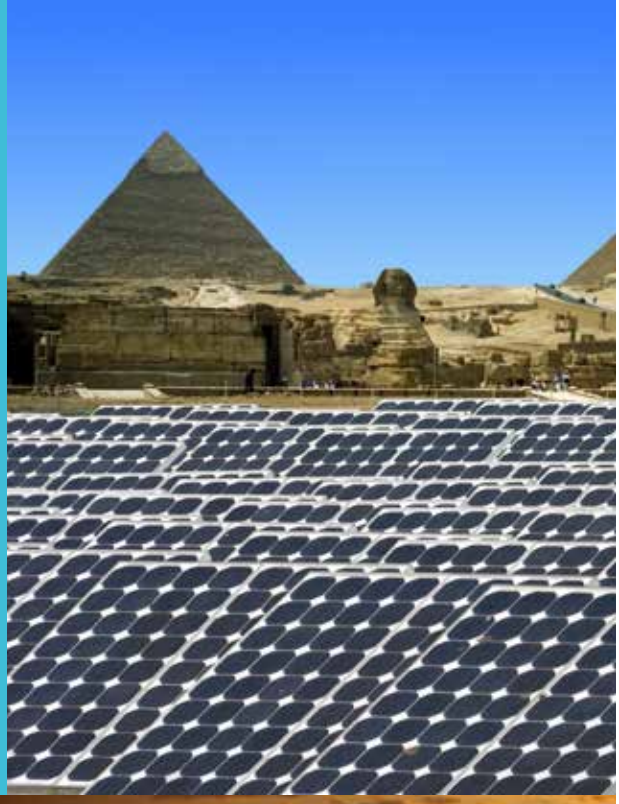
These steps have included the enactment of Law No. 203/2014 for the Production of Electricity from Renewable Energy Resources. The law aims at encouraging the private sector to produce electricity from renewable energy sources by adopting several schemes for the private development of renewable energy projects, including: feed-in tariff; build own operate (BOO) projects; competitive bids; and independent power production through third-party access.

In 2015, Egypt witnessed a substantial reform in its electricity legal framework by issuing the Electricity Law No. 87 of 2015 (Electricity Law).

The Electricity Law replaced the previous single buyer model and established a fully competitive electricity market where electricity generation, transmission and distribution activities are fully unbundled. The law ended the single buyer model for electricity and allowed private generation companies to sell their production to end users.

The Electricity Law allowed third-party access to the grids, and changed the government-owned and

[1] The Solar Atlas of Egypt, New and Renewable Energy Authority's website: http://www.nrea.gov.eg/Content/files/SOLAR%20ATLAS%202018%20digital1.pdf, Page 82.
[2] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA_Outlook_Egypt_2018_En.pdf, Page 4.
[3] The Solar Atlas of Egypt, New and Renewable Energy Authority's website: http://www.nrea.gov.eg/Content/files/SOLAR%20ATLAS%202018%20digital1.pdf, Page 83.



operated Egyptian Electricity Transmission Company (EETC) into an independent transmission system operator (TSO).

The Electricity Law created two electricity markets. The first is the competitive market where qualified consumers (high voltage customers) may freely choose their electricity suppliers based on bilateral direct agreements and negotiated electricity prices. The second is the regulated market where unqualified consumers (medium voltage customers and low voltage customers) pay a regulated tariff and purchase electricity from the distribution companies who are supplied by a public trader.

The Electric Utility and Consumer Protection Regulatory Agency (EgyptERA) has been restructured to be an independent institutional champion responsible for supervising, developing and coordinating between electricity producers, transmitters, distributors and end users. It has become the electricity regulator for licensing, designing and approving tariffs, providing a separate dispute resolution mechanism, and developing a competitive market design and structure. It is also responsible for ensuring a reliable long-term supply of electricity with reasonable prices and a stable environment.

A further key step taken by the government towards promoting investment in the renewable energy sector is the allocation of land plots to be developed and used by the New and Renewable Energy Authority (NREA) in developing solar and wind projects, whether by itself or through private sector companies.

Electricity subsidies reform

In its moves towards a free competitive market, in 2014 the Egyptian government started a scheme to gradually liberalise electricity prices and achieve the full removal of electricity subsidies by 2022.

To implement this gradual liberalisation, the Minister of Electricity issued an annual ministerial decree setting the new electricity tariffs applicable for that year. The latest one was issued on 21 May 2019 by virtue of decree No. 111 of 2019 determining the new electricity tariffs for the year 2019/2020.

2. Recent developments in the renewable sector

Net metering

EgyptERA's efforts to encourage the exchange and usage of electricity generated from solar energy have included issuing in 2013, a set of rules regulating the net metering system in Egypt. These regulatory rules were subject to several amendments to improve the system and encourage the investors to produce electricity from solar energy using the net metering system.

The current net metering system now applies to solar photovoltaic plants with a capacity of up to 20MW rather than 500kW. It also allows customers to cover all or part of their needs from electricity provided by their own solar plant or one owned by a third party qualified by NREA to establish PV plants and contracted with the customer through a power purchase agreement to sell the electricity generated from the solar plant.[4]

The main advantage of the net metering system is that it allows the customer to feed any surplus power generated from the solar plant into the national grid, with the option of claiming it back in the following months when needed. The settlement is made on a monthly basis through net metering devices installed by the distribution company to the customer at its own cost.

If there is an electricity surplus at the end of the fiscal year, it is bought by EETC or the distribution company at a price equivalent to the average cost of the generated electric power according to an EgyptERA report on the cost of service. The price will be updated annually for existing and new solar projects.[5]

Waste-to-energy

The Egyptian government is committed to the safe disposal of waste, and in 2015 it started producing energy from waste recycling.

In 2018, the cabinet approved a unified waste-to-energy feed-in tariff of EGP 1.40/kWh to attract investors and use high technology in waste recycling. The proposed tariff is awaiting the approval of the House of Representative before it enters into force.

The announced waste-to-energy tariff should be borne and distributed between several governmental entities, and the biggest percentage of the tariff will be borne by the electricity sector.

In April 2019, EgyptERA finally approved a rate of EGP 1.03/kWh as the percentage of the waste-to-energy tariff that will be borne by the electricity companies.

Egypt has a Waste Management Regulatory Authority (WMRA), established in 2015 by virtue of the Prime Ministerial Decree No. 3005 of 2015, affiliated to the Minister of Environment. WMRA is mainly responsible for regulating, supervising and controlling all matters relating to waste management and determining the roles and responsibilities of all stakeholders in the waste management system.

It is also responsible for attracting investments in waste collection, transmission and management, and the safe disposal of waste. WMRA works on promoting relationships between Egypt and other countries and international organisations in relation to the waste management.[6]

The Egyptian government is keen to support the private sector's participation in environmental projects and to benefit from the high technology that follows from private sector involvement. These environmental projects include the conversion of municipal solid waste into electricity.

3. Forthcoming development in the renewable sector

Benban Solar Park

Benban Solar Park is one of Egypt's most ambitious feed-in tariff projects. It was established on a total area of 37km^2 in Aswan Governorate, aiming to produce 1,800MW through solar energy. Its total capacity was reduced to 1,715MW after the construction of the internal roads and the ring roads, and the allocation of an area within Benban site for the facility management company to carry out the facility management works for the benefit of all the developers.

The Benban project falls under the feed-in tariff program (FIT Program) announced by the Egyptian government in 2014 to generate 4.3GW electricity from renewable energy, 2,300MW from solar and 2,000MW from wind.

The FIT Program was divided into two rounds: Round 1 announced by the Cabinet Decree No. 1947 of 2014; and Round 2 announced by the Cabinet Decree No. 2532 of 2016. The applicable tariff in Round 1 for solar projects with a capacity of more than 20MW and up to 50MW is USD 14.34 cents/kWh; it was reduced to USD 8.40 cents/kWh in Round 2.

Benban Solar Park is expected to be officially inaugurated before the end of 2019. This will see 32 developers with total capacity of 1,465MW – under Round 1 and Round 2 – start producing their full capacity of electricity generated from solar energy. The remaining 250MW has not yet been allocated to a developer.

When it becomes operational, Benban will be the biggest solar photovoltaic park in the world. In March 2019, it was awarded the annual best project award by the World Bank Group – the first time Egypt has won this award.

The project is developed by private investors and financed mainly by the International Finance Cooperation (IFC) and the European Bank for Reconstruction and Development (EBRD).

The development of the Benban site is ongoing. Presidential decree No. 230 of 2019, issued in May 2019, allocated a total area of 15 feddans to NREA to be used in the establishment of a solar photovoltaic plant.

[4] EgyptERA Circular No. 3 of 2018 issued on 16 August 2018.
[5] EgyptERA Circular No. 3 of 2017 issued on 6 September 2017.
[6] For more information, please visit the following website: http://www.wmra.gov.eg/en-us/Pages/default.aspx

France

Authors: Christophe Barthélemy, Céline Cloché-Dubois and Aurore-Emmanuelle Rubio (August 2020)

1. Brief overview of the renewables sector

Key statistics

In 2019, France's primary generation of energy decreased by 2.7% compared to 2018, due to the decline in nuclear power generation.

The Ministry for Ecological Transition now publishes data that describes the evolution of the different renewable energies.

This document shows that 0.4GW of wind power was connected in the first half of 2020, ie 45% less than during the same period in 2019. This source of energy represented 9.5% of French electricity consumption during this same period. In terms of photovoltaic energy, an additional 379MW were connected, compared to 405MW in the first half of 2019. With regard to biomethane projects, a maximum production capacity of 453GWh/year have been installed during these six months; this represents an increase compared to the first half of 2019 (221GWh/year). Finally, for biogas, 12MW were connected, for a total installed capacity of 508MW.

2. Recent developments in the renewables sector

Onshore business

Evolution of the support scheme for renewable energy sources

Like many other European countries, France decided at the beginning of the century to support clean electricity generation through a "power purchase obligation" support scheme. The generators benefited from a purchase obligation, at feed-in tariffs laid down by ministerial orders while the State organised public tenders when commercial initiatives were insufficient to reach the national objectives for a specific part of the territory (including overseas territories) or for a particular technology (e.g. offshore wind farms).

Due to the overall cost for the electricity consumer and the discrepancy between the steady purchase price and declining cost of equipment, from 1 July 2014 the EU Commission revised its State aid guidelines aimed at monitoring the support for energy generation sources. Simultaneously, internal litigation led the ECJ to hold that the French power purchase obligation mechanism was a State aid scheme, and that the State had omitted to notify to the EU Commission (CJEU, Association Vent de colère/ministre de l'écologie, Case C-262/12, 19 December 2013), even though the Commission decided in the wake of this judgment that it was compatible with the internal market.

Consequently, the current support scheme for renewable energy sources in France is based on Law No. 2015-992 of 17 August 2015 "on energy transition for green growth". Consistent with the new Guidelines on State aid for environmental protection and energy, the new rules are based on the sale on the market of electricity from renewable sources, with a possible uplift if the market price is below the reference tariff. The new rules are gradually replacing the old ones, as they apply solely to new projects – older power purchase agreements were signed for 15 years (onshore wind farms, small hydro power plants) or 20 years (photovoltaic power plants).

Gradual replacement of feed-in tariffs with premium fees ("open window" system)
The power purchase obligation scheme was governed by Article L.314-1 of the French Energy Code. Purchasing agents designated by the law (EDF or, in some cases, local distribution companies) were compelled to enter into a regulated power purchase agreement (PPA) to buy the entire production of each renewable producer willing to do so. Every renewable producer agreed to this arrangement, as the feed-in tariff has remained above the market price. This covered onshore wind turbines, geothermal installations, solar, photovoltaic and thermal facilities. The characteristics of the facilities and the conditions for benefiting from the support schemes were determined by a decree.

The feed-in tariffs for each energy source were then defined by specific orders issued by the Ministers of Economy and Energy.

The Law of 17 August 2015, and its implementing decrees, profoundly reformed this support system, turning it into a mechanism of contracts for difference, in accordance with the new Guidelines.

Producers must now sell their energy on the market, and they receive, through an ex-post mechanism, an additional variable remuneration (complément de rémunération) from EDF (the local distribution companies are no longer part of the mechanism) in the form of a monthly premium. The premium is based on a formula which includes a reference tariff set by a ministerial order for each type of energy. This remuneration aims to ensure a reasonable return on invested capital. However, if the market price exceeds the reference tariff, the generators must reimburse the difference to EDF, which acts as a State agency – the premiums and its expenses are reimbursed by the State.

In the middle of 2016, the French government adopted three implementing decrees:

- Decree No. 2016-682 of 27 May 2016, which sets out the conditions of access to the support mechanism provided by the Law on energy transition for green growth (premium fee and power purchase obligation), and establishes the calculation methods.

- Decree No. 2016-690 of 28 May 2016, setting out the terms and conditions of the assignment of power purchase obligation agreements to third parties, subject to prior State approval, as well as the conditions for the delivery of that approval (to date, only a handful of aggregators have been authorised). This mechanism aims to provide fluidity to the wholesale electricity market (i.e. preventing EDF from benefiting from 100% of this energy).
- Decree No. 2016-691 of 28 May 2016, which specifies which installations will be eligible for a compensatory fee, and which ones will remain within the scope of the feed-in tariff regime. The feed-in tariff regime is maintained for small installations and for wind energy producers that are not eligible for the compensatory fee scheme. The revised feed-in tariffs mechanism only applies to a limited extent.

As a result of this reform, premium fees is now the main support mechanism for renewable energy.

The reform allows aggregators, which may work with electricity producers or electricity consumers, to develop a new business. For renewable electricity producers, the aggregator acts as an intermediary between them and the wholesale market: when buying and aggregating the production of various renewable producers, they bear commercial costs, balancing costs, and prediction risks (in periods of negative prices, the premiums are not paid).

Public tenders (tender procedure and competitive dialogue procedure)
Facilities which cannot benefit from the power purchase obligation mechanism or from premium fees through the "open window" (e.g. offshore wind farms and photovoltaic installations with a power above 100kWp) may benefit from the power purchase obligation or from premium fees through a competitive process. The competitive process may be used by the State when the development of production capacities in the market – including the type of production technologies and the geographical location of plants – is not meeting the target of the energy multi-annual programme (PPE in French).

There are two different procedures: the classical tender procedure, and competitive dialogue, the latter based upon the competitive dialogue (*dialogue concurrentiel*) of the Directives on public procurement, and created by Decree No. 2016-1129 dated 17 August 2016.

- **Classical tender procedure.** Tender specifications are drawn up by the Ministry for Energy and published on the website of the national regulatory authority (the CRE). The CRE examines the applications within the time limit set by the specifications and sends to the Minister for Energy the list of offers that meet the tender criteria, the list of those that do not meet the criteria, a proposed ranking of the candidates (including a detailed rating), and the projects that the national regulatory authority proposes to select.

  The Minister for Energy subsequently selects the successful candidates, but is not bound by the proposal made by the CRE.

- **Competitive dialogue.** This is designed to foster the development of innovative renewable energies, such as offshore wind farms, by helping the government to better define the projects through a dialogue with the candidates. One of the purposes of this procedure is to allow a reduction of electricity prices paid by the taxpayer. The competitive dialogue starts with a consultation document drawn up by the Ministry of Energy.

  The Minister selects the candidates allowed to take part in the dialogue. At the end of the dialogue, the Minister issues the final tender specifications and invites the candidates who have participated in the competitive dialogue to submit their offers to the national regulatory authority. For the remainder of the proceedings, the classical tender procedure described above applies.

Corporate PPAs
Over the past two years, Corporate Power Purchase Agreements (PPAs) have begun to develop in France, mainly within groups of companies, or in the form of projects launched by State-owned entities with significant consumption, interested in long-term electricity delivery with fixed prices. Such Corporate PPAs could also regulate the further financing of installations, including repowering, maintenance and rental costs, when public subsidies for existing installations (either PPAs or CfDs) come to an end, although there is no sign of this as yet.

The development of crowdfunding
Crowdfunding of energy projects is developing in France. It has a local dimension – the financing community is the local community and the beneficiaries are local citizens, small companies and municipalities. Crowdfunding is particularly appropriate for the development of distributed energy sources such as solar, wind farms, and small hydro projects.

Until 2014, the implementation of participative funding in renewable energy projects was restricted: complex rules usually governed the offer of securities to the public and local authorities were obliged to contribute only through a local semi-public company, with a public majority. But several measures relaxing the legal framework for participative funding have been taken since 2014:

- Renewable energy stakeholders can now initiate projects with participative funding, thanks to crowdfunding platforms free of the regulatory constraints that apply to the offering of securities to the public (pursuant to Law-Decree No. 2014-559 of 30 May 2014 on crowdfunding).
- Law No 2015-992 of 17 August 2015 on "energy transition for green growth" created in the Energy Code a new Article L.314-18, offering the possibility for renewable energy project companies to propose to "private persons, including those whose residence is close to the location of the project, and local authorities or their groupings the territories of which are used by the project" to take part in the financing. This law modified Articles L.2253-1, L.3231-6 and L.4211-1 14 of the General Local Authorities Code, to allow regions, departments, towns, and groupings of these corporations, to directly participate in renewable energy projects.

Development of marine energies

Delay on the development of offshore wind energy

France does not yet have an operational offshore wind farm. However, offshore wind energy is one of France's major areas for development of marine energy – offshore wind turbines now, floating wind turbines tomorrow and possibly tidal current turbines.

The commercial development of the offshore wind energy sector was initiated by the launch of two calls for proposals of bids in 2011 and 2013, and the award of nearly 3,000MW spread over six wind farms off the coast of Normandy, Brittany and Pays de la Loire. A third offshore wind tender was launched in December 2016 off the coast of Dunkirk. It was awarded in June 2019 for a capacity of 500-600MW.

As regards floating projects, with a less advanced technology, four pilot farm projects of 24MW each have been designated winners of a call for projects launched by the ADEME (a public body) in 2017 as part of the "Programme of investment for the future": one in southern Brittany, three in the Mediterranean. The first commissioning is expected in 2021.

In order to develop offshore wind energy, consultations were held with all stakeholders in the context of the development of "strategic coastal proposals". These proposals provide for the identification of areas with the potential to host offshore wind energy projects. The first tenders for floating wind turbines will be launched in southern Brittany, then in the Mediterranean. The next tender for ground-based wind turbines will be launched in Normandy. Starting in 2024, other tenders should be launched for offshore wind farms building upon links with previously awarded installations.

Towards a friendlier legal framework for marine renewable energy

Decree No 2016-9 of 8 January 2016 relating to power generation and transportation facilities for marine renewable energy is a first step towards simplifying and speeding up the development of offshore projects.

The offshore wind industry – which is like the onshore industry, but with much bigger capacity per project – is systematically subject to litigation involving local stakeholders and environmental associations, because of planning issues concerning the construction and operation of the facilities.

The Decree provides for a specific litigation regime applicable to marine renewable energy bodies, intended to limit the number of claims and the duration of the proceedings. The Administrative Court of Appeal of Nantes is now the exclusive jurisdiction empowered with settling legal disputes brought against bodies required to undertake marine renewable energy projects. The court decides in the first and last instance: the opponents and/or the developer can only file an appeal before the Conseil d'Etat, with recourse being limited to challenging the judgment on matters of law (facts are no longer subject to discussion). The Decree also created new tools to control the length of litigation. In the first instance, even if this deadline is merely indicative, the court is required to issue its ruling within one year from the date on which a dispute is brought before it. Secondly, the arguments raised by the parties may be frozen by the court if a party so requests, and if the court finds the request to be appropriate. The Decree introduced new admissibility criteria for the claim: anyone intending to challenge a marine renewable energy authorisation is required to notify its claim, by a registered letter with acknowledgement of receipt within 15 days following the introduction of the claim, both to the administration which delivered the authorisation and the authorisation holder. Non-compliance with this obligation will make the claim inadmissible.

The Decree also provides two modifications to the legal framework applicable to marine renewable energy projects: it lengthened to a maximum of 40 years the duration of the concession to occupy the maritime public domain; and it extended the duration of the operating licence in case of late commissioning (16 years for marine energy projects, as opposed to ten years for other generation projects).

To make the modifications provided by the Decree more acceptable to people who may consider their rights to be affected by marine renewable projects, a new complaint procedure ('*procedure de reclamation*') has been created. Any interested person may use this complaint procedure to challenge the extent of the mitigation measures (e.g. environmental care) set by

the authorisation in order to make the project consistent with comparable developments. The state administrator ('*Préfet*') to whom the claim is submitted has two months to assess the quality of the request and, if necessary, to order additional mitigation measures for the implementation and/or operation of the plant. If he or she does not answer, or decides that the measures imposed are sufficient within the two-month timeframe, the claimant may challenge this (explicit or implicit) decision before the Administrative Court of Appeal of Nantes.

A second step towards the faster and simpler development of offshore projects comprises Decree No. 2017-628 of 26 April 2017. It sets compensation that applies if the TSO delays connecting an electricity production facility from renewable energy sources at sea to the transmission network beyond the agreed deadline. This Decree implements the Law No. 2017-227 of 24 February 2017 on renewable energy, which provides a specific allowance for offshore wind turbines in case of late connection.

Its key provisions include:

- The connection agreement signed between the TSO and the producer may derogate from the provisions of sections D. 342-4-1 to D. 342-4-6 of the Energy Code, which set a deadline for the TSO to connect offshore wind plants (usually 18 months).
- The Decree's late connection compensation provisions may be superseded by those provided for in the specifications of the competitive tendering procedure launched in application of Article L. 311-10 of the Energy Code.
- Article R. 342-2-10 of the Energy Code sets the list of damages that may be so compensated – the costs and overcosts of financing resulting from the delay, and the additional costs of design, development and realisation of the production facility.
- A cap which applies to the compensation, calculated according to new Article R. 342-4-11 of the Energy Code.

However, all these modifications were not considered sufficient by the offshore industry – the legal framework for offshore projects is under deeper review – to simplify procedures and to achieve greater legal security for the developers. In that respect, Law No. 2017-1839 of 30 December 2017 to stop research and exploitation of conventional and unconventional hydrocarbons sets up provisions which improve the situation of the aforementioned developers. This law transfers to the TSO the responsibility for building and operating the offshore substation, and sets the principle of indemnification of the producer in case of the unavailability of connection works during the operation phase. Indeed, it provides that:

- The TSO shall achieve the connection works before the date indicated in the tender specifications.
- Otherwise, in case of late connection to the grid, the TSO shall indemnify the developer. However, the indemnification amount paid by the TSO is capped (see Article L. 342-3 of the Energy Code).
- The producer which applies for connection to the grid, shall bear the connection costs, with the exception of installations selected through a competitive tender bidding procedure when the producer does not choose location of the wind park area (which is the case with all past, present or planned projects, since these projects are carried out on the public maritime domain, at the initiative of the State). In this particular case, which is the most common, the TSO bears the connection costs which correspond to the technical conditions laid down in the specifications or defined by the Minister for Energy, including stranded costs in case of abandonment of the call for competition procedure. However, any changes to technical connection conditions at the initiative of the successful candidate are their responsibility. In case of failure of the selected candidate, they assume the stranded costs under the conditions provided for in the specifications (see article L. 342-7 of the Energy Code).

  When the producer selected after a competitive procedure does not choose the location of the wind park area and when the connection costs are borne by the TSO, the new article L. 342-7-1 of the Energy Code provides that the TSO must compensate the producer for losses resulting from the total or partial failure (when the connection includes several cables) to connect electricity into the transport grid in the event of damage or malfunction of connecting works. The amount of this compensation, as well as its terms, are defined by decree. These last two provisions apply only to the competitive tendering procedure launched in application of Article L. 311-10 of the Energy Code for which a notice has been issued after 1 January 2016.

Two further regulations were adopted to supplement the legal framework:

- Firstly, the Ministerial Order of 10 November 2017 sets the indemnification amount against the TSO, should the company be late in the connection works of marine renewable generation facilities (indemnity laid down in 4° of the article 341-2 of the Energy Code). Under this Ministerial Order, TSO's contribution shall be capped at 40% of any indemnity paid to any developer and this first cap set by installation shall be superseded by a second yearly and overall cap of EUR 70m. The tariff (TURPE) pays the balance. This rule applies only in cases where the cause of delay (or limitation) of the production is attributable, at least in part, to the TSO.
- Secondly, the Decree No 2018-22 of 30 March 2018 sets the calculation methods when the TSO bears the cost of connection of the wind farm to the transmission grid, in two distinct cases:

(i) the TSO is late in the connection works: the compensation is set at 90% of the loss, to be paid, at the latest, six months after the end of the delay (with a monthly payment established at 80% of the expected loss); (ii) there is a damage or malfunction in the cable (offshore or onshore parts): the same penalty applies, 90% of the total loss is compensated, with 80% paid monthly by the TSO).

And finally, Article 58 of the Law No. 2018-727 dated 10 August 2018 has introduced important changes within the Energy Code and the Code of Environment. The reform concerns the simplification of the law for the construction and operation of offshore wind turbines, the renegotiation of purchase prices resulting from the 2011 and 2013 offshore tenders, and the introduction of a new pecuniary sanction.

- Firstly, when the Minister for Energy intends to organise a competition procedure pursuant to Article L. 311-10 of the Energy Code for the realisation and the operation of an offshore wind farm, the Minister must notify, beforehand, the CNDP which is the French National Public Debate Commission. This Commission determines the modalities for public participation in the decision-making process for launching the competition process. In particular, the public is consulted on the choice of the potential area(s) where the wind turbines will be located.
- In addition, the article L. 181-28-1 of the Environment Code, created by the Law No. 2018-727 dated 10 August 2018, establishes special provisions for the authorisations necessary for the construction and operation of wind farms. The State will carry out part of the impact study ('*étude d'impact*'). The authorisations required for the construction and operation of wind turbines will contain variables, with associated requirements ('*permis enveloppe*'). The variables may relate to the number of wind turbines for example, or their size, or their arrangement in the defined area, so that the project can expand after obtaining the initial administrative authorisations, without having to obtain further authorisations. The beneficiary of the authorisations will have to inform the administration of the characteristics of the project as it will be finally operated.
- Furthermore, Article 58 lays down the legal framework for the renegotiation of purchase prices resulting from the 2011 and 2013 offshore tenders (points III to V of Article 58);
- Lastly, Article 58 provides for a special sanctions regime in the event that a winner of a competition procedure does not carry out the project without a valid reason. Article L. 311-15 of the Energy Code already provided for a sanction, but this sanction was previously only applicable when the installation was in operation.

Self-consumption and closed distribution systems

Self-consumption

Article 119 of Law No 2015-992 of 17 August 2015 on energy transition for green growth empowered the French government to provide a statutory framework for the development of self-production and self-consumption schemes by a law-decree.

Law No. 2017-227 of 24 February 2017 ratified Law-Decree No. 2016-1019 dated 27 July 2016 relating to electricity self-consumption which was amended by Law No. 2019-1147 of 8 November 2019 on "energy and climate". It created a new chapter in the Energy Code, dedicated to self-consumption of electricity. Both "individual" and "collective" self-consumption are now authorised and regulated. Article L. 315-1 of the Energy Code defines individual self- consumption as "the ability for an individual producer to consume on the same site the electricity produced by his own facility. The electricity produced can be either consumed immediately or after a storage period". In addition, the Energy Code specifies that "The self-producing facility may be owned or managed by a third party. The third party may be entrusted with the installation and the management, including the maintenance, of the generation facility, provided that it remains subject to the instructions of the self-producer. The third party itself does not qualify as a self-producer". Article L. 315-2 defines collective self-consumption as the situation where "the supply of electricity is made between one or more producers and one or more final consumers linked together within a legal person and whose withdrawal and injection points are located in the same building, including residential buildings. A collective self-consumption operation is qualified as "extended" when "the supply of electricity is carried out between one or more producers and one or more final consumers linked together within a legal entity whose extraction and injection points are located on the low-voltage network and comply with the criteria, in particular a geographical proximity, set by an Order of the Minister for Energy, taken after having requested the opinion of the Energy regulator". This distance is set at two kilometres in mainland France, and the maximum power of the installations is 3MW or MWp.

Law No. 2017-227 requires public network operators to facilitate self-consumption. It specifies that the French Energy Regulator should establish a network tariff adapted for self-consumption, taking into account the reduced use of public networks and the related costs implied in the long run by self-consumption. This grid tariff has been issued.

Closed distribution networks

Law-Decree No. 2016-1725 of 15 December 2016 concerning closed distribution networks finally gave effect in France to Article 28 of the 2009/72 EU Electricity Directive.

A closed distribution system is a system which distributes electricity within a geographically limited industrial, commercial or shared services site. This network can only supply non-household consumers, i.e. industrial, commercial or sharing services activities, according to Article L.344-1 of the Energy Code. However, the operator of a closed distribution system may supply residential customers if they are employed by or associated with the system owner, and consume the electricity in the area supplied by the system.

To be qualified as a closed distribution system, the system must meet one of the following conditions:

- the production or the operation process of the users of the system is integrated for technical or safety reasons.
- the system distributes electricity primarily to the owner or operator of the system or its related undertakings.

On 12 January 2017, the Paris Court of Appeal adopted a surprising position on privately owned distribution systems, in the context of a dispute between Valsophia, a local operator, and ENEDIS, the main French DSO. The judgment prohibits indirect connections of consumption sites to the distribution grid. The Court of Appeal questioned the decision dated 6 May 2015 of CoRDiS (the Committee for Dispute Settlement and Sanctions of the Energy Regulator) which ruled that there is no legal obstacle to indirect connection to the grid for consumption installations, just as for generation facilities (which had been admitted by the Paris Court of Appeal). According to the Court of Appeal, private facilities supplying electricity to final customers are distribution systems and, before Law-Decree No. 2016-1725 comes into effect and with it the creation of such closed distribution systems, only the companies operating public distribution networks may legally operate a distribution system. This judgment is currently being challenged before the Cassation Court.

To counteract one of the effects of this judgment, Article 16 of Law No. 2017-1839 of 30 December 2017 to stop research and exploitation of conventional and unconventional hydrocarbons created "interior building grids", which are a new category of electrical grids, consolidated in Articles L. 345-1 to L .345-8 of the Energy Code. This relates to interior grids of an office building which belongs to a single owner. The law permits in this specific case, the indirect grid connection of final consumers. The implementing decree is Decree No. 2018-402 dated 29 May 2018.

3. Forthcoming developments/opportunities in the renewables sector

The review of the PPE

The multi-annual energy program (PPE) that the French Government must publish under Law No. 2015-992 of 17 August 2015 on energy transition for green growth, replaced the former multi-annual investment program (PPI) that was limited to electricity, indicative multi-annual gas investment plan, and multi-annual investment plan for heating facilities. It sets out, by energy source, the broad energy policy guidelines in France.

The first (partial) PPE was adopted in October 2016. A new, more ambitious one which integrated nuclear power, was adopted by Decree in April 2020, with perspectives up to 2028.

Carbon tax

A "climate-energy contribution" (CCE) was introduced in France in 2014 in the form of a "carbon component" gradually added to the existing taxes on domestic energy consumption. The carbon tax – which taxes energy based on the CO_2 emissions they cause – is gathering momentum. The Climate Plan foresees that this taxation will increase in the coming years. However, so far the carbon tax has been relatively inefficient because of the substantial drop in oil prices which has offset the increase in taxation.

Smart grids

The development of smart grids guarantees a better integration of renewable energies by: improving the management of intermittence; optimising electricity networks; enabling better integration of electricity storage systems; developing self-consumption and of "consum'actors"; and promoting greater energy independence and security of supply.

Development of hydrogen, power-to-gas and energy storage

The development of the hydrogen sector accelerated in France in 2019, driven by calls for projects from the governmental Hydrogen Plan. Major energy companies launched their own calls for projects and set up subsidiaries dedicated to hydrogen. Many French regions published hydrogen roadmaps. Hydrogen is also strategic for mobility: many French municipalities are deploying hydrogen bus lines. Manufacturers are currently increasing the number of places where carbon-free hydrogen is produced and the recovery of fatal hydrogen, in a context where the production of hydrogen is still dominated by fossil resources.

The "power-to-gas" technology, which consists of producing hydrogen by electrolysis of water and then combining it with CO_2 through a methanation process to generate synthetic methane, is developing. Power-to-gas will allow the storage in natural gas networks of the surplus electricity generated by wind turbines and solar power plants. The hydrogen generated by these renewable energies will be converted into gas that can be injected into the gas distribution networks, since hydrogen cannot be, for security reasons.

On September 11, 2019, the French Energy regulator (the CRE) published its roadmap on electricity storage, to set a legal, technical and economic framework allowing for the development of long-term electricity storage consistent with the French energy system and the ambitions of the multi-annual energy program (PPE).



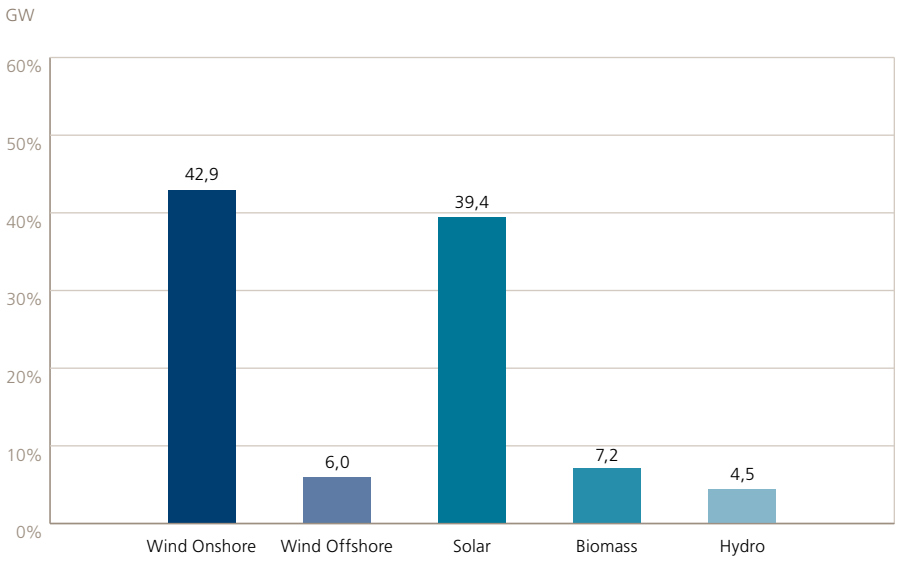
Germany

Author: Dorothée Janzen (September 2020)

1. Brief overview of the renewables sector

Germany's energy transition, (the *Energiewende*), has been a major part of the programme of every German government since 1998. After 21 years of adjustments to build a statutory framework, in 2019 17.5 % of Germany's gross final energy consumption and 42.1% of Germany's gross electricity consumption was generated by renewable energy sources. Germany aims to increase the percentage of gross electricity consumption from renewable energy sources to 65% by 2030 and to 80% by 2050.

Split of installed capacity for renewables-based electricity generation in Germany in 2019:



Source: Federal Ministry for Economic Affairs and Energy (BMWi).

With an installed capacity of roughly 61GW, Germany is one of the world's largest markets for wind energy. The renewable industry in Germany is no longer a market for pioneers. Since 2000, a total of more than EUR 290bn has been invested in renewable energies in Germany.

The Renewable Energy Sources Act (EEG) is the centerpiece of the legislative framework supporting renewable energies. It is subject to regular revision and has been complemented over the years with several supporting laws and regulations.

2. Recent developments in the renewables sector

The EEG originally provided for a pure feed-in tariff-based support system. The EEG 2014 first introduced a tender model for greenfield solar projects.

In January 2017, a further major revision of the German Renewable Energy Sources Act (EEG 2017) came into force, alongside a separate law regulating the expansion of offshore wind *(WindSeeG)*. Among other changes, it replaced the fixed tariff for wind, solar and biomass with a market-based tender model with predetermined capacity volumes being auctioned in each tender. For offshore wind, the feed-in tariff-based support system still applies for all wind turbines commissioned prior to 1 January 2021. The financial support for other renewables – hydropower or geothermal plants – and for small plants continues be determined by law.

The legislator expected this systemic change both to decrease the cost of the governmental subsidy and to increase competition and diversity between the players. It also aligned the German support system with the EU Guidelines on State Aid for Environmental Protection and Energy 2014–2020 (2014/C 200/01). In addition, the system grants more control over the increase in installed capacity, as tender volumes are based on growth targets. The results of the first tenders in 2017 demonstrated that the renewables industry seems to be willing and able to accept lower support – or, in the case of some offshore wind projects, no support at all.

The price for offshore wind energy dropped to an average of 0.44 cents/kWh in the first offshore tender in 2017. Three of the four successful projects bid zero and are Europe's first offshore projects without any subsidy. The 2018 tender still included a bid with zero subsidy. At the same time, the highest successful bid was awarded with a subsidy of 9.83 cents/kWh. There were no tenders in 2019 and 2020, as the planned growth of offshore capacity had been reached by the 2017 and 2018 tenders.

However, the tender rounds also showed flaws in the system, especially for onshore wind. While the support dropped significantly in the first 12–18 months of the tender system, it has since started to increase again. In addition, almost all tender rounds for onshore wind in 2019 and 2020 were significantly undersubscribed and installed capacity for onshore wind dropped from 5,009MW in 2017 to 2,273MW in 2018 and to 1,078MW in 2019.

Winning prices in cents/kWh of the latest German tenders for onshore wind, offshore wind and solar and the lowest average prices in prior tenders:

	Wind onshore		Wind offshore		Solar	
Tender result in cents/kWh (Weighted average)	November 2017	July 2020	April 2017	April 2018	February 2018	July 2020
	3.82	**6.14**	**0.44**	**4.66**	**4.33**	**5.18**

The tenders are organised by the Federal Network Agency which publishes tender dates, volumes and maximum prices in advance and tender results afterwards. Bidders must provide security and implement the winning projects within a predefined period or pay a penalty. However, to assist projects with delays caused by the COVID-19 pandemic, the Federal Network Agency temporarily does not publish tender results but notifies bidders individually as publication starts the implementation deadlines. Tenders are performed between twice and seven times a year, depending on the technology. For onshore wind and solar, in December 2018 the legislator introduced additional tender rounds and capacities for the years 2019 to 2021 to counteract reduced growth in installed capacity and to ensure political targets can be met. For onshore wind this did not solve the problem caused by undersubscription of tenders.

3. Forthcoming developments/opportunities in the renewables sector

The renewables sector in Germany is still growing. The tender system created new challenges for the industry and it requires further adjustments. At the same time, the system provides a stable regulatory framework while reducing the costs to the public for the promotion of renewable energy.

The legal framework for the German renewables sector is changing with increasing frequency to keep up with and adapt to developments. The EEG 2017 has been amended 13 times since it was passed and the German Federal Legislator is working on a new revision of the EEG and the WindSeeG, which shall be passed before the end of 2020.

The German Federal Government's 2020 draft legislation to reform the WindSeeG proposes a series of changes to increase the capacity for offshore wind energy from 15 to 20GW by 2030 and 40GW by 2040. Since the current version of the WindSeeG stipulates that the maximum bid value possible is equal to the lowest successful bid in 2018, only zero-subsidy bids would be possible in the next auction. The draft is looking to increase the maximum value for bids in order to increase the interest of potential investors and, ultimately, the successful implementation of projects.

The draft EEG 2021 published by the German Government on 25 August 2020 introduces the new goal to get to greenhouse gas-free (produced and consumed) power in Germany by 2050. The draft EEG 2021 furthermore foresees that for the calculation of the market premium receivable by plant operators, an annual average value is applied instead of the now applicable monthly average value. The aim is to give the plant operator an incentive to produce and market energy in times when the price regime for energy is the most expensive and therefore adapt the production to the economic framework. Moreover, the regulation on negative prices is tightened; instead of the now applicable six-hour rule, the subsidy, in the form of the market premium will be suspended if the spot market price is negative for 15 consecutive minutes. The aim here is to improve the renewables' market and grid integration. Both measures could have a negative impact on renewable projects such as wind and solar with no influence on the times electricity is produced. They may also make it more cumbersome for lenders to make estimates regarding the revenues of the projects.

In the long term, electricity prices and decreased or zero-subsidy bids will have a significant influence on project development and implementation as well as providing new challenges in contract design for offshore wind (EPCI vs. multi contracting) and project financing. Planned changes to the calculation of the subsidy in the form of the market premium will pose new challenges. As a consequence of these factors, alternative sales strategies, such as corporate PPAs (power purchase agreements), are likely to become increasingly relevant.

Hungary

Authors: Dr. Peter Simon and Peter Deak (September 2019)

1. Brief overview of the renewables sector

Electricity generation from renewable sources is a developing sector in Hungary. According to the preliminary data, in 2018 the share of renewables in final electricity consumption was 8.5%, with biomass as the main type of renewable energy source (RES). In its National Action Plan, Hungary's undertaking is to have 14.65% of its energy consumption from renewable sources by 2020 compared to the 13% share expected by the EU. This indicator was 13.3% in 2017.

Until 2015–2016, biomass was the most common form of RES for power generation. Even before the current electricity act came into force on 1 January 2008, and the introduction of a mandatory offtake regime for electricity produced from RES, some generators had already started considering switching the fuel source of their existing generating stations from coal/gas to waste/biomass and investing in other RES projects (e.g. Veolia's biomass development at Pécs). Some of the bigger generating stations have partially switched to operating on biomass, and several smaller biomass generating stations operate solely on RES. From 2017–2018, the increase in electricity produced from RES has mainly come from the growth of the installed capacity of solar panels.

There are few waste-to-energy plants in Hungary, but the country's capital, Budapest, has a communal waste burning power plant that has substantial capacity and generates steam for district heating and electricity. Recently, there have been calls for EU-funded projects for the development of district heating systems in rural towns. Waste-to-energy is one of several options, but there has been no news to date on the outcome of these projects.

There are several geothermal projects already in operation or under development, typically in small or medium-sized towns, to provide municipal districts and public buildings with heating. Hungary has considerable potential in geothermal energy, although these reserves are typically used for heating purposes rather than electricity generation. Nevertheless, according to preliminary data for 2018, 12GWh of electricity has been produced from geothermal sources. This might not seem a great amount, but it is a significant increase given that the same data showed 0GWh in 2016. As Hungary has excellent geological conditions for the efficient exploration of geothermal sources (e.g. appropriate temperature of geothermal heat, and heat resources are relatively close to the surface), the exploitation of geothermal sources will continue to develop.

Approximately 330MW of wind generation capacity has been installed so far. All the currently operational projects were licensed in, or before, 2006. Almost half of the operating wind power generation capacity belongs to one Spanish investor; the rest is operated by smaller operators.

There is increasing demand for solar energy, both on the household and industrial level. Some larger-scale PV plants (stand-alone or as part of an industrial project) are already in operation with a total national installed capacity of 680MW. According to the current government plans, capacity will increase to 4,000MW by 2030. The number of household-size PV plants that do not require a licence has also been increasing steeply – their total installed capacity was 240MW at the end of 2017, amounting to over 99% of the household power plants. As it is apparent from the above, solar power is the leading source for household renewable electricity production.

Hungary's renewables offtake regime was substantially amended at the end of 2016 and is currently in a transitional period. There are still some projects under the old regime which can be developed an operated, however, the market focus is now definitely on the new regime (the METÁR system). Under the METÁR system, the electricity generated from renewable sources is taken over from the generator in one of three ways:

- at a pre-determined, mandatory feed-in tariff by the TSO (for smaller power generation units).
- a premium subsidy can be awarded by the Hungarian Energy and Public Utility Regulatory Authority (HEPURA).
- a premium subsidy is granted by way of a tender procedure called for by the HEPURA.

Following its introduction, several changes were made to the METÁR system. Since 26 April 2018, there has been no entitlement for a mandatory feed-in tariff to be granted and, after 1 May 2019, no premium subsidy may be awarded by the HEPURA without a tender. The market waited for a long time, for the first pilot tender procedure which has been called for granting premium subsidies at the beginning of September 2019. In the framework of the tender participants can apply for subsidies in the following categories:

- power plants between 0.3MW and 1MW capacity (a total of HUF 333m to be distributed).
- power plants between 1MW and 20MW capacity (a total of HUF 667m to be distributed).

Bids and applications are to be submitted between 4 November 2019 and 2 December 2019, and results will be announced in early 2020. It is expected that after the first pilot tender HEPURA will launch tenders in each of the following years.

The mandatory feed-in tariff or the premium subsidy is granted for a period, determined by the HEPURA, that guarantees a return on investment, with a maximum duration of 25 years. For solar power plants the length of the offtake period under the METÁR system is a maximum of 14 years and four months.

2. Recent developments in the renewables sector

New offtake regime

The most important recent change in the renewables sector was the introduction of METÁR, the new offtake regime. It has applied to the generation of electricity from renewable sources since 1 January 2017. It introduced an offtake regime that offers mandatory feed-in tariffs and premium subsidies to newly-built power generation units using RES, or existing units that are to be refurbished if the refurbishment costs exceed 50% of the original investment.

The mandatory feed-in tariffs are applicable to production units that do not exceed 0.5MW in capacity. The tariffs are determined by legislation and are indexed annually. Further diversification of the tariffs is based on the time of day and type of RES (solar, wind or other). The TSO is obliged to take over the electricity produced by the production unit admitted to the mandatory feed-in tariff system up to the volume of electricity determined by the HEPURA and pay the mandatory feed-in tariff to the producer. However, no entitlement for a mandatory feed-in tariff may be granted after 26 April 2018.

Premium subsidies for production units between 0.5–1MW of capacity can be applied for from the HEPURA. However, no premium subsidy may be awarded by the HEPURA without a tender after 1 May 2019. Premium subsidies for production units above 1MW capacity are granted through a tender procedure called for by the HEPURA on the instruction of the Ministry of National Development. Legislation sets a maximum level for the aggregate amount of premium subsidies and is recalculated on an annual basis based on a formula. Generators receiving premium subsidies must sell their electricity individually on the market.

The premium subsidy is paid to the eligible generators by the TSO, based on the day ahead prices of the Hungarian Electricity Exchange and a subsidised price set out in the tender application of the producer or, in case of a subsidy granted without a tender, a formula set out in the legislation.

The new legislation specifies that the generators that applied for the necessary regulatory licences before 31 December 2016 are entitled to remain in the previous (very favourable) mandatory offtake system. This resulted in an enormous number of applications for solar power plant licences up to an aggregate amount of 2,000MW installed capacity. Some of the applicants are smaller family controlled firms that cannot effectively develop the licensed projects and they are now seeking investors and financiers for their licensed projects.

Changes to rules for the establishment of wind parks

At the end of 2016, close government control of potential future wind park projects was introduced and the development of these projects is now also hindered by restrictive construction provisions. The current regulatory environment effectively makes it close to impossible to obtain new wind park licences, and there is a question as to whether Hungary strategically will designate any specific role to wind in the energy mix in the next 10 years.

3. Forthcoming developments/opportunities in the renewables sector

Due to the low proportion of renewables in overall electricity generation, Hungary will need to focus on this sector in the coming years in order to be able to reach its undertaking of 14.65% from RES by 2020.

As a result of the recent restrictive legislative changes regarding wind energy, the areas of renewables most likely to develop are solar and geothermal.

Although Hungary has very favourable geological conditions, there are relatively few geothermal projects, most likely due to the capital requirements of seismic and drilling activities. However, the legislative background for these projects is in place: geothermal concessions have been announced each year since 2013. Recently, promising attempts for the application of new geothermal technologies have appeared on the market, therefore it seems that it is worth paying special attention to future developments in this source of energy.

The introduction of the METÁR system saw a surge in solar power plants applications at the end of 2016, leading the HEPURA to grant multiple licences or issue resolutions setting out the mandatory offtake price for numerous PV projects. Although it is unlikely that all licensed solar projects will be put into operation, solar power seems to be the most promising segment of the renewable generation sector and the development of PV projects under the old regime is expected to be continued to the end of 2022 at the latest.

Italy

Authors: Pietro Cavasola and Matteo Ciminelli (September 2019)

1. Brief overview of the renewables sector

In recent years, the Italian government has adopted several measures aimed at developing and fostering energy production from renewable energy sources (RES) with a view to increase Italy's independence from energy imports.

Since 2010 Italy has been consuming a higher proportion of renewable energy than the target set in the National Action Plan, adopted after the implementation of EU Directive 2009/28/CE. According to the Directive, Italy had to reach 17% of gross final energy consumption from RES by 2020. This target was reached yet in 2016 and, according to the latest available data, the gross final energy consumption from RES is currently around 18,5%.

The Ministry of Economic Development (MSE) and the Ministry for the Environment, Land and Sea (MATTM), are responsible for the promotion and development of renewable energy and energy efficiency. The other main regulatory bodies for general energy policy are:

- ARERA *("Autorità di Regolazione per Energia, Reti e Ambiente"),* formerly AEEG – the independent body that regulates, controls and monitors the electricity market in Italy. Its purpose is to protect the interests of users and consumers, promote competition and ensure efficient, cost-effective and profitable nationwide services.
- GSE *("Gestore Servizi Energetici")* – the state-owned company that promotes RES and fosters sustainable development by providing support for renewable electricity generation and by taking actions to build awareness of environmentally efficient energy uses.
- Terna, which manages the Italian transmission grid, is responsible for high-voltage electricity transmission and distribution throughout Italy.

The administrative procedures supporting the development of renewable sources involve the Italian State, the relevant region where the plant is located or, for small-scale plants, the relevant Municipality. These administrative procedures are:

- **Single authorisation:** introduced by legislative decree 387/2003 and required depending on the nominal power of the plant. The single authorisation is granted following a specific procedure which involves the relevant region and all the public administrations and private entities with an interest in the envisaged project;

- **Simplified administrative procedure:** applicable to small scale renewable plants, the simplified administrative procedure consists of a request to be submitted to the relevant municipality at least 30 days before the work starting date, together with documentation proving the sustainability of the project and compliance with applicable building regulations and safety provisions.

2. Recent developments in the renewables sector

In recent years, the Italian government has implemented several incentive schemes to encourage the development of renewable energy production. The last scheme has been implemented by Decree of the Italian Ministry of Economic Development dated 4 July 2019 and published in the Official Gazette of the Italian Republic on 9 August 2019 (the "FER 1 Decree" or the "Decree"). The Decree – which has come into force 7 years after the Ministerial Decree of 5 July 2012 regulating incentives for PV projects and 3 years after the Ministerial Decree of 23 June 2016 regulating incentives for RES projects other than solar – provides for a specific incentive scheme for energy produced through renewable sources for the 3-year period 2019–2021 and appears to be in line with the mentioned 2016 decree, confirming several provisions therein included.

In particular, the new Decree focuses on the following energy sources:

- Onshore wind;
- Photovoltaic;
- Hydroelectric;
- Plants fuelled by landfill and gas residues from purification processes.

The FER 1 Decree reintroduces the overall average annual cost for incentives, equal to EUR 5.8bn applicable to all renewable energy sources regulated under the Decree (that is the same threshold set by the 2016 decree which, however, did not include PV projects). Once this annual threshold is reached, no further incentives will be granted according to the Decree.

Registers and Auctions

According to the FER 1 Decree, RES projects may have access to incentives through registration with specific registers managed by the GSE or, depending on the size of the project, through auctions organised and managed by the GSE.

The Decree reduces the power threshold allowing access to incentives through registration to whose projects power capacity is less than 1MW (under the 2016 decree, the threshold was set at 5MW). Therefore, new plants with a capacity below 1MW will access via registers, while plants with power capacity equal to or in excess of that threshold will have access through auctions. Moreover, the FER 1 Decree eliminates direct access for small plants, discouraging very small investments.

The new incentives for photovoltaic plants shall apply *inter alia* provided that the relevant PV plant meets the following conditions:

- is new and built with new components;
- is not ground-mounted on agricultural land.

The Decree sets out seven rounds of register and auction procedures according to the following schedule:

Round No.	**Notice opening**
1)	30 September 2019
2)	31 January 2020
3)	31 May 2020
4)	30 September 2020
5)	31 January 2021
6)	31 May 2021
7)	30 September 2021

For wind and photovoltaic plants, the maximum power capacity which may be incentivised under the Decree, is equal to i) 770MW for access via registers; and ii) 5,500MW for access via auctions.

Specific provisions deal with the requirements and deadlines for the submission of the applications and with the priority criteria for the successful inclusion in the relevant rankings.

According to the Decree, incentive periods shall last for 20 years for all renewable sources except for hydroelectric plants, whose incentive periods may last 25–30 years, depending on the characteristics of the plant.

3. Forthcoming developments/opportunities in the renewables sector

The new Decree provides that within 180 days from the date of its entry into force, the GME *("Gestore dei Mercati Energetici"),* the company established by the GSE and vested with the economic management of the Italian Electricity Market, shall launch a public consultation for the creation of a market platform – alternative to the incentive scheme provided under the Decree – for the long-term trading of energy from renewable sources. Specific requirements shall apply to those operators willing to participate to such platform.

The FER 1 Decree is expected to attract new investments and create new opportunities for national and international operators in the renewables sector. Moreover, a new decree is likely to be implemented dealing with new incentives for energy produced by renewable sources not regulated by the FER 1 Decree (biomass or geothermal sources, etc.), which is expected to make the Italian market even more attractive for RES operators.

Japan

Authors: Munir Hassan and Sabrina Polito (November 2020)

Introduction

In the early 2000s, Japanese energy policy focused on energy independence and security as well as achieving objectives set by the Kyoto Protocol. To that end, the government of Japan concentrated on utilising nuclear power as a means of reducing emissions and increasing domestic energy production. By 2010, nuclear energy accounted for almost 30% of Japan's total electricity production and targets were in place to increase this figure to 50% by 2030.

However, the Fukushima Daiichi nuclear accident in March 2011 marked a fundamental shift in Japanese energy policy. In the aftermath of the accident, all of Japan's remaining nuclear reactors were shut down and much of the nuclear energy shortfall was met with liquid natural gas and coal. With lessons learned from the accident and its decarbonisation targets in mind (particularly following signature of the Paris Agreement in 2016), most of Japan's nuclear reactors are yet to resume operations. However, looking ahead, commentators expect nuclear and renewable generation to have a significant share of the Japanese energy mix as part of the country's decarbonisation strategy.

In October 2020, the Japanese government announced plans for the country to become carbon neutral by 2050, with a focus on the promotion of renewable energy, prioritising safety as it explores a larger role for nuclear generation and developing next-generation battery and carbon recycling technology. As such, key players are now lining up to take advantage of the anticipated increase in the renewables sector. These include most of the major Japanese conglomerates together with well-known international players such as Equinor, Northland Power, Total, RWE and Ørsted.

1. Brief overview of the renewables sector

The development of the renewables sector presents both a challenge and an opportunity for the Japanese energy economy. Japan has a wealth of renewable energy resource available to it, including hydropower, solar and wind. Additionally, the country has the world's third-largest potential for geothermal power and is reportedly rich in biomass reserves. In 2019, Japan's share of total renewable energy generation increased to 18.5% from 17.4% in 2018. In recent years, there has been a boost in solar and offshore wind power which is, in part, due to continued cost reductions and the government's long-term strategy of having wind and solar as central to the country's clean energy transition.

However, Japan's geography has presented a challenge in its clean energy transition. With a large population and a mountainous and seismic landscape, this limits the land available for renewable projects. This has also

restricted its grid network, with limited space being available for grid connection, and in turn, abnormally high costs for connection with limits imposed by several regions for intermittent renewable power to the grid.

Looking forward, the government aims to have renewables account for 22–24% of national electricity generation by 2030, with fossil fuels accounting for 56% and nuclear power 20–22%. Some critics say that Japan's renewable plans are not ambitious or far-reaching enough in comparison to other countries, with fossil fuels and nuclear still playing a central role in Japan's energy mix.

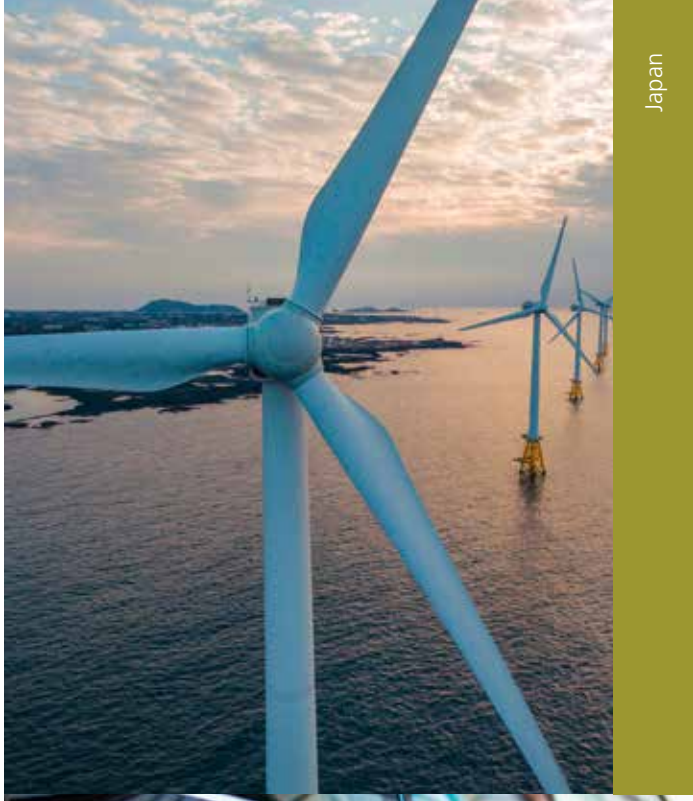
Despite this, since the introduction of Japan's national feed-in-tariff (FIT) scheme in 2012 the deployment of renewable energy has progressed rapidly. Under the FIT scheme, owners of a renewable energy project (that has been certified by the Ministry of Economy, Trade and Industry (METI) may request a transmission owner to enter into a power purchase agreement with it at a fixed price and term set by METI. To date, fixed prices under FIT are decreasing year-on-year. However, these prices remain higher than the market price of electricity meaning the FIT scheme is the primary route to market for renewable projects in Japan.

2. Recent developments in the renewables sector

Offshore wind

Offshore wind presents an enormous opportunity, with Japan having the seventh longest coastline in the world and estimated theoretical resource of around 61GW of offshore wind in depths below 50m. In addition, given that the water depths increase quickly (on average up to 200m) relatively close to the shore, commentators note that these conditions present the opportunity for Japan to be a leading market for floating wind. In November 2019, the International Energy Agency stated that offshore wind power alone has the potential to meet Japan's total power demand by over nine-fold.

In its 5th Strategic Energy Plan published in July 2018, the Japanese government highlighted the need to develop domestic offshore wind given the geographical challenges associated with onshore wind development. The government have recently implemented reforms to strengthen the regulatory framework for offshore wind in order to incentivise and give greater certainty to developers. For example, the Offshore Wind Promotion Law (Law No. 89 of 2018) came into force on 1 April 2019 and sets out the legal framework for promoting offshore wind, including the designation of certain promotion areas for offshore wind development and a competitive auction process for the rights to develop and build projects in these areas. Further to this, in June 2019, the government published guidelines for the auction process (the "General Sea Areas Public Auction Implementation Guidelines") which provides detailed guidance on the process and evaluation criteria. As of



July 2019, METI has selected 11 sea areas as potential zones for offshore projects and will be commencing wind condition and geological studies in the near future.

In summer 2020, METI announced a suite of offshore wind auctions, the first in respect of a floating offshore wind farm off Gotō in Nagasaki. The successful project must have a capacity of no less than 16.8MW, and the feed-in-tariff for the project is set at JPY 36 (EUR 0.3)/kWh. Further, in July 2020, METI confirmed it will launch auctions for another four offshore wind sites. The Japan Wind Power Association (JWPA) claims 20–30 organisations have signed up to compete in the upcoming tenders.

The Japanese government currently has a target of 10GW installed offshore wind capacity by 2030 and is expected to auction 1GW of offshore wind capacity a year from 2020 onwards to meet this target. The JWPA estimates this capacity will be comprised of 6GW of fixed turbine and 4GW floating turbine wind farms.

Solar

Following the Fukushima accident and the introduction of the attractive FIT scheme, solar power has accounted for a large portion (second to hydropower) of Japan's total renewable capacity. However, recently there have been signs of slowed investment due to the substantial decline in FIT prices for solar power and a lack of connected grid capacity.

In September 2018 the Japanese government announced a transition away from the FIT scheme to competitive auctions for the procurement of solar projects with 2MW or more, and FIT subsidy cuts for smaller-scale projects, which is expected to slow growth in Japan's solar power sector over the coming decade. Further to this, in November 2018, the METI proposed a reduction in FIT prices for large-scale PV projects (over 2MW) approved between 2012 and 2014 that will not reach completion by March 2019. It is estimated that around 23.5GW of solar projects which are entitled to FITs of JPY 40/kWh (USD 0.36/kWh), JPY 36/kWh (USD 0.32/kWh) and JPY 32/kWh (USD 0.29/kWh) may be affected and be assigned a new rate of JPY 21/kWh (USD 0.19/kWh). These changes are expected to be introduced shortly in an effort to keep costs down to consumers.

Despite this, the outlook for solar power in Japan still remains positive. It is expected that Japan will achieve its target of 64GW of installed solar capacity by 2020 as opposed to 2030. Moreover, in its 5th Strategic Energy Plan, the government envisages that in the mid-to-long term, cost reductions are expected to further promote solar power based on its position as an energy source which can be developed on a large scale and used as a distributed power source generated in an area adjacent to end users for local consumption and as an emergency power source.

3. Forthcoming developments/opportunities in the renewables sector

Environmental approval processes for offshore wind

Prolonged environmental impact assessments have inhibited the uptake of offshore wind in recent years with the process in Japan taking up to 5 years to complete. It is estimated that Japan's lengthy and expensive environmental impact assessment process has left nearly 15GW of offshore wind projects stuck in the permitting queue as of January 2020. To date, the Japanese government has implemented a new front-loading procedure that allows developers to commence environmental impact assessment surveys and evaluations before public consultation with stakeholders have finished in order to speed up the process. Whilst the new Offshore Wind Promotion Law does not address environmental processes specifically, commentators note that with the new designated promotion zones, which will require government agencies to engage with all relevant stakeholders, it is hoped that this added development will significantly shorten environmental approval processes.

Establishing Fukushima as a centre of the renewable energy industry

The government has set out plans for establishing the Fukushima prefecture as a centre for the renewable energy industry in Japan. By 2017, Fukushima was powering 60% of its electricity and 28% of its overall energy use with renewables and is home to Japan's first floating turbine at the Fukushima Forward demonstration project.

In November 2019, it was announced that the Development Bank of Japan and Mizuho Bank are among the institutions providing USD 2.7bn in funds needed for a 600MW wind, solar and transmission project at the site which is expected to be operational by 2024 and will feed Tokyo with electricity.



Kenya

Authors: Julius Wako and Jacinta Ngumo (September 2020)

1. Brief overview of the renewables sector

The Government of the Republic of Kenya has long noted the significant potential for power generation from renewable energy sources in the country. The Government has therefore sought the expansion of renewable energy generation in its overall power development plan for the period 2017 to 2037. The projection is that by the year 2037, renewable energy sources will provide just over 60% of the installed power capacity in the country.

Renewable Energy Generation Projections 2017–2037

Geothermal

The intention is that there will be an installed capacity from geothermal sources of 2,647MW by 2037, up from 650MW in 2017.

Kenya's geothermal resource capacity is estimated at 10,000MW along the Rift Valley.

Hydro

The intention is that there will be an installed capacity from hydro sources of 1,782MW by 2037, up from 805MW in 2017.

Kenya's hydropower potential is estimated to be in the range of 3000–6000MW. The undeveloped hydropower power potential of economic significance is 1,449MW of which 1,249MW comes from projects of 30MW or more. The potential is located in five geographic regions: Lake Victoria Basin (329MW); Rift Valley Basin (305MW); Athi River Basin (60MW) and Tana River Basin (790MW).

Wind

The intention is that there will be an installed capacity from wind sources of 845MW by 2037, up from 325MW in 2019.

Kenya has an area of close to 90,000km^2 with wind speeds of 6m/s and above. The prime sites are located in the counties of Marsabit, Samburu, Laikipia, Meru, Nyeri, Nyandarua and Kajiado.

Solar

The intention is that there will be an installed capacity from solar of 852MW by 2037.

Due to its location near the equator, Kenya receives 4–6 kWh/m^2/day levels of insolation. The total area capable of delivering 6.0kWh/m^2 is about 106,000km^2 .

2. Challenges faced in the renewable energy sector

Geothermal

The challenges to the development of the geothermal power generation to meet its contribution to the energy mix in 2037 have been identified in the main as: long lead time from concept to production (5–7 years); high upfront investments costs; high resource exploration and developments risks; heavy investment in transmission and other support infrastructure to existing load centres and land use conflict issues.

The Government has made it a policy to, among other measures: support and fund geothermal resource assessment and development to manage the geothermal exploration risk and attract investors; streamline licensing and allocation of geothermal blocks with incentives to accelerate geothermal development; and to promote early geothermal generation through the implementation of efficient modular geothermal technologies.

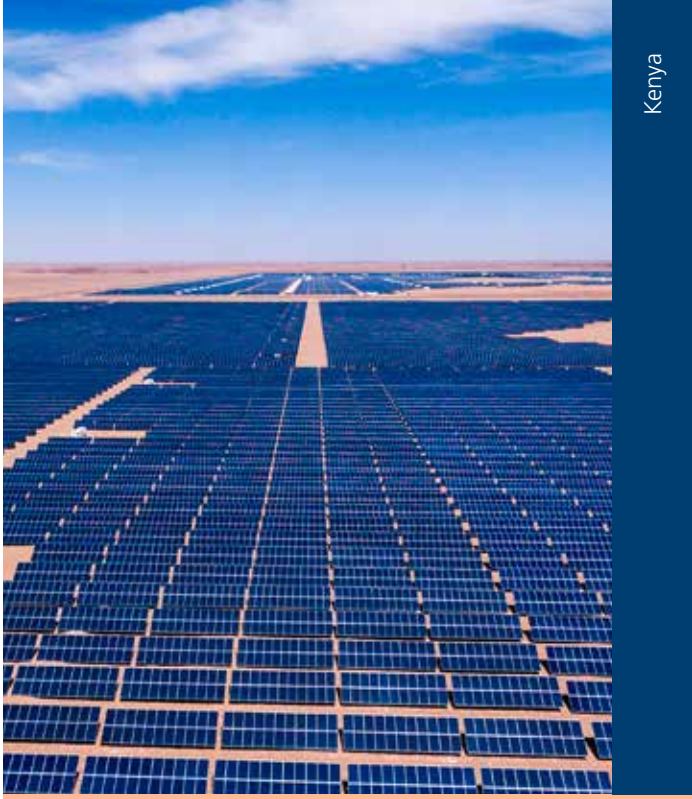
Hydro

The challenges to the development of hydro power generation to meet its contribution to the energy mix in 2037 have been identified chiefly as: its vulnerability to variations in hydrology and climate change, leading to reduction of water levels in reservoirs; relocation and resettlement of affected persons to create room for the construction of reservoirs; the absence of synergies and competing interest in the management of hydropower generating infrastructure leading to delays in implementation of viable projects; and the long lead time.

More general challenges

Despite the increased drive by the Government to promote the renewables sector, the sector faces a myriad of challenges that impede investment and exploitation of renewable resources in Kenya. These challenges include:

- multiple licensing/approval requirements;
- low awareness of the potential opportunities and economic benefits of renewable energy;
- a limited local capacity to manufacture power components and equipment;
- limited publicly available information on renewable resources to support investment promotion, decision making and energy planning;
- inadequate appropriate credit and financing mechanisms which causes delay in project implementation;
- lack of system standards for equipment and accessories;
- single buyer model – currently, all the power generated in Kenya is sold to the Kenya Power and Lighting Company;
- inadequate storage capacity in existing power generating reservoirs;
- resistance of communities to engage the IPPs and to relocate from identified project sites.



3. Recent developments in the renewables sector

To promote investment in the renewables sector, the Government has over the years put in place various measures geared towards increased exploitation of renewable sources. These include:

Enactment of the Energy Act No. 1 of 2019

Kenya adopted the Energy Act No. 1 of 2019 (the **Energy Act**) to, among other objectives, promote the generation of renewable energy in Kenya. The Energy Act mandates the Cabinet Secretary for the Ministry of Energy and Petroleum to develop, publish and review energy plans in respect of renewable energy to ensure delivery of reliable energy services and to, at a minimum, cost and develop a conducive environment for the promotion of investments in energy infrastructure development. In an effort to promote energy investments, national and county government are required to facilitate the acquisition of land for energy infrastructure development.

Establishment of the Energy and Petroleum Regulatory Authority (EPRA)

The Energy Act establishes the EPRA to, among other functions: regulate production, conversion, distribution, supply, marketing and use of renewable energy; collect and maintain energy data; ensure, in collaboration with the Kenya Bureau of Standards, that only energy-efficient and cost-effective appliances and equipment are imported into the country; and co-ordinate the development and implementation of a national energy efficiency and conservation action plan.

The powers of the Authority include, but are not limited to, the power to: issue and renew licences and permits for all undertakings and activities in the energy sector; manage electric power tariffs and tariff structures; investigate tariff charges; formulate, set, enforce and review environmental, health, safety and quality standards for the energy sector; approve electric power purchase and network service contracts for all persons engaging in electric power undertakings; investigate and determine complaints or disputes between parties over any matter relating to licences and licence conditions under the Energy Act; and impose such sanctions and fines as may be appropriate for violation.

Establishment of the Energy and Petroleum Tribunal

The Energy Act establishes the Tribunal to hear and determine civil disputes and appeals from the EPRA and any other licensing authority relating to the energy and petroleum sector. The Tribunal has powers to grant equitable reliefs including, but not limited to: injunctions, penalties, damages, specific performance and the power to, on its own motion or upon application by an aggrieved party, review its judgments and orders.

Establishment of the Rural Electrification and Renewable Energy Corporation (RERC)

The main purposes of the RERC are to spearhead development of renewable energy resources in Kenya and to accelerate the pace of rural electrification in the country. The RERC is mandated under the Energy Act to undertake feasibility studies and maintain data with a view to availing the same to developers of renewable energy resources and provide an enabling framework for the efficient and sustainable production, conversion, distribution, marketing and utilisation of renewable sources in Kenya.

The following projects by the RERC are underway:

- The 50MW Garissa Solar Power Plant which is said to be the largest grid connected solar power plant in East and Central Africa. The project was developed with the aim of diversifying the power generation mix and reduce energy costs in Kenya.
- Electrification of public utilities project. This project is being implemented under the Rural Electrification Programme and the Digital Learning Programme through grid extension for public facilities within the grid network and installation of solar PV systems for facilities in off-grid areas particularly in northern Kenya. The utilities include public secondary schools, trading centres and health centres, public primary schools, polytechnics, administrative offices, churches, mosques, coffee factories and processing plants, police posts, tea buying centres and water projects.
- Off-grid electrification project which is being implemented through: extension of power lines from off-grid towns with diesel stations to other towns within the off-grid areas (e.g the Turkwel – Lokichar Line), stand-alone diesel generators/extension of power lines from diesel stations, installation of solar PV systems for schools and other public facilities, development of grid-based solar plants (e.g the 50MW Garissa Solar project) and development of solar mini-grids. Currently, the RERC is implementing six solar mini-grid projects in the off-grid counties of Wajir, Turkana, Marsabit, Mandera and Garissa.
- Transformer maximisation project which aims to increase electricity access and connectivity in areas with large populations that are beyond the 600-metre radius transformer limitation. Priority areas are currently being identified for implementation of the project.
- The Kenya Off-Grid Solar Access Project (K-OSAP) aimed at increasing modern energy services in 14 out of the 47 counties in Kenya that have been defined as marginalised by the Commission on Revenue Allocation. The counties include: Garissa, Isiolo, Kilifi, Kwale, Lamu, Mandera, Marsabit, Narok, Samburu, Taita Taveta, Tana River, Turkana, Wajir and West Pokot.

Establishment of the Renewable Energy Resource Advisory Committee

The Committee is intended to play an advisory role to the Cabinet Secretary for the Ministry of Energy and Petroleum on the criteria for allocation of renewable energy resource, licensing of renewable energy resource areas, management of water towers and catchment areas, development of multi-purpose projects such as dams and reservoirs for power generation and management and development of renewable energy resources.

Establishment of the Renewable Energy Feed-in Tariff System

The Energy Act provides for a Feed-in-Tariff (FiT) System aimed at diversifying the generation of electricity through renewable energy sources; encouraging local distributed generation, thereby reducing demand on the network and the technical losses associated with transmission and distribution of electricity over long distances; encouraging uptake of, and stimulating innovation in, renewable energy technology; and reducing greenhouse gas emissions by lessening reliance on non-renewable energy resources.

The Energy Act mandates the Cabinet Secretary to make regulations necessary for the administration and implementation of the FiT system. Currently, there exists a FiT policy (2008) and the FiT Application and Implementation Guidelines which set out the procedures for applying for and implementing the FiT system. The policy sets the applicable tariffs for wind, small hydro and biomass sources, for plants with capacities not exceeding 50MW, 10MW and 40MW respectively. The policy was revised in 2012 to introduce improvements to the FiT calculation model and to include a linear interpolation method to adjust the tariff for the actual capacity of the generation project.

The policy specifies the contents of a Standardised Power Purchase Agreement (which applies to all technologies) for both up to and above 10MW plants connected to the grid. The FiT applicable at the time when a PPA is signed is the fixed value which will apply over the 20-year life of the PPA. Renewable energy projects which are larger than 10MW of installed capacity may be considered. However, they must pass load flow and system stability tests.

Various studies show that as of 2018, a number of investors had expressed interest in developing projects under the FiT policy, including: 104 small hydropower projects with total capacity of 579.71MW, 19 wind power projects with total capacity of 898.2MW, six biomass/biogas energy projects with total capacity of 496.09MW, solar energy projects with a total capacity of 2,519.40MW, geothermal energy projects with a total capacity of 15MW.

It is expected that the existing FiT policy, Connection Guidelines for Small-Scale Renewable Generating Plant and the Application and Implementation Guidelines will inform the FiT regulations to be developed by the Cabinet Secretary pursuant to the Energy Act.

It should be noted that for solar and wind projects, the Government is considering transitioning from FiT to a renewable energy auction mechanism that will promote competition and result in price reductions.

Net metering provisions

The Energy Act allows grid-connected consumers who own an electric power generator of a capacity not exceeding one megawatt to supply the excess power to a distribution licensee or retailer, if that consumer has a generation facility that is located in the area of supply of the distribution licensee or retailer such as KPLC.

Under the Energy Act, every distribution licensee/retailer is mandated, upon receipt of an application, to make available the net metering service to any electricity consumer that the licensee serves.

According to a report titled *Grid Connection of Solar PV: Technical and Economical Assessment of Net-Metering in Kenya, compiled by GIZ* on behalf of the German Federal Ministry of Economics and Technology in 2014, Kenya's solar potential is untapped, hence the need for developments such as net metering within the energy sector. This new development would pave the way for developers to exploit the opportunity and presents a cheaper energy solution for consumers. The regulations necessary for the administration and implementation of the net metering system are yet to be made.

Development of the National Energy Policy, 2018

Pursuant to this policy, the Government has committed to the provision of affordable quality energy for all Kenyans to be achieved through the provision of clean, sustainable, affordable, competitive, reliable and secure energy services at the least cost while protecting the environment.

Incentives

Incentives for renewable energy include:

- for companies operating within a Special Economic Zone, the chargeable tax is at the rate of 10% for the first 10 years from the date of first operation and thereafter 15% for another 10 years.
- exemption from stamp duty for registration of companies.
- exemption from stamp duty for instruments executed in transactions relating to loans from foreign sources for purposes of investing in the energy sector.

- investment deductions at the rate of 100% for power generating plants and equipment including the building housing the power generating plant as well as those operated within Export Processing Zones and at 150% where the plant is located outside Nairobi, Mombasa and Kisumu.
- insurance cover by the Multilateral Insurance Guarantee Agency (MIGA).
- Double Taxation Agreements (DTAs) between Kenya and a number of countries.
- development of Public Private Partnerships by the Government which are driven by the Public Private Partnership Unit pursuant to the Public Private Partnership Act No. 15 of 2013.
- the Government also issues letters of support that give comfort to both project companies and their financiers to enable project implementation.
- Kenya has no restrictions on converting or transferring investment funds.
- capital repatriation and remittance of dividends and interest to foreign investors are guaranteed in the Foreign Investment Protection Act Chapter 518, Laws of Kenya.

4. Forthcoming developments/opportunities in the renewables sector

It is predicted that the development projects in various sectors recommended in the Vision 2030 blueprint will lead to an increase in Kenya's population and that this, among other factors, will increase demand on Kenya's energy supply, including renewable energy. According to the Least Cost Power Development Plan (2011–2031), the demand for electricity in Kenya is projected to grow to 15,065MW by 2030.

The Energy Act gives the Cabinet Secretary for the Ministry of Energy and Petroleum 12 months from the date of commencement of the Act (28th March, 2019) to conduct a countrywide survey and a resource assessment of all renewable energy resources and prepare updates biennially which shall be published in the Kenya Gazette. This will greatly inform the public and potential investors in the private sector of the opportunities available to invest in and exploit the renewable energy resources. This exercise is currently on schedule.

There are various projects initiated or proposed to be initiated by the Government in respect of renewable resources. This presents opportunities for IPPs and other private investors to invest in the projects either by bidding for construction and installation work or for financing the implementation of these projects. Opportunities also exist for the manufacture of associated components and accessories to be used for the development of the various renewable technologies, especially wind and solar.

According to various studies, Kenya is endowed with significant potential for exploitation of renewable energy as shown below:

Geothermal power
Kenya has potential to generate 7,000–10,000MW of geothermal power spread over 14 prospective sites across the Great Rift Valley. Currently, only 800MW is generated at Olkaria and Menengai and injected into the national grid.

Hydropower
The estimated potential capacity for hydropower is 6,000MW comprising of large hydros (sites with capacity of more than 10MW) and small hydros. Potential for small hydros is estimated at over 3,000MW, of which, about 25MW is being developed. This hydropower potential is located in five geographical regions, representing Kenya's major drainage basins: Lake Victoria (329MW), Rift Valley (305MW), Athi River (60MW), Tana River (790MW) and Ewaso Ng'iro North River (146MW).

In terms of the National Energy Policy 2018, there are plans by the Government to develop large hydro projects in Karura and High Grand Falls (both in the Tana catchment area), Nandi Forest (in the Lake Victoria North catchment area) and Magwagwa (in the Lake Victoria South catchment area), and Arror (in the Rift Valley area). This development could lead to additional hydropower capacity of over 800MW in the long term.

Biomass
According to the EPRA, the main sources of biomass for Kenya include charcoal and wood-fuel which has contributed to the increasingly depleted forest cover in Kenya over the years. To make up for this loss, the Government has promoted agro forestry and social forestry programmes to increase the stock of woody biomass on farms. Opportunities have been identified in production and processing of jatropha and sweet sorghum into biofuel in Galana and other areas of the country such as Eastern, North-Eastern, Rift-Valley and Nyanza Provinces.

Municipal waste
This is one of the many under-exploited renewable resources in Kenya. According to UNEP, bio-waste accounts for 60% of the solid waste in cities and towns. More than 50% of the waste is organic; 38% is made up of plastic, paper, glass and metal. In Nairobi County alone, over 3,000 tonnes of municipal solid waste is collected per day in the Nairobi Metropolitan Area and dumped at the main dumpsite in Dandora, less than 10km from the city entre.

The Nairobi Metropolitan Services and the Kenya Electricity Generating Company (KenGen) recently entered into an agreement pursuant to which a waste-to-energy power plant project is to be developed. In August, 2020, KenGen commenced the process of securing expressions of interest from consultants with respect to the establishment of the waste-to-energy power plant in the county of Nairobi.

Co-generation
A pre-feasibility study completed in 2007 by the Ministry of Energy and Petroleum shows that cogeneration by sugar companies presents potential for generating up to 120MW of electricity with minor investments and about 200MW with modest investments in terms of expanding cane fields and cane-crushing capacity. Sugar companies are expected to diversify into the use of sugar processing by-product value addition through cogeneration and bioethanol production.

Biogas
According to the EPRA, biogas potential in Kenya has been identified in municipal waste, sisal and coffee production. The total installed electric capacity potential of all sources ranges from 29–131MW, which is about 3.2 to 16.4% of the total electricity production. A number of pilot and small commercial biogas facilities for heat and electricity generation have been rolled out. It is estimated that Kenya has potential to construct 6,500 biogas digesters in Kenya every five years.

Wind Power
Various studies show that Kenya has a proven wind energy potential of as much as 346 kW/m^2 and speeds of over 6m/s particularly in parts of Marsabit, Kajiado, Laikipia, Meru, Nyandarua, Kilifi, Lamu, Isiolo, Turkana, Samburu, Uasin Gishu, Narok, Kiambu Counties among others. It is estimated that these areas have potential to produce over 1,000MW of wind power for sale to the national grid. The Ministry of Energy and Petroleum has installed more than 60 wind masts and data loggers in various counties across the country to collect site specific data in a bid to attract generation electricity from wind.

Solar power
It is estimated that the installed capacity of solar photovoltaic systems will reach 100MW generating 220GWh annually. There are also plans to develop 26 diesel/solar hybrid plants at various sites of the country with an estimated capacity of 114MW.

Other renewable resources
Other untapped renewable energy resources include ocean (on-shore) energy, biomass gasification, bio-refinery technologies and concentrating solar power energy storage.

Luxembourg

Authors: Juilien Leclère and Jérôme Guillot (September 2019)

1. Brief overview of the renewables sector

Luxembourg has made progress towards strengthening its energy supply security, developing sustainable energy supplies and integrating its markets into the central-west European region. Luxembourg promotes resource-efficient energy supply and has made eco-innovation and clean energy technologies priorities for research and development.

Legal framework

Luxembourg's policy on renewable energy sources (RES) is guided by the following key legal elements:

- *Law of 5 August 1993* (the Law of 1993) provides the legal basis for deployment and renewable energy usage in Luxembourg. It establishes mandatory energy use norms and standards for buildings. It also creates a legal basis for the introduction of financial support mechanisms for the deployment of renewable energies in Luxembourg, such as feed-in tariffs, grants, and tax reliefs. These activities can benefit from state aid.
- *The National Renewable Action Plan of July 2010* – in line with EU Directive 2009/28/EC, Luxembourg's 2020 renewable energy targets are:
  - Overall target: 11% share of gross final energy consumption generated from RES.
  - Heating and cooling: 8.5% of heat consumption met by renewable sources.
  - Electricity: 12% of electricity demand met by electricity generated from RES.
  - Transport: 10% of energy demand met by RES.
- *Luxembourg has specific policies and schemes to achieve these targets, including:*
  - Feed-in tariff system
  - Removal of administrative barriers
  - Energy efficiency and energy saving measures in new and existing buildings
  - Organisation of training in RES installation, servicing, management and certification
  - Renewable building obligations
  - Information programmes aimed at the general public, business and household owners, and potential investors
  - Financial support for research and development
  - Comprehensive framework of fiscal incentives.

The Grand Ducal Regulation of August 2014 on the production of electricity based on renewable energy sources (the Grand Ducal Regulation of 2014) – establishes a system of certificates guaranteeing the renewable origin of the electricity produced. It outlines the method for calculating feed-in tariff (FIT) levels for renewable energy. It also introduces an additional bonus for commercialised heat generated by combined heat and power based on biomass, biogas and wood waste.

Several policies aim at promoting the development, installation and use of RES-installations, including a training programme for RES-installers; a general research, development and demonstration program; and support schemes for RES-H infrastructures.

General investments
Luxembourg awards investment grants in relation to all renewable electricity generation technologies. Luxembourg regulations identify several types of investment that are eligible for grants, including: investments in energy saving; investments in high-efficiency cogeneration; and investments in the production of energy from RES.

Any individual or company holding a business permit to carry out an industrial, commercial or artisanal activity as a main or secondary activity within Luxembourg may be eligible for these investment grants.

Aiming to support environmental protection and the rational use of resources, Luxembourg grants subsidies for companies investing in RES. Luxembourg attracts foreign investments with a full range of adapted investment incentives for investing in the efficient use of energy. Financial support may be granted in the form of medium- and long-term loans by the National Credit and Investment Corporation.

Luxembourg's income tax law provides for a special depreciation method to encourage investments in assets contributing to energy efficiency in buildings, some exemptions from income tax (e.g. for the sale of electricity generated from PV sources) or tax deduction (e.g. for biofuel).

Luxembourg's electricity market regulation has a compensation mechanism for any company involved in electrical activity (i.e. production, transport, distribution, supply or trading). The mechanism operates in the general economic interest as well as in the interest of consumers.

2. Recent developments in the renewables sector

The Luxembourg government's programme makes energy transition a key priority. The new Grand Ducal Regulation of 24 April 2017 promotes RES and energy efficiency. It amends some elements of the Grand Ducal Regulation of 1 August 2014.

3. Forthcoming developments/opportunities in the renewables sector

Luxembourg intends to meet its renewable energy and climate targets mainly through efforts at the EU and international levels. Luxembourg adopted challenging energy and climate targets for 2020 within the EU framework.

In the context of the EU objective of achieving a reduction of 80% to 95% of greenhouse gas emissions by 2050, and discussions around the 2030 climate and energy framework, Luxembourg's white paper process is an opportunity to further work on a new integrated energy and climate strategy.

Given the regional integration of its gas and electricity markets, Luxembourg is also likely to be impacted by the decarbonisation policies of neighbouring countries, as it imports most of its energy needs.

Looking ahead, Luxembourg should seize opportunities for promoting a smart green economy, competitive retail markets, smart transport and mobility solutions, and regional integration of the short- and longer-term electricity markets, with a view to maximising energy security benefits while minimising costs to consumers.

Developing a long-term vision for the energy system up to 2030–2050 in consultation with all key institutions would provide Luxembourg with the opportunity to play an active and valuable role in enhancing energy security, and meet the decarbonisation challenges faced not only in Luxembourg but in the region. The regional element is vital, as it will encourage resource efficiency, and the interoperability of technologies and infrastructure, including in the transport sector. Two key institutions have a major role to play: the Ministry of the Economy, which has overall responsibility for energy policy including renewable energy; and Myenergy, a common agency of the Ministry of the Economy, which manages the promotion of the use of renewable energy resources.

Mexico

Authors: Derek Woodhouse, Luis Fernández, José Antonio Tellez and Sofía Taracena (September 2020)

1. Brief overview of the renewables sector

The period between 2013 – 2016 saw the implementation of wide-ranging energy market reforms across Mexico which opened up the energy market to private investment, supported increased deployment of renewable energy and provided a foundation for strong economic growth. Mexico has substantial and diverse renewable energy generation resources available, including wind, solar, hydro and geothermal, with IRENA reporting that renewable energy has the potential to reduce coal demand by 62%, natural gas by 21% and oil by 6% by 2030. Moreover, the 2015 Mexican Energy Transition Law enshrined targets of 30% renewable energy generation by 2021 and 35% by 2024 (however, Mexico is currently not on track to meet these). As such, investor interest over the last few years had been high as the Mexican renewable energy market appeared poised for growth.

However, recent events have cast significant doubt over the role of both private investment in the Mexican energy market and renewable generation in the energy mix. In response to the COVID-19 pandemic in particular, the Mexican government have issued a range of measures which clamp down on private investment in the energy sector as it moves to protect state-owned oil and utility companies in light of the downturn, such measures including a blanket ban on all new energy permits. In response to such measures, the market has sought to maintain investment value through a huge wave of injunctions (or *amparos* as they are called in Mexico) that have limited most of the major effects of the new regulations issued by the energy ministry (SENER), the system operator (CENACE) and the energy regulator (CRE). Although injunctions against the new regulations have helped stop such measures in their tracks, the industry as a whole has been adapting to major changes in the way CRE and CENACE operates, as well as dealing with delays in the procurement of permits and connections.

Nonetheless, private investors and projects remain resilient, working to keep projects on track and making strategic plans beyond the current crisis, and the judicial system has responded to these developments – albeit somewhat slowly.

In April 2020, Mexico's long-term foreign-currency and local-currency issuer ratings dropped to Baa1 from A3, with Moody's citing the lack of clarity over the role of private investment in the electricity sector and wider energy policy as one of the factors in the downgrading. We consider that the short and medium-term financial crisis might actually help in finding a compromise between government interests and those of private parties, with a first step in the right direction being the government resuming its intention to foster a number of renewable energy projects which will be supported by the Palacio Nacional (the office of the Mexican President).

2. Recent developments in the renewables sector

On 28 October 2019, SENER issued the first of several regulations affecting the renewable energy sector. The first resolution provided the Mexican state-owned electric utility CFE with clean energy certificates (CELs) – the main form of subsidy support in the Mexican market for renewable energy projects – for all hydroelectric projects operated by the CFE, which were in operation prior to the 2013 energy reforms. The result of this meant that the CEL market would be overwhelmed such that the CEL demand-supply price would sink to unexpectedly low levels. This measure was challenged by stakeholders in the Mexican renewables industry, with the Mexican courts suspending the resolution.

Further, on 15 May 2020, SENER published a new policy regarding the "reliability, security, continuity and quality in the national electric system" (the "Reliability Policy"). The Reliability Policy focused on the alleged undermining of energy reliability caused by intermittent generation, with little supporting evidence of these claims. To mitigate these effects of intermittency on the grid, SENER mandated several measures including a general curtailment of solar and wind projects, interconnection preference given to strategic projects and new ancillary services to be charged to generators. In response, there have been several injunctions filed by private parties and organisations (for example Greenpeace issued an injunction on grounds relating to the environmental impact that may result from restricting renewable energy development). The Mexican Antitrust Commission (COFECE) also filed a constitutional claim before the Supreme Court of Justice against the provisions of the Reliability Policy. At the time of writing, the Reliability Policy has been stayed by court order.

Last but not least, on 28 May 2020, the CRE resolved to increase transmission fees on grandfathered renewable projects by approximately 500–800%. Such a change violated acquired rights of grandfathered projects and thus the industry came back to court and won several individual stays.

Commentators suggest the possibility of a larger swathe of new energy regulations to follow and even a counter energy reform framework. However, no formal announcement has been made on that matter.

3. Forthcoming developments/opportunities in the renewables sector

CFE's only plans for investing in renewables involve proposed upgrades to existing hydroelectric projects.

On the one hand, in the short-term, we foresee that the struggle will continue, as the government appears to consider renewable energy as more of a problem rather than a solution, while on the other, the effects of climate change may force everyone to look for a reconciliation with the renewable industry.

Mexico has historically been supportive of international challenges, as shown by the relatively ambitious commitments undertaken by Mexico pursuant to the Paris Agreement, and the current curtailment measures threaten the pledges made by the Mexican government.

As the Covid-19 financial crisis deepens, leading the Treasury Ministry to predict that Mexico is about to undergo the worst economic crisis it has faced since 1935, we anticipate that renewables will regain a principal role in both public policy and Mexican life, and will help us tackle global systemic risks. It is always hard to predict the future, but in this case, it is even more difficult than usual.

Morocco

Authors: Marc Veuillot and Alix Fredet (October 2018)

1. Brief overview of the renewables sector

Morocco is highly dependent on foreign energy supplies, which represent significant costs for the kingdom where foreign exchange regulations restrict foreign currency payments. With about 3,000km of coast and high sun exposure, the country has valuable assets in favour of energy transition and therefore has a strong interest in promoting renewables.

According to the Ministry of Energy and Mines, and the National Office of Water and Electricity, the demand for electricity will double by 2020 and quadruple by 2030. Implementation of the Moroccan "2020 energy plan" has started, with the promotion of two main governmental programmes: the Moroccan Solar Plan (2009) and the Moroccan Wind Power Plan (2010). These plans target the installation of 3,000MW by 2020 and to establish the kingdom among the world's top five countries for investment in the renewable sector. The Moroccan national energy strategy is looking to increase the contribution of renewable energy sources (RES) including hydropower, wind power and solar power.

Morocco's involvement in green energies was confirmed when the country hosted the 22nd session of the Conference of the Parties (COP 22) to the United Nations Framework Convention on Climate Change (UNFCCC), held in Marrakech from 7 to 18 November 2016. This event underlined the role played by the kingdom in cutting emissions and promoting renewable energies.

Solar

Solar represents the biggest investments in RES currently carried out in Morocco. The Moroccan Solar Plan led by MASEN (Moroccan Agency for Sustainable Energy) aims to implement a minimum power capacity of 2,000MW by 2020. One massive project currently in process is the USD 9bn multi-phased Noor Solar Complex in Ouarzazate. Noor I was commissioned in 2016; commercial operations of Noor II and Noor III will start in 2017 and 2018 respectively.

As well as the Noor Project, Morocco is also establishing micro solar sites that benefit Morocco's rural population. In 1995, the rural electrification rate did not exceed 18%. Fifteen years later, the programme for rural electrification has brought this rate to 96.8%.

Wind

As part of the national strategy to secure the country's supply of electrical energy and promote RES, Morocco has set a target of achieving 42% of the installed capacity based on renewable energy by 2020. To achieve this goal, and in addition to wind capacity already produced or under development, Morocco has decided to launch a programme of integrated

production of electricity from wind energy. This Integrated Wind Programme includes two phases and six wind farms with a total installed capacity of 1,000MW. Five of the wind farms are now under tendering process – the 850MW Project, the second phase of the Integrated Wind Programme – and should be implemented by 2020. Morocco's wind power potential capacity is estimated at 6,000MW.

Hydro

Morocco's installed hydropower capacity was about 1,770 MW at the end of 2015. The kingdom plans to increase this capacity by improving the sector's attractiveness; the new law No. 58–15, amending the law No. 13–09 for renewable energies, has set a new threshold for installed capacity from 12MW to 30MW.

Biomass

Today, the potential of biomass in Morocco is about 950MW. The Green Morocco Plan launched in 2008 to boost agricultural production, combined with new regulations for waste management, will lead to an additional potential of 400MW by the year 2030.

2. Recent developments in the renewables sector

Morocco established its real "green" legal basis through law No. 13–09 for renewable energies, dated 18 March 2010, later amended by law No. 58–15, dated 12 January 2016. Both laws establish an authorisation regime or prior declaration for any installation for the production of electricity from renewable sources, according to its power and nature. Below thresholds determined by law, the establishment, creation and modification of installations for energy production from renewables is free. To obtain authorisation, an operator must provide technical justification, prove financial capacity, and fulfil specific conditions. For example, if the applicant is a private legal entity, it must be a corporation registered in the Kingdom of Morocco and must not be subject to any court receivership or liquidation procedure. Authorisation is first granted on a provisional basis, and the applicant must obtain definitive authorisation to put the premise into use. Definitive authorisation is valid for 25 years, renewable once for the same duration. Concerning the prior declaration, the applicant must submit an administrative file leading to the delivery of a provisory receipt (récépissé) that becomes definitive after the file's examination. If the premise has not been put into service within three years of the date of definitive receipt, the entire procedure must be repeated.

For commercialisation of "home-made" renewable energies, priority is given to the Moroccan national market.

According to law No. 58–15, operators are now authorised, under certain conditions, to commercialise the 20% surplus of their annual production. Two types of conventions are necessary to commercialise renewable energies in Morocco: (i) a convention signed between the operator and the National Office for Electricity (ONE) or the electricity grid supplier; (ii) a convention between the operator and the State or the entity designated by the State for that purpose.

3. Forthcoming developments/opportunities in the renewables sector

As the renewables sector grows, projects will emerge in the next few years. The Research Institute on Solar Energy and Renewables (IRESEN) is financing joint research projects involving universities, research centers and Moroccan industries and enterprises. IRESEN is also aiming to launch two new calls for projects in research and development and for innovation support.

As an additional call to green investments, Morocco is continually trying to implement fiscal incentives to attract Moroccan and foreign investors. Most of these incentives are provided by the Investment Charter initiated in 1995, due to be renewed soon and including five main measures: total exemption from corporate tax for any new industrial business; implementation of at least one Export Processing Zone (EPZ) per region; granting of the EPZ advantages to big export companies even if they are not established in an EPZ; recognition of the indirect exporter status (for big export groups' subcontractors – exemption of corporate income tax on export turnover during the first five years, and application of a corporate income tax rate of 17.5% for the following years); and implementation of supports for less developed areas to stimulate industrial investment and promote well-balanced territorial investment.

The Netherlands

Authors: Cecilia van der Weijden, Maurits Rabbie and Marcellina Rietvelt (August 2020)

Introduction

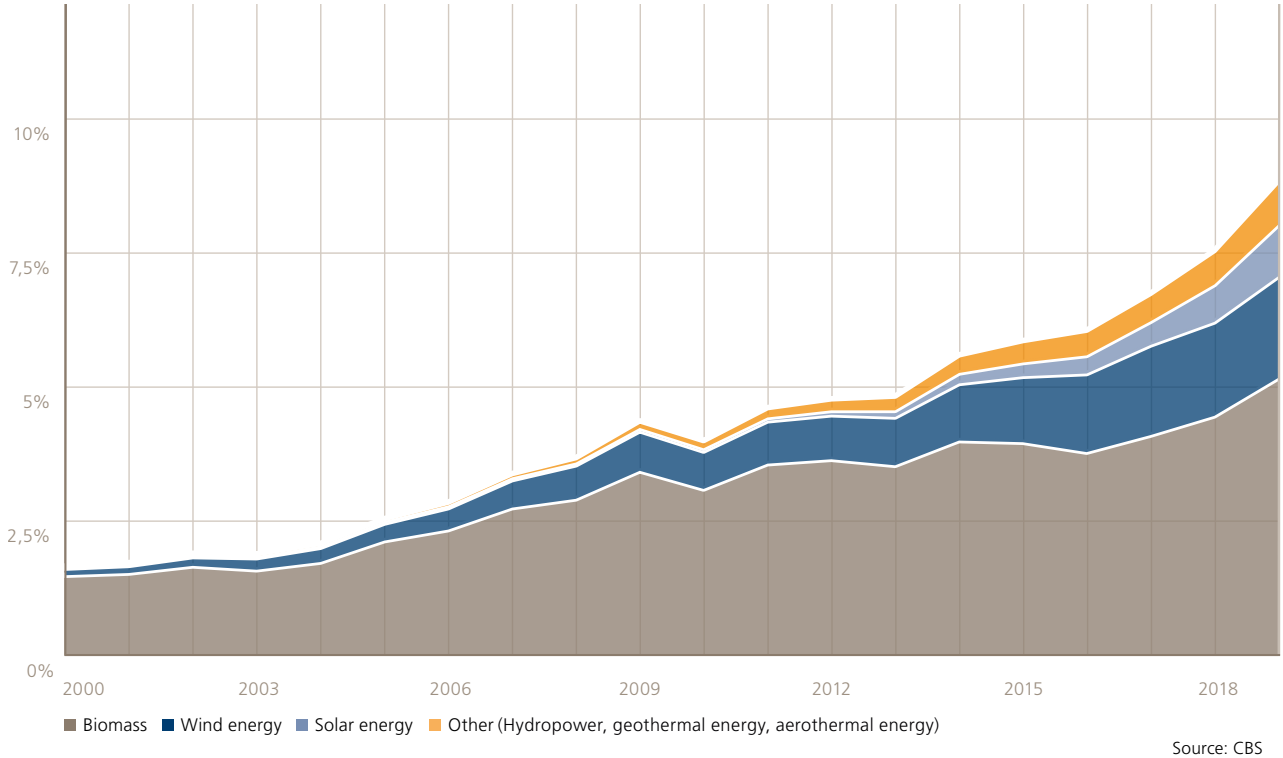
Since 2017, the Netherlands has taken many steps towards realising the objectives set out in the 2015 Paris Climate Change Conference. In October 2017, the Dutch government presented an ambitious energy policy which aimed to achieve a 49% reduction in greenhouse gas emissions by 2030 (compared to 1990) and a 95–100% reduction by 2050. On 1 September 2019, the Dutch Climate Act came into force, making the Netherlands the seventh country in the world to have a Climate Act. In addition, in June 2019 a Dutch Climate Agreement was presented which set out in detail how the Netherlands plans to achieve its CO_2 emission reduction objectives. The Climate Agreement was prepared in conjunction with over a hundred organisations, companies and governmental authorities and provided for governmental action in five different areas: electricity; transport; agriculture and land use; industry; and built environment. One of the measures was a legislative proposal introducing a minimum price on CO_2 which was intended to take effect as of 1 January 2020. However, the process has been delayed and the proposal is still being debated by the Dutch Parliament. In addition, in May 2020 a legislative proposal introducing a levy on CO_2 emissions by industrial companies was presented for consultation. There are several similarities between both proposals, however, the proposal for a minimum price is only applicable to electricity generators.

At the same time, the Netherlands has taken major steps to phase out fossil fuels. A bill prohibiting the use of coal for the production of electricity came into effect on 11 December 2019, as a result of which the first coal-fired power plant closed on 1 January 2020. The Netherlands' remaining four coal-fired power plants will follow ultimately by 2030. The Dutch government also announced in March 2018 that gas extraction from the Groningen field – the largest gas field in Europe – will come to an end by 2030 at the latest. The Dutch government envisages phasing out natural gas for households and has implemented legislation that means, as of 1 July 2018, the TSO is no longer obliged to connect newly-built houses to the gas grid. The Dutch government forecasts that by 2021, 75% of newly-built houses will not be connected to the gas grid, and that by 2050 households in the Netherlands will no longer use natural gas.

1. Brief overview of the renewables sector

Key statistics

In 2019, the share of renewable energy amounted to 8.6% – 181 PJ – of total Dutch energy consumption (see page 89). Even though the Netherlands is lagging behind other European countries and is falling short of its targets, the development of renewable energy projects has shown an enormous increase in recent years. Although the original target for 2020



Source: CBS

(14% renewable energy in the total energy mix) will not be met – the target for 2023 (16% renewables in the total energy mix) is still feasible.

The share of wind and solar is still relatively small, but this is changing rapidly. In 2019, solar photovoltaic (PV) increased by 37% to 20 PJ. Wind power rose by a mere 7% to 39 PJ, but multiple large new wind parks are currently under construction. It is expected that 50% of renewable energy production capacity will consist of wind and solar by 2023 and 66% by 2030.

A complicating factor in meeting those targets is that currently all Dutch provinces are either experiencing or expecting grid capacity shortages. These shortages are putting the wind and solar energy sectors at risk, since projects that have already been awarded subsidies are waiting to be connected to the grid and new projects are at risk of not receiving the necessary transmission capacity. In order to address this problem, the Dutch government has come up with a series of solutions including developing strategies for congestion management, legislative changes and amending the subsidy application procedure, taking into account the regional grid situation.

Biomass is currently by far the largest source of renewable energy in the Netherlands, with a share of almost 60%. However, at the moment there is a public debate in the Netherlands on biomass sustainability. Opponents are of the view that biomass results in too much CO_2 emission and therefore the government should stop subsidising biomass. Supporters of biomass, however, state that without it the Netherlands will not be able to meet its climate targets. As a result of the public debate, biomass projects across the Netherlands are being put on hold or cancelled. An example of this is the energy company Vattenfall which announced that it is postponing its plans for the development of the largest biomass power plant in the Netherlands until the Dutch government has taken a clear position on biomass.

Subsidy scheme

As of September 2020, the main subsidy scheme for the promotion of renewable energy is the SDE++ (Stimulation of Sustainable Energy Transition). The goal of the SDE++ scheme is to reduce CO_2 emissions. As a consequence, technologies will compete on the basis of the amount of CO_2 that has been avoided. The SDE++ scheme offers an operating premium feed-in tariff subsidy for renewable energy that aims to compensate the difference between the cost price of the technology and the market price of the avoided CO_2 SDE++ will be financed in the same way as its predecessor (the SDE+ scheme): through a levy on consumer energy bills.

The SDE++ scheme is available for the following categories[1]:

- renewable electricity through osmosis, hydropower, wind and solar;
- renewable heat and cogeneration through biomass (fermentation and combustion), spent mushroom compost, geothermal energy (deep and ultra-deep) and solar thermal energy;

[1] Please note that the SDE++ scheme has not yet been published in the Government Gazette (*Staatscourant)* and therefore this list of categories eligible for SDE++ subsidy is subject to such publication.

- renewable gas through biomass (fermentation and gasification);
- CO_2-reducing heat through aquathermal energy (recovered from surface water (TEO) and waste water (TEA)), daylight greenhouse, e-boilers, geothermal energy (shallow), waste heat and heat pumps; and
- CO_2-reducing production through carbon capture and storage (CCS) and hydrogen by electrolysis.

2. Recent developments in the renewables sector

The rise of solar PV

Although solar photovoltaic (PV) power plants currently represent a small portion of Dutch power generation, solar PV is becoming an increasingly important energy generation technology. In the period 2017–2020, on average half of the SDE+'s available budget was allocated to solar PV. Over the past five years, the capacity of solar PV has almost quadrupled. Today, projects with a capacity of 50MWp–110MWp are under development, as well as a number of large rooftop projects. For example, dairy co-operative Friesland Campina has partnered with an energy company to install 400,000 rooftop solar PV panels with a capacity of 294MWp on the farms of its members, in a project which was granted an SDE+ subsidy of more than EUR 200m.

Storage of solar and wind energy

Even though storing energy is vital to balancing the grid, the storage sector in the Netherlands has only recently started to develop. In recent years several energy storage pilots have been conducted.

Storage is currently not regulated under Dutch legislation and therefore there are obstacles yet to be overcome. For example, unlike in some other EU member states, Dutch households that produce renewable energy with solar PV currently have little incentive to invest in home storage systems. One of the reasons for this is that the Netherlands offers consumers the possibility to off-set an energy surplus that is fed into the grid against the electricity purchased from their energy supplier.

For producers of wind and/or solar with a large-scale grid connection that are eligible for receiving SDE++ subsidy, storing electricity is currently also not beneficial as no SDE++ subsidy is granted for electricity first stored and subsequently delivered to the grid. In addition, a double energy tax may be levied in the case of storage – both for the storage and the subsequent consumption of energy.

Subsidy free offshore wind

The current offshore wind tender scheme consists of five annual tenders of 700MW that will take place in the period 2018–2023. It is expected that after 2023 the annual built capacity will increase to 1GW. To achieve the objectives of the 2015 Paris Climate Change Conference, it is believed that by 2035 the total Dutch offshore wind energy capacity will have to amount to approximately 17GW (at present, the installed capacity amounts to almost 1GW).

SDE+ subsidy was made available for the first two offshore wind tenders. However, the third tender, held in autumn 2018 (for Hollandse Kust Zuid Sites I and II), the fourth tender, held in spring 2019 (for Hollandse Kust Zuid Sites III and IV) and the fifth tender held in spring 2020 (for Hollandse Kust North Site V), were all subsidy-free tenders. In both the third and fourth tenders, the Dutch government awarded Vattenfall the permits to develop the world's first subsidy-free offshore wind parks. The winner of the fifth tender is a consortium of Shell and Eneco.

The Offshore Wind Energy Act (OWEA) currently offers two tender procedures: a subsidised procedure with a wind permit and subsidy awarded to the party offering the lowest tender; and a subsidy-free procedure with a wind permit awarded on the basis of a comparative test. Following the recent zero-subsidy bids, the Dutch government presented in November 2018 a legislative proposal for amending the OWEA. The bill introduced two additional subsidy-free tender methods: a combination of a comparative test and a financial bid; and an auction procedure. The bill is currently being debated in the House of Representatives.

3. Forthcoming developments/opportunities in the renewables sector

TenneT's Hub and Spoke concept

In 2016, Dutch electricity operator TSO TenneT came up with a proposal to make CO_2 reduction targets feasible and affordable by building a large European electricity system in the North Sea, based on a 'hub-and-spoke' principle. Offshore wind parks would be connected to a hub in the North Sea, from which the electricity generated would be transmitted to the North Sea countries with direct current cables, which would also serve as interconnections between the energy markets of these countries. Hydrogen could also be produced and stored at the North Sea hub. TenneT's thinking was based on an island with a modular structure, in the form of a platform, caisson island or sand island depending on the objective and desired characteristics of the specific hub.

In July 2019, this concept was further developed by the North Sea Wind Power Hub-consortium (consisting of TenneT, Gasunie, Havenbedrijf Rotterdam and Energinet.dk). After in-depth investigation, the consortium concluded that instead of having one large island, eight to ten smaller energy hubs (of 10–15GW each) would be more optimal for realising the 'hub-and-spoke' principle. The consortium now envisages having the first energy hub operational by 2030. Currently, the key complicating factor for the development of this concept is the approval of the various governments involved.

Hydrogen

The Dutch Climate Agreement sets out ambitious targets for hydrogen, with key concepts being upscaling, cost reduction and innovation. The Dutch government sees hydrogen as an opportunity for the Dutch economy, both as a factor that may influence companies in deciding to invest in the Netherlands and because of the fact that hydrogen may lead to opportunities for Dutch companies and universities. The Netherlands has some unique selling points: it has empty gas fields in the North Sea that can be used for CO_2 storage, it has substantial offshore wind installations that can – in the long term – produce green hydrogen and an extensive natural gas infrastructure, which can, with minor adjustment, be used for the transportation of hydrogen. As such, a large number of projects, pilot-projects and initiatives are in the process of being constructed and developed. Examples include:

- *Porthos*: the Porthos project in the port of Rotterdam is led by a consortium of state-owned companies – Gasunie, EBN and the Port of Rotterdam. The project focuses on the capture of CO_2 within the port of Rotterdam from existing hydrogen production to produce large-scale blue hydrogen aimed at reducing emissions by 2030, whereby the CO_2 is stored in an empty gas field in the North Sea.
- *PosHYdon*: this is a joint project involving Gasunie, TNO and Nextstep (the Dutch association for decommissioning and reuse) using Neptune's oil platform as an offshore green hydrogen plant, integrating wind, gas and hydrogen. The pilot aims to integrate three energy systems in the North Sea: offshore wind, offshore gas and offshore hydrogen by producing hydrogen from seawater on Neptune's Q13-a platform in the North Sea. The aim of the pilot is to gain experience of integrating working energy systems at sea and the production of hydrogen in an offshore environment.
- *Magnum Project*: The Vattenfall Magnum power plant is a 1,32GW gas-fired combined-cycle power plant located in Eemshaven, Netherlands. Operational since 2014, the three-unit plant is owned and operated by Vattenfall. The facility is capable of generating enough power to serve the needs of approximately 2m Dutch households. An innovative hydrogen conversion project is currently underway at the power station to convert one of its units to run on hydrogen by 2023. Upon completion, the Vattenfall Magnum will be the world's first facility to generate 100% carbon-free power using hydrogen as fuel.

North Macedonia

Authors: Marija Filipovska and Dusan Bosiljanov (July 2020)

1. Brief overview of the renewables sector

The energy sector, as one of the strategic areas of the Government of the Republic of North Macedonia ("Government") is a highly regulated sector of the national economy. This means that many laws and regulations govern energy projects, some of which are subject to frequent change.

As part of the EU harmonisation process, the Macedonian Parliament adopted the new Energy Law in May 2018 ("Energy Law") which harmonised the energy legislation of North Macedonia with the EU Third Energy Package. To implement the provisions of the Energy Law, appropriate secondary legislation has been adopted. The purpose of the new law was to create an effective legal framework for cooperation, mutual reporting and coordination of the activities of the competent authorities of North Macedonia with the relevant institutions of the European Union Energy Community, such as coordinated crisis management, reporting on the imposition and monitoring of compliance with public and universal service obligations and coordinated activities related to the functioning and development of regional markets of energy. Also, the Energy Law set the foundations for stability, competitiveness, and economic functionality of the energy sector. As a priority, the Energy Law fostered the promotion of renewable energy sources (RES) and encouraged energy efficiency. This, in a short time, has contributed to increased investments in the field of renewables.

As the Government has a strategic goal to invest in renewables, it regulates supportive measures such as the Energy Law, to help electricity producers that use renewables and looks to assist investors hoping to obtain the status of privileged power producer. For the first time, the privileged power producer may now obtain the right to use premiums, alongside the existing option to use the feed-in tariffs. The premiums can be awarded to privileged energy producers producing energy from wind power plants and photovoltaic power plants only.

Based on the Energy Law and the Energy Development Strategy of North Macedonia until 2040 ("Strategy"), the ultimate goal is to significantly increase the use of RES sustainably, to a point where renewables make up 45% of total energy consumption. According to the Strategy, this is expected to be achieved by promoting the use of RES in a way that ensures sustainable development. The share of RES in total final energy consumption should increase in the forthcoming period

and it is expected to reach 35–45% by 2040. Also, it is expected that photovoltaic and wind power plants will be the fastest growing technologies for electricity production in all scenarios (up to 1,400MW for photovoltaic and 750MW for wind).

2. Recent developments in the renewables sector

In 2019, the Government adopted the Decree on Support Measures for Electricity Production from RES (Decree), which regulates the conditions and manner for determining the Premiums and Feed-in Tariffs.

Pursuant to the Decree, the Feed-in Tariffs could be awarded to privileged power producers that produce energy from hydropower plants, wind power plants, and biomass and biogas thermopower plants.

Previously, Premiums could only be awarded to privileged energy producers that produce energy from wind power plants and photovoltaic power plants.

Furthermore, since the adoption of the Energy Law, several procedures for construction of photovoltaic power plants have been realised, such:

- Construction of 35MW photovoltaic power plants on state land;
- 10MW photovoltaic plant in TPP Oslomej; and
- Construction of a photovoltaic power plant of 100MW in the former coal mine TEC Oslomej.

With all these investments, as well as the planned photovoltaic power plant in REK Bitola, which is projected at 20MW, it is expected that installed capacity will reach 200MW, which is a strategic priority of North Macedonia. These developments confirm the commitment to invest in RES and further attract interested investors in this area.

As a most recent development, in May 2020 the Government announced that the tender procedure for awarding premiums for electricity generated by photovoltaic power plants on private land was completed. In total, 44 bids were submitted, and, after a thorough evaluation process, including deadlines for appeals, the Government signed agreements for right of premium usage with a total of 23 investors in 16 municipalities for a total of 21MW. The investors will have three years to complete the construction of the photovoltaic power plants, and after completion of the construction, an agreement for premium usage for 15 years will be signed.

To further improve the conditions for large investments in general, particularly for foreign capital, the Parliament of the North Macedonia in January this year adopted the Law on Strategic Investments of North Macedonia (SIL).

The SIL is the latest legal instrument designed to encourage, attract, and create conditions for conducting strategic investments in North Macedonia which offers new opportunities for the potential investors in general. With this opportunity, potential investors in RES could initiate a large investment cycle in the country. This could have a positive impact not just in the energy sector as a strategic priority, but could improve the country's competitive advantages and economic growth as well as the living conditions of the citizens of North Macedonia in general.

3. Forthcoming developments/opportunities in the renewables sector

North Macedonia welcomes investments in the energy sector. The Government has shown its intention to promote and provide good conditions for investments in this sector. In accordance with the Strategy, the Government intends to grow the energy sector, by pursuing the following objectives:

- Aiming to increase installed solar energy capacity and to increase wind power capacity to 100MW;
- Inviting companies to design, build, and operate new large and small hydropower plants; and
- Introducing concessions for building small hydropower plants.

Furthermore, pursuant to SIL, the Government in May, 2020 announced a Public Call for submission of a request for determining the status of a strategic investment project (SIP).

According to the SIL and the Public Call, the execution of the SIP is determined as a public interest. Hence, the SIP should cumulatively meet the following requirements:

- the proposed investments must comply with environmental standards;
- the proposed investments must not be contrary to the Constitution of North Macedonia and ratified international treaties;
- SIP must comply with the strategic priorities of the Government of North Macedonia.

Priority areas to be covered by this call are projects in the fields of energy and infrastructure. Therefore, potential investors in the field of RES will get an additional opportunity for investment that would be set as a SIP by the Government of North Macedonia.

Therefore, in the coming years we can expect the Government to further encourage investment in the RES sector, in order to boost usage of RES which would allow sustainable development of the energy sector in general.

Oman

Author: Mary Allan (September 2019)

1. Brief overview of the renewables sector

Since the first economic oil discovery was made in 1962, the oil and gas sector in the Sultanate of Oman has been the driving force of its economy.

Since 2000, gas has been the primary fuel source for energy generation in Oman. However, in recent years the limited gas resources in Oman, coupled with the difficulties of transportation due to the remote locations of gas discoveries as well as the vast distances and land contouring, have caused the government to explore alternative fuel sources for generating electricity. This can be seen with the recent launch of several major renewable energy projects, the sultanate's monopoly power procurer, the Oman Power and Water Procurement Co (OPWP), expects solar energy, wind power, and waste energy projects to make up 30% of the country's energy mix by 2030.

This trend in Oman has coincided with the rapidly developing global shift towards renewable energy generation, with the Middle East region at the forefront of this energy diversification.

2. Recent developments in the renewables sector

The Omani government sees an important role for the private sector in order to achieve its *Vision 2020* goals towards sustainability and economic development. According to *Vision 2020*, Oman seeks to reduce its dependence on oil, as well as stressing an increased use of natural and renewable resources. It sets out an objective to privatise electricity, water, and other commodities alongside a target to produce 10% of the country's electricity requirements through renewable energy sources by 2020.

Oman currently aims to diversify the sultanate's energy resources. Leading this diversification is OPWP, which aims to meet ongoing demand for electricity by procuring 30% of Oman's power requirements through renewable energy projects by 2030.

According to the OPWP, the expected renewable energy mix by 2030 is for 21% to be generated using solar energy, 6.5% from wind power and 2.5% from waste energy. It is important to note, however, that gas-fired power plants will remain the largest source of energy, expecting to take up around 70% of the total energy mix.

In 2009, the Authority for Electricity Regulation of Oman (AER) also conducted a comprehensive study of the level of solar energy density in Oman. The results of the study demonstrated that the Sultanate of Oman has one of the highest levels of solar density in the world, which the government is now seeking to utilise in order to ensure that power can be generated in a more clean and efficient manner.

Recent projects

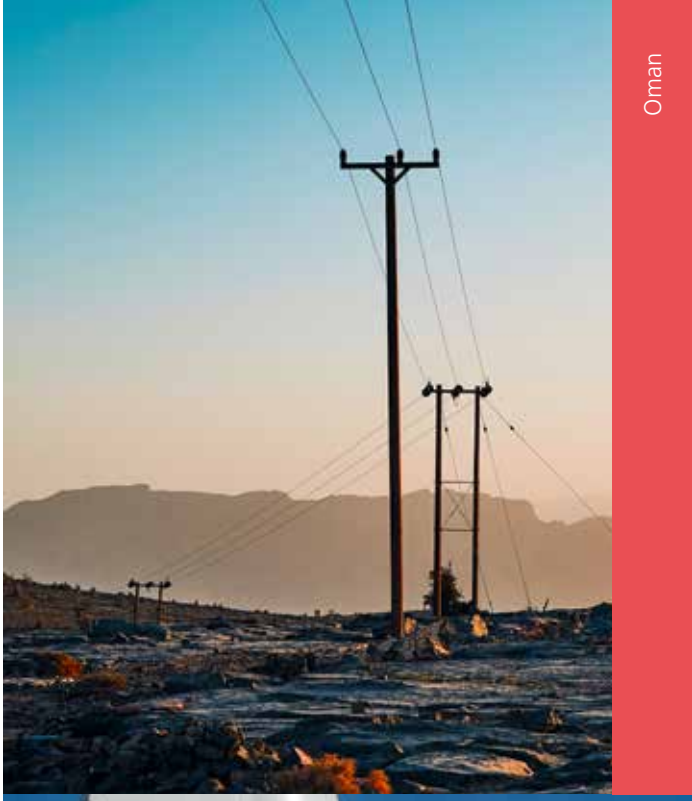
The renewables market in the sultanate is still very young with several projects currently in their procurement or construction phase, although there is a definite move towards expanding the renewables sector. The projects under way include a 500MW solar PV plant to be built in the Wilayat of Ibri by a consortium led by Saudi Arabia's ACWA Power which will power 30,000 homes by 2021.

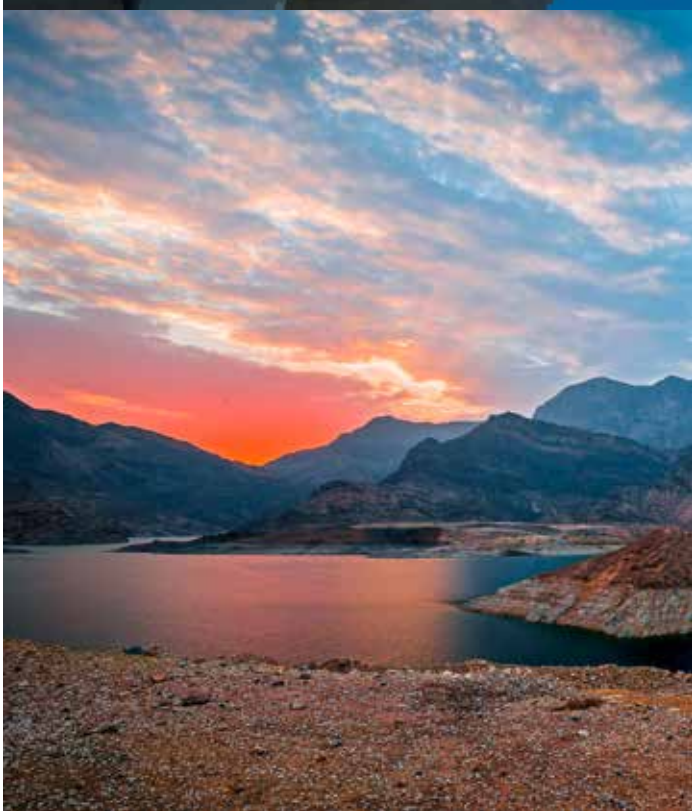
The OPWP has recently also issued RFQs for two new solar IPPs – Manah I and Manah II – which will be located in Manah, southwest of Muscat, which will generate a combined 1.1GW of energy.

Having completed a feasibility study, the OPWP is also in the process of procuring a waste to energy IPP, which will have an electricity generation capacity of 125–160MW and would process 1.4m tonnes of municipal solid waste annually.

Petroleum Development Oman LLC (PDO) has procured a 100MW solar PV plant to be built by Japan's Marubeni which will supply electricity from May 2020 to PDO for the purposes of its operations in Amin, in the south of Oman.

A trend that is being seen elsewhere in the region is the use of captive solar PV in the construction, operation and maintenance of independent water projects (IWPs). This has already been seen in Oman during the procurement of the Sharqiyah IWP where the winning bidder, Japan's JGC Corporation, proposed the use of a captive solar PV plant to reduce the electricity consumption required from Oman's grid.





The AER has issued a licence for a first-of-its-kind solar pilot project in the sultanate. The 303kW solar power plant is located in the province of Al Mazyounah in the southern Dhofar Governorate. The pilot project allows assessments to made of the feasibility of commercial use alongside the challenges that may arise on similar projects. Another renewable project which is set to commence operations this year in Dhofar is Oman's first wind power project, the first large-scale wind farm in the GCC region which will generate a capacity of 50MW. Once fully commissioned, the wind farm is expected to generate enough electricity to supply 16,000 homes, equivalent to 7% of Dhofar Governorate's total power demand.

3. Forthcoming developments/opportunities in the renewables sector

Given that the renewables market in Oman is still in its infancy, it is notable that there is no specific renewable energy legislation which governs and regulates the renewables market. Therefore, the Electricity Sector Law promulgated by Sultani Decree 78/2004 remains the key piece of legislation governing energy generation in the sultanate. The AER has recently initiated the development of a regulatory framework for the use of renewable energy, which is expected to be drawn up by the end of this year.



Peru

Authors: Carlos D. Hamann, German Tarazona and Alejandro Diez Canseco (September 2020)

1. Brief overview of the renewables sector

Peru's energy sector experienced significant development post-2010 due to the increase in internal demand caused by the country's economic growth. Unfortunately, growth has slowed down in the past few years, following the delay of certain mining mega projects.

To satisfy internal demand and to reduce greenhouse gas emissions, in line with the Organisation for Economic Co-operation and Development (OECD) requirements, Peru has been gradually implementing policies to achieve "clean" growth. A fundamental aspect of the country's energy strategy, established by the National Energy Policy 2010–2040, is the relationship between renewable energy resources (RER), energy efficiency and environmental requirements. Such aspects were strengthened by Peru's ratification of the Paris Agreement in 2016, being the first Latin-American country to do it.

RER are regulated in Peru by Legislative Decree N°1002 and its Regulations, published in 2008. Power generated from resources like biomass, wind, solar, geothermal and tidal energy are considered to be RER. Hydraulic energy projects are treated as a RER whenever their installed capacity does not exceed 20MW.

In order to achieve a diversified energy mix with an increasing share of renewables, and acknowledging the relatively high costs associated with these technologies, the Peruvian government has promoted renewable energy with the organisation of RER auctions. The auctions are scheduled to be called every two or three years, giving bidders the opportunity to participate in development projects. In each auction, energy supply contracts are awarded to the bidders who offer the best price for a 20-year period. The difference between the market price for electricity and the price awarded in the RER auctions is obtained from the contributions of network users, by means of surcharges in the connection levy.

The benefit of this approach is that it secures the sale of RER production at a pre-determined rate, which facilitates the financing, construction and operation of renewable energy projects. RER also benefit from other privileges. For example, priority is given to the daily dispatch of freight, conducted by the Peruvian Committee for Economic Operation of the System (COES), because it is considered to have a variable production cost equal to zero.

It is expected that RER will play an increasing role in the energy generation market. According to the Supervisory Agency for Investment in Energy and Mining (OSINERGMIN), the energy market regulator, it is planned that by the year 2040 RER will represent 20% of all the energy produced in Peru.

Tendered requirements in RER Auctions				
Auction	**First Auction (2009)**	**Second Auction (2011)**	**Third Auction (2014)**	**Fourth Auction (2016)**
RER Technologies Hydro < 20MW	1,314GWh 500MW	1,300GWh 681GWh	320GWh 1,300GWh	1,300GWh 450GWh

Source: https://www.osinergmin.gob.pe/empresas/energias-renovables/subastas

2. Recent developments in the renewables sector

The development of RER has been achieved with the use of the Auctions. The evolution of the Auctions since the first in 2009 is shown in the table above.

In the fourth RER auction, two biomass projects, four wind turbine projects and 48 solar projects were presented. In the first round, two projects for the utilisation of solid urban waste were awarded, as well as one wind farm and a solar project installation.

The prices awarded on the fourth RER auction, especially for wind and solar facilities, have reflected the recent drop in price of wind turbines and solar panels. This situation encourages competition and benefits final users, as reduced costs faced by RER translate into lower energy bills. The minimum unified prices of power and energy are lower than the minimum prices offered by hydroelectric plants. The results of the fourth auction suggest that the renewable energy integration scheme is becoming more competitive.

It is important to note that, in January 2020 the extension of the "Wayra I" wind farm, which was awarded in the fourth RER auction, was approved. This farm is currently capable of generating 600GWh of energy per year, and its expansion will include the installation of 30 wind turbines that will increase the farm's power by approximately 108MW.

Another important indicator of the evolution of RER is that, even without auctions, and in addition to the 65 projects associated with RER, which include wind, hydro, solar and biomass, awarded through auctions, in February 2020 the Ministry of Energy and Mines (MINEM) granted the concession of three solar plant projects in the Arequipa region, which together will have an installed power capacity of 460MW.

Such solar plant projects, along with wind and tidal projects which in the future shall operate outside the scope of RER auctions, will now be able to compete with conventional energy projects since OSINERGMIN, in August 2019, amended the Technical Procedure N° 26 of COES (PR-26), for including the recognition of their "firm capacity".

In deed, while conventional energy projects injecting energy continuously into the national grid are paid by COES for such "firm capacity", RER projects had limited ways to compete with conventional energy projects, due to the variations in energy injections. With theamendment to Technical Procedure N° 26 of COES (PR-26), OSINERGMIN and COES found a way for recognizing "firm capacity" to the mentioned RER projects, and thus, improving their chances to compete in the market.

Likewise, in July 2020, a Supreme Decree project was published for comments, in which many important amendments to the power sector would be passed (when approved) among which we can highlight the inclusion of measures that benefit RER and especially promote the use of geothermal technology.

Peruvian government RER policies also have the aim of improving rural electrification in the country. By 2021, MINEM aims to have 100% rural electrification, – a goal that may be achieved with the help of RER.

3. Forthcoming developments/opportunities in the renewables sector

Experts consider that the competitiveness of RER is greater than that of hydroelectric power plants. As a result, wind and solar investment opportunities are currently being explored. According to the Annual Operation Report of the National Interconnected Electric System (SEIN), published on January 20, 2020, electricity production from hydroelectric plants during 2019 was 30,168GWh, 2.76% higher than 2018's registered production.

However, according to MINEM, as of May 2020, the following national energy production was registered (see table on the next page top).

It should be noted that renewable energy produced from solar sources increased its production from 57 to 59GWh, compared to May 2019.

The evolution of technology and efficiency, and the appearance of new players in the local market, has led to a decrease in costs, managing to increase the competitiveness of renewable energies compared with other sources. However, a fifth auction has not been called, nor has it been scheduled due to market saturation.

Production of electric power nationwide – May 2020 According to destination and source (GWh)				
Market Source	**Electric market**	**Private use**	**Total**	**Participation**
Hydro	2,790	50	2,840	78%
Thermal	487	117	604	16%
Wind	131	–	131	4%
Solar	59	–	59	2%
Nationwide Total	3 466 95%	167 5%	3 633	

Source: https://bit.ly/3hSIL00

Despite the interest of several players in the local market, the Peruvian government cancelled the 2018 auction, even though Legislative Decree N° 1001, published in 2008, established that at least one auction must be held every two years. The main reason to justify the suspension was the oversupply of power, given that the country's energy mix is currently able to supply twice the maximum power demand, as there are an important number of natural gas-fired power plants. The delay in the development of mega copper mining projects has lowered expected demand.

This may also be due to the fact that several of the projects that were awarded in the fourth RER auction have not yet been put into operation. According to what was indicated by MINEM's General Directorate of Electricity, the start of commercial operation of three RER power plants which were awarded in said auction was scheduled for 2020: the Duna and Huambos Wind Power Plants, in the Cajamarca Region; and the Callao Biomass Power Plant, in the Callao Constitutional Province.

These projects are in addition to the Manta Hydroelectric Power Plant in the Ancash Region, and the San Gaban III Hydroelectric Power Plant in the Puno Region, which are currently under construction. By 2023, these projects are expected to increase the country's installed capacity by 264.8MW.

Some studies foresee an increase in the country's energy needs by 2022, and in this context, additional mechanisms that generate greater investment and competitiveness in the renewable market are currently being evaluated in order to take advantage of the country's potential in the sector.

RER projects are also being developed for mining on a private basis. According to OSINERGMIN, almost 20% of the investment costs of a mining company have to do with the energy sources that they use.

Consequently, and as a mining country with a series of world-class projects in development, Peru could tap into these global trends in the mining sector. Energy companies and investors can take advantage of the synergies that may be achieved by using RER in mining operations.

Finally, there is an attractive opportunity for the country to export its produced energy surplus to neighbouring countries, particularly Ecuador and Chile. The challenge is essentially to establish an adequate regulatory framework so that investors can focus on the development of new projects and, in this way, ensure that domestic demand is satisfied and that revenues can be generated based on the export of energy.

In this context, in June 2020, the Andean Parliament Plenary approved the proposal for a Community Standard for the Electric Interconnection of the Andean region. Among its strategic plans, the Community Standard contemplates the sustainability of energy resources, establishing measures that guarantee essential economic resources to favour the sustainable management of energy resources.

Poland

Author: Piotr Ciolkowski and Ada Szon (September 2020)

1. Brief overview of the renewables sector

The support for renewable energy sources (RES) in Poland has been stimulated by two major support mechanisms: certificates of origin and the auction system. Certificates of origin (green certificates), issued by the Regulator, confirm the generation of electricity by a renewable energy source. The property rights resulting from green certificates can be traded on the Polish Power Exchange and OTC. However, the green certificate system is being gradually phased out and replaced by the auction system introduced by the Renewable Energy Sources Act of 2016. Significant changes to this support scheme were made in July 2018 and in August 2019.

Support systems have underpinned the intensive development of the RES sector in recent years. According to data gathered by Eurostat, the share of renewable energy in gross final energy consumption increased from 6.9% in 2005 to 9.3% in 2010, and 11.8% in 2015. In 2016 and 2017, the share fell to 11.3% and 11% respectively, while in 2018 it rose again to 11.3%.

In order to comply with the RES strategy laid down in EU legislation, Poland needs to achieve a 15% RES share in final energy consumption by 2020. Unfortunately, Poland will not be able to achieve this target by the end of the year. Since the RES Directive sets forth the next ambitious target – i.e. the share of energy from renewable sources in the EU's gross final consumption of energy in 2030 shall be at least 32%, and Poland, in its integrated national energy and climate plan, committed itself to contribute to this target by achieving a 21–23% share of renewable energy in the gross final consumption – it became necessary to provide certain measures to enlarge the RES market. Therefore, the Polish government decided to stimulate the RES market by strengthening the auction support system. As the auction system has reinvigorated the RES market, a new wave of investment has been attracted into the market, particularly in the wind farm and PV projects. In addition to this, the government plans to develop the offshore wind farm sector through its own dedicated support subsidy scheme.

2. Recent developments in the renewables sector

Auction system

The auction system offers the opportunity to participate in auctions organised by the Polish Regulator, i.e. the President of the Energy Regulatory Authority. The maximum volume and value of electricity which can be auctioned in the next calendar year is determined annually by the Council of Ministers. The sole criterion of the auctions is the price – the lowest bidders are selected until the maximum volume determined for the given auction has been reached. Auction winners are guaranteed protection against a "negative balance"

that may arise between the market price of energy and the auction price, which makes the system similar to CFDs (contracts for difference). The support is paid out by Zarządca Rozliczeń S.A., a state-owned entity that is responsible for the financial side of the subsidy scheme and settlement of the "negative balance". The period of support is 15 years from the date of the first sale of electricity, although it will not run beyond 30 June, 2039.

The first auction took place at the end of December 2016 and the second in June 2017. Both were mainly dedicated to installations below 1MW of installed capacity. The auctions announced by the President of the Energy Regulatory Authority in August 2017 were cancelled. Subsequent auctions took place in 2018 and in 2019. In 2019, the small PV projects (up to 1MW) achieved a total of 731MW, while with regard to large scale projects the total capacity of successful projects amounted to 62MW for PV projects (above 1MW) and 2220MW for wind farms. Subsequent auctions are planned for the end of 2020 and in 2021

Onshore wind

Only a couple of years ago, the sector faced numerous challenges from a regulatory perspective, as well as uncertainty resulting from the fact that no auctions had been announced for onshore wind installations above 1MW. However, most of the legal obstacles have been removed or relaxed, which, alongside the yearly auctions, has encouraged investment in onshore wind projects in Poland.

One of the obstacles that onshore wind market faced was the introduction of rigorous provisions in the Act on wind turbine investments. The Act sets a minimum distance between new wind turbines and households or mixed purpose buildings of at least ten times the total height of the wind turbine (the 10h rule). However, these requirements have been slightly mitigated by the legislator. This liberalisation may also be accelerated by the CJEU ruling of 28 May 2020, which lays the groundwork for questioning the distance restrictions under the Act, provided that the Polish court assesses – whilst taking into account the necessity and proportionality of the regulation – whether the Act has directly contributed to the slowdown of wind energy development in Poland. Moreover, there is a new draft law liberalising this requirement. Although the 10h rule will not disappear, there are plans that it will be amended subject to certain conditions being fulfilled (such as the consent of the local community).

There was also a dispute concerning the property tax on wind turbines in 2017, which sees companies obliged to pay this at a higher rate due to amendments in the law. These disputes were ended by the Supreme Administrative Court's ruling in 2018, which stated that the property tax for 2017 based on the legislative amendments should be paid at a higher rate – 2% on all

the elements constituting the wind farm, both its construction parts and technical elements. However, the law has now been changed again and the tax is now paid, as before, at a lower rate – i.e. only on the construction parts. This issue was also the subject of the judgment of the Constitutional Tribunal of 22 July 2020, pursuant to which the regulations that introduced changes in the taxation of wind farms with retroactive effect from 1 January in mid-2018 were deemed inconsistent with the Constitution.

Therefore, while there have been some unfavourable regulations in the past, the development of wind farm projects in Poland now has quite a lot of appeal for potential investors, including foreign IPPs and funds. Irrespective of the subsidised projects, there is a growing interest in the merchant plants and corporate PPAs as an alternative way to secure financing for onshore projects.

Growing interest in PV

The photovoltaic (PV) sector has been one of the fastest-growing renewable energy sectors in Poland. The total installed capacity in PV power sources at the end of 2018 was about 500MW, while in August 2020 the installed capacity had reached 2200MW.

The Institute of Renewable Energy estimates that, by the end of 2020, the installed PV capacity in Poland may reach 2.5GW. IRE forecasts also indicate that the turnover on the photovoltaic market will increase this year by as much as 25% compared to the previous year and will exceed PLN 5bn. In 2025, the total installed capacity in photovoltaics may reach 7.8GW.

The draft Energy Policy for Poland until 2040 indicates photovoltaics as the installations that – next to the offshore projects – will play a key role in achieving the RES targets. So far, there have been four auctions in which solar projects with a capacity below 1MW have succeeded (in 2016, 2017, 2018 and 2019). The total capacity of the winners' PV projects was almost 1700MW.

The increased interest in the auctions and the falling investment costs of solar are a current market factor. This trend creates a major opportunity for investment in Poland and with the support envisaged under the Act on Renewable Energy Sources, PV installations are becoming the most popular renewable installations for investment. The latest tendency is to develop large-scale solar projects – i.e. projects with a capacity above 1MW – or to combine PV with other RES technologies. The Ministry of the Climate envisages that a large-scale solar project of 700MW will be granted support in the auction to be held in 2020.

3. Forthcoming developments/opportunities in the renewables sector

Offshore opportunity

Poland has significant industrial potential to develop offshore wind investments. According to the integrated national energy and climate plan, the idea is to achieve 3.8GW of capacity from the offshore wind farms by 2030 and approximately 8GW by 2040. According to the newest version of the Energy Policy for Poland until 2040, offshore wind farms will play a key role in achieving the RES targets set for Poland by the EU. This document sets out that Poland will achieve 5.9GW of capacity from offshore wind farms by 2030 and approximately 8–11GW by 2040.

In order to achieve this, the first draft of the Polish offshore wind legislation was released for public consultation in January 2020 and the second, revised version was subsequently published in July 2020. The Act sets out the framework for a dedicated support system for offshore wind projects. The offshore projects will be entitled to reclaim the negative balance resulting from the difference between the fixed price and the average market price. The right to reclaim the negative balance will be awarded in two different ways: for the most advanced projects – by way of an individual decision of the Regulator, and for the rest – through a competitive auction. The Act also addresses other important areas related to the development and operation of offshore projects, such as local content requirements, changes to the planning procedure, the rules for grid connection, as well as a pre-emptive right to purchase the devices needed for the offtake of power from the offshore wind farm by the TSO.

The goal is for this Act to come into operation by the end of 2020, which will speed up the development of offshore projects in Poland. No offshore project has yet been constructed, but key energy companies are showing a growing interest. The most advanced investments are developed by Polenergia (a private company) with Equinor, and PGE (a state-owned company), which plans to team up with Ørsted. Other companies that are developing the most advanced projects are PKN Orlen (a state-owned company), EDPR and RWE.

Energy storage

In order to balance the generation of energy from RES, energy storage projects are planned for the coming years. However, they are still at an early stage of development. As electricity storage is a relatively undeveloped field in Poland, there are still no detailed regulations in this area.

There are storage projects under development in Poland. In 2018, construction started on the largest energy storage facility in Poland with a capacity of 27MWh, near the Bystra wind farm. The construction of the hybrid-battery energy storage is a critical project in the Polish energy sector. It is being developed by the Energa Group (Energa Wytwarzanie and Energa Operator), the Polish transmission system operator Polskie Sieci Elektroenergetyczne, and Hitachi, as part of the joint project "Smart Grid Demonstration Project in Poland". The goal is to build a system for the protection of the electrical network, which will ultimately enable the appropriate management of a large number of wind farms.

Other Polish companies are also developing energy storage projects. Polska Grupa Energetyczna S.A. (PGE), a state-owned company, plans to implement eight storages with a capacity of approximately 40MW. The energy storage located in Rzepedź, with a capacity of 2.1MW, will be finished by the end of 2020. PGE is also working on stores near the photovoltaic installation on Żar Mountain and near the wind farm Karnice I.

Another state-owned company, Tauron, is developing a system of energy storages in Cieszanowice. The goal of this system is to ensure a more effective management of the electricity from onshore wind farms.

In mid-2020, the Minister of the Climate restarted work on the set of provisions dedicated to energy storage, which will cover a new definition of energy storage, as well licensing aspects. However, at this moment it is still a new draft regulation.

Recent regulatory amendments to the RES support system

In August 2019, an amendment introduced some improvements to the RES support system, including:

- extending the deadline for selling the electricity generated by a RES installation for the first time.
- (for producers planning to participate in auctions in 2019 and 2020) the right to postpone to 30 June 2021 the deadline for feeding electricity into the grid for the first time under existing grid connection agreements.
- a procedure allowing one-off modifications (updates) to the bid after winning the auction with respect to the planned date for selling electricity for the first time.

The amendment also specified the maximum volumes and values that can be sold in the auctions in 2019, both for new RES installations and existing ones.

In 2020, due to the COVID-19 pandemic, the renewable sector was supported in several ways. Among others, the so-called Anti-Crisis Shield Act provided investors with the right to request an extension of the deadlines for the commencement of sale of power within the auction system for the first time.

Recently, the Minister of the Climate introduced the regulation for the auctions planned for 2020. In these auctions, for large-scale projects (i.e. above 1MW), it is estimated that the support will be secured for wind farms up to 800MW and for up to 700MW of PV projects. In the case of small PV projects (below 1MW), the Minister of the Climate estimates 800MW of capacity.

As regards the auctions in 2021, for now the Ministry of Climate has presented a draft regulation which determines the volumes of energy planned for sale in auctions in 2021. The Ministry's first proposal indicated that there is 300MW secured in the auction for wind farms, 1000MW for small scale PV projects and 700MW for large scale PV projects. However, the general impression from the wind and PV sector was that the proposed volumes were too small.

Planned regulations in the RES sector

As indicated above, there are plans to soften the 10h rule introduced by the Act on wind turbine investments. The plan is to retain this rule, but to add new conditions. According to the new proposal, a new wind farm could be located only on the basis of the local spatial plan prepared for the entire 10h area around the planned wind farm. Thus, the right to reduce the 10h area will be given to the local communities, which will be able to decide whether or not to accept the change to the aforementioned rule.

According to the current legislation, installations with an installed capacity greater than 50kW but less than 500kW are only required to be entered in the register of energy producers, while the obligation to obtain a licence is set for an installed capacity of 500kW and over. However, the Ministry of the Climate proposes to raise the second threshold up to 1MW.

Portugal

Authors: Monica Pacheco and Bernardo Cunha Ferreira (August 2020)

1. Brief overview of the renewables sector

Portugal's dependence on imported energy has always been high, since the country does not produce oil or natural gas. However, due to an increasing amount of renewable energy in the generation mix, total energy dependence has been declining. In the first decade of the 21st Century it is estimated that renewable electricity contributed about 10% to energy dependency reduction. Nevertheless, the period from 2010 to 2019 has seen a tendency towards stagnation in the energy dependency index.

However growth in the renewables sector has been detected in 2019, taking in account the stagnation in 2018. Therefore, the International Energy Agency concluded that, in 2019, the energy produced from less polluting sources increased 12% to a total of 200GW, with an solar energy production rising by 17%.

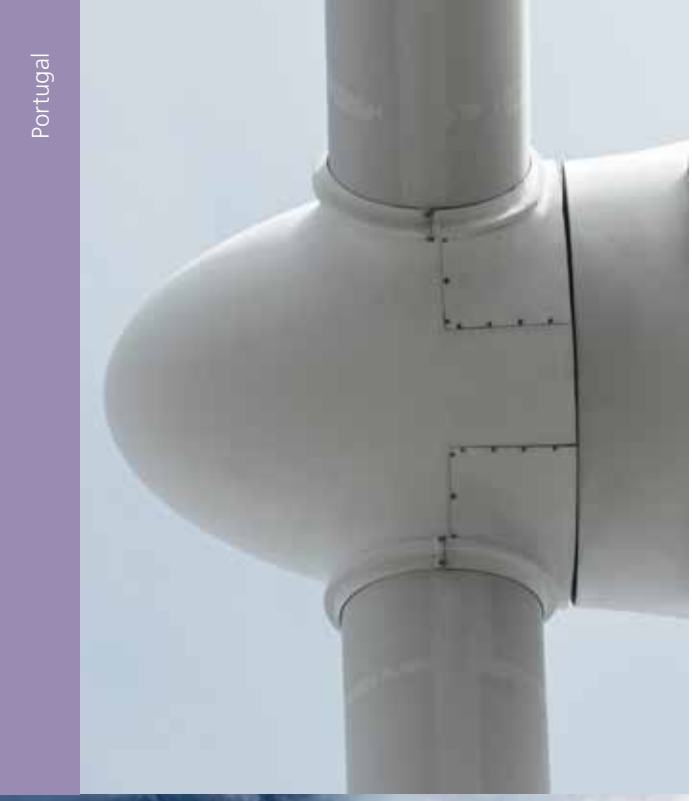
According to the Portuguese Association for Renewable Energy, in the first five months of 2020 renewable electricity accounted for 71.6% of electricity production, equating to 14 387GW. Power stations relying on fossil fuels represented 28.4%, of electricity production, equating to 5 695GW.

Wind and solar power have been the main drivers in the promotion of renewable energy sources and growing energy production in Portugal. In future, solar's contribution will increase as the Portuguese government is aiming to reach about 9,000MW of installed solar energy capacity by 2027, from its current level of below 500MW. The government's new energy plan also includes the goals of covering 80% of the country's total power demand with clean energy by 2030, and electrifying 65% of its economy by 2050.

Implementation of the renewable energy policy is conducted primarily by the government while policy development rests with the Directorate-General for Energy and Geology (DGEG) and the Energy Services Regulatory Authority (ERSE).

As an EU member, Portugal's renewable energy policy is aligned with the EU 2024, 2030 and 2050 targets. Portugal has a binding national target for the incorporation of renewable gases into the natural gas network until 2030.

Beyond 2020, EU member states have agreed on a target of a 32% share of renewable energy in energy



consumption by 2030. The target is binding for the European Union as a whole only. The contribution to be made by individual EU member states to achieve this EU-wide target has yet to be decided.

Portugal's targets for renewable energy for 2030 and the policies and measures to meet them were laid out in the National Renewable Energy Action Plan approved by Resolution of Council of Ministers no. 53/2020, of 10 July.

The legal framework regarding renewable energy, in force since 1988, was constructed via a number of laws. In 2012, as a result of Portugal's changing economic circumstances and reduced demand for electricity, the government conducted a series of comprehensive structural reforms in several sectors, including the electricity sector. One of the outcomes of this process was a new regulatory framework (Decree-Law no. 215-A/2012 and Decree-Law no. 215-B/2012, of 8 October, that incorporated the Renewables regime), which allowed anyone producing electricity from renewable sources to sell it on the open market. Recently, Decree-Law No. 76/2019, of 3 June, has introduced important amendments, as explained in section 2 below.

2. Recent developments in the renewables sector

Recent amendments to the renewable energy legal framework

The Portuguese legal framework relating to the activities of the electricity sector has been amended significantly by Decree-Law No. 76/2019, of 3 June 2019, which became law on 4 June 2019 (DL 76/2019).

The most important amendment for renewables is the requirement of the granting of a prior network capacity reserve title before the generator can apply for a production licence to build a power plant. The network capacity reserve title is issued by the relevant network operator.

The issuance of network capacity reserve titles may occur through three procedures:

1) Standard procedure – request issuance of title
   - Under the standard regime of issuance of titles, the applicant requests the title and, if there is network capacity, the network operator (of the distribution or transmission network) grants the capacity reserve title.
   - If there is more than one applicant for the same capacity, priority is given to the applicant that first presented the request.
   - The applicant must submit a security deposit of EUR 10,000 per MVA of capacity reserve to be allocated, to ensure that it will carry out the procedure until the issuance of the production licence.

- According to the government's interpretation of the law, the title will expire automatically if a tender procedure is opened for the granting of capacity in the same grid area before a production licence has been granted. In this case, the security deposit is returned to the applicant.

2) Agreement procedure
   - Where there is an absence of network capacity, the applicant and the network operator may, following request of the former, enter into an agreement under which the applicant will finance the costs arising from the construction or reinforcement of the network required to receive the energy produced by the power generation plant.
   - Network capacity may be granted to the applicant, provided that applicant makes the relevant investments in the network.
   - The applicant must present a security deposit corresponding to whichever is higher of (i) 5% of the costs incurred by the applicant for the investments in the grid, or (ii) EUR 10,000 per MVA of capacity reserve to be allocated.
   - The title issued in this regime is not subject to cancellation due to the opening of a tender procedure.

3) Tender procedure
   - The government may launch a tender procedure for the granting of network capacity reserve titles for one or more network areas.
   - Under this regime, the title is issued by the network operator following a competitive tender procedure for the allocation of reservation of reception capacity in the network.
   - The procedure may take the form of an electronic auction open to all interested parties who meet the defined requirements, and with defined criteria for selecting the awardee. Typically, the applicant offering the lower price or the higher contribution to the electricity system to each grid area will win the tender.
   - The procedure is opened by means of an announcement published in the Portuguese Official Gazette. The procedure documents published on the DGEG website must contain, among other elements, the procedure modality, conditions and criteria for award, remuneration, and security.

As regards the modality (2) and because of the high number of requests submitted by promoters, in February 2020, DGEG published the "Terms of Reference" which aimed to explain the ranking criteria, such as location of the project and land agreements secured. On modality (3), it should be noted that a first auction was launched on 2019 for 1,400MW of electricity capacity rights, and in due course, the Solar Auction for 2020 will take place which comprises 700MW capacity, to be distributed in the Alentejo and Algarve regions (for more information on this, please refer to point 3a) below.

Once issued, the title of power reception capacity is non-transferable until the issuance of the operation licence, even though change of control of the applicant is not forbidden in the standard agreement procedures (in the tender procedure it will depend on the tender specifications).

The Decree-Law also foresees the possibility of having feed-in tariffs in the following cases:
- the granting of network capacity through competitive tender procedures as mentioned above, depending on tender specifications.
- power plants with installed capacity up to 1MW (this limit is defined annually by the Secretary of State for Energy).
- for over-powering situations or for production units using a different primary source to be installed
  in an existing energy project of new production units, depending on further legislation.
- other systems that may be given legal status.

There are also former power plants still in operation which still receive feed-in-tariffs (mostly wind).

DGEG is now the sole licensing entity for electricity generation. Licensing of the power plant and transmission system may be done simultaneously.

It is also possible to have hybrid electricity generation plants (two technologies supplying electricity to the grid up to the maximum licensed capacity) – subject to additional licensing if the second technology being employed is different to the one originally licensed. Further regulations will be introduced for these cases.

Extension of the application of the clawback regime to solar PV plants

The "clawback mechanism" (clawback) was created by Decree-Law No. 74/2013, of 4 June and amendment by the Decree-Law No. 104/2019 of 9 August.

This law is aimed at eliminating windfall profits for Portuguese generators benefitting from the increase in the market price of electricity caused by taxes levied on power generators in Spain, which have no parallel in Portugal. Due to the existence of a single wholesale electricity market in Portugal and Spain (the Iberian Electricity Market), which is a marginal pricing market, an increase in the price of power in Spain may cause a similar increase in the price of power in Portugal. These were the grounds on which the clawback scheme was built.

The clawback consists of a levy over power generators in Portugal, at an amount set by the Secretary of State for Energy, following a proposal by ERSE. It aims to offset the impact on prices of extramarket events occurring in Spain (notably the taxes in force in Spain). This levy is charged as an add-on to the tariff of Global Use of the System charged by REN, as Transmission System Operator, to generators subject to it. This levy is was set at EUR 4.75/MWh.

Under Decree-Law 104/2019, solar photovoltaic plants are now also subject to the Clawback scheme and to its payment arrangements. Three exceptions apply, for plants: (i) with feed-in-tariffs; or (ii) making contributions to the national electricity system within the context of the competition procedures (auctions) foreseen in article 5-B of Decree-law No. 172/2006 as amended; or (iii) with a capacity of less than 5MW.

According to Ministerial Order 282/2019, of 30 August that implemented the changes introduced by Decree-law 104/2019, the amount of compensation should be set annually, and may be differentiated by technology, while an advance payment should be made by power plants annually, subject to subsequent review if the impact of extramarket events is higher.

In 2020, the Secretary of State for Energy published a clarification (Order no. 8/2019/SEAEne, of 16 December 2019) which said that the clawback shall be deemed as not being applicable to power plants selling their electricity under a fixed-price PPA with a supplier or a final customer, with no direct or indirect indexation to the spot price of electricity. The extent, and also the grounds for these clarifications are still under discussion.

Also, in 2020, an order by the Secretary of State's Office established that the payment on account to be applied for the current year is set at the amount of EUR 2.24/MWh. This applies to all electricity energy producers that operate electricity generation centres covered by Decree-Law No. 74/2013, with the exception of those included in the scope of the internal market events referred to in Order No. 12424-A/2019.

3. Forthcoming developments/opportunities in the renewables sector

New renewable energy projects

Following the success of the capacity auction held by the government in June 2019, on May 29, 2020, the solar capacity auction was launched with submissions open until July 31, 2020.

The 2020 Auction looked to grant 700MW of capacity, to be distributed in the Alentejo and Algarve regions. Each area represents an autonomous lot and separate auctions were held for each lot. Competitors could bid for one or more lot but only up to 50% of the total capacity on offer in the auction.

The Auction consisted of 12 lots, with an electrical supply capacity of between 10MVA and 109MVA. The contract for supplying electricity would run to June 30, 2024.

The main changes from the 2019 auction were the following:

- the inclusion of a third modality of evaluation and submission of offers from plants with storage systems;
- the assessment of offers to be in Euros/MW (not in Euros MW/h) to enable comparison with the storage option.

Also, in comparison with the 2019 auction, the following points should be noted:

- it will be possible to install one or more new production units using a different renewable primary source provided that it does not exceed the generation capacity awarded;
- new time limits for the holder of the title to achieve the designated targets
- if the title is cancelled, the holder may not submit another application in a competitive procedure within the next five years;
- there will be no possibility of changing the location within a 15-month period and it will only be possible after this period with the issuance of an opinion from the competent authorities.

The 2020 Auction process shall have the same three phases as the 2019 auction: qualification, bidding and awarding.

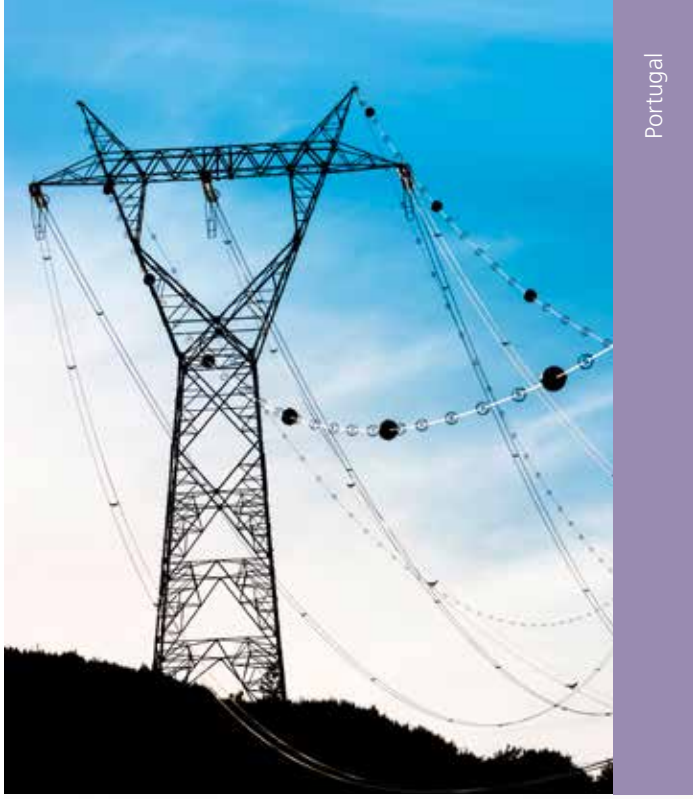
Hydrogen

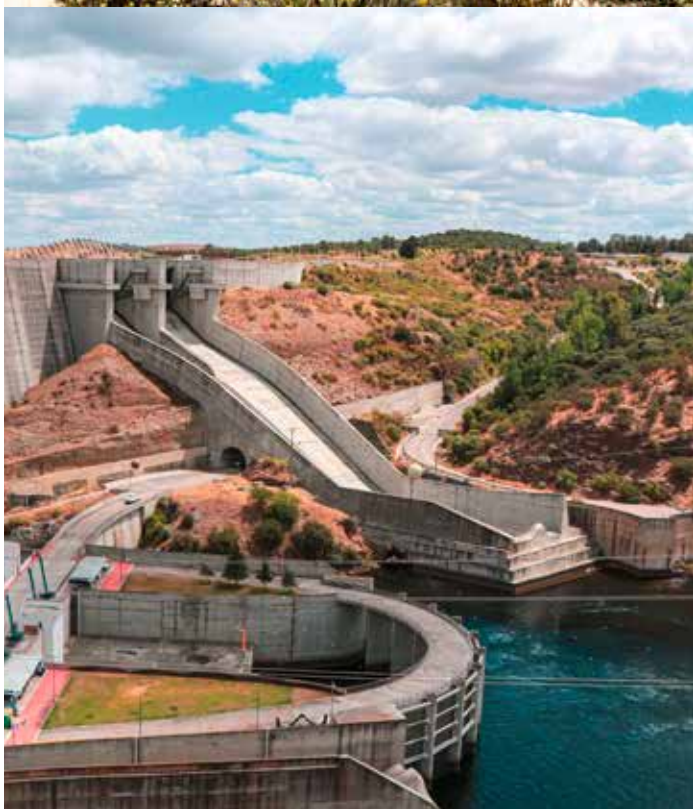
Green hydrogen is of increasing interest as it allows the storage and preparation of other renewable base fuels, thus contributing to the achievement of national targets for the incorporation of renewable sources, not only for final consumption but also for the decarbonisation of consumption, particularly in industry and transport. At the European level, the European Commission has adopted the new European Strategies for the Integration of Energy Systems and Hydrogen, which, by 2024, aims to see the installation of 6GW of electrolysers – equipment needed for hydrogen production – and the production of up to 1m tonnes of hydrogen. The 2030 target is the installation of 40GW and a production of 10m tonnes. By 2050 the Commission expects that the technology will be very established and that it can be implemented on a large scale.

At the internal level and regarding this matter, the Council of Ministers Resolution no. 53/2020 of July 10 approved the National Energy and Climate Plan 2030 (PNEC 2030).

Among other measures, PNEC 2030 proposes (i) the regulation of the renewable gases into the national natural gas network; (ii) the implementation of a system of Guarantees of Origin for renewable gases; (iii) extra funding at a national and European level to support the production of renewable gases, in particular hydrogen and biomethane; and (iv) the setting of binding targets by 2030 for the incorporation of renewable gases into the natural gas network, present in the PNEC 2030.

In addition to the measures outlined above, it should also be noted that (i) on 17 June 2020 there was the opening of a period for expression of interest for participation in the future Important Project of Common European Interest (IPCEI) Hydrogen, through Order No. 6403-A/2020; (ii) the announcement of the installation of an industrial plant in Sines for the production of green hydrogen with full capacity in electrolysers of at least 1GW by 2030, powered by renewable electricity, including solar and wind.





Romania

Author: Varinia Radu, Ramona Dulamea and Raluca Diaconeasa (July 2020)

1. Brief overview of the renewables sector

Obtaining energy from renewable sources has become a reality in Romania over the last ten years, starting from the need to gradually replace the energy sources which use finite and polluting raw materials. What had seemed to be a small segment of the electricity industry, electricity produced from renewable sources, has become an essential one, and its role in the current and future energy mix dominates discussions regarding the legislation and policies in the sector. The emergence of this sector of electricity production required government support at first, to guarantee a satisfactory profit for investors, and Romania, in 2008, through Law 220/2008, introduced a support scheme to promote electricity from certain renewable sources (giving renewable energy producers an additional gain supplementary to the energy sold on the market). Renewable energy producers (wind, solar, biomass and micro-hydro power plants), through this mechanism, were certified by the National Energy Regulatory Authority (ANRE) and each month were entitled to receive a number of green certificates (GC), issued according to the quantity of MWh of energy produced and delivered to the electricity network – either to the suppliers or directly to the final consumers. The suppliers and some energy producers are obliged to purchase these GC every year, the number being allocated by ANRE in specific procedures.

As a result of promoting this support scheme, allied to the country's geographical advantages, Romania's renewable energy market has undergone an unexpected investment "boom" in the wind and solar energy sector. Thus, in 2011, Romania was the eleventh of the 40 countries listed in the Country Attractivity Index in renewable energy, drafted by E&Y.

In 2013, due to the support scheme, Romania installed more than 1GW of photovoltaic parks, placing the country in a category that includes global players such as Italy, India, Greece and UK. Small, medium and large-sized photovoltaic solar parks were built.

The support scheme has been applied only to the renewable energy production capacities put into operation beforel the end of 2016 and with a lifespan of 15 years from the date of commissioning. Since 2017, no renewable energy production capacity has been put into operation in Romania (except for very small photovoltaic parks). From 2013, the support scheme for renewable energy regulated by Law 220/2008 was subsequently amended. The changes have reduced (at least temporarily) the support for power plants using renewable energy sources (RES), and these measures were designed to diminish the financial impact of the support scheme on energy consumers.

In 2019, 42.16% of the Romanian electricity production, including hydro power generation,[1] came from renewable sources. Romania had a generating capacity of renewable electricity installed of 4,7798MW at the end of December 2019, including 1,358MW of solar energy and 2,960 of wind energy, according to data provided by the system operator, Transelectrica.[2] In April 2020, the share of green energy in the total production of electricity was 49.92 %. Wind energy represented 17.38% of the total energy delivered to the grid, solar energy contributed by 2.63%, hydro energy 29.67% and biomass energy 0.24%.[3] At the end of 2018, there were 28 power plants using biomass, biogas and waste gas.[4]

Going further:
Thus, before drawing a line under the first stage of collective efforts to decarbonise and diversify the energy mix in 2020, it should be noted that Romania is one of the countries that has achieved its proposed target, reaching, according to public data, a share of approximately 27% of green energy in 2019, including the generation capacity of the hydropower system. Furthermore, the vision of the Romanian Energy Strategy 2019–2030 foresees growth in the Romanian energy sector through the construction of new generating capacities and also the repowering and modernization of production capacities, transport and distribution of energy, while encouraging savings in domestic consumption under energy efficiency targets.[5]

The strategic investment projects mentioned in the Strategy document include: Groups 3 and 4 from Cernavoda NPP, the pumped storage hydro unit from Tarnita-Lapustesti, the 600MW Group from Rovinari and the Tunu Magurele Nicopole Hydrotechnical Complex in partnership with Bulgaria.

To achieve these objectives, Romania will need investments in the energy sector of EUR 15–30bn for the period 2018–2030, with a central estimate of around EUR 20bn.

At a European level, the energy market has evolved based on the legislative measures known as the "Third Energy Package", which was subsequently amended and supplemented by the Clean Energy Package for all Europeans. In June 2019, Directive (EU) 2019/944 on the common rules for the internal electricity market and amending Directive 2012/27/EU and Regulation 943/2019 on the internal energy market came into force, both aimed at addressing the challenges and needs of the common market, which undertakes major transformations. Climate change and the decarbonisation target are the central elements, in addition to the efforts to create an interconnected, competitive market, which now takes further account of the consumer, who becomes an active player. In addition to the above, renewable energy continues to play a key role, so this legislation sets specific rules for certain types of renewable energy production facilities, energy storage and the transport system, and looks to address different problems created by the new energy mix and the fluctuating nature of renewable resources.

In this context, Romania has yet to align fully with these goals and with the specific legal provisions for the common energy market. Beyond the country's confirmed potential for favourable green technologies, especially wind and solar, the interest of investors depends mostly on a stable, predictable, competitive legislative and regulatory framework, alongside a proper taxation regime.

The Bucharest Stock Exchange (BVB) and OPCOM have started to establish a central agency which would eliminate the risk of a volatile market and create the necessary conditions for attracting investment into the renewable electricity sector. It is expected that this project will be finalised and operational by 2020, which would represent remarkable progress in diversifying the products through which the energy market can secure financing, especially in the long term, and will provide investors with sophisticated trading options. Since September 2019, a new market for trading electricity and green certificates has become available on OPCOM, namely, the Centralized Market for Electricity from Renewable Energy Sources Supported by GCs (CME-RES-GC).

CME-RES-GC is a mechanism for trading in a competitive regime that is anonymous, transparent, public, centralised and non-discriminatory, according to which the contracts are awarded by extended auction, supported by the sale of green certificates. The market is anonymous and for each MWh put up for sale, a separate number of certificates are issued.

The electricity delivery period is at least one month, and it is mandatory to use the framework contract for selling and buying green certificates, which may contain additional provisions proposed by the offeror in regards to payment terms and associated guarantees. The right of unilateral termination is prohibited, as too are any changes to the price, quantity, delivery schedule as well as any other terms and conditions.

[1] https://www.anre.ro/download.php?f=fqd7gaE%3D&t=vdeyut7dlcecrLbbvbY%3D
[2] https://www.anre.ro/download.php?f=fqZ%2Fg6c%3D&t=vdeyut7dlcecrLbbvbY%3D
[3] https://www.anre.ro/download.php?f=fqaEiac%3D&t=vdeyut7dlcecrLbbvbY%3D
[4] https://www.anre.ro/download.php?f=fqZ%2Fg6c%3D&t=vdeyut7dlcecrLbbvbY%3D
[5] http://energie.gov.ro/transparenta-decizionala/strategia-energetica-a-romaniei-2019-2030-cu-perspectiva-anului-2050

The price of the green certificates sold under the framework contract shall be the closing market price of the green certificates traded on the spot market, which may be further amended if there are changes in the Energy Law in regards to the minimum/maximum price of a green certificate.

2. Recent developments in the renewables sector

After several years of significant decline in investment, this past year has seen major changes on the legislative front. Some of the legislative changes have been aimed at improving or to rectifying practical problems related to the functioning of the green certificates market, while others have been aimed at creating new investment opportunities in the future, i.e. a more flexible and favourable framework for large project finance.

Bearing in mind the full electricity market liberalisation in January 2021, the Government, on 14 May, passed amendments to Energy Law 123/2012 that allow PPAs for power-generation capacities that will be commissioned after 1 June 2020 (solving a restriction to long-term freely-negotiated bilateral agreements dating back to 2012).

Production from these capacities will be sold both within and outside the centralised market at negotiated prices in compliance with competition rules. Producers will offer all remaining electricity publicly and without discrimination on the open market after fulfilling their obligations to sell electricity to last-resort suppliers. The only exception will be for electricity from energy-generation capacities commissioned after 1 June 2020, which can be sold through freely negotiated PPAs.

These amendments are part of the commitment Romania made to the European Commission to deregulate its electricity market as of 1 January 2021 in order to stimulate investments in new electricity-generation capacities.

Until this recent legislative change, all electricity transactions could be carried out solely on the centralised market in a transparent, public, competitive and non-discriminatory manner. This restriction on freely negotiated PPAs was seen as the main hurdle preventing investments in new generation capacities, especially in the renewable sector.

In a subsidy-free era, such investments were lacking a route to market since long-term arrangements are deemed to need secure project financing. PPAs are usually signed for the long term (ten to twenty years) and can offer investors and lenders the necessary confidence to manage energy price volatility risk and counter-party risk.

In addition, July brought further change to the Energy Law 123/2012 with a view to creating a more flexible regulatory system and promoting investments. In order to facilitate investment financing for new electricity production capacities, ANRE regulations now allow a natural or legal person to act as a producer of electricity generated through a new energy capacity without holding a production licence at the time of the electricity trade, provided that a licence is obtained at least 60 days before the date of the physical delivery of the electricity generated by the new energy capacity. On the wholesale competitive market, ANRE has the right to approve the introduction and use of specific trading products in order to ensure flexibility in concluding long-term electricity transactions, including flexible delivery profiles for renewable energy producers. ANRE and the electricity market operator (OPCOM) will periodically monitor and evaluate the impact of the use of these flexible products. Provisions for prosumers are also included by granting exemption from payment of income tax and social-contribution taxes for income obtained from the sale of their generated electricity to suppliers, as well as from the obligation to buy green certificates for electricity generated and used for their own consumption.

3. Forthcoming developments/opportunities in the renewables sector

Romania has undertaken to achieve a quota of 30.7% for renewable energy within the total energy mix by 2030, according to the National Integrated Plan for Energy and Climate Change 2021–2030.

Overall, the Romanian energy production system needs massive investments in the coming years, according to the Strategy. In order to address the issues related to the extended deterioration of the existing capacities, to help in the transition to clean energy and the new mix generated by an increasing share of renewable energy sources, the Ministry of Energy has considered the introduction of a support scheme, which will support investments in new generation electricity capacities with low carbon emissions. In 2019, public consultation on a document presenting this new support mechanism in the form of a scheme based on paid capacity tenders similar to the Contracts for Difference (CfD) scheme was concluded. Following the positive debate, the Ministry of Energy has resumed the process with EBRD seeking a consultant to support the Ministry of Energy to develop the mechanism.

The proposed scheme is inspired by the British system of CfD, aimed at both sectors, renewables and nuclear and in general "clean" technologies. Through this mechanism, eligible producers may enter into a private law contract (CfD contract) with the nominated counterparty and agree on a "strike price". Producers sell electricity on the competitive market; but if the market price (reflected in the so-called "reference price") falls below the strike price, the counterparty will reimburse producers the difference. Likewise, if the market price exceeds the strike price, the producers will reimburse the difference to the counterparty. Completion of the legal framework is long-awaited as the business community is keen to see a clear governmental stance on future investment priorities and a long term commitment to the sustainable energy mix and in general, market development in line with international technologies and practice. In any case, long-term investments, such as those in the electricity generation sector, require financial instruments that may support the financing of the magnitude required by these projects. This type of contract has proved to be a viable instrument in US and European markets, both within capacity auctions organised by the states, but also in a private framework of bilateral contracts concluded between the market participants in similar terms.

Also, at the beginning of July 2020, the Romanian government published the Economic Recovery Plan. The value of the investments allocated by the National Energy System for the period 2020–25 is estimated at EUR 12.48bn, covering energy production projects such as intelligent natural gas and electricity transmission and distribution networks (i.e. onshore and offshore wind farms (2x300MW) – RON 4.6bn, new hydro production capacities (Retezat, Vidraru, Mărişelu, Avrig, Bistra, Livezeni, etc.) – RON 1.6bn).[6]

According to the Integrated National Plan in the field of Energy and Climate Change 2021–2030 (PNIESC), submitted to the European Commission in April 2020, the authorities are considering the implementation of pilot projects to promote the use of hydrogen in electricity production and in the industrial sector.

Societatea Națională de Gaze Naturale Romgaz SA Mediaș (Romgaz) plans to build an electricity plant by integrating the electricity from renewable sources with hydrogen production, through a power plant using natural gas of medium size of 200MW located in Turnu Severin – Halanga.

In June 2020, Romgaz and Liberty Galați signed a memorandum for the construction of a gas plant and also wind and photovoltaic capacities, setting up a joint venture, with a view to developing greenfield investment projects, including the development of a natural gas-fired electricity generation unit and renewable energy production units, using both wind and photovoltaic technologies. The project is potentially one of the largest investments in Europe, worth EUR 1.2bn, over the next five years. It is a large investment that should

[6] https://gov.ro/fisiere/programe_fisiere/Planul_Na%C8%9Bional_de_Investi%C8%9Bii_%C8%99i_Relansare_Economic%C4%83.pdf

make the Galati steel plant carbon neutral by 2030. The project involves the use of gas and then gas replacement with hydrogen

Regarding the field of mergers and acquisitions, we notice an increase in the flow of transactions with assets representing capacities of energy generation from renewable sources, but also an interest in investments of the "greenfield" type, in particular in the generation of wind power, provided that long-term energy sales contracts are concluded. Undoubtedly, energy derivative financial contracts would be a plus in the local and regional trading market. Also, the return to a completely liberalised market is one of the primary wishes of any investor, in line with European policies and the practice of EU countries. Last but not least, 2020–21 will probably bring the listing on the Bucharest Stock Exchange and the London Stock Exchange of Hidroelectrica who announced investments of EUR 26bn by 2025 and full commitment to green energy.

In conclusion, the legislative and regulatory framework in the field of clean energy is undergoing dramatic changes and the progress made over the last year must be continued in a coherent manner. Thus, Romania will be able to face the challenges generated by an accelerated transition in this field, and these transformations could generate multiple opportunities. These could include the renewal of the national system with new generation capacities, the implementation of highly-efficient modern technologies and finally the long-term development of a market that offers consumers a safe, sustainable and affordable energy supply.

Russia

Author: Dominique Tissot, Dmitry Bogdanov (September 2020)

Introduction

Russia's energy mix is dominated by natural gas, which accounts for 52% of primary energy supply and 42% of electricity generation.

The Russian Federation has set out to increase and diversify its use of renewable energy sources (RES), particularly for power generation. Under current plans and policies, generation from RES should reach nearly 5% of total final energy consumption by 2030. Accelerated deployment, however, could boost Russia's renewable energy share to more than 11% in the same timeframe, according to the International Renewable Energy Agency (IRENA). Achieving this potential would require cumulative investments of about USD 300bn in RES up to 2030.

Generally, the environment is more favourable for wind, hydro and solar power generation. Hydropower, representing about a fifth of the Russian power generation capacity, is currently one of the most prominent renewable sources, along with bioenergy used for heating in both buildings and industry.

1. Brief overview of the renewables sector

Key statistics

Since the adoption in 2009 of the Russian Energy Strategy to 2030, the Russian legal and regulatory framework has improved but still remains somewhat inconsistent, with the RES generation target being revised several times.

A governmental decree in 2009 set a target of 4.5% by 2020, excluding large hydropower plants of more than 25MW. A governmental resolution in July 2015 lowered the target to a minimum of 2.5 percent by 2020 and set a new target of 4.5 percent by 2024.

The above target corresponds to approximately 5.9GW of newly installed RES capacity (excluding large hydropower plants) by 2024, and is to be achieved using three renewables technologies: solar, small hydro, and wind, with the latter covering the major share of approximately 3.4GW.

In 2019, the total installed RES capacity in Russia was approximately 52.7GW, according to IRENA. The main part of it came from large hydropower plants, which represented 51.5GW, followed by bioenergy. As of 2020, according to Russia's Ministry of Energy, hydro,

solar, and wind power account for almost 21% of the country's total installed power capacity of about 246.34GW.

Subsidy schemes and tariffs

The Russian legal and regulatory framework sets the rules on wholesale and retail energy trading and offers certain incentives.

A so-called "premium scheme" – applied to the wholesale prices for RES-generated electricity – was introduced in 2007 by an amendment to the 2003 Federal Electricity Law. However, largely due to consumer price concerns and legal difficulties with developing a clear implementation mechanism, this price scheme, which would have been equivalent to a feed-in tariff, has never been put into practice.

In 2011, another support mechanism was introduced by the Federal Electricity Law: the promotion of RES through the capacity market. This scheme aims to ensure the financial viability of investments into renewables by concluding "Capacity Supply Agreements" with RES project developers.

The legal framework for this scheme was further developed in 2013 under governmental decree No. 449 (Decree 449). Decree 449 establishes the regulatory mechanisms for selecting new RES projects and for their supply agreements. Under a capacity supply agreement, the grid company (Distribution System Operator) undertakes to purchase electricity from RES-generation facilities in the relevant region in order to compensate for transmission losses. The Russian regulatory body, the Market Council, introduced regional incentive schemes for qualifying RES projects. These projects enjoy long-term tariffs, which aim to guarantee returns on investment over 15 years. The capacity to be produced by such facilities is selected by way of annual tenders for renewables at a price that is usually several times higher than the price for existing conventional capacity.

More specifically, the bidders must provide a technical description of the project, including the percentage of localisation (local content) and project financing/guarantee structures. On that basis, the trading system administrator will select the winning bids, and a relevant RES capacity supply contract will be signed.

Various other financial, legal and tax incentives are available at the local, regional and federal levels, depending on the specifics of a particular RES investment project (e.g. region of investment and degree of localisation, type of CAPEX, legal and project financing structures such as "special investment contract" (SPIC) and "agreement on protection and promotion of investments" (SZPK)).

However, although this is a significant step towards the creation of a regulatory framework designed to promote clean energy production in Russia, there are still restrictions. Firstly, this scheme is only applicable to RES-generation facilities eligible for the wholesale market (5MW capacity or more). Secondly, it does not allow the promotion of renewable energy technologies in the regions of Russia that have fully regulated tariff systems and the more isolated regions, where the deployment of renewables is economically feasible and supported by the availability of renewable resources. Thirdly, and above all, only projects in which a certain percentage of Russian technology and locally-produced components have been used (the so-called "local content requirement") may qualify for the favourable pricing regime. For example, for the period from 2020 to 2024, for wind projects the required degree of localisation is equal to 65%, and for solar projects it is 70%. Governmental decree No. 426 adopted in 2008 and the Order of Russia's Ministry of Industry and Trade No. 3788 adopted in 2018 provide the local content requirements for each type of RES, and also provide the formula to calculate a relevant degree of localisation. This is a key condition to ensure project bankability and thus sustainability, as a reduction factor is applied to tariffs for projects without the required degree of localisation (35% for solar power and 45% for wind, small hydro and waste treatment power sources).

2. Recent developments in the renewables sector

Unlike 2017 and 2018, when more than 2.5GW of capacity supply agreements were successfully tendered under Decree 449, the renewable energy capacity auction launched in 2019 was less attractive because of the low volumes offered to bidders, namely 78.1MW for the wind power industry, 5.6MW for solar energy and almost 230MW for small hydro sources. As a result, only three projects were selected in 2019. The reason for this overall reduction is that more than 95% of the power generation capacity targeted until 2024 by the state policy (see above) has been already assigned, mostly in wind and solar energy projects.

The main market participants remain the same, namely: Enel, Rosatom and Fortum (together with Rusnano).

Significantly, Rosatom and Rusnano, the leading Russian state-owned companies, have not historically been positioned on the RES market (the companies are involved in the development and commercialisation of nuclear and nano technologies, respectively). This demonstrates the political will and awareness of Russian state authorities in relation to the strategic importance of and prospects for RES in Russia. Interestingly, the relevant projects involve such leading foreign wind turbine suppliers as Danish Vestas, Dutch Lagerway and German-Spanish Siemens Gamesa. The suppliers have positioned themselves as key technology partners (supplying or locally producing

wind turbine generators in Russia) of Fortum-Rusnano, Rosatom and Enel, respectively.

Rosatom is currently implementing wind power projects awarded previously and has stated that its total investments in wind projects in Russia may exceed USD 1.3bn.

Fortum and Rusnano previously won tenders for the construction of wind farms with an aggregate capacity of more than 820MW. The power generation facilities will be put into operation by 2023. The two companies have announced their intention to invest approximately EUR 400M in wind farm construction projects. In 2019, the consortium commissioned a 50MW wind power plant in the Ulyanovsk region.

Enel won a 71MW wind power project in the 2019 tender. Notably, it managed to offer CAPEX (one of the main tender criteria) that was almost half the amount initially tendered. Apparently, the company will also concentrate on further implementation of projects it was awarded previously, with total investments in the projects estimated at approximately EUR 405m.

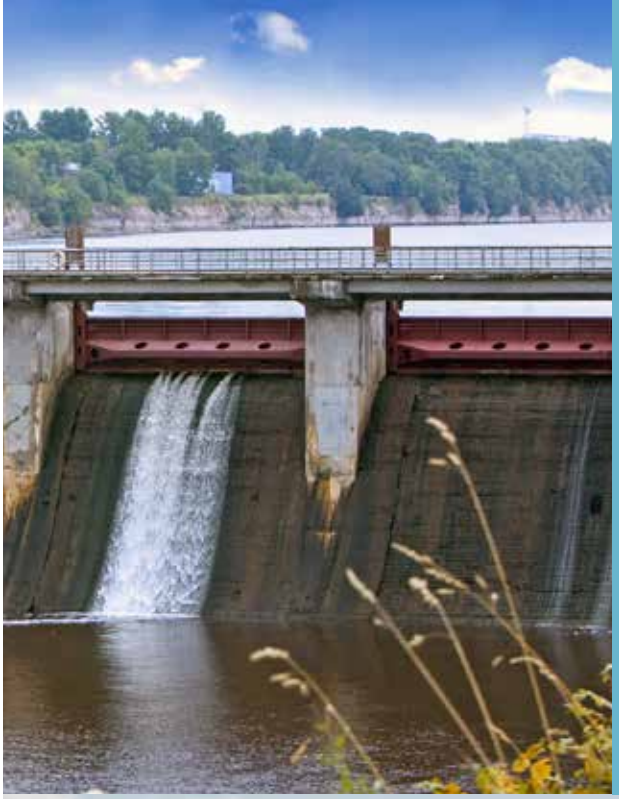
It is also worth mentioning that, in 2019, new legislative acts were adopted to support micro-scale generation (up to 15kW) and renewable energy use in isolated territories, which comprise about 70 per cent of Russian territory. However, the application of renewable energy sources in these spheres has yet to be developed.

3. Forthcoming developments/opportunities in the renewables sector

Russia has the potential to increase the use of all types of renewable energy technologies. Historically (since the Soviet period), it has a well-developed hydropower segment. Its bioenergy potential is also significant, as this technology is used in the agriculture, forestry, infrastructure and trade sectors. But today, Russian renewable energy policy is focusing on accelerating the deployment of wind and solar photovoltaic.

As mentioned above, almost all targeted capacity has already been tendered. In November-December 2020, it is planned to hold auctions for the additional 180MW for wind power plants, 478.6MW for solar power plants and 42MW for small hydro power plants, all to be commissioned in 2023 and 2024. However, a respective official notice has not been published yet.

At present, there is uncertainty regarding future support for the renewable energy sector after the expiry of the current incentives in 2024. The details of state support for RES on the wholesale electricity and capacity markets for the new period of 2025–2035 as well as developments of incentives for RES on retail markets are currently being discussed by the Russian Government.



However, it is likely that, subject to certain modifications, the existing capacity supply scheme implemented under Decree 449 will be applicable until 2035. Preliminary estimates are that funds allocated to support investment projects in renewable energy in this period may reach approximately RUB 400bn, and new capacity is expected to reach up to 10GW. That said, the exact volumes have yet to be defined.

In parallel, the Market Council has initiated development of the concept of Russian green certificates, which may be used to supplement the existing structure. Thus, for the first time in Russia, the concept of green certificates seems to be a potentially workable option. By selling these green certificates, consumers could reduce their total amount of payments for capacity under the current support mechanism of capacity supply agreements, while for power suppliers, the green certificates could act as a source of return on their investments.

Apart from the wind and solar focus, in 2017 Russia introduced a set of legislative amendments aiming to extend the existing renewable energy scheme to energy-from-waste facilities. Currently only the Republic of Tatarstan (55MW) and the Moscow Region (approximately 280MW) are included in the list of Russian regions where such facilities are to be built. First tenders were carried out in summer 2017. In 2018, two new Russian regions were added: Krasnodar Krai (55MW) and Stavropol Krai (55MW). However, no bids were submitted for these new projects and the 2018 tender for construction of waste-burning plants was not successful. In 2019, there was no tender announced at all. We expect development in this sector will be largely dependent upon successful implementation of the recent "waste reform" in Russia.

More generally, there are a number of drivers in Russia that explain the increasing focus on renewables and decentralised energy. New energy solutions are seen as a way to modernise the power system, but they are also a part of a broader socio-economic development model to achieve higher living standards. In addition, a decentralised electricity generation system is of interest to Russia's remote and distant regions, as it is economically impractical to extend high-voltage electricity lines to these regions.

Furthermore, decentralised electricity generation is also interesting and attractive for industrial complexes. It offers opportunities for them and allows them to become more independent from the centralised power system. The current situation of relatively high electricity prices is another reason to explore new energy solutions.

Finally, in response to the EU and US sanctions, Russia's local content requirements have become one of its main economic policy drivers supporting inbound investments and technology transfers to develop local innovative technologies, including in the RES sector. We have even seen the first examples of locally produced components (blades for wind turbines manufactured by Vestas) being exported in Europe.

Finally, in response to the EU and US sanctions, Russia's local content requirements have become one of its main economic policy drivers supporting inbound investments and technology transfers to develop local innovative technologies, including in the RES sector.

Serbia

Authors: Ivan Gazdić, Marija Marošan and Igor Đorđević (July 2020)

1. Brief overview of the renewables sector

Serbia adopted its Energy Law in 2014, aiming to harmonise Serbian energy legislation with the EU's Third Energy Package. The Serbian market then faced a long wait for by-laws that would allow the full implementation of renewable projects. This finally happened in June 2016, when the Serbian government introduced regulations governing the renewables sector which fostered further development of the entire energy market.

The regulations, known as "the PPA Package" – consist of three decrees:

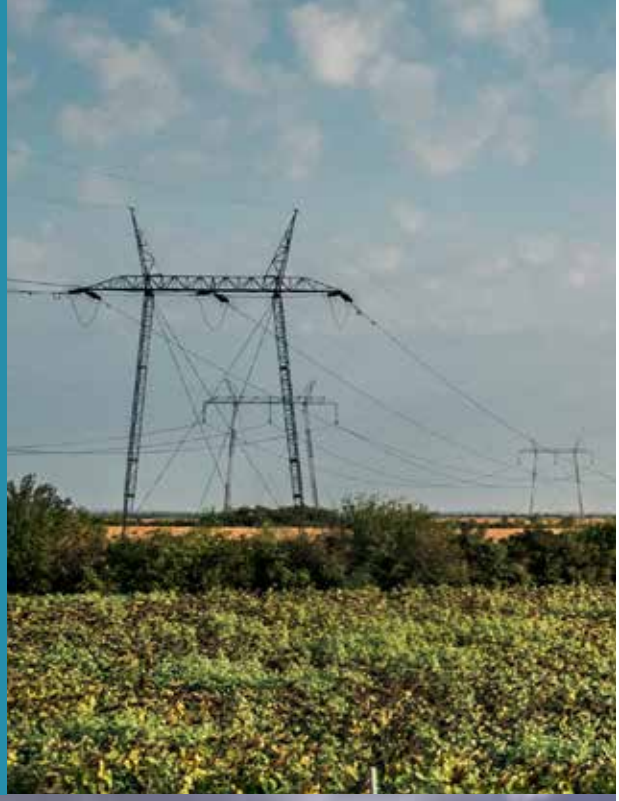
- Decree on Incentive Measures for Electricity Generation from Renewable Energy Sources and High-Efficiency Cogeneration of Electricity and Heat ("Incentive Decree").
- Decree on Conditions of and Procedure for Obtaining the Status of a Privileged Power Producer, Preliminary Privileged Power Producer and Producer from Renewable Energy Sources ("Status Decree").
- Decree on the Power Purchase Agreement ("PPA Decree").

The PPA Package is a consistent, comprehensive and, on the face of it, bankable set of regulations to govern the renewable sector in Serbia in a manner which appears to be unmatched in the western Balkan region, both in the quality of drafting and the completeness of the solutions now in place.

Incentives for renewable energy include:

- mandatory take-off of all electricity generated by the privileged producer by the guaranteed supplier, under guaranteed preferential prices – feed-in tariffs (FiT) – for 12 years under PPA.
- take-off of electricity during the plant's trial period at 50% FiT.
- exemption of the privileged producer from the balancing responsibility, i.e. the privileged producer is not required to bear the balancing costs.
- priority access to the transmission/distribution system.
- free access to the transmission/distribution system.

A year after the adoption of the PPA Package, most of the major renewable projects have reached the construction phase, and some have even achieved financial closure. As in previous years, the development and construction of onshore wind capacities remains Serbia's most developed renewables sector. In recent years, the 104.5MW Kovačica wind farm and the 68MW



Košava wind farm have become fully operational, in addition to pre-existing minor wind farm projects. Some of the sub-sectors are still under-developed, however. Solar is a case in point, where the government allowed for only minor capacities in its incentive measures (10MW overall), that have already been awarded and completely exhausted. Once new capacities are introduced for solar, we expect it will finally gain momentum in Serbia, as their investment costs have decreased over the past years and will certainly continue to fall.

Biomass is also becoming an emerging sector, with many projects currently in the preparation phase, the majority of them 1–5MW projects. The same holds true for co-generation from waste-to-energy projects, where the facilities are expected to produce both electricity and heat from waste treatment operations. However, Serbia is still lacking true RDF (refuse-derived fuel) projects.

2. Recent developments in the renewables sector

The renewable energy market sector in Serbia is undergoing significant development, despite its long-delayed start.

Bearing in mind that the feed-in tariff subsidy scheme has been fully exhausted for some years, Serbia is seriously considering a transition to competitive auctions. Significant support to the Ministry of Mining and Energy in this process is expected from EBRD.

On 15 March 2020, a state of emergency in the Republic of Serbia was declared due to the coronavirus pandemic and COVID-19 outbreak (the State of Emergency). The State of Emergency was effective from 15 March 2020 until 6 May 2020. On 18 March 2020, the Government of Serbia enacted a conclusion no. 312-2625/2020 (the Government Conclusion), in which it acknowledged the report submitted to it by the offtaker in which the offtaker gave notice of – by reference to paragraph 2, sub-paragraph 2) of article 27 of the standardised power purchase agreement template and further to the State of Emergency – projected financial difficulties in the collection of its claims from end-consumers of electricity.

On 20 March 2020, the offtaker submitted for power producers' consideration: (a) information that a *force majeure* event (as defined in the PPA) had occurred and requested the suspension of the terms of the PPA for the duration of the State of Emergency; and (b) an offer for the conclusion of a new temporary PPA (the Temporary PPA) under revised terms and conditions, including (amongst others) a purchase price of generated electricity of RSD 3.302/kWh (ca. EUR 28/MWh) for wind, up to the final date of the State of Emergency. To the best of our knowledge, most of the power producers (if not all of them) signed Temporary PPAs, and therefor agreed to the reduced price.

But does the state of emergency in Serbia truly make the offtaker unable to fulfil its assumed obligations? This is very difficult to establish.

Big and small hydro projects are also in various phases of development around the country. There are reportedly over 100 small hydropower plants currently operating in Serbia, and, according to the publicly available data, over 700 small hydropower plants are due to be constructed in the coming years. According to the adopted "National action plan for renewables until 2020", the total planned capacity of small hydropower plants is 1,092MW. However, it should be noted that small hydropower plants have recently been criticised by different groups for their alleged damaging effects on the environment, so investors should be highly diligent and ecologically conscious when developing these projects.

Interest in Serbia for wind, hydro, biomass and solar projects is increasing among investors and companies from all over the world. Companies including Enlight Renewable Energy, Elicio, Masdar, Secci Italy, RWE Inoggi Germany, REV Canada, Fintel Energia from Italy, Taaleri from Finland, DEG from Germany and others already operate in Serbia and have established their market footprint. Many of their projects have already reached financial closure.

In 2017, Serbia's Ministry of Mining and Energy made significant efforts to promote the use of biomass in district heating and cooling (DHC) systems. Its initiatives were supported by the EU, EBRD, foreign governments, and international lenders. The launch of a major programme "Promotion of Renewable Energies: Developing the Biomass Market in Serbia", focused on facilitating a switch from fossil fuel to more environmentally friendly solutions and was a key development. The initiative has led to a partial switch to biomass in DHC systems in several municipalities, following the commissioning of reconstructed biomass-fuelled boiler rooms. Consequently, this market now has major potential for investors, mainly ESCOs, interested in entering into public agreements with local government bodies, public authorities and institutions. Their focus is the reconstruction and refurbishment of existing coal and/or heating oil-fuelled boiler rooms – projects that will lead to the further development of the Serbian biomass market.

3. Forthcoming developments/opportunities in the renewables sector

Despite the significant improvements introduced by the PPA package decrees, the new model PPA still has not remedied all of the shortcomings of the previous regulatory regime.

One of the main problems is that the offtaker may only provide promissory notes as collateral for the fulfilment of the obligations under the PPA, and not a bank guarantee. Under the law, promissory notes are only effective if the debtor has the funds in its account, and therefore it remains to be seen whether they will be perceived as adequate collateral by lenders. Amendments to the PPA are possible, but only with the approval of the relevant Ministry which can potentially allow some other forms of collateral (such as a bank guarantee). This fact, coupled with the possibility of a change in the offtaker every five years without the producers or the lenders having any say in the matter, is expected to be the most significant challenge for the further realisation of renewable energy projects.

We look forward to seeing whether Serbia will succeed in implementing the policy measures outlined in its action plan and reach its renewables target (27%) of gross energy consumption in due course. Nevertheless, the uncertainty created by the coronavirus pandemic must create doubt as to the viability of this, and many other, targets.

In wind energy, the statutory cap – currently set at a total of 500MW – is already reserved and exhausted. Thus, it remains to be seen whether the government will continue to incentivise renewables after 2020. Certainly, increased quotas for wind would attract further investments in the sector and bring Serbia closer to achieving its renewables targets in gross energy consumption. On the other hand, according to Serbia's Ministry of Mining and Energy, introduction of the long-awaited auction system – instead of the 'first come, first served' quotas mechanics – is still likely to happen in 2020, but this is yet to be officially confirmed.

As solar has been a major failure so far, there is a growing expectation among stakeholders that the Serbian government will create further incentives. Significantly, the Serbian Ministry of Mining and Energy says that preparatory work has already taken place on the regulatory framework needed for the introduction of 'net metering' in Serbia. This initiative – if implemented correctly – will surely encourage private investments in the Serbian solar sub-sector and will hopefully facilitate its further development in the coming years.

Hopefully, transition to competitive auctions scheme supported by EBRD will be implemented by 2022, enabling further developments of the renewable energy projects.

Singapore

Authors: Marc Rathbone, Adrian Wong and Jacob Quek (August 2020)

Introduction

Singapore, with one of the highest population densities in the world, is fairly restricted when it comes to renewable energy options. Space for ground-mounted solar farms is limited, whilst being sheltered geographically results in lower wind speeds. Lack of tidal wave power offshore and limited water sources also puts a strain on hydro power generation. Much of Singapore's electricity is therefore generated from gas-fired power plants predominantly run on imported fuels.

Despite this, Singapore remains competitive, seeking opportunities to prove itself as a serious contender in the global renewables arena. With an average annual solar irradiance of approximately 1,500kWh/m^2/year coupled with significant urbanisation and technological advancements across the city state, Singapore is an ideal platform for rooftop solar energy generation via the installation of solar panels run by photovoltaic systems.

Singapore is part of a global movement in recent years towards increased awareness and focus on environmental sustainability and has pledged to reduce its Emissions Intensity by 36% from 2005 levels by 2030 as part of its commitments under the Paris Agreement. Additionally, Singapore banks Overseas-Chinese Banking Corporation (OCBC Bank) and DBS Bank have indicated an end to their financing of new coal power plants, further evidencing Singapore's growing commitment to renewable energy.

1. Brief overview of the renewables sector

Key statistics

The total electricity generation capacity in Singapore peaked at 13,667MW last year, up 17.6MW from the previous year. Over 95% of the nation's fuel mix comes from natural gas.

Singapore has made significant ground in the use of green energy in recent years with the number of grid-connected solar panel installations increasing from 294 in 2012 to 3,173 by the end of Q2 2019. Singapore has achieved its 2020 target solar deployment of 350MWp which was set in 2010, through ongoing solar projects from public sector agencies such as the Housing & Development Board and Economic Development Board's deployment of more solar PV systems through the SolarNova project (currently in its fifth phase).

Until the first quarter of 2018, Singapore's waste-to-energy incineration plants contributed 256.8 MW to Singapore's total power generation, placing Singapore in first place of ASEAN Member States with the highest waste-to-energy capacity.

Research and development
Singapore aims to be a centre for research and development (R&D) in the renewable energy sector, and several exciting R&D projects in Singapore have made recent headlines.

In 2019, Ocean Sun AS (Norway) and its subsidiary in Singapore, developed a patented technology platform in Singapore for scalable, low-cost, robust and increased-efficiency floating solar on membranes for worldwide deployment, particularly in the equatorial region. This project won the 2019 ASEAN Energy Awards in the Renewable Energy Category.

In the same year, the National Environment Agency (NEA) announced that a two-year trial R&D Project exploring the viability of collecting and transporting source-segregated food waste for co-digestion with used water sludge at the Ulu Pandan Water Reclamation Plant had yielded positive results – the process can triple biogas yield. This novel process is set to be applied to the Tuas Water Reclamation Plant and the Integrated Waste Management Facility by 2025.

Singapore has also recently started exploring hydrogen as a low-carbon alternative energy solution. In March 2020, five Singapore companies (most of which are government-linked) and two Japanese companies entered into a Memorandum of Understanding to develop ways to utilise hydrogen as a green energy source, involving R&D of technologies related to the importation, transportation and storage of hydrogen.

2. Recent developments in the renewables sector

Singapore's national water agency PUB announced its plan to install one of the world's largest single floating solar photovoltaic systems in the Tengeh Reservoir by 2021. This year, it was announced that Sembcorp has been appointed to construct the solar farm which, when completed, could generate enough energy to power about 16,000 four-room Housing Board flats. This is an exciting development and demonstrates Singapore's intention to further its use of renewable energy and to one day turn its reservoirs into "energy batteries".

Approximately 21,000 solar panels were installed on the rooftops of six CapitaLand buildings in partnership with Sembcorp Industries. This is the largest combined solar facility in Singapore by a real estate company. It is estimated that the 21,000+ panels will be able to generate approximately 10,292 MW hours of energy annually. This is the equivalent of powering around 2,300 four-room Housing Board flats each year. Additionally, any surplus solar power that is generated will be channelled to the grid. This solar energy system will assist in eliminating over 4.3m kg of carbon dioxide emissions annually.

In July 2020, Senoko Energy launched a six-month pilot to introduce peer-to-peer (P2P) trading of renewable energy in the city-state. In P2P energy trading, electricity producers with rooftop solar panels can directly sell the excess electricity they produce to other local consumers across the network. The pilot will test the potential for commercialisation of this new energy offering, with the eventual goal of rolling it out to all households and businesses in Singapore.

3. Forthcoming developments/opportunities in the renewables sector

In November 2019, Singapore's central bank launched a USD 2bn Green Investment Programme as the city-state seeks to become a regional centre of environmental investing. The central bank is actively seeking managers with green investment capabilities in research, stewardship, policy and portfolio management, and has also formed a network with seven other monetary authorities to promote sharing of experience and best practices in green finance.

This year, private corporations are also seeking to commit more capital in the renewables sector. In particular, Keppel Corp revealed in its 10-year roadmap that it intends to allocate more capital to nearshore floating infrastructure, green data centres and smart district developments, and is actively looking to partner with investors in energy and environmental infrastructure and data centres.

Likewise, OCBC Bank is looking to grow its sustainable finance portfolio to USD 18bn by 2025. The bank considers that sustainable finance for sectors like renewable energy, clean transportation, education, water and waste management have a high growth potential in the Asia-Pacific region, and there has been a significant increase in the demand for sustainable financing in recent years due to increased efforts to fight climate change.

In the energy from waste sector, the NEA announced earlier in February 2020 that it will be constructing a new Integrated Waste Management Facility at the Tuas View Basin site by 2024. The IWMF will be able to process 5,800 tonnes per day of incinerable waste; 250 tonnes per day of household recyclables; 400 tonnes per day of source-segregated food waste; and 800 tonnes per day of dewatered sludge to generate electricity.

Recent trends have shown that in addition to demand and technological innovation being key drivers of renewable energy trends, electricity retailers on the supply side also have a part to play. iSwitch, is one of the few retailers in Singapore that provides 100% green electricity to both commercial and residential customers, and by 2019 it had helped over 50,000 residential customers save the equivalent of 35,000 tonnes of carbon dioxide emissions. This trend is only set to increase and it is a market with clear growth prospects.

Overall, Singapore remains an important member of the Asian community in driving renewable energy opportunities and this presents an exciting outlook for the near future.

Slovakia

Authors: Michal Hutan (June 2020)

1. Brief overview of the renewables sector in the country

Key statistics

According to statistics published in June 2020 by the Slovak Regulatory Office for Network Industries, electricity consumed from renewable energy sources (RES) in 2019 represented about 17.48% of the Slovak Republic's energy mix.

Total production of electricity from RES was around 18,42%. Biomass (5%) and hydropower (8.1%) are the leading renewable sources. Solar energy only represents around 1.8% while nuclear energy still generates more than 55% of all the electricity consumed in Slovakia.

Operational Support

Operational support has always been the main driver for the development of RES. In Slovakia, clean energy installations are not able to compete with conventual power plants without these support schemes. Therefore, support from the state will continue to be needed in the future.

Historically, electricity production from RES was supported by the feed-in tariff scheme, under which RES producers sell electricity for fixed prices that are higher than those for conventionally-produced electricity. This support scheme has increased electricity prices for all end users. The feed-in tariff rates are set on an annual basis by the Slovak Regulatory Office for Network Industries. The level of feed-in tariff depends on the year in which the project was put into operation and is guaranteed for a fixed number of years set out in law.

Although, in theory, all producers of electricity from RES in the Slovak Republic are entitled to take advantage of preferential access to the distribution system and preferential transmission, distribution and supply, the reality has proved rather different. In recent years, distribution companies have been very reluctant to connect new installations (especially solar) arguing that the national grid does not have sufficient capacity.

The previous government, in trying to solve this "stop status" situation, initiated a major legislative update, effective as of 1 January 2020.

2. Recent developments in the renewables sector

Solution for "stop status" and major update of RES legislation

On 1 January 2020, a significant amendment to Act no. 309/2009 Coll., on the promotion of renewable energy sources and high efficiency cogeneration (the Renewable Energy Sources Act) was adopted.

The amendment was intended to lead to extensive reform of the support of electricity production from RES. The reform was prepared in line with the phasing-out philosophy, with the priority of ensuring cost- effectiveness and minimising the impact on final energy prices.

The new rules introduced a new feed-in premium tariff (which guarantees a premium above the market price) through green auctions for solar installations above 100kW and other installations above 500kW, instead of the existing feed-in-tariff system. For smaller installation, the feed in tariff will be still available but not as generous as it was in 2009–2010 when most of the new solar plants were installed. The amendment has also introduced a local source up to 500kW and obligation of the distribution companies to connect these sources to the national grid on the condition that 90% of electricity is consumed at the place of installation.

Furthermore, to solve the "stop status", the amendment transferred obligation to pay the tariffs from the distribution companies to the Short-term Electricity Market Operator (OKTE) which is a state-owned entity.

The amendment has also imposed new limitations which will mainly impact electricity production from biomass or biogas due to greenhouse gas emissions.

First green auction

The most significant update was, without doubt, the introduction of green auctions for new installations to be organised by the Ministry of Economy in accordance with EU guidelines.

In February 2020, the Ministry of Economy announced the first green auction for new installations with capacity up to 30MW with guaranteed feed-in premium tariff for 15 years. The auction was targeted at the following new installations:

- solar installations with maximum installed capacity of 100kW – 2MW including installations on rooftops, façades of buildings or non-arable land;
- installations using biomass, biogas, gas from disposal sites, gas from sewage/water treatment plants, wind energy, hydro energy or geothermal energy with maximum installed capacity of 500kW – 10MW.

The Ministry has set the maximum prices which can be offered in the auction. For solar and wind energy the maximum price was EUR 84.98/MWh and for the rest, the amount was EUR 106.80/MWh.

As a solution to the "stop status" problem, the auction rules imposed an obligation on the distribution companies to connect the winning installations to the national grid.

Unfortunately, due to the Covid-19 situation, this first auction has been cancelled. However, the Ministry is planning to relaunch the auction in autumn 2020.

Overcompensation issues

Slovakia is also facing a problem with overcompensation. Recently, the Slovak Regulatory Office for Network Industries examined more than 60 subjects and discovered that more than 50 of them had received overcompensation of more than 100m euros. Given this significant figure, the Office has announced that it plans to verify all producers of green energy (approx. 2700). As yet, there are no definite plans for legal sanctions, but we may expect much stricter measures in the future.

3. Forthcoming developments/opportunities in the renewables sector

In February 2020, a new government was elected. The government has announced a plan with strong support for renewable energy sources, with an aim to reduce bureaucracy, make the support schemes more transparent and the application process less complex. This can hopefully bring cheaper electricity prices from RES for end-consumers (feed-in tariff costs represent around 20% of the final electricity price).

The new government has approved its National Energy and Climate Plan, setting a target of 20% of all energy to come from RES by 2030. The total investment costs for reaching this target are anticipated to be EUR 4.3bn.

Given the sensitive environmental aspect, the government is not planning to support the installation of any new hydro plants.

Slovenia

Authors: Dunja Jandl and Tamara Žajdela (July 2020)

1. Brief overview of the renewables sector

While the official figures are not yet available, it seems unlikely that Slovenia will have achieved a 25% share of renewable energy in gross final energy consumption by the end of 2020, as required under the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources (RES). Nevertheless, the country has made progress with respect to RES, implementing changes and proposing ambitious targets for the future. The main developments in the renewables sector include the introduction of the National Energy and Climate Plan and the adoption of secondary legislation, aiming to make Slovenia a climate-neutral society in the coming decades and motivating private finance to invest in projects including renewable sources. The feed-in support scheme continues to play an important, albeit diminishing role.

2. Recent developments in the renewables sector

National Energy and Climate Plan

In February 2020, the Slovenian government adopted the National Energy and Climate Plan (NECP), outlining the energy strategy targets for 2030, with an outlook for 2040. By 2030, Slovenia aims to have renewable energy (RES) make up at least 27% of total energy usage, while making up 43% of total electricity consumption. It is also expected that two thirds of energy consumption in buildings will be sourced from RES.

The NECP sets out the overarching goals Slovenia will strive towards in the next decade of energy development:

- Decarbonisation, by
  - Reducing and discontinuing fossil fuel incentives and subsidies
  - Reducing coal use in electricity production by 30% by 2030 and phasing it out by 2050 at the latest, by
    - Retiring unit 5 of the Šoštanj Thermal Power Plant
    - Reducing lignite excavation
    - Abandoning imported coal for electricity production at the Toplarna Ljubljana Thermal Power Plant
- Energy efficiency, with a 35% target across sectors
- Energy security, by reducing dependence on imported fossil fuels and increasing resilience of the electricity distribution network to interference
- R&D, by dedicating 3% of GDP to research and investment in human resources and the new skills needed for the transition to a climate-neutral society

While the NECP offers a good foundation for decarbonisation and further reduction of fossil fuels, it only sets a goal of 1% reduction of greenhouse gas emissions resulting from agriculture. The targets regarding public passenger transport are also low and no goals have been defined for the use of geothermal energy, which has great potential in Slovenia.

Alongside the adoption of the NECP, Slovenia is preparing the Spatial Development Strategy of Slovenia 2050, which also defines the impact of various RES on environment and nature. Accordingly, the strategy prohibits the installation of wind power plants in protected areas and restricts it to areas far away from settlements. Furthermore, the use of solar power is currently envisaged only on areas of construction land, infrastructure facilities and devalued areas (e.g. abandoned areas of mineral excavations, waste landfill, etc). More on the topic in our article https://www.cms-lawnow.com/ealerts/2020/02/slo-chasing-last-train-eu-commitments?cc_lang=en.

The Strategy is currently being prepared by the Ministry of the Environment and Spatial Planning and is expected to be completed in 2021.

Feed-in support scheme

Investment in the renewables sector has been dependent on the availability of financing mechanisms. The Slovenian Energy Agency is the competent authority for tenders for the feed-in support scheme. Power plant operators, awarded by public tender, may choose between guaranteed purchase and operating premium. If they choose guaranteed purchase, the Centre for RES/CHP (CP), under the aegis of Borzen, d. o. o., takes the electricity from the power plant and sells it to the market (the producer is thus included in the special balance group, operated by CP). If they choose the operating premium, the producers sell the energy on the market, while CP only pays a premium as a difference between the full ("guaranteed purchase") price and the market price, which is determined yearly ex-ante, based also on plant type. Eligible for the feed-in support are the producers with power plants of installed capacity up to 10MW, excluding wind power plants, where the installed capacity may be up to 50MW.

In May 2020, the Slovenian government adopted amendments to the Rules on Support for Electricity Generated from Renewable Energy Sources and from High Efficiency Cogeneration, introducing the obligation for investors to provide an adequate insurance for the performance of the project applying for the feed-in support. The insurance amount could be up to 5% of the investment value of the project, with the exact amount, type and validity of the insurance determined by the Slovenian Energy Agency alongside its decision on whether the project qualifies for the feed-in support scheme.

In 2019, electricity production within the subsidies scheme – in the 3858 power plants with a nominal power of 417MW – amounted to 947,5GW, which is 1% more than in 2018. The subsidies were awarded as follows:

- Solar power plants – EUR 61.9m for producing 261.4GWh
- High-efficiency cogeneration powerplants on fossil fuels – EUR 27m for producing 346,4GWh
- Biomass power plants – EUR 18.3m for producing 133,5GWh
- Hydropower plants – EUR 4.6m for producing 110.4GWh
- Biogas power plants – EUR 9.6m for producing 84.4GWh
- Wind power plants – EUR 0.3m for producing 6.1GWh
- Other plants – EUR 1.3m for producing 5.2GWh.

In total, EUR 123m has been paid out in 2019 – 9% less than in 2018.

Installation of a small solar power plant does not require a building permit

In March 2020, the Slovenian government adopted the Decree on Small Installations for the Production of Electricity from Renewable Energy Sources or Through High Efficiency Cogeneration. It sets out the types of installations for energy production from renewable energy sources and high-efficiency cogeneration that do not require a building permit, i.e. "small power plants". Solar power plants with the maximum power of up to 1MW are, according to the Decree, considered small power plants and do not require a building permit to be installed. The Decree simplifies investing in renewables and is a welcome change as procedures for obtaining building permits in Slovenia can be time-consuming.

3. Forthcoming developments/opportunities in the renewables sector

The potential to increase renewable energy in Slovenia is significant. The country enjoys abundant sunshine, its forest areas (58% of the country) are a major resource, and it has an existing network of hydro power plants. After a period of stagnation in the hydro power plant network, a EUR 1.3bn project to build a chain of 10 hydro power plants is envisaged on the middle course of the Sava river. If the project comes to fruition, the electricity production from RES will be increased by 1TW, which amounts to 10% of current total electricity production in Slovenia.

As certain regions in Slovenia are windy, opportunities for construction of wind power plants exist. Three are planned in the Eastern region of Slovenia by the investor Dravske elektrarne Maribor d. o. o., with a total capacity of 46MW and 122GWh annually, as well as another project being developed by Stiria Invest.

The main obstacle on the path towards building new hydro and wind power plants are NGOs and locals, who oppose the construction of such power plants. Recently, the government identified the development of hydro power plants in Mokrice and on the Sava river as a priority. Moreover, recent changes in the law restricted the influence of NGOs in the process for obtaining building permits.

Slovenia is also in the final stages of adopting the Energy Efficiency Act, which sets out measures to promote and increase energy efficiency, particularly to improve the energy efficiency of buildings, achieve security of energy supply and boost the use of renewable energy sources.

There are many (co)financing opportunities for investment in the energy sector, especially in renewables. In addition to tenders for the feed-in support scheme, which are published around twice a year, additional co-financing mechanisms are available. Loans by SID Bank, the Slovenian development and export bank, are available to public sector and ESCO companies for the energy renovation of public sector buildings. Eco Fund, the Slovenian Environmental Public Fund, provides several options for obtaining non-refundable monies for investment in energy efficiency.

It is expected that new opportunities will arise in the near future, following the adoption of the aforementioned National Energy and Climate Plan.



South Korea

Authors: Munir Hassan and Sabrina Polito (November 2020)

1. Brief overview of the renewables sector

South Korea is Asia's fourth-largest economy and recent years have seen its renewable energy market grow at a fast pace. Currently, South Korea relies on coal and nuclear power to produce around 70% of its electricity, with renewable energy accounting for around 15%. South Korea remains one of the world's largest coal importers, however, given mounting concerns over air pollution and greenhouse gas emissions, reducing the country's reliance on coal power and increasing the share of renewable energy is a key focus of the government's energy policy. In October 2020 the government announced its goal of net-zero emissions by 2050, and commentators expect a shift away from coal will be key to meeting this.

In May 2020, the government announced its 2020–2034 plan – a long-term energy transition plan to deliver 40% renewable energy generation by 2034. It is expected that the share of liquified natural gas (LNG) fired plants will be maintained at 32% and all coal-fired power plants will be shut down, with plans to convert half of these into LNG plants. The 2020–2034 plan will also see the closure of nine nuclear plants, decreasing the share of nuclear power in South Korea to 10%.

However, as with many other countries in the region, South Korea faces challenges in the deployment of renewable technologies due to land availability. More than 70% of the country is mountainous and so lower areas, that would be well-suited to renewable projects, are densely populated. Despite this, South Korea has great potential for renewable projects, particularly offshore wind given its long coastline and favourable topography. The South Korean government aims to build 12GW of offshore wind by 2030, up from its current capacity of 124MW.

The renewable energy industry in South Korea is principally regulated by the Electricity Business Act (also known as the Electric Utility Act) and the Renewable Energy Act. The Renewable Energy Act outlines key matters in relation to renewable energy projects. The support schemes currently in place for renewable energy projects are as follows:

- Renewable Portfolio Standard Scheme (RPS) – this is the key support system of renewable energy projects and replaced South Korea's feed-in-tariff scheme in 2012. The RPS scheme requires generators (both state and non-state owned) which have power generating facilities of over 500MW to produce a minimum portion of their power using new and renewable energy sources. As at 2019, the minimum portion is 6%, set to increase to 10% by 2023.
- Renewable Fuel Standard (RFS) – the transportation sector is required to use a certain mix of renewable energy in their fuel (3% biodiesel by 2020).
- Mandatory renewable energy installation for public buildings – public buildings need to consume more than 21% of their total expected energy usage with renewable energy sources (with plans to increase this target to 30% shortly).

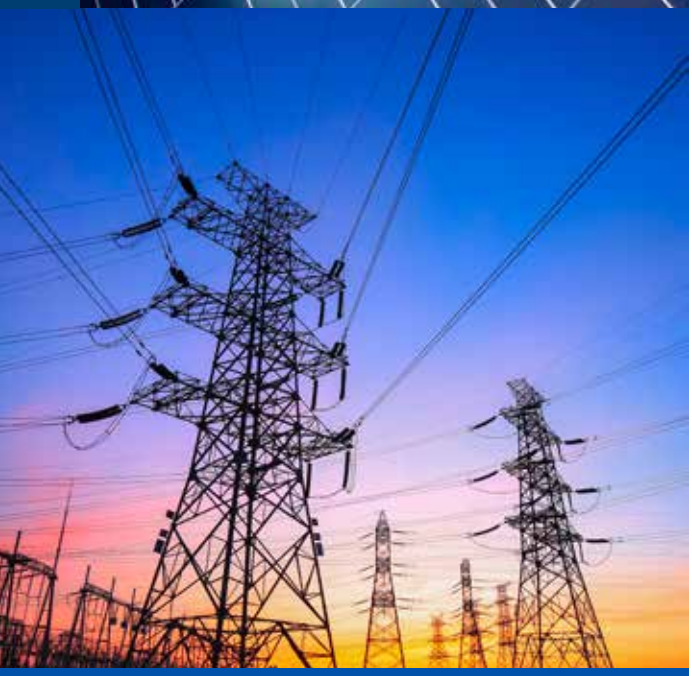
2. Recent developments in the renewables sector

The Green New Deal

In May 2020, the South Korean government unveiled its USD 60.9bn 'Green New Deal' (also known as the '2025 Plan') as part of its wider national strategy to transform the economy from high carbon to low carbon in light of the Covid-19 pandemic. It includes plans to expand the country's green mobility fleet to 1.33m electric and hydrogen powered vehicles and investment in smart grids. The Green New Deal also sets ambitious goals of ending funding of overseas coal plants, transforming urban areas into smart green cities and the introduction of a carbon tax.

Offshore wind

In recent years, only seven onshore wind projects have come online in South Korea, with the onshore wind sector facing challenges due to land availability and acceptance from local communities. However, South Korea has favourable conditions for offshore wind projects, particularly in the northern and southern Jeolla provinces. Currently, more than 90% of the ongoing offshore wind development projects are located in these provinces with South Korea having a development pipeline of over 15GW of offshore wind projects, with around 7GW of offshore wind projects due to enter construction before the end of 2020. Investors in South Korean offshore wind projects include both public and privately-owned national investors, with international sponsors holding significant stakes in a number of large-scale projects. There is also mounting interest in floating wind, particularly off the south coast where



winds are stronger. According to reports, Jeonnam Development Council is planning to auction up to two areas around Sinan for ~2GW of floating wind development in 2021.

Further, in order to encourage acceptance of offshore wind projects amongst local stakeholders, the government has introduced development models which promote the co-existence of offshore wind projects with the fisheries industry and equity participation by local residents. For example, in July 2020, local governments, business and residents signed a memorandum of understanding to develop 2.4GW of offshore wind capacity off the north Jeolla province. The expected investment amounts to around USD 11bn to be raised from the private sector.

3020 Implementation Plan for New and Renewable Energy (the "3020 Plan")

The 3020 Plan, issued in December 2017, underpins the government's long-term renewable energy strategy, following a presidential campaign which focused largely on reducing coal and nuclear dependency. The 3020 Plan includes proposals for the introduction of new incentives, such as a feed-in-tariff to support smaller projects, the expansion of solar power generation in agricultural land areas and local communities' participation in renewable energy projects from the initial project stages. Commentators therefore expect that in light of the policies set out in the 3020 Plan, the expansion of renewables in South Korea will be driven by smaller developers who may be in a position to benefit from government policies, and large scale renewable projects such as offshore wind will be driven by large developers, including the six generation subsidiaries of Korea Electric Power Corporation (KEPCO).

New renewable energy support programs

In March 2019, the government announced proposals to implement three different programs to prioritise high-efficiency renewable projects that use equipment with a low carbon footprint and adhere to stricter South Korean industry standards. These programs enforce the use of a certain level of renewable energy sources in the power generation, transportation and public sector. This form of carbon certification is expected to have a positive impact in strengthening standards, efficiency and sustainability across the industry.

It is also anticipated that projects that comply with the three programs will be given additional renewable energy certificates, with the programs launching in 2020/21.

3. Forthcoming developments/opportunities in the renewables sector

The Ninth Basic Plan for Long-term Electricity Supply and Demand

South Korea's Ministry of Trade, Industry and Energy (MOTIE), is currently drafting a new version of the country's 'Ninth Basic Plan for Long-term Electricity Supply and Demand' (the "Plan"). Commentators expect that the Plan will include the demolition of coal-fired power plants aged 30 years and older and the construction of large-scale wind farm projects. In addition, measures for the suspension of power operations during the spring are to be strengthened and discussions will be held in respect of factoring power generation costs and environmental expenses into the electricity pricing scheme.

The Fourth Energy Technology Development Plan and Roadmap

In November 2019, MOTIE submitted its Fourth Energy Technology Development Plan and Roadmap (the "Roadmap") to renewable energy industry representatives for review. The Roadmap includes sixteen energy technology priorities in the run up to 2030, including reducing the costs of solar technology and increasing product efficiency which will be supported by unspecified research and development investment. The plan also includes actions to increase the uptake and development of the electromobility sector, with the mileage per single charge being doubled and increasing the scale of offshore wind projects.

In addition, MOTIE is actively encouraging research and development of high-efficient water electrolysis to produce green hydrogen and the development of next-generation secondary batteries. Energy storage is expected to be a key sector of growth particularly given that a number of South Korean companies are major manufacturers of batteries. Key industry players such as KEPCO are already investing in this area. Looking forward, MOTIE plans to increase investment into research and development on long-term projects, field tests and safety management. It is reported that MOTIE will invest between USD 2.4m and USD 25.7m per project and construction testing.

Solar power research and development

South Korea has good potential for solar power given that the country experiences, on average, around 2,500 hours of sunlight a year. By the end of 2020, every public building and 1m homes in Seoul are set to be powered by solar. Despite the availability of sunlight, solar power developers have faced challenges due to low radiation and for national companies, cost competition from China.

To deal with these difficulties, a number of research institutions in South Korea are actively conducting research and development on next generation solar cells, heightening expectations for commercialisation. For example, a research team has developed a new graphene electrode to produce perovskite solar cells at a low temperature. It is hoped that the availability of more innovative and efficient solar technologies will allow developers to harness South Korea's solar potential. MOTIE recently passed rules which will see the carbon footprint of solar power projects taken into account when prioritising new installations.

Spain

Author: Ignacio Grangel Vicente (August 2020)

1. Brief overview of the renewables sector

The production of electricity from renewable sources represents 49.3% of Spain's power generation capacity, with over 108,000MW installed. Of the 261,020GWh of electricity produced in Spain in 2019, 36.8% came from renewable technologies, which led to the commissioning of almost 5,000 new megawatts of capacity during the year.

The development of renewable energies has coincided with the regulation of these technologies and the approval of various remuneration schemes. Following the Electricity Sector Act 54/1997 of 27 November, economic arrangements[1] were created which triggered a sharp increase in renewable energies, especially wind-based facilities (with a current installed capacity of 25,000MW), and contributed towards achieving the 2000–2010 Plan for the Promotion of Renewable Energies.

The subsequent enactment of Royal Decree 661/2007 of 25 May, regulating electricity production under a special scheme, enabled the construction of small-scale photovoltaic facilities totalling 4,000MW in capacity. Investors were guaranteed a reasonable rate of return on their investments based on remuneration for the energy produced at a fixed price (feed-in tariff). The costs attributable to the grid were passed on to consumers, also at a reasonable rate.

However, an increase in all grid-related costs, including payments to transmission and distribution networks and capacity-based payments, meant that consumer bills failed to include the entirety of these costs and led to the accumulation of an annual deficit in the grid. This forced a review of all remuneration types in a bid to halt the build-up of debt within the system.

A remuneration scheme was created based on recovering investments and obtaining a rate of return which would ensure reasonable profitability for renewable energy producers within a sustainable grid framework. This reform was developed by way of Royal Decree-law 9/2013 of 12 July, adopting urgent measures to guarantee the financial stability of the electricity system, and the Electricity Sector Act 24/2013 of 26 December.[2]

[1] Royal Decree 2818/1998 of 23 December on the production of electricity at facilities supplied with renewable energy sources or resources, waste and cogeneration and Royal Decree 436/2004 of 12 March outlining the methodology for the review and systematic approach towards the legal and economic arrangement of electricity production under a special scheme.

[2] Both regulations have been developed by Royal Decree 413/2014 of 6 June regulating the production of electricity from renewable energy, cogeneration and waste and Order IET/1045/2014 of 16 June 2014 approving the remunerative parameters for ordinary facilities applicable to certain electricity production installations using renewable energies, cogeneration and waste.

Under this reform, all facilities became regulated by the same laws and earned income from participation in the market, receiving – where applicable – two kinds of supplementary remuneration. First, a price per unit of installed capacity (EUR/MW), covering the costs of investment for ordinary facilities which cannot be recouped through the sale of energy (return on investment. Second, an operations-based price (EUR/MWh) covering the difference between operating costs and income from ordinary facilities' participation in the market (operations-based remuneration). The return on investment mechanism also includes a remuneration rate which could reach a reasonable rate of return, abolishing the feed-in tariff arrangement.

The annual cost of remuneration through this specific scheme for the grid exceeds EUR 7bn, with the electricity system boasting financial stability and even a surplus since 2015.

Later, in 2016 and 2017, auctions were called in Spain which awarded 9,300MW of renewable capacity, mainly from wind and photovoltaic sources. The facilities which won the auctions had to be commissioned before 1 January 2020 in order to continue to benefit from the specific remuneration scheme. Under that scheme, these facilities would only receive income from the grid when the price obtained from the sale of electricity in the market was lower than the floor offered at auction (the return on investment offered was zero).

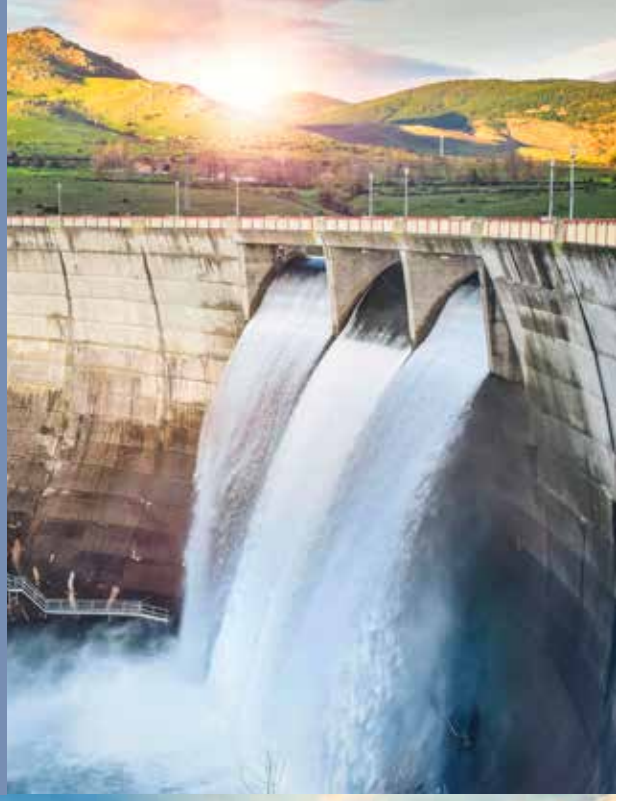
Both 2018 and 2019 have witnessed an increased number of wind farms and photovoltaic plants which are not included under the specific remuneration scheme. These facilities receive the market price directly or enter into long-term agreements with customers who purchase their energy and take on the risk of price fluctuation to recover their investment.

2. Recent developments in the renewables sector

Facilities entitled to remuneration under the 2019 scheme

The specific remuneration scheme, Royal Decree-law 17/2019 of 22 November introduces urgent measures for the essential adjustment of electricity grid remuneration parameters and addresses the process of decommissioning thermal power stations.

For facilities eligible under the scheme (renewables, cogeneration and waste), this regulation sets out the reasonable rate of return applicable to the remaining regulatory lifespan of ordinary facilities. This figure will be used to review and update the remunerative parameters to be applied during the second regulatory period (2020 to 2025).



Accordingly, all facilities receiving specific remuneration – following the former Royal Decree 661/2007 and subject to Royal Decree 413/2014 – will be able to receive it (2016 and 2017 auctions). Future facilities, possibly following new auctions, which are entitled to receive a return on their investment when the rate for the following regulatory period is set, will receive a rate of return of 7.09% or 7.398%.

Facilities commissioned before 2013 will receive 7.398% from 2020 to 2031 where they have not filed or agree to waive legal action or arbitration proceedings against the Kingdom of Spain due to the 2013 regulatory amendments.

Private consumption

Royal Decree 244/2019 of 5 April regulates the administrative, technical and economic conditions for the private consumption of electricity (RD 244/2019). It incorporates a section of the content of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources into the Spanish legal system.

The Electricity Sector Act 24/2013 of 26 December was the first law to create a legal framework for private consumption, which is considered to be a source of power generation aside from the grid. It is defined as consumption by one or several consumers of electricity from facilities close to or linked to where consumption takes place. This act sets out the different forms of private consumption: individual or collective; and with or without excess generation. Energy consumed privately which comes from renewable sources, cogeneration or waste is exempt from all types of charges and tariffs.

Royal Decree-law 15/2018 of 5 October, on urgent measures for the energy transition and protection of consumers, highlights private consumption as an essential element to ensure that consumers are able to obtain cheaper and cleaner energy. It also stipulates the exemption of charges and tariffs in a bid to promote private consumption with distributed renewable generation.

These regulations have triggered the development of private consumption facilities at homes and in industry, representing a key increase alongside photovoltaic plants.

Regulatory developments
Royal Decree-law 1/2019 of 11 January covers urgent measures to adapt the remit of the Spanish Competition Authority to EU law requirements in relation to Directives 2009/72/EC and 2009/73/EC of the Parliament and of the Council of 13 July 2009 on common rules for the internal market for electricity and natural gas. It sets out new responsibilities for the regulator and will enable greater independence when it comes to regulatory decision-making, specifically the approval of regulations which affect the technical management of the grid and remuneration-related aspects.

New regulation to drive the energy transition
Royal Decree-law 23/2020 of 20 June approving energy-related and other measures for economic recovery regulates a series of key components for the development of the electricity system:

- Access and connection, as well as a new auction-based mechanism designed to provide energy produced from renewable sources with a stable and defined framework.
- New business models as part of the energy policy and, in particular, the aggregation of demand, storage and hybridisation.
- Energy efficiency, enabling greater flexibility of the National Energy Efficiency Fund.

Regulations on the development of new auctions and access/connection permits are currently being debated and set to be passed by the end of 2020.

3. Forthcoming developments/opportunities in the renewables sector

The plans to develop renewable energies in Spain are covered by two main regulations which are both linked to the European-wide goal of reducing greenhouse gas emissions and fulfilling the commitments assumed under the Paris Agreement. The key regulatory texts are as follows:

1) The EU Winter Package – "Clean energy for all Europeans"– is the Europe-wide mechanism for driving the transition towards clean energy. It sets out the EU's goals for 2030 in relation to the reduction of greenhouse gas emissions, as well as energy efficiency and renewable energy incorporation objectives. The binding goals set for the European Union as a whole are:
   - To cut greenhouse gas emissions by 40% in relation to 1990 levels.
   - 32% of final energy consumption to come from renewable sources.
   - An increase in energy efficiency of 32.5%.
   - To ensure total electricity interconnection with neighbouring states of at least 15%.
2) The Integrated National Energy and Climate Change Plan (the PNIEC). Following the guidelines set out under the Governance Regulation, the Spanish government has included specific goals for Spain in this document, some of which appear significantly more ambitious than those set by the EU. The goals include:
   - A 21% reduction in greenhouse gas emissions in relation to 1990 levels.
   - 42% of final energy consumption to come from renewable sources.
   - An increase in energy efficiency of 39.6%.
   - 74% of electricity to come from renewable sources

The PNIEC forecasts total installed capacity in the electricity sector of 157GW by 2030, 50GW of which will be wind energy, 37GW solar energy and 7GW thermoelectric.

Total investment is expected to come in at around EUR 236bn, with 80% private sector investment against 20% public sector investment. This investment will be made through:

- Development of transmission and distribution networks. To achieve the PNIEC goals, the electricity system requires significant investment to integrate new renewable capacity. Spain has begun to pass through a new 2021–2026 plan for transmission networks aimed at facilitating an increase in installed and supply capacity for new renewable energy facilities.
- New auctions for innovative renewable energy facilities, technologies under development and those which contribute to the management of the grid may be called.

In addition to these two main regulatory texts, other notable developments include:

- Spain is working on an energy storage regulation which will enable greater viability in terms of supply and the management of electricity produced at renewable energy facilities. New projects are expected to be presented in 2020.
- Projects which enable hydrogen to be obtained from solar panels are currently being investigated, and further advances are predicted which will pave the way for new technology in the energy sector.
- Energy transition has led oil and gas companies to develop green gas and renewable gas projects in a bid to comply with CO_2 emission regulations.
- Significant regulatory changes are expected in relation to network access and connection permits, which could restrict the acquisition of these rights for projects that are not effectively developed.
- New auctions for renewable facilities scheduled over the coming years.

Switzerland

Author: Stephan Werlen (September 2020)

1. Brief overview of the renewables sector

For many decades Switzerland has used hydro-electric power as one of its main renewable energy sources. Today, more than 57% of domestic electricity production comes from hydro-power sources.

In 2019, more than 670 hydropower plants producing an average of approx. 36,567GWh per year, were operating within Switzerland. More than 48% of these hydropower plants are run-of-river power plants, 47% consist of storage power plants and more than 4% are pump storage plants. The Swiss government intends to continue promoting hydropower, in particular by supporting the renovation and expansion of existing plants in order to increase their efficiency. However, the construction of new hydropower plants is rather unlikely in view of the current number of existing plants, restrictions from environmental laws, nature and landscape protection regulations, and other factors.

In recent years, other renewable energies such as solar, wood, biomass, wind, geothermal energy and ambient heat have gained an increasing share of Switzerland's energy supply. In 2019, 7% of annual domestic electricity production originated from such renewable energies. However, it would take many years for most of these renewable energies to become economically competitive without supporting measures. In particular, the substantial potential of photovoltaic (PV) and geothermal energy will only become fully exploitable in the coming decades.

2. Recent developments in the renewables sector

Following the Fukushima nuclear disaster in 2011, the Swiss Federal Council and Parliament decided on Switzerland's staggered withdrawal from nuclear energy. This decision, as well as other far-reaching changes in the international energy environment, required a restructuring of the Swiss energy sector. For that purpose, the Federal Council drew up the Energy Strategy 2050, which has to be implemented gradually.

On 21 May 2017, Switzerland voted in favour of the first step of the Energy Strategy 2050 and adopted the revised Energy Act as proposed by the Swiss Federal Council and the Parliament. The revised Energy Act aims to reduce energy consumption, increase energy efficiency and promote renewable energies. In addition, the construction of new nuclear power plants shall be prohibited. Further, the revised Energy Act includes the aim of reducing Switzerland's dependence on imported fossil energy sources and of strengthening domestic renewable energies.

The revised Energy Act and the corresponding ordinances entered into force at the beginning of 2018. In the context of the ongoing revision of the Electricity

Supply Act, which aims to open up the electricity market, the revised Energy Industry Act also needs to be adapted. The intention is to support market liberalisation by providing more attractive incentives for investments in domestic renewable energies, thereby strengthening Switzerland's security of supply.

3. Forthcoming developments/opportunities in the field of renewable energies

In accordance with the Energy Strategy 2050, the following four main pillars have been defined as the first set of implementation measures:

1) **Increasing energy efficiency.** Recent studies have shown that more than 40% of energy consumption and climate-damaging CO_2 emissions are attributable to the building industry. Accordingly, measures have and will be put in place to subsidise the energy-saving renovation of buildings. Further, investments to improve energy efficiency are tax-deductible, including the cost of demolition of existing buildings to make way for new buildings. Another measure is the replacement of traditional domestic electricity meters with smart meters. The more accurate data will enable more efficient supply and electricity savings. Regulations on CO_2 emissions for new cars will be stricter and extended. From 2021, passenger cars will be allowed to emit on average only 95g CO_2/km over the entire new car fleet, which is about a quarter less than today.

Development of renewable energies. Operators of solar and wind energy production facilities are eligible to apply for feed-in remuneration (of up to 2.3 centimes/kWh) to promote the construction of these facilities and contribute to the (still high) production cost. The support system is also valid for a limited period: feed-in remuneration for new facilities can only be approved until the end of 2022. Further, provided certain criteria are met, operators of PV installations and large new hydro-electric power plants may apply for investment subsidies. In the past, only operators of small PV installations (i.e. production capacity of less than 30kW) were eligible; today, operators of large PV installations may apply. Given the importance of hydro-electric power plants for Switzerland and current low market prices, the Swiss government has decided to grant financial support to operators of both new and existing hydro-power production facilities. This support is, however, limited to a period of five years. The procedures for the approval of new renewable energy production facilities will be shortened and simplified. In this context, the production of renewable energy will be granted the status of national interest – particularly important where the protection of nature and the landscape could limit the construction of new facilities.

2) **Nuclear energy.** The construction of new nuclear plants is prohibited – permits for the construction of new nuclear plants will no longer be granted. Existing nuclear plants may continue to operate as long as they are safe. The export of spent fuel rods for reprocessing has also been prohibited. It is currently expected that the existing nuclear plants (there are four nuclear plants operating in Switzerland) will have to be demolished and dismantled by around 2034. The first nuclear plant was shut down in December 2019.

3) **Electricity grids.** The current electricity power grids need substantial upgrading to meet new requirements. Under the current legal system, the process for upgrading and renewing existing electricity power grids is burdensome and time-consuming. The Energy Strategy 2050 will simplify and accelerate the processes for upgrading and renewal.

The implementation of the Energy Strategy 2050 is on track and has already reached the short-term legal benchmarks for 2020. In the longer term, however, further efforts are needed to gradually transform the energy system and in particular to promote the expansion of renewable energies and energy efficiency.

Taiwan

Authors: Munir Hassan, Adrian Wong and Sabrina Polito (November 2020)

1. Brief overview of the renewables sector

In recent years, Taiwan's energy policy has been driven by the need to increase national energy security, reduce its reliance on nuclear power and cut greenhouse gas emissions. To date, nuclear power still accounts for around 15% of electricity generation and Taiwan relies heavily on fossil fuel imports to meet its energy supply (with energy import dependency at around 97%). However, the government of Taiwan is motivated to accelerate Taiwan's clean energy transition and as such, the country has gained considerable attention from developers and investors worldwide.

In 2017, the government announced plans to source 20% of the country's electricity from renewable sources by 2025, however, in 2019, renewables comprised just 6% of Taiwan's electricity supply. This will require 27GW of newly installed renewable energy capacity, with solar expected to comprise 20GW, offshore wind 5.5GW, hydroelectric 2.08GW and the remainder being biogas and onshore wind.

With these targets in mind, the government of Taiwan will be looking to secure around USD 59bn of foreign investment and have developed a framework that is supportive of renewable energy development. For example, the government has enhanced its supply chain and grid infrastructure in readiness of increased renewable energy deployment, with 10.7GW of grid capacity scheduled to be added to the national grid by 2025.

Taiwan also ranks highly on the World Bank's Ease of Doing Business Report and has a range of renewable incentive schemes in place, which include the following:

- **Feed-in Tariffs (FiT).** Under the FiT scheme, state-owned Taiwan Power Company (TPC) is obliged to enter into power purchase agreements with renewable energy generators for a term of 20 years. The purchase price under FiT must not be lower than the average cost for domestic fossil fuel power production.

- **Green Finance Action Plan.** This comprises a set of measures aimed at encouraging financial institutions to invest in renewable energy. For example, for foreign banks with Taiwanese branches, restrictions were recently lifted in respect of revenue thresholds in place for customers borrowing funds for renewable energy projects. In addition, Taiwanese branches of foreign banks are now allowed to issue bonds to raise finance for renewable energy projects.

- **Demonstration incentives.** In recent years, the government of Taiwan has provided incentives and subsidies for certain types of renewable demonstration technologies. For example, the government has subsidised the demonstration of offshore wind projects for up to 50% of the total installed cost of the turbines. The government are now also looking to implement regulations on the promotion of building-integrated solar PV power generation demonstration, under which subsidies of up to NWD 50,000/kWp can be awarded for the purchase of a solar power facility.

Despite being susceptible to severe weather conditions, Taiwan has excellent potential for renewable energy. Taiwan is considered one of the world's most technologically innovative economies and it is anticipated that with the growth of the renewables industry in Asia generally, many established Taiwanese companies will be looking to develop innovative technologies that are better suited to withstanding adverse weather conditions in the region. Moreover, Taiwan's proximity to other key Asian growth markets means it can serve as a renewable energy hub for the wider Asian market.

2. Recent developments in the renewables sector

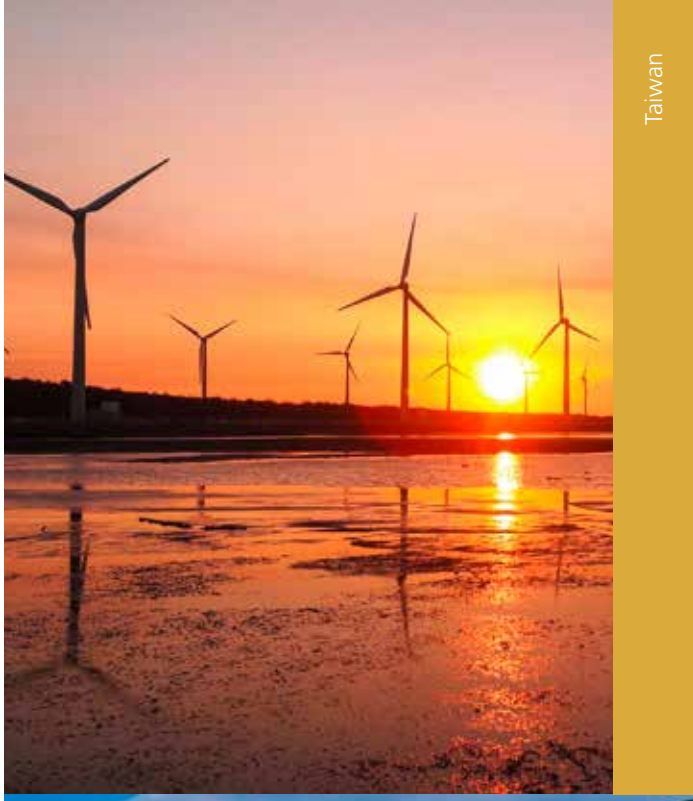
Key legislative reforms

In January 2017, the Electricity Business Act was amended to liberalise Taiwan's electricity market and promote renewable energy generation. Key amendments included the unbundling of TPC's generation business from its transmission and distribution business by 2026 and allowing renewable energy to be sold directly to end users.

Further, in May 2019, the government of Taiwan passed a series of amendments to the Renewable Energy Development Act (REDA) to further its market liberalisation strategy. In addition to establishing the "27GW by 2025" renewable energy target, the application procedure for renewable facilities with a capacity of less than 2MW was simplified and generators were permitted to choose whether to sell electricity via direct supply, wheeling or wholesale to TPC. Additionally, an obligation was introduced for heavy electricity users to either develop a certain capacity of renewable generation facilities, purchase a certain portion of energy supply from renewable sources or pay an amount dedicated to renewable energy development. The implications of some of these amendments are set out in further detail below.

Offshore wind

Commentators estimate that Taiwan will become the second largest offshore wind market in Asia, with more than 7.8GW of offshore wind capacity in the project pipeline at present and plans to increase this figure to 15.5GW by 2035.



Taiwan's geographical conditions present both difficulties and opportunities for development of the offshore wind market. Strong wind speeds in the Taiwan Strait (which forms something of a natural wind tunnel) offer great energy yield and Taiwan's relatively shallow waters provide ideal conditions for offshore wind sites. However, seismicity and severe typhoon activity presents additional complexity to developers when designing and constructing projects. Therefore, recent projects have seen developers collaborate with local supply chains to share lessons learned from local engineering practices to deliver solutions that work effectively in such conditions.

In November 2019, the government announced plans to add 10GW of extra offshore wind capacity during the period of 2026–2035. However, in order to support the country's offshore wind targets, work is needed to update and improve the infrastructure necessary to service the offshore wind market. Many of Taiwan's ports are not suited for turbine assembly and installation and the country's grid network will need updating to handle intermittent supply. To address this, steps are being taken at a local and national level. For example, at the Kaohsiung Xingda Port in southern Taiwan, a centre for research and development is under construction and will offer training for the offshore wind sector. Moreover in 2018, the Ministry of Economic Affairs (MoEA) awarded grid capacity to seven developers for ten offshore wind projects in the first bid of its kind. It is projected that by the end of 2020 these projects will provide 738MW of energy and a further 4GW between 2021 and 2025.

After a period of political uncertainty and proposed changes to FiT, in January 2020 the MoEA announced that it will be reducing the 2020 offshore wind FiT rate to reflect technological progress in the offshore wind industry and international development trends. The 20-year FiT for offshore wind power purchase agreements (PPAs) signed in 2020 is set at NWD 5.0946/kWh, which is down by 7.6% compared to the 2019 FiT rate.

The MoEA has also announced plans to hold three offshore wind auctions with a combined capacity of 5GW by 2023. It is expected that the next auction will be held in the second quarter of 2021 and will auction off around 1GW in capacity. The next two auctions, in 2022 and 2023 respectively, will each be for 2GW. The projects selected in the three auction rounds are expected to be commissioned between 2026 and 2030.

Solar

Taiwan is also expected to become one of the fastest-growing solar markets in the world, with the country already being the second largest PV cell maker worldwide. Whilst land scarcity still remains a challenge to developers, the government's Solar PV Promotion Plan expects around 3.7GW of new solar capacity to come online before 2021 and will result in around USD 7.5bn in investment and business opportunities.

Despite the fall in solar FiT prices, commentators note that this reduction may be offset by the steady fall in technology costs, and the government continues to incentivise development of the Taiwanese solar market. Most solar projects in Taiwan use locally sourced equipment, as regulations restrict developers from buying modules made in China, which have a Voluntary Product Certification that gives developers an additional 6% bonus to their FiT rate.

Further to the option of wholesale to TPC and in addition to FiT, the government provides a 6% subsidy for high-efficiency solar components, a 3% subsidy for consumers who install solar PV systems on rooftops and a 15% bonus to solar projects built in the counties of Miaoli, Hualien, Yilan and on remote islands.

Corporate procurement of renewable energy

Another area showing tremendous growth potential is in the corporate procurement of renewable energy (through the use of corporate PPAs).

One of the key features of the May 2019 amendments to the REDA is the ability of renewable energy generators to choose whether to sell electricity via direct supply, wheeling or wholesale to TPC. Unlike other more regulated jurisdictions, this gives rise to the ability for corporate purchasers to purchase renewable energy on an "off-site basis", i.e. where their premises are not located at the site where the electricity is generated. This is usually caused by insufficiency of on-site resources to generate sufficient electricity for their needs. The renewable generator and the corporate purchaser can enter into a PPA where the electricity will be wheeled (from the generator's site) through TPC's grid to the corporate purchaser's premises.

One of the greatest challenges to a robust corporate PPA market is the ability of renewable generators to manage (or mitigate against) the credit risk of corporate purchasers as compared to generally more credit worthy utility companies which are often state-owned. If the main revenue stream for a project comes from a PPA with a corporate purchaser who may not have a strong credit rating, this may pose bankability issues for the financing of the project. The REDA now confirms that if a renewable generator signs a corporate PPA with a purchaser, it is still able to subsequently switch to selling the electricity to TPC at the agreed FiT calculated based on the date of its initial grid connection. This provides an important backstop to the credit risk of the corporate purchaser.

Taiwan has also developed its own market to cater to the sale and purchase of renewable energy certificates associated with projects developed in Taiwan. A renewable energy certificate (REC) is a document providing proof that energy has been generated from a renewable energy source. Each REC represents the environmental attributes associated with one unit (usually 1MWh) of renewable energy generated. The availability of RECs in the market is a necessary component to enable the off-site procurement of renewable energy. Electricity that is dispatched onto a grid will be indistinguishable from its source (which could be from a renewable energy generator or a fossil fuel-based power plant). The holder of a REC allows a buyer to claim that its consumption of the relevant unit of electricity came from the relevant renewable energy source (from which the REC was issued). This further creates a conducive corporate PPA environment in the market and there is growing empirical evidence of the receptivity of the market to this environment.

In early 2019, it was reported that Google signed a long-term agreement with several Taiwanese energy players for the purchase of power generated at a 10MW solar array in Tainan City, around 100km south of Google's Taiwan data center in Changhua County. Further, in July 2020 Ørsted and Taiwan-based TSMC announced what is currently the world's largest renewables corporate PPA. TSMC will offtake the full output from Ørsted's 920MW Greater Changhua 2b&4 offshore wind farm. Under the agreement, the Greater Changhua wind farms will receive a power price during the 20-year contract period that is higher than the FiT which was originally secured under Taiwan's first offshore wind auction in June 2018. This is a first-of-a-kind development for the region, demonstrating strong support for the Taiwanese offshore wind market as a corporate PPA market and the potential route to market for projects going forward.

3. Forthcoming developments/opportunities in the field of renewable energies

Green finance and foreign investment

The government has welcomed international banks with offshore wind experience in bringing their expertise to Taiwan to develop the green finance industry.

In January 2020 it was announced that the second phase of the pathfinder 128MW Formosa 1 offshore wind project has commenced commercial operations. Formosa is Taiwan's first offshore wind farm and the government has subsequently approved a further two Formosa offshore wind projects, with construction of Formosa 2 having commenced in late 2019 and Formosa 3 currently at development stage. Formosa 2 reached financial close in November 2019, with the USD 2bn project obtaining finance from a consortium of international and local financial institutions. Project financing is now also being considered for Formosa 3.

In a related move in November 2019, Ørsted completed pricing of NWD 12bn green bonds to be traded on the Taiwanese over-the-counter market and to support offshore wind investments in Taiwan (and in particular, its projects in Changhua). This is the first time a foreign company has issued green bonds in Taiwan and is a significant step in developing the country's green finance industry. Moreover, in April 2020, Taiwanese solar power developer, Chenya Energy Company Limited, announced that it received USD 239.2m financing for a 180MW floating solar project in the Changhua Coastal Industrial Park. Financing was provided by a consortium of seven international and local banks.

These developments indicate the appetite of local and global investors to provide long term project finance support for projects in Taiwan, and the government continues to promote the financing of wind projects in Taiwan as a new opportunity for the banking industry worldwide.

Policy developments

Following President Tsai Ing-wen's re-election in January 2020 and the DPP's supportive position of renewable energy, industry commentators are confident that Taiwan will continue its clean energy transformation and be a leader in the transition globally. Further, pursuant to its obligations under the REDA, the government is also set to review the country's renewable energy development targets and plans for 2021.

Looking forward, commentators stress that Taiwan's position as a key market for renewable energy over the coming decades will depend significantly on the level of commitment the government signals to foreign investors. It is noted that whilst Taiwan currently has "first mover" advantage, there is not much information about the government's plans for renewable energy development beyond 2025. In light of President Tsai Ing-wen's recent election victory, the attention of the industry will be on the government to deliver longer-term targets and plans to provide certainty for investors in respect of the significant pipeline of renewable projects in Taiwan.

Turkey

Authors: Döne Yalçın and Levent Bilgi (July 2020)

1. Brief overview of the renewables sector

Under Turkish law, renewable energy is divided into five categories: hydropower, wind, solar, geothermal and biomass.

Hydropower

Turkey has a hydropower potential of 433bn kWh. At the end of June 2018, Turkey generated 22.4% of its electricity from the country's 636 hydropower plants with a total installed capacity of 27,912MW. By the end of 2019, the number of hydropower plants had risen to 682 with a total installed capacity of 28,503MW.

Wind

The estimated wind energy potential of Turkey is 48,000MW. Wind energy is a special focus of the country and the legal framework is favourable for investors. The Turkish government provides targeted incentives for wind power generation, such as attractive feed-in tariffs and specific tax exemptions.

In 2018 Turkey had a total installed capacity of 7,005MW from the wind power plants in operation. At the end of 2019 there were 275 registered wind turbines with a total installed capacity of 7,591MW.

Solar

Turkey has great solar energy potential due to its geographical location. According to the Solar Energy Map of Turkey, prepared by the Directorate General for Renewable Energy, in 2008, the total annual solar irradiation time is 2,741 hours (7.5 hours per day) and the total solar energy produced is 1,527kWh/m^2 per year (4.18kWh/m^2 per day).

At the end of 2018 there were 5,863 solar power plants with a total installed capacity of 5,063MW. In the future, more than 98% of the installed capacity (4,981.2MW) is expected to be generated by solar power plants not requiring a licence. At the end of 2019 there were 6,901 solar power plants with a total installed capacity of 5,995MW.

Geothermal energy

As Turkey lies in the orogenic belt of the Alpine Himalayas, the country has a relatively large geothermal potential. Turkey's geothermal capacity is 35,500MW and 78% of areas with geothermal potential are located in Western Anatolia. 90% of its geothermal resources are low and medium heat and are suitable for direct use (heating, thermal tourism, mineral extraction, etc.), while 10% are suitable for indirect use, e.g. for electricity generation.

Turkey has more than 1,000 geothermal resources distributed throughout the country, of which 239 geothermal fields are currently in use (i.e. for heating, industrial purposes and thermal spring tourism) while only ten of these are used for electricity generation. At the end of 2019 there were 54 geothermal power plants with a total installed capacity of 1,514MW.

Biomass
Turkey's annual biomass potential is estimated at about 8.6m tonnes of petrol equivalent (MTEP) and the amount of biogas that can be produced from biomass is 1.5–2MTEP.

In 2018 Turkey generated 3,216GWh of electricity from biomass power plants with a total installed capacity of 811MW.

At the end of 2019, there were 181 biomass power plants with a total installed capacity of 801.6MW. According to data from the Turkish Electricity Transmission Company, the total installed capacity of biomass power plants reached 813.6MW with 183 biomass power plants at the end of January 2020.

2. Recent developments in the renewables sector

Turkey is one of the richest countries for renewable energies. The latest development in this area, the Renewable Energy Resource Area Regulation (RERA), enables Turkey to play an even greater role in renewable energy investments.

Wind
In May 2019, the Ministry of Energy and Natural Resources (MENR) launched the second RERA tender for wind energy at four different sites (Balıkesir, Çanakkale, Aydın and Muğla) with a capacity of 250MW each for a total installed capacity of 1000MW. The Turkish energy company Enerjisa Üretim Santralleri A.Ş. (a joint venture of Sabancı Holding and E.ON SE) and Enercon Rüzgar Enerji Santrali Santrali Kurulum Hizmetleri Ltd. Şti. submitted the lowest bids for the construction of the wind farms (USD 3.53/kWh for Balıkesir from Enercon, USD 3.67/kWh for Çanakkale from Enerjisa, USD 4.56/kWh for Aydın from Enerjisa and USD 4/kWh for Muğla from Enercon).

MENR's first tender – for a wind energy project under RERA – concerned the development of wind farms with a total capacity of 1,000MW on land with renewable energy resources. A consortium consisting of the German company Siemens and the Turkish companies Türkerler and Kalyon Enerji Holdings won this multi-billion-dollar wind energy tender in August 2017 with the lowest bid of USD 3.48/kWh.

In addition to the onshore RERA tenders, MENR announced Turkey's first and the world's largest offshore RERA tender for wind. The project volume is USD 2–3bn with a total capacity of 1,200MW, which is expected to start generating electricity by 2023. The details of the tendering process are expected to be published in the coming months.

Solar
In addition, the MENR carried out the first RERA tender for a solar energy project of 1000MW in March 2017. A Turkish-Korean consortium consisting of Kalyon and Hanwha Group submitted the lowest bid (USD 6.99/kWh for 15 years with a committed investment of USD 1.3bn) and won the contract in the Karapınar Energy Specialised Industrial Zone.

Furthermore, on 3 July 2020, the details of the RERA solar tenders for energy power plants with a total capacity of 1,000MWe were announced in the Official Gazette No. 31174. Of the 74 announced tenders, 34 will be for 10MWe, 28 for 15MWe and 12 for 20MWe to create a total connection capacity of 1,000MWe. Accordingly, only legal entities established as limited liability companies or public limited companies under the Turkish Commercial Law may participate in such tenders. Financial capability (*mali yeterlilik*) and work experience are not required to apply for participating in tenders. The necessary conditions and required documents are specified in the relevant tender specifications *(ihale şartnameleri*). The specifications must be obtained for each bid. Accordingly, the price of the specification for each tender is TRY 2.000. Payment for the specifications must be made in TRY – foreign currency is not accepted. The maximum purchase price for electrical energy for each tender starts at TRY 0.30/kWh (EUR 0.039/kWh). The period for the purchase of electrical energy is 15 years from the date of signing the agreement. Applications must be submitted personally to MENR. A defined guarantee amount must be submitted to MENR during the application phase in order to participate in the tenders. The due date for applications is between 19 and 23 October 2020, and the place, date and time of the planned calls will be announced later on the MENR website.

Hydropower
The deadline for the tender for the privatisation of the Ahiköy I–II hydropower plants has been postponed due to COVID-19 and the new date is 20 July 2020. The Ahiköy I–II hydropower plants will have a total installed capacity of 4.2MW.

Support Mechanism – YEKDEM

The Energy Market Regulator (EMRA) regulates prices, deadlines and payments for production licensees that carry out production activities based on renewable energy resources. Accordingly, in 2005 EMRA introduced a specific incentive mechanism in order to support and promote renewable energy in Turkey. This mechanism is known as renewable energy resources development mechanism (*Yenilenebilir Enerji Kaynakları Destekleme Mekanizması, YEKDEM*) and guarantees fixed feed-in tariffs as indicated below for companies using renewable energy resources to generate electricity power. Companies wishing to participate in YEKDEM must register by 31 December 2020. According to the latest statement by the Turkish government, the deadline for YEKDEM will not be extended beyond 31 December 2020. The government's intention is to ensure competition in this sector while improving the investment environment through bidding procedures under RERA (see above).

In order to finance the guaranteed feed-in tariffs, a specific YEKDEM charge, known as the estimated cost of YEKDEM per energy unit (*birim enerji miktarı başına öngörülen YEKDEM maliyeti*) is included on the invoices of electricity consumers. These costs are determined by EMRA each year by the end of December. The cost for June 2020 was set at TRY/MWh 98.41 in the Official Journal published on 29 December 2019. This was later increased to TRY/MWh 106.82 in the Official Journal published on 31 March 2020 and revised again on 20 June 2020 and is now TRY/MWh 134.36.

Please note that YEKDEM regulates the guaranteed and fixed feed-in tariffs (FIT) for a period of ten years after the power plant has started operation. The FITs are as follows:

Type of renewable energy source	USD cents / kWh
Hydroelectricity generation plant	7.3
Generation plant based on wind power	7.3
Generation plant based on geothermal energy	10.5
Generation plant based on biomass materials (including landfill gas)	13.3
Generation plant based on solar energy	13.3

The FITs are applied on an annual basis. Renewable energy companies are only entitled to submit an application to EMRA by 31 October of each year in order to benefit from the purchase guarantee for the following year.

The Renewable Energy Integration Project

In preparation for electricity generation through the projects described above, Turkey is in the process of restructuring its transmission network infrastructure to make it ready for large scale renewable energy production. The renewable energy integration project will help to meet Turkey's growing demand for electricity by strengthening the transmission system to facilitate large-scale renewable energy production. The total cost of the project amounts to USD 475m (including USD 300m from the International Bank for Reconstruction and Development). The expected completion date of the project is 31 March 2021.

Amendment to the Regulation on Support for Domestic Components Used in Installations

Generating Electricity from Renewable Energy Sources In addition, on 5 June 2020 an amendment to the Regulation on support for domestic components used in installations generating electricity from renewable energy sources came into force. A domestic component is defined as a component with at least 55% of its integral parts produced domestically (ie in Turkey). According to the paragraph added to Article 4 of the Regulation, reports and commitments made in relation to the combined heat and power system used in biomass power plants must be submitted to the MENR. Field verification reports must be submitted to the MENR within the first year after the domestic supplementary contribution price has been claimed (*yerli katkı ilave fiyatı*). The efficiency value of the CHP system used in biomass production plants should be at least 85% and the savings rate of primary energy resources should be at least 10%. Documents for applications to claim the additional domestic contribution should be submitted to MENR by 16 October 2020.

National Hydrogen Strategy of Turkey

In January 2020, MENR organised an international conference to discuss the future of hydrogen in Turkey and to evaluate the development of a national hydro-strategy for the Turkish energy market. Following this conference, the MENR published a concept document, a "White Paper" (*beyaz belge*) on January 24, 2020, in order to obtain public opinions as well as suggestions and recommendations from hydrogen stakeholders in Turkey on the future strategy of hydrogen energy in Turkey. The deadline for stakeholder contributions expired on 22 January 2020. These contributions will be published in an opinion document, a "Blue Paper" (*mavi belge*), and this should be available to the public on August 21, 2020. Thereafter, the Turkish government plans to introduce a final decision document, a "Red Paper" (*kırmızı belge*), in January 2020 to define the government's approach to the national hydrogen strategy in Turkey. The short-term goal of the MENR is to prepare test projects (*deneme projeleri*) to strengthen the organisational structure and the research and development of hydrogen potential in Turkey. The long-term objectives are to improve the infrastructure and prepare the necessary legislation regarding the production, transmission, distribution and use/consumption of hydrogen and related products based on renewable energy (green hydrogen) for the Turkish industrial and transport sector (vehicles, railways and shipping).

3. Forthcoming developments/opportunities in the field of renewable energies

Turkey's short-term plan for the period 2015–2019 was completed at the end of 2019. It focused on eight key issues:

- Energy efficiency;
- Security of energy supply;
- Good energy governance;
- Local and international activities;
- Research and development, technology and innovation;
- Improving the conditions for investment;
- The efficient and productive processing of raw materials; and
- Security of raw material supply.

According to the National Renewable Energy Action Plan prepared by MENR, Turkey proposes the following targets for the energy sector in its vision for 2019–2023:

- Increase of the total installed capacity to 120GW;
- Increase the share of renewable energies to 30%;
- Maximise the use of hydropower;
- Increase installed capacity based on wind power to 20,000MW; and
- The installation of power plants that will supply 1,000MW of geothermal and 5,000MW of solar energy.

According to the Turkish government's eleventh development plan (*on birinci kalkınma planı*), which was prepared by the Strategy and Budget Department of the Presidency of the Republic of Turkey, the following plans, among others, are planned for 2023:

- Establish a national certification system for green building;
- Implement energy efficiency projects in public buildings;
- Increase the share of electricity generated from renewable sources from 32.5% to 38.8%;
- Initiate the preparation of a national hydrogen strategy by involving national and international experts and stakeholders;
- Increase the capacity of the technical and market infrastructure necessary for the development of the electricity market; and
- Take measures to reduce carbon emissions and ensure energy efficiency and the expansion of forests.

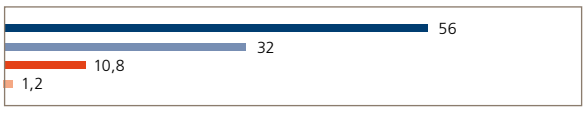
Ukraine

Authors: Vitaliy Radchenko, Volodymyr Kolvakh and Maryna Ilchuk (August 2020)

Introduction

Renewable energy generation is one of the key priorities for the Ukrainian energy sector and national economy. However, the current share of energy generated from renewable energy sources – wind, solar, biomass, biogas and small hydro (RES), as well as by big hydropower projects (greater than 10MW) – in Ukraine's energy mix is still relatively small. By 1 May 2020, the share of renewables (including big hydro generation that exceeds 10MW) had reached 10.8%. This means that renewable energy in Ukraine almost reached the target of 11% share of total energy consumption in 2020 according to the "Energy Strategy of Ukraine until 2035" which expects renewable energy to account for 25% of Ukraine's energy needs by 2035.

Ukrainian power generation structure in the first four months of 2020



● Nuclear ● TPP and CHP ● RES* ● Other
*Including big hydro generation (exceeding 10MW)

Achieving this target is both desirable and necessary for the safe and gradual replacement of the worn-out capacities of conventional generation. More than 84% of all thermal power plants (TPP) and combined heat and power plants (CHP) have already exceeded their operating lifetime, and the lifetime of almost 70% of Ukraine's nuclear power plants will also require extension in the next 10 years.

Fortunately, Ukraine has reasonably good generation potential in all renewable technologies, especially in biomass and biogas due to the country's large agricultural sector and available workforce. It is estimated that bioenergy's installed capacity could reach 15GW. However, under-developed infrastructure and an unstable supply of raw materials means that only a very small number of bioenergy projects have been implemented to date.

Wind energy has the potential to grow to around 15GW. But this would require significant investment – by both private developers in generating facilities, and from the state infrastructure budget – to ensure the availability of the grid's off-taking capacity for wind parks.

1. Brief overview of the renewables sector

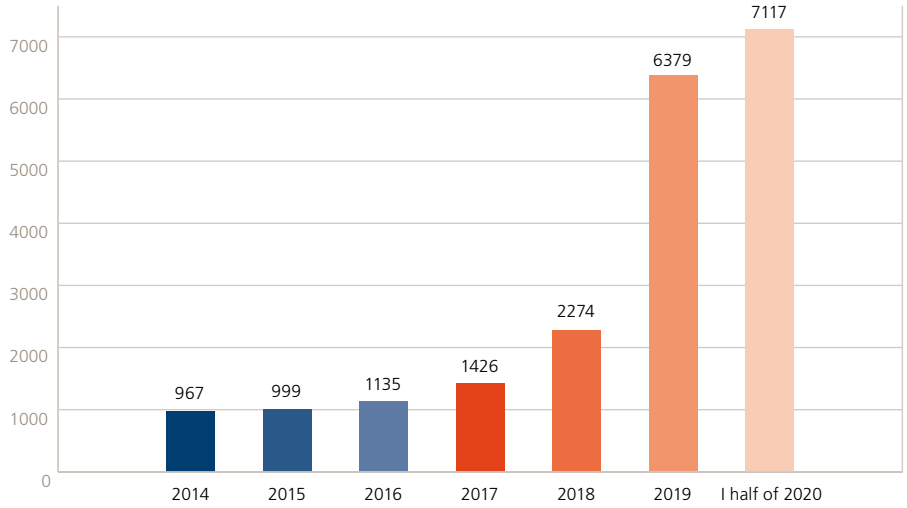
Key statistics

According to the national energy regulator, as of 31 March 2020 the total installed capacity of active renewable energy projects (excluding big hydropower projects (over 10MW) and small SES developed by private households) was around 7,117MW, close to 4% of the country's total energy generation. More than three quarters of this capacity (78.8%) is produced by industrial solar (around 5,605MW), 17% by wind (1213MW), 1.6% by small hydro (116MW) and the rest (2.6%) by biomass and biogas power plants. That does not include big hydro generation (exceeding 10MW), which is not eligible for state support.

About 66% of all renewable generation is located in five southern regions – Odeska, Zaporizhska, Mykolaivska, Khersonska and Dnipropetrovska – which, apart from the Crimea, have the best wind resources and highest insolation.

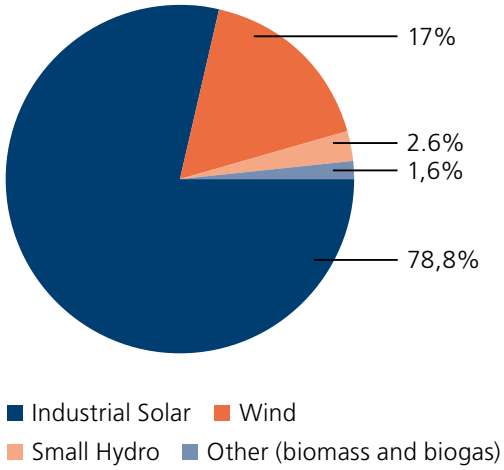
Commissioning of renewable energy projects in Ukraine increased significantly in 2018–2019. In the first nine months of 2019, the total capacity of commissioned power plants reached 2,472.6MW – significantly greater than during the whole of 2018 (848MW).

Growth of RES projects' installed capacity over the years*



* Excluding big hydro generation (exceeding 10MW)

Structure of installed RES Projects*



* Excluding big hydro generation (exceeding 10MW)

Subsidy schemes

The state provides various supports to renewable power producers (RPPs).

Green tariff

The feed-in tariff (known as the "Green Tariff" in Ukraine) is currently the main state support mechanism for RPPs. The Green Tariff was introduced on 1 April 2009 as a special preferential price for electricity produced from RES, to be paid until 1 January 2030. It is set by the regulator separately for each RPP and for each technology.

The Green Tariff may not be lower than a set minimum rate, which is fixed in EUR according to the UAH-EUR exchange rate as of 1 January 2009. Therefore, currency fluctuations of the Ukrainian hryvnia do not have an adverse effect on the payouts to RPPs.

Change of Green Tariff Support System

By autumn 2019, due to the rapid growth of the RPP's installed capacities, the Green Tariff support scheme had become less sustainable. As a result, in autumn 2019, the Ukrainian government initiated discussions regarding further restructuring of the Green Tariff for operational RPPs and a limitation of the timeframe for commissioning of developing RPPs that had executed preliminary Power Purchase Agreements (pre-PPAs) before 31 December 2019.

The Green Tariff support scheme was actively discussed between all parties in the Ukrainian renewables market and several draft laws were presented to Parliament to address the issue. However, none of these found support among the members of Parliament and the government. As a result, the Energy Community Secretariat was engaged to mediate the discussion with the Ukrainian government.

Eventually, on 10 June 2020, a Memorandum of Understanding (MOU), aimed at resolving long-term negotiations in the renewable energy sector, was signed between the Government of Ukraine, the Ministry of Energy and the Ukrainian Wind Energy Association (UWEA) as well as the European-Ukrainian Energy Agency (EUEA) representing RPPs. The Ukrainian Association of Renewable Energy (UARE), representing solar investors refused to sign the MOU.

Although the MOU is a big step towards resolving problems in the green energy market, it needs to be followed up by the requisite legislation, as well as the adoption of sub-legislative acts by the Regulator.

As a result of lengthy negotiations between all participants to the Ukrainian renewables market, the Ukrainian Parliament adopted Law of Ukraine No. 810-IX "On amending of certain legislative acts of Ukraine regarding improvement of terms of support of renewable energy producers" (or the Implementing Law) on 21 July 2020. This law restructured the green tariff support scheme from 1 August 2020. Below we provide our summary of the main provisions of the MOU and the Implementing Law:

Summary of the MOU

Mandatory restructuring of the green tariff

The MOU envisages the following scenario for restructuring the green tariff support scheme for RPPs without prolonging green tariff support beyond 31 December 2029:

- 15% reduction for all solar RPPs with capacity equal to or more than 1MW commissioned between 1 July 2015 and 31 December 2019;
- 10% reduction for all solar RPPs with capacity less than 1MW commissioned between 1 July 2015 and 31 December 2019; and
- 7.5% reduction for all wind RPPs with a single turbine capacity equal to or more than 2MW commissioned between 1 July 2015 and 31 December 2019;
- 2.5% reduction for all solar and wind RPPs commissioned after 1 January 2020.
- Furthermore, the MOU envisages that the green tariff for all RPPs commissioned before 30 June 2015 cannot exceed Ukraine: EUR 0.2197 cents/kWh.

Commitments of Ukrainian authorities

According to the MOU, Ukrainian state authorities, among others, commit to the following:

- ensure repayment of all outstanding debts of the Guaranteed Buyer that accrued after 1 January 2020 in relation to electricity generated by all RPPs by 31 December 2021 in the following manner: 40% in the fourth quarter of 2020, followed by 15% in each quarter of 2021;
- ensure timely payments for electricity generated by all RPPs in the future starting from the month after the law implementing the agreements in the MOU comes into force;
- revise the TSO tariff and usage by the TSO (Transmission and Distribution system operators) of other financial sources within one month after the law implementing the agreements stated in the MOU comes into force. This is to ensure that all Guaranteed Buyer payments to RPPs are made in a timely way;
- consider the amendment of the Electricity Market Law and the regulatory framework that will allow RPPs to leave the balancing group of the Guaranteed Buyer (with the right to join other balancing groups, become the party responsible for balancing or creating new balancing groups) and sell generated electricity freely on the electricity market with the right to obtain compensation for the difference between the price for which electricity generated by RPPs was sold on the electricity market and the rate of the green tariff established for such RPPs
- make every effort to adopt the law implementing the agreements stated in the MOU before 1 August 2020;
- establish that Ukrainian law will apply to the rights and obligations under the PPAs and Pre-PPAs executed by the RPPs only in its version from the date when the law implementing the agreements in the MOU comes into force. In this way, the RPPs can challenge in court any later changes to the legislation that negatively affect them; and
- prepare and approve an amendment of the regulatory framework that will ensure payment of compensation for the performance of curtailment commands issued by the TSO to the RPPs within a month of the law prepared for implementation of agreements stated in the MOU coming into force.
-

Other commitments of RPPs In addition, RPPs will also agree to:

- establish 31 July 2020 as the deadline for the commissioning of solar RPPs that have executed Pre-PPAs before 31 December 2019 (deadlines for wind RPP commissioning will not be shortened and will remain in force under their pre-PPAs);
- take responsibility for imbalances impacting RPPs that are part of the balancing group of the Guaranteed Buyer, in the following order:
  - 50%* starting from 1 January 2021; and
  - 100%* starting from 1 January 2022.

**Until 31 December 2029, such RPPs will pay for imbalances only if the deviation between actual and forecasted generation will exceed 5% (for solar) or 10% (for wind).*

Other changes envisaged in the MOU

The MOU also envisages other changes in relation to renewables in Ukraine, in particular:

- The MOU touches briefly on the distribution of the support quota for RPPs through auctions by:
  - obliging Ukrainian state authorities to approve quotas for support of the RPPs through the auction support scheme (see further details on this scheme below) within two months of the law implementing the agreements stated in the MOU coming into force and to ensure performance of the auctions for distribution of the aforementioned quotas until the end of 2020; and
  - requiring the commissioning of the power-generating facilities of the RPPs that have obtained support on the basis of auctions for distribution of support quotas, to also be confirmed by the Act on performance of interconnection, executed with either the TSO or the respective distribution system operator.

- The MOU cannot be interpreted as a waiver of any right or claim of any signatory under the MOU towards other signatories of the MOU, including a waiver of the right to court or arbitration recourse for protection of rights and interests.
- The MOU also establishes that if the law implementing the agreements stated in the MOU contains provisions that are contrary to the MOU, the MOU will be terminated.

Implementing Law

The Implementing Law covers the majority of the provisions of the MOU regarding mandatory restructuring of the Green Tariff, commitments of the RPPs and, partially, the commitments of the Ukrainian authorities (regarding the stability clause and the payments of compensation for the performance of curtailment commands issued by the TSO).

The Implementing Law envisages mandatory green tariff decrease without prolonging its applicability. The new green tariff rates are provided in the table below.

Please also note that the Implementing Law has also changed criteria for eligibility for the green tariff. In particular, it: (a) excluded eligibility of wind RPPs with up to three wind turbines (irrespective of their capacity) for the green tariff; and (b) established requirement for biomass and biogas RPPs to be commissioned before 1 January 2023 in order to be eligible for the green tariff.

It should also be noted that the Implementing Lawal ready contains certain differences from the MOU, including:

- The Implementing Law excludes eligibility of any wind RPPs with up to three wind turbines (irrespective of their capacity) for the Green Tariff.
- New balancing responsibilities envisaged by the MOU are applicable only to RPPs with installed capacity exceeding 1MW as follows:
  - 50%* starting from 1 January 2021; and
  - 100%* starting from 1 January 2022.

**Until 31 December 2029, such RPPs will pay for imbalances only if the deviation between actual and forecasted generation will exceed 5% (for solar) or 10% (for wind).*

<table>
<tr><th colspan="9">Green tariff rates after decrease (cents/kWh)</th></tr>
<tr><th rowspan="2">Type of generation*</th><th colspan="8">Mechanical commissioning</th></tr>
<tr><th>Between 1 July 2015 and 31 December 2015</th><th>Before 31 December 2016</th><th>Before 31 December 2019</th><th>Before 31 October 2020</th><th>Before 31 December 2020</th><th>Before 31 March 2021</th><th>Before 31 December 2021</th><th>Before 31 December 2022</th></tr>
<tr><td>Solar (ground based) < 1MW (must be commissioned within two years after execution of the Pre-PPA – the latest by the end of 2021)</td><td>15.69 (-7.5%)*</td><td>14.79 (-7.5%)*</td><td>13.90 (-7.5%)*</td><td colspan="2">10.98 (-2.5%)*</td><td colspan="2">10.61 (-2.5%)*</td><td rowspan="3">n/a</td></tr>
<tr><td rowspan="2">Solar (ground based) ≥ 1MW (must be commissioned within two years after execution of the Pre-PPA – the latest by the end of 2021)</td><td rowspan="2">14.42 (-15%)*</td><td rowspan="2">13.90 (-15%)*</td><td rowspan="2">12.78 (-15%)*</td><td rowspan="2">10.98 (-2.5%)*</td><td>4.50 (For RPPs ≥ 75MW) (-60%)*</td><td colspan="2">4.35 (For RPPs ≥ 75MW) (-60%)*</td></tr>
<tr><td>7.88 (For RPPs < 75MW) (-30%)*</td><td>7.62 (For RPPs < 75MW) (-30%)*</td><td>4.35 (For RPPs < 75MW) (-60%)*</td></tr>
<tr><td>Wind with turbine capacity >1MW (must be commissioned within two years after execution of the Pre-PPA – the latest by the end of 2022)</td><td colspan="3">9.42 (-7.5%)*</td><td colspan="5">8.82 (-2.5%)*</td></tr>
</table>

* Percentage in brackets is the decrease envisaged by the Implementing Law No. 3658.

- The Implementing Law introduced the decreased rates of Green Tariff as provided in table.
- Various changes to the auction procedure as provided in subsection *Auction support scheme* below.
- Various changes related to compensation for curtailments.

The Implementing Law establishes the following in relation to curtailments compensation:
Before 1 January 2021:

- Performance of curtailments will be done according to the existing legislation on the basis of Electricity Market Law and of the proposal provided by the TSO in April 2020 (we will be happy to provide detailed analysis of this proposal upon your request); and
- The TSO will pay compensation for curtailments to RPPs according to the Procedure for compensation of curtailments that happened before 1 January 2021*.

* After 1 January 2021 (based on our understanding of the Implementing Law, as there are still no publicly available drafts of the related secondary legislation):

- All RPPs will be required to provide proposals to the TSO for provision of service of lowering of the capacity in the amount of daily forecasted generation of each RPP;
- The TSO according to the Procedure for the provision of the service of lowering of the capacity* will choose which applications of the RPPs to use according to the principles of necessity to ensure the sustainable and reliable operation of Ukrainian energy system and minimisation of expenses for balancing of production and consumption of electricity; and
- The TSO will reimburse RPPs, whose applications were used, for the cost of unsupplied electricity calculated according to the respective methodology*.

The Implementing Law envisages that secondary legislation necessary for the purpose of implementation of compensations for curtailment (marked with * above) must be adopted until 1 September 2020. According to the recent information from the Ministry of Energy, it has created working groups tasked with preparation of the respective documents and made the Regulator and the TSO responsible for this.

Stability clause
The Implementing Law includes a stability clause. However, it excludes from its application changes in legislation relating to tax, defence, national security, public order or environmental protection.

Auction support scheme
On 22 May 2019 the "Auctions Law" – *On Introduction of Certain Changes to Laws of Ukraine regarding Ensuring Competitive Conditions for Generation of Electricity from Alternative Energy Sources* No. 2712-VIII dated 25 April 2019 – came into effect. The Auctions Law narrowed the scope of application of the Green Tariff support system and implemented a new quota auction support system (see below). As a result of these changes, only the following renewable projects may still benefit from the Green Tariff:

- projects of any capacity and any RES technology commissioned before 31 December 2019
- projects of any capacity and any technology that by 31 December 2019 have executed a power purchase agreement (PPA) with the offtaker. These projects must have: land use rights; construction permitting documentation; and a grid-connection agreement
- wind power plants with capacity below 5MW and not more than two wind turbines
- solar power plants with capacity below 1MW
- projects other than wind and solar power plants, irrespective of their capacity.

Quota auction support system
The Auction Law implemented a new quota auction support system for renewables. All RES projects are eligible for the quota auction support system. The Implementing Law also included certain amendments to the quota auction support system.

Under the quota auction support system, the state will provide a 20-year support from the date of commission of the renewable project, through the guaranteed offtake of electricity within the quota and at the tariff determined by auction. According to the Implemeneting Law, instead of annual approval of the support quota for the next five years, the Cabinet of Ministers of Ukraine would approve support quotas for the next year with indicative forecasts of support quotas for the four years following the year for which the support quota is being established.

At least 10% of support quotas must be allocated separately for solar, wind and for all other technologies together.

According to the Law, the Cabinet of Ministers of Ukraine were supposed to conduct a pilot auction before 31 December 2019. However, the pilot auction has been delayed and was not considered by the government as a priority. Subsequent auctions will be held twice a year. In order to participate in the auction, applicants must secure land rights, grid connection and provide a bid bond (EUR 5/kW). The auction winner is also required to provide a performance bond (EUR 15/kW) to the offtaker to secure its obligations under the PPA.

The auction's model will be a single-stage static sealed-bid auction with winning bids based on the lowest offtake tariff offer. Tariffs will be fixed in EUR as of the date of the PPA, in accordance with the official exchange rate of the national bank of Ukraine.

The Implementing Law clarified that the following may be established within the annual support quota:

- Regions in which RPPs can benefit from the support quotas;
- Maximal capacity of RPPs that can benefit from the support quotas; and
- In addition to the land auctions, roofs for placement of RPPs could be offered within auctions for distribution of the support quota.
- Maximum bidding price is limited as follows (replacing the respective green tariff rates (in case of solar and wind) or green tariff rates for biomass/biogas RPPs commissioned before 31 December 2019 (for all other renewables technologies)):
  - EUR 0.09/kWh for solar and wind auctions performed before 31 December 2024;
  - EUR 0.08/kWh for solar and wind auctions performed after 1 January 2025; and
  - EUR 0.12/kWh for auctions in relation all other technologies irrespective of the date of performance of such an auction.

Other incentives

RPPs may also receive a premium of 5% or 10% on top of the Green Tariff or auction tariff for using Ukrainian equipment – such as PV modules, trackers, rotor blades, nacelle, metal frames, boilers, anaerobic digestion reactors, pumps, etc – in renewable energy plants. The Ukrainian origin of these elements must be certified by the Ukrainian Chamber of Commerce and Industry.

The state also guarantees the mandatory offtake of all electricity from renewable energy producers, irrespective of whether they receive support through the Green Tariff or quota auction support system, and gives renewables priority in dispatch and settlement.

In addition, the Ukrainian Parliament has exempted from Ukrainian VAT various types of renewable energy equipment until 31 December 2022. This equipment includes wind power generation units, PV cells and panels, and some types of transformers and invertors.

2. Recent developments in the renewables sector

New electricity market

On 1 July 2019, Ukraine launched a new liberalised electricity market compliant with the Third Energy Package of the European Union. The former electricity market, organised under the obsolete single-buyer model, was divided into several new sub-markets: the bilateral contracts market; the day-ahead market; the intraday market; the balancing market; the market for ancillary services; and the retail market.

RPPs mainly operate on the bilateral contracts market, selling their output at the Green Tariff directly to the Guaranteed Buyer. The latter then re-sells the electricity on the day-ahead and intraday markets. The difference between the Green Tariff and the price of electricity sold at the day-ahead and intraday markets is reimbursed to the Guaranteed Buyer by the transmission system operator (TSO), as a payment for the Guaranteed Buyer's services for the increase of the share of electricity generated from RES.

RPPs selling electricity at the feed-in tariff must also enter the special balancing group where the Guaranteed Buyer (as the party responsible for balancing on behalf of all such RPPs) must settle imbalances emerging within the balancing group. In turn, RPPs must reimburse to the Guaranteed Buyer costs associated with the settlement of imbalances. The share of this compensation will gradually increase from 10% in 2021 to 100% by 2030.

Should the Law implementing changes of the Green Tariff support scheme be adopted, the rules for liability for imbalances will change as described above.

3. Forthcoming developments/opportunities in the renewables sector

With the increase of renewable generation from solar and wind resources in the last few years, the grid is increasingly in need of balancing capacities. In this respect the new market has provided opportunities for the evolution of a completely new segment of balancing services and auxiliary services.

According to the Ukrainian government, stability of the grid can be ensured by implementing the following measures: installing highly manoeuvrable "peak" generation, such as gas-fired power plants; implementing advanced demand management systems; and building energy storage. It is estimated that the grid would require around 2GW of new peak-covering capacity and about 500MW of energy storage by 2025.

The switch to the auction system for solar and wind should attract more attention to other renewable technologies which will not be affected by the quotas. Bioenergy projects definitely top that list, given Ukraine's huge potential in the agricultural sector, e.g. the production of biogas from animal manure, and solid biofuels from agricultural residues, and demand in the waste management industry.

Other opportunities can be seen in the continuously increasing microgeneration sector – a growing market for household PV systems (up to 150kV are eligible for the Green Tariff); decentralised off-grid generation; and the development of smart grids.

United Arab Emirates

Author: Amir Kordvani (September 2019)

1. Brief overview of the renewables sector

The United Arab Emirates (UAE), known for its oil and gas reserves, has become a regional leader in the development of the renewable energy sector.

The discovery of vast hydrocarbon reserves in the 1960s and 1970s helped the UAE rapidly become a global financial and economic hub. The growing population (3m in 2000 to almost 10m in 2019), combined with continuous economic industrialisation, has seen energy consumption and carbon emissions surge. At present, over 90% of the UAE's power consumption is met by natural gas. The proliferation of international agreements to reduce fossil fuels mean that continued reliance on gas-powered power stations is neither desirable nor sustainable.

As the UAE is moving from its reliance on natural gas, the cost and efficiency of renewable technology, particularly solar photovoltaic (PV) systems, has developed. As a result, the electricity produced through renewable technology has become a competitive and affordable alternative for generating power in the UAE. As the UAE is located in the world's 'Sun Belt' and enjoys high solar irradiation, it is highly suitable for various forms of renewable energy technology, especially solar PV. The new energy strategy will therefore involve natural gas, along with nuclear and solar energy, which will cover most of the UAE's energy needs.

Under the UAE's federal structure, each emirate retains autonomy over the management and regulation of its energy and resources. Some emirates, in particular Dubai and Abu Dhabi, have started to take steps to increase the use of renewable technologies in order to get ahead of the curve.

2. Recent developments in the renewables sector

UAE Energy Plan

The UAE is still on track towards implementing its Energy Plan 2050 (the "Energy Plan 2050"), announced in January 2017. The Energy Plan 2050 sets out ambitious targets which aim to put clean energy centre stage in the UAE's economic and environmental future. This also represents the UAE's strong commitment to apply the terms of the 2016 Paris Agreement and the United Nation's Sustainable Development Goals. The Energy Plan 2050 aims to cut CO_2 emissions by 70% and improve energy efficiency by 40%. Solar power is given special importance in the Energy Plan 2050. The 2050 target is a UAE energy mix of 44% clean energy with solar power accounting for 25%, 38% natural gas, 12% clean coal and 6% nuclear. It is expected that an

investment of up to USD 160bn will be made to achieve the UAE clean energy vision. The UAE State of Energy Report 2015 reported that the share of power generated from natural gas will drop from 98% in 2012 to less than 76% in 2021, as clean energy enters the mix and energy efficiency grows. Research has indicated that if the UAE achieves its clean energy goals, it could save up to USD 192bn by 2050 in the energy sector.

Recent projects

In addition to the UAE's federal policy, the individual emirates are now setting independent renewable energy targets. Accordingly, several significant renewable projects are being developed. For instance, Dubai has introduced a Clean Energy Strategy 2050, with the aim of having clean energy contribute 25% of total energy output in Dubai by 2030 and 75% by 2050.

In Abu Dhabi, the Abu Dhabi Water and Electricity Authority commissioned the Shams 1 solar-thermal plant (100MW), which came into operation in 2013. The use of concentrated solar power (CSP) allows the plant to dispatch peak power at nights, a first of its kind in the GCC (Gulf Cooperation Council), and one of the largest CSP facilities in the world.

In January 2019, Noor Abu Dhabi – the world's largest single-site solar project with a capacity of 1,177MW and capable of generating enough power for 90,000 people – has started its commercial operation. The solar plant is located in Sweihan in Abu Dhabi and is a joint venture between the Abu Dhabi government and a consortium of Japan's Marubeni Corp and China's Jinko Solar Holding. The project will enable an increase in renewable energy production and a reduction in reliance on natural gas in electricity generation. This will help to make energy more sustainable and efficient as well as reducing the emirate's CO_2 emissions by 1m metric tonnes per year.

The region's first wind turbine was installed in Abu Dhabi, on Sir Bani Yas Island. The wind turbine, which stands 65 metres high and has three rotor blades each with a 52-metre wingspan, has a production capacity of 850KW/h. In addition, a further onshore wind farm on this island, with a capacity of up to 30MW, is expected to be developed by Masdar and Abu Dhabi's Tourism Development and Investment Company (TDIC) to bolster the wind energy offering. Abu Dhabi will also soon see its second major solar PV project as the Emirates Water & Electrical Company (EWEC) has set a bid deadline of 31 October 2019. This 2GW plant will involve financing, construction, operation and maintenance under a long-term power purchase agreement.

As of March 2019, Dubai's Electricity and Water Authority (DEWA) has installed and connected approximately 1,276 solar panels on the roofs of residential, commercial and industrial buildings, with a total capacity of about 81MW. The first rooftop solar system installed was a 30KW system at Al Maktoum International Airport.

DEWA has been very active and dedicated to implementing the Energy Plan 2050 by administering the Shams (meaning "Sun" in Arabic) Dubai Program, which allows customers to connect their PV systems to the DEWA grid and offset any excess generation from future electricity bills. DEWA also connected several solar projects on its own premises, such as a 1.5MW system at Jebel Ali Power Station. It has collaborated with 19 government organisations, sponsoring approximately 37 projects under the Shams Dubai program, including schools and mosques.

Notably, Mohammed bin Rashid Al Maktoum Solar Park is the first project to be implemented using the IPP (independent power producer) model. The project is currently being rolled-out in four phases, with a total investment of AED 50bn (USD 13.5bn), and a planned capacity of 5,000MW by 2030. The 13MW PV first phase became operational in 2013, whilst the 200MW PV second phase was launched in 2017. It is expected that the third phase will be fully operational by 2020, adding a further 800MW. When all four phases are completed in 2030, the solar park will cover 214 square kilometres and will provide power for around 800,000 households.

Dubai is also developing clean coal projects and the first phase should begin operating in 2020. This is in line with Dubai's Integrated Energy Strategy 2030, which calls for 12% of generating capacity from clean coal, 12% from nuclear, 5% from solar facilities and 71% from natural gas by 2030.

Dubai is also investigating the potential for a hydro-energy storage site. In January 2018, DEWA signed a memorandum of understanding with Belgium's Dredging, Environmental & Marine Engineering Group (DEME) and the GCC Interconnection Authority (GCCIA) to explore this possibility. This follows DEWA's launch of the 250MW pumped storage innovation in Hatta, where water will be stored in the Hatta Dam and in an upper reservoir built into the mountains.

3. Forthcoming developments/opportunities in the renewables sector

The development of regulatory frameworks will significantly increase the development of renewable energy and the implementation of the Energy Plan 2050. The UAE Federal government should continue to encourage private sector participation in order to achieve its ambitious targets. Planning and participation under the Energy Plan 2050 will be key to introducing the relevant regulatory framework and a federal law governing the renewable energy sector.

The UAE is now positioning itself as an innovator and is providing investment opportunities in the renewable energy sector. It is anticipated that a wider variety of renewable technologies will be implemented in the short- to medium-term, such as wind and landfill gas, which will add further diversity to the UAE's clean energy mix.

For instance, in 2010, the UAE cabinet approved the Green Building and Sustainable Building Standards to be applied across the country. Application of these standards started at government buildings in early 2011 and the project is expected to save around AED 10bn by 2030 and contribute to a 30% reduction in carbon emissions.

Another example of the UAE's clean energy strategy in action is the Dubai Autonomous Transportation Strategy, which intends to transform 25% of all transportation to autonomous means by 2030. The Dubai Supreme Council of Energy has also launched initiatives to support electric vehicle owners, including free charging, free parking and free registration fees.

The UAE is moving in the right direction to cut its reliance on hydrocarbons as a source of electricity production and, as a result, there has been a push to attract investment in and the development of clean energy. A development in the regulatory framework, including a federal law on renewable energy, will further push the Energy Plan 2050, placing the UAE as the regional revolutionary leader in the renewable energy sector.

United Kingdom

Authors: Munir Hassan and Dalia Majumder-Russell (November 2020)

Introduction

In 2019, the UK became the first major economy to enshrine in law its commitment to reduce its net contribution to greenhouse gas emissions to zero by 2050; signalling to governments and markets worldwide its commitment to tackle climate change and transform its economy. However, the UK Committee on Climate Change recently reported that progress is generally off-track in most sectors and as such, the UK is unlikely to stay within its set carbon budgets over the next decade.

In response to the COVID-19 pandemic, an emphasis has been placed on the need for economic recovery packages to accelerate the UK's transition to net zero. In particular, the UK government aims to position the UK as a world leader in low carbon technologies as part of its plan to "Build Back Greener". Solutions to meeting the UK's decarbonisation targets while ensuring security of supply and affordability for consumers continue to be developed as the UK plans for all coal generation to come offline by 2025. Although substantive generation capacity is forecast to be provided by new nuclear and possibly clean gas with carbon capture and storage (CCUS) technology, this is subject to concerns about both delay and commercial viability. The UK already has the world's largest offshore wind generation capacity and in October 2020, the UK government announced a target of 40GW of offshore wind capacity by 2030, up from its original 30GW by 2030 target. These plans include 1GW of floating offshore wind – which is more than 15 times the present worldwide capacity for this emerging form of generation.

The routes to market for the UK's main renewable technologies (discussed more particularly below) include via subsidy support (principally CfD), long-term revenue contracts secured with corporate offtakers and/or participation in flexibility markets. In 2020, the UK rose to 6th place in EY's index of the most attractive countries for the investment in and deployment of renewable energy.

1. Brief overview of renewables sector

Key statistics

In 2020 Q1, renewables formed a record 47% share of UK energy generation, surpassing the previous record of 39% set in the summer of 2019. This has been largely attributed to an expansion in offshore wind capacity and favourable weather conditions caused by sustained periods of high wind and sunshine. In 2020 Q2, renewable generation exceeded fossil fuel generation and coal generation fell to record low levels, due to a 67-day period of coal-fee generation nationwide. This is the longest such period since the 19th century.

By the end of 2019, overall UK renewable energy capacity stood at 47.2GW, a 6.5% increase compared to the previous year. Growth in offshore wind capacity was the main factor behind this, having seen 21% capacity growth during the year. Onshore wind capacity grew 4.2% in the UK during 2019 and formed the largest share of renewable capacity (29.9%). Solar PV provided 28.3% of capacity and bioenergy capacity accounted for 16.6% of capacity.

Subsidy schemes

The main support scheme for new renewable generating stations is through the CfD (contract for difference) mechanism which was introduced under the Energy Act 2013. The other schemes such as the Renewables Obligation scheme and the feed-in tariff scheme for certain renewable generators with a maximum capacity of 5MW closed to new capacity in March 2017 and April 2019 respectively.

In May 2019, the UK government announced that it would allow, subject to derating factors, subsidy-free renewable technologies to participate in the UK's capacity market for the first time, and a year later, introduced a carbon emissions threshold and mandatory reporting and verification requirements for participants in the scheme.

Small-scale generation is supported through a smart export guarantee regime, which came into force on 1 January 2020, and requires electricity suppliers of a certain size to offer to enter into contracts with owners of small, low-carbon electricity generation installations. This provides a guaranteed route to market for small-scale renewable generation in the absence of the feed-in tariff regime, although the level of tariff is at the discretion of the individual supplier and the tariffs being offered by some electricity suppliers are as little as 0.5–1.5p/kWh.

The UK government also supports the use of certain renewable technologies in heating through the domestic and non-domestic renewable heat incentive scheme. Participants receive quarterly payments for seven years for the renewable heat their renewable heating systems generate, provided they comply with certain ongoing obligations. Since it was introduced in 2014, the UK Government has spent more than GBP 500m on the scheme.

2. Recent developments in the renewables sector

CfD auctions

In November 2018, the Department for Business, Energy & Industrial Strategy (BEIS) announced the third round of CfD allocations (AR3) for "less established technologies" – advanced conversion technology (ACT), dedicated biomass and offshore wind, and a separate pot for remote island wind projects.

The results of the third allocation round, announced in September 2019, demonstrated the rapid decrease in the cost of offshore wind. Nearly 6GW of capacity in the 2023/2024 and 2024/2025 delivery years was awarded CfD contracts with strike prices falling by 30% since the lowest strike price seen in the second CfD auction in 2017. As a result of the very competitive strike prices (below the wholesale electricity prices assumed in the auction), AR3 in principle had a neutral impact on the budget made available for CfD support.

Given that the CfD is the main methowd by which a project can achieve investment certainty, the continuing fall in prices and the dominance of large offshore wind projects demonstrates the sector's confidence in being able to deliver profitable projects at prices almost on part with wholesale electricity prices.

These results are driven by improvements in technology and supply chains, and cost of capital make the technology less reliant on support mechanisms. Therefore, while fewer projects may be able to secure additional revenue support through CfDs, there is growing appetite for "subsidy-free" CfDs which offer the price stability but not the additional revenues.

In March 2020, the UK government published a consultation proposing a number of significant changes to the CfD scheme to apply to projects competing in allocation round four (AR4), scheduled to run in late 2021. BEIS published its response to the consultation at the end of November 2020, confirming the changes to be made for AR4 and future allocation rounds.

Of the changes to AR4, the most 'headline grabbing' was the UK government's plans to restructure the budget allocation "pots": this includes abandoning its opposition to subsidising new onshore wind farms and solar power projects, after withdrawing additional CfD support for both technologies in 2015, and the creation of a "pot 3" dedicated to fixed bottom offshore wind. Moreover, it was confirmed that a new definition and separate strike price will be introduced for floating offshore wind, which will continue to compete with other "less established technologies" (such as dedicated biomass with CHP) in "pot 2".

Other notable amendments for AR4 that will impact all eligible bidders include the extension of negative pricing which had been introduced in AR3, the extension of the milestone delivery date to 18 months post-contract signature, and the intention to strengthen the supply chain plans for which an additional consultation has begun. For future allocation rounds, BEIS has also confirmed its will implement flexible capacity caps and that the current final legislative delivery year of 2030 will be extended to 2035, to enable the CfD scheme to run beyond 2026.

Offshore Wind Leasing Round 4

The Crown Estate and Crown Estate Scotland are in the process of their latest round of offshore wind leasing, known as "Round 4" and "ScotWind" respectively. Round 4 launched in September 2019 but has seen its timetable revised with ITT (invitation to tender) Stage 2 due to open in late 2020 with multicycle bidding following in early 2021.

The bidding process is designed to award at least 7GW, with the maximum possible 8.5GW to be awarded. The Crown Estate has defined 'innovation' as one of its key objectives and has offered a 50% discount for the first five years' of rent for up to 10% of the project's capacity where there is deemed to be qualifying 'innovation'.

ScotWind differs from Round 4 to the extent that no capacity cap has been designated and commentators expect floating offshore projects to be of particular interest to Crown Estate Scotland given the potential of this market in Scotland's favourable wind conditions. Commentators also expect prescribed bands of option fees to be set, allowing developers to select which band they would be willing to pay. This is in comparison to the competitive option fee process in Round 4 whereby bids are ranked by price and the site with the highest option fee price will be selected.

Offshore Transmission Owner Tender Rounds 6 and 7

The offshore transmission owner tender round six (TR6) opened for three projects at the end of 2018. Since then, two of the projects (Beatrice and Hornsea One) have reached preferred bidder stage. The third project, East Anglia One, remains at ITT stage due to delays caused by Covid-19 but a preferred bidder is expected to be announced by the end of 2020 or early 2021.

In November 2020, Ofgem announced its intention to commence tender round 7 (TR7) for the Moray East and Triton Knoll projects. TR7 is expected to launch in late November 2020 and it is anticipated that both projects will enter ITT stage in 2021. Ofgem is also consulting on future changes to the tender rounds, putting forward proposals to streamline the tendering and transaction process.

Corporate PPA growth

Corporate PPAs are transactions between a generator and a corporate end-user. Corporate PPAs offer a solution to renewable energy developers seeking to mitigate the problems they face in the form of reduced subsidies and also large energy users, such as corporates, looking to secure a hedged position against volatile or increasing energy prices and source a percentage of their energy from a renewable source. Investor appetite in the UK market continues to rise as a growing number of projects seek secure revenue streams for financing purposes and corporates face mounting pressure to clean up their operations and earn "green kudos".

Growth in the storage sector and flexibility markets

The UK has seen rapid growth in the energy storage sector, which has been driven by falling costs of technology and the availability of new revenue streams. At scale, battery storage will allow renewables to represent a greater proportion of the UK's power and help the UK to meet its ambitious net-zero target whilst also playing an important role in the future grid's resilience. Where only 20MW of commercial batteries were in operation in 2016, at the end of 2019 the UK's operational battery storage capacity reached 1GW with a further 4GW in development. There was c.300MW of battery storage deployed in 2019 alone, demonstrating the industry's growth over the last half of the decade. Revenue stream certainty continues to be a challenge for storage projects however, this is being mitigated by some developers by way of an optimisation agreement with an electricity trader, who manages short term contracted system services and merchant revenue streams, potentially with downside floor price protection.

The outcome of the UK government's 2019 consultation on the treatment of electricity storage within the planning system was published in January 2020 and, as a result, the Draft Infrastructure Planning (Electricity Storage Facilities) Order 2020 is currently being laid before Parliament. If passed, the legislation will facilitate the construction of more battery storage sites with higher capacities in England and Wales. This will largely be due to the removal of electricity storage sites (>50MW) from the nationally significant infrastructure project (NSIP) regime meaning that such projects will no longer need to apply for a development consent order (DCO). It is estimated there is around 13.5GW of battery storage projects in the pipeline in the UK, all at various stages, with the average capacity per project being 26MW (likely a representation of a high percentage of these being c.49.9MW in line with the current NSIP cap).

Electric vehicles
Transport remains the largest emitting sector of CO_2 in the UK and the electrification of the industry is seen as pivotal to meeting emission reduction targets. In November 2020, the UK government brought forward its ban on selling new petrol, diesel or hybrid cars from 2035 to 2030, signalling a clear commitment to the market and driving momentum to ensure infrastructure is robust to deal with the transition.

The UK currently ranks as Europe's third-largest EV market by volume, with EVs making up 3.2% of all new car and van sales in 2019 (a total of 74,400). There is a continuing upward trend for the purchase of EVs in the UK as over 108,000 EVs have been registered in 2020 to date. Projections show that UK stock could rise as high as 36m by 2040. Policies such as the UK government's 'Road to Zero Strategy', tax benefits and proposals to implement a requirement for all new homes to be fitted with EV chargepoints are a testament to the UK's commitment to wide-scale deployment of EVs. Nonetheless, commentators remain cautiously optimistic, as the nature and terms of the UK/EU withdrawal deal will undoubtedly have an impact on the growth of the UK's EV market.

Hydrogen
In the context of decarbonising public transport, hydrogen is expected to play a key role. The Office for Low Emission Vehicles' Hydrogen for Transport Programme is supporting 33 hydrogen fuel cell electric buses for Aberdeen, Belfast and Liverpool while the Mayor of London has pledged all London busses to be emissions-free by 2037. The UK is expected to have its first hydrogen trains operating as early as 2022 and, in September 2020, mainline testing began on HydroFLEX, a joint project between the University of Birmingham's Birmingham Centre for Railway Research, that saw it carry out a 25-mile trip reaching up to 50mph.

Hydrogen will also play a key role in decarbonising the UK's heating and industry sectors. With an extensive gas network in the UK, the decarbonisation of heating will be instrumental in achieving the UK's net zero goals. Hydrogen blending projects are being piloted across the UK and in May 2020, Cadent announced its HyDeploy pilot project has seen positive results in the blending of up to 20% hydrogen onto the gas network.

The UK government has demonstrated its dedication to decarbonise industry through its Low Carbon Hydrogen Supply Competition under which funding was awarded to HyNet North West which has now received a total of GBP 12.8m over phases 1 and 2 of the competition to establish the world's first net-zero carbon industrial cluster by 2040. As part of the cluster, ten large industrial sites will be converted to operate using 100% hydrogen.

3. Forthcoming developments/opportunities in the renewables sector

The Energy White Paper
The UK Government has announced its intention to publish a number of policy documents over the course of late 2020 – through 2021.

Chief amongst these is the widely anticipated Energy White Paper, which will set out the pathway that all stakeholders in the energy system will need to take in order to accelerate the energy transition. Industry sources anticipate that the paper will include the following policy commitments:

- Decarbonising heating systems in up to 4m homes by 2030;
- Making energy efficiency a national infrastructure priority;
- Targeting up to 40GW of new low-carbon baseload capacity comprising new nuclear and gas with CCUS; and
- Targeting CCUS projects to capture 10m tonnes of carbon by 2030.

Other policy developments
Ahead of the COP26 climate summit, which the UK government will host in Glasgow in November 2021, policymakers intend to release a comprehensive Net Zero Strategy. The strategy will outline the UK government's vision for a net zero economy, indicating what it sees as the economic and employment opportunities that the energy transition will provide across the country. This follows suggestions from a broad range of stakeholders that an overarching net zero strategy would provide much needed certainty and would facilitate further private investment.

The UK government also intends to issue its Heat and Buildings Strategy, which will set out its plan for the decarbonisation of heat over the coming decade. New strategies for hydrogen and biomass have been earmarked for spring 2021 and 2022, respectively, and will provide further clarity for stakeholders in these sectors.

For further details on net zero, green finance, energy storage licencing, CCUS, the offshore wind sector deal, and EVs, please see our recent articles on these subjects on Law Now.

Vietnam

Author: Louise Dalton, Sabrina Polito and Amber Sinclair (November 2020)

1. Brief overview of the renewables sector

In light of remarkable economic growth and industrialisation over the past few decades, Vietnam's electricity demand has climbed substantially in recent years and is predicted to increase by around 8% annually until 2035. To meet this demand, it is estimated that the Vietnamese energy sector will require upwards of USD 148bn of investment by 2030.

Vietnam has excellent potential for renewable energy deployment, with an estimated 4 to 5kWh per square metre for solar power and more than 3,000km of coastlines with consistent wind speeds for offshore wind capacity. As such, the Vietnamese government has set bold targets for increasing the share of renewable electricity generation – up from 58bn kWh in 2015 to 186bn kWh by 2030, translating into an overall 10% share of electricity generation by 2030.

However, Vietnam still relies heavily on its coal sector to meet the increasing energy demand. Figures from April 2018 show that Vietnam's coal imports hit a record 2.3m tonnes, up 132.5% year on year, and is set to increase even further. It is estimated that coal power will make up over 50% of Vietnam's energy generation by 2028. Nonetheless, many stakeholders are pushing for further support of renewable energy sources to replace use of fossil fuels, given concerns around air quality, energy security and the country's vulnerability to climate change impacts.

The Vietnamese government has in place a number of measures to attract both domestic and foreign investment into its renewable energy market such as a Feed-in-Tariff (FiT) scheme, a new public-private partnership (PPP) framework, a power purchase agreement framework, corporate income tax exemptions or reductions, favourable land rental policies and funding for research and technology used in pilot projects.

2. Recent developments in the renewables sector

A new legal framework for PPP projects

On 18 June 2020, the National Assembly of Vietnam passed its new PPP law, which comes into effect as of 1 January 2021. The PPP law aims to attract more private investment into Vietnamese infrastructure projects by creating an umbrella legal framework for PPP projects across a number of sectors including power, transportation and water. Key changes to the new framework include clarification around investment procedures and the introduction of revenue sharing and support mechanisms.

Under the PPP law, the private capital contribution must be at least 15%, and the state capital contribution is limited to no more than 50%, of the total investment capital. Support available can include several measures such as payment for revenue support in the event of revenue reduction or payment to the project company for providing public services.

Solar

Vietnam is regarded as a major market for solar power in Asia, with the country expected to have almost 6GW of installed solar capacity by the end of 2020. The Vietnamese government has set a tentative target of 12GW of installed capacity by 2030 and in order to continue to realise Vietnam's solar power potential, the Ministry of Industry and Trade (MOIT) continues to develop its existing frameworks relating to solar power. For example, in August 2020, MOIT issued new guidelines (in the form of 'Circular No.18') on the development of solar projects, following highly anticipated updates to solar FiTs in April 2020.

Circular No.18 implements new development guidelines in respect of grid-connected solar farms and rooftop solar panels and provides updated forms of mandatory power purchase agreements (PPAs). Amongst a number of key changes, the updated PPAs remove the obligation on the national utility, Electricity of Vietnam (EVN), to agree to purchase the entire output generated by the solar farm and sets out additional restrictions around termination payments. These changes introduce additional risk allocation complexity in what continues to be an evolving regulatory regime and market.

Moreover, in April 2020, the Vietnamese government announced new FiTs that will apply to solar projects that have already been approved and will achieve commercial operations by the end of 2020. The new solar FiTs are equivalent to:

- USD 7.09 cents/kWh for ground-mounted solar power projects;
- USD 7.69 cents/kWh for floating solar power projects; and
- USD 8.38 cents/kWh for rooftop solar power projects.

Following expiry of the FiT scheme, MOIT have recommended a competitive bidding framework for solar power pricing going forward in order to achieve more bankable projects, foreign investment and greater competition. MOIT's options for a competitive framework currently under consideration include:

- Competitive bidding for projects already included in project development planning but which are not entitled to the solar FiT; or
- Competitive bidding based on transformer station/substation connections; or
- Competitive bidding for specific projects.

Wind

Commentators report that Vietnam's wind potential is among the highest in the world at around 475GW. The Vietnamese government's roadmap for wind power development for the period up to 2020 is detailed in its National Power Development Plan VII. Under the plan, the installed capacity targets for wind power are set at 800MW in 2020, 2GW in 2025 and 6GW by 2030. As of June 2020, almost 100 new wind projects were approved with over 90% of these projects located in central and southern Vietnam, representing an additional 7GW of capacity. The nascent *Vietnamese* offshore wind market, which is reported to have an estimated potential project capacity of 160GW, is receiving much attention from international investors and stakeholders. According to a study published by the Danish Energy Agency and World Bank Group, 10GW of offshore wind power could be operational in Vietnam by 2030.

In developing a strong pipeline of projects, we are seeing a marked increase in cross-border collaboration on large scale offshore wind developments. For example, in July 2020 it was announced that Vietnamese companies Asiapetro and Novasia Energy with Copenhagen Infrastructure Partners signed a memorandum of understanding with Binh Thuan People's Committee for the development of a 3.5GW offshore wind project; one of the first large scale offshore wind projects in Vietnam.

As mentioned above in respect of solar projects, there are proposals to shift the renewables market from the FiT subsidy scheme to competitive bidding frameworks. The FiT regime which applies to wind projects was due to expire in November 2021, however in June 2020 the government agreed to extend the scheme until the end of 2023, although there have been calls for the current FiT regime to extended to 2025 to allow time to develop project pipelines and local supply changes.

Commentators suggest an auction framework is being considered to replace the FiT scheme. Nonetheless, the uncertainty around the future of the FiT scheme, amongst other considerations such as permitting, contractual risk allocation and financing, presents challenges for investors.

3. Forthcoming developments/opportunities in the renewables sector

Pilot framework for corporate power purchase agreements

In January 2020, the MOIT proposed a framework to enable corporate PPAs between generators and consumers in respect of solar and wind power projects, presenting a significant opportunity for further growth in these sectors. A two-year pilot of the direct PPA programme is due to start before the end of 2020 for projects with a capacity between 400MW to 1GW. As part of the proposals, generators and buyers of electricity are be able to negotiate contracts for difference with a term of at least 10 years.

Publication of the National Power Development Plan VIII

The Vietnamese government is expected to release its National Power Development Plan VIII (Plan VIII) by the end of 2020, which will set the stage for the next phase of growth in the country's renewable energy sector for the period of 2021–2030. It is expected that Plan VIII will address key issues in the Vietnamese renewables market such as the role of direct PPAs, behind-the-meter renewable energy and energy storage. Commentators have also called on the Vietnamese government to set out a clear strategy on developing Vietnam's offshore wind potential in Plan VIII, in particular addressing approval complexities and supply chain interests.

In addition to the above key issues, grid capacity has been a major limiting factor in the expansion of renewable generation deployment in Vietnam. The unprecedented surge of added capacity over recent years, which has been concentrated in certain provinces and was not matched by investment in grid infrastructure, has created enormous pressure on Vietnam's network. As such, several renewable energy projects have been requested to curtail output without compensation from EVN. For example, 10 new projects in the Ninh Thuan region were forced to operate at only 30% to 40% capacity, resulting in a total loss of VND 500bn (USD 21.7m).

Commentators are therefore anticipating that Plan VIII will set out solutions to ensure the country's grid infrastructure is capable of supporting the continued growth of the renewables sector.



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