



# Project Clover

## Feasibility Phase Conclusions

July 2021



**KPMG**  
Sustainable  
Futures

- Project Clover is a three-phased programme to commercialise a number of industrial decarbonisation strategies within the Irish dairy, and wider food and drink industries.

## Workstream 1

### *Development of an indigenous Irish Biomethane Industry*

Development of an industry led scheme to support the establishment of an indigenous biomethane industry in Ireland supplying decarbonised gas into the food supply chain

## Workstream 2

### *Organic Soil Improver*

Development of a commercial proposition to monetise organic materials, including the by-products of anaerobic digestion, as an organics soil improver in line with the farm-to-fork objectives including displacement of chemical fertiliser

## Workstream 3

### *Soil Carbon Sequestration*

Work alongside existing scientific research into soil carbon sequestration to commercialise the significant, currently unquantified, carbon sequestration benefits of Irish farming and utilise this to offset carbon production in the food supply chain



# Project Clover - Feasibility Conclusions

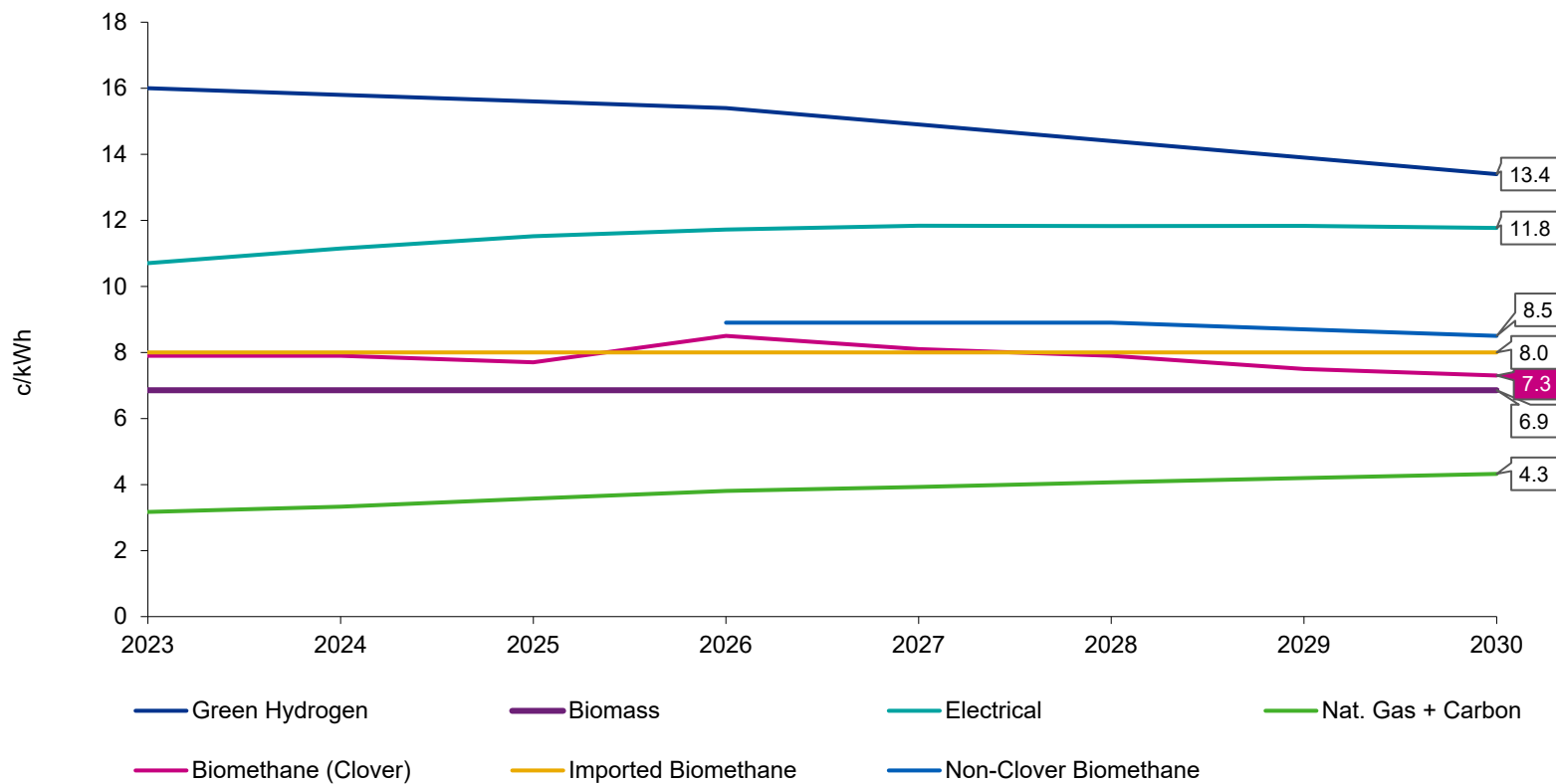


<b>Strong Industry Demand</b>	<ul style="list-style-type: none"><li>There is strong industry demand for biomethane, primarily in manufacturing / processing with high temperature thermal loads</li><li>Biomethane can be the cheapest technology for certain applications</li></ul>
<b>Scale of Ambition</b>	<ul style="list-style-type: none"><li>The feasibility study has concluded that the overall ambition of 125 x 20GWh plants remains an appropriate long-term level of ambition for Project Clover and Ireland.</li><li>The study has however concluded that this should be progressed through an initial pilot phase of 8 x 20GWh plants to establish the sector in a measured manner.</li></ul>
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# Biomethane Competitiveness

Biomethane can be among the lowest cost thermal options for certain industries.

## Alternative Thermal Options (c/kWh)



## There is growing pressure on industry to decarbonise and biomethane represents a key opportunity to achieve this

- The Irish agricultural industry has a strong desire and requirement to decarbonise across the supply chain.
- The forthcoming EU Climate Law and Ireland's Climate Action and Low Carbon Development (Amendment) Bill 2021 both demonstrate that the **direction of policy travel is towards net zero emissions by 2050.**
- Regulations are putting increasing pressure on the sector to improve its broader sustainability performance.
- AD biomethane can aid in industry decarbonisation in addition to wider environmental benefits.

### Alignment to the EU Farm to Fork goals

Ensure food production has a **neutral or positive environmental impact**

#### EU Carbon Farming Initiative

Promote a **circular bio-based economy**

**50% reduction in nutrient losses** without reducing soil fertility

Increase the proportion of **organic farming** to 25% by 2030

Implement a **sustainable food labelling framework**

### Alignment to the EU Biodiversity Strategy for 2030

At least 10% of agricultural area is under high-diversity landscape features

At least **25% of agricultural land** is under organic farming management

### Alignment to the Programme for Government goals

Seek reforms to CAP to reward farmers for **sequestering carbon**

Continue to support farmers to embrace farming practices that are **beneficial environmentally**, have a lower carbon footprint and better utilise and protect natural resources

Encourage investment in **renewable infrastructure** on farms

Explore opportunities for farmers from **anaerobic digestion**

Deliver an incremental and ambitious reduction in the use of **inorganic nitrogen fertiliser** through to 2030

### Alignment to Ag-Climateise

**Action 1** reduce chemical nitrogen use to 325,000 tns by 2030

**Action 9** - Increase organic production to 350,000 ha by 2030

**Action 12** – promote a sustainable bio-economy in agri-food

**Action 17:** Develop a pilot scheme in relation to on-farm carbon trading

**Action 20:** : Engage with stakeholders to maximise the potential opportunities from Anaerobic Digestion for the agriculture sector

Fully aligned

Partially aligned

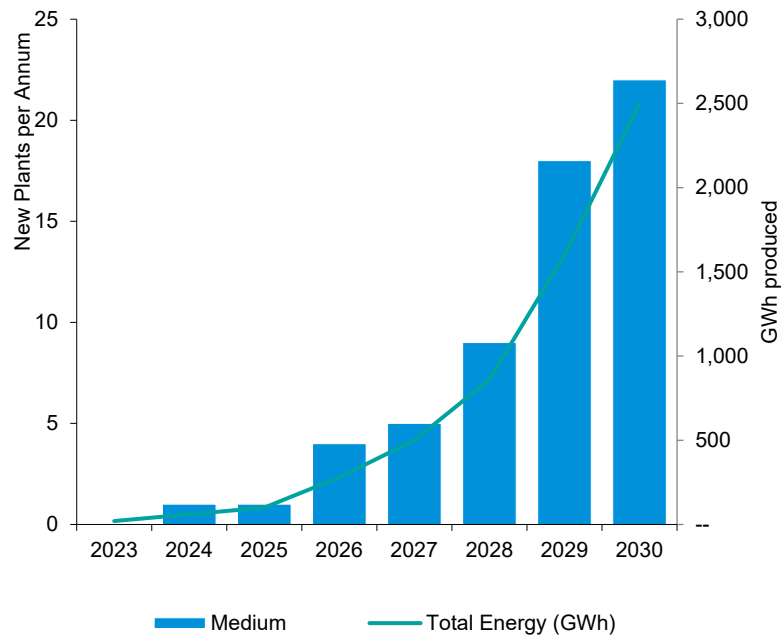
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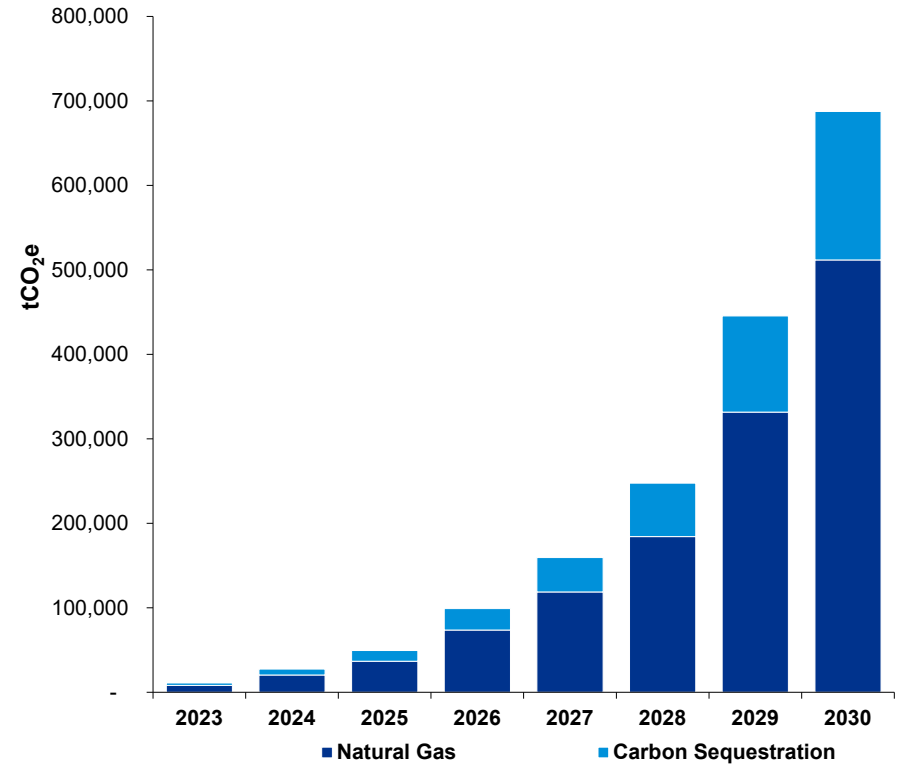
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# Project Clover - Scale of Ambition

## 125 x 20GWh Plants

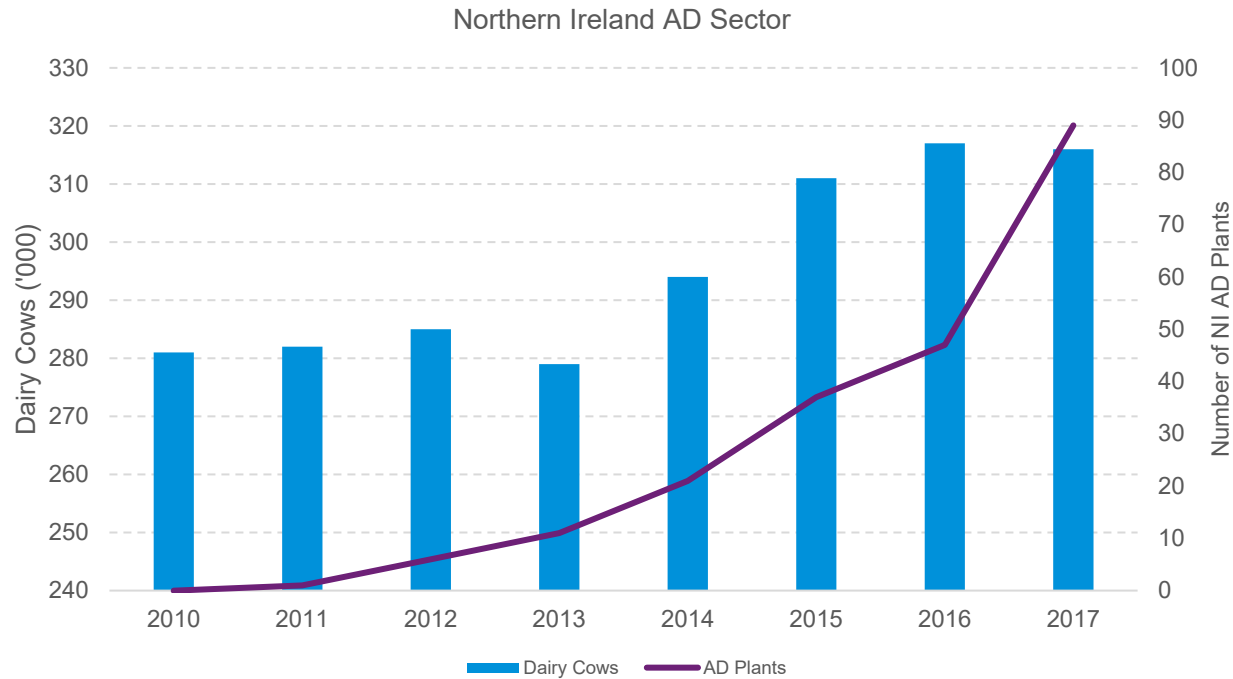


## Potential to displace over 680k tn CO<sub>2</sub> per annum by 2030



*Each individual plant is assumed to produce 20GWh of biomethane*

# Northern Ireland Case Study



## NI AD Sector Statistics

- 90 AD Plants
- Consumes 700,000 tns silage annually
- Dairy numbers grew 12%, overall cattle 4% during period of deployment
- Grass production area expanded by 3%, while consumption increased by 10%, showing productivity gains

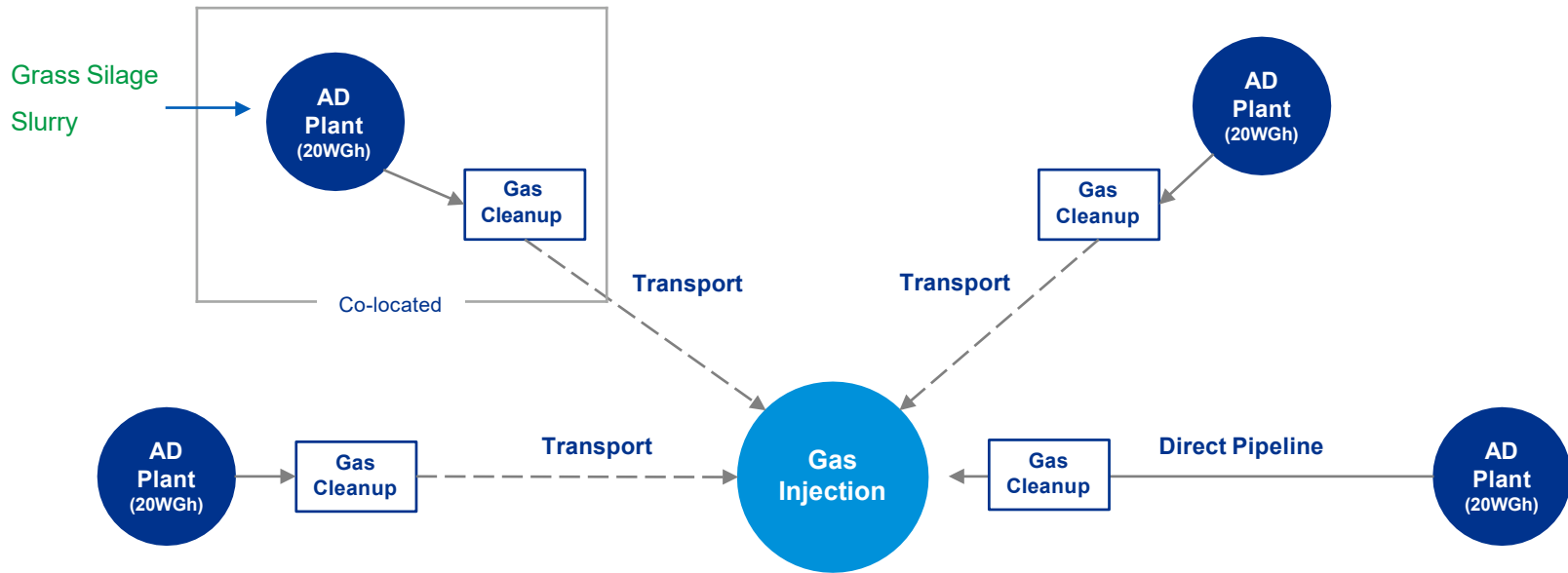


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# Scheme Design



Cookstown, Northern Ireland, 15GWh

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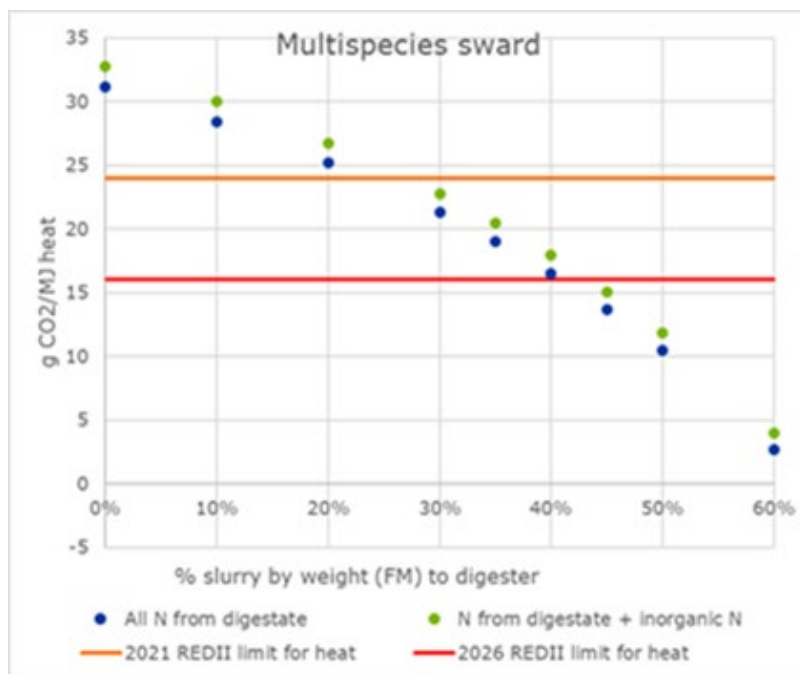


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# Sustainability Considerations

## Ability to meet REDII Sustainability Requirements

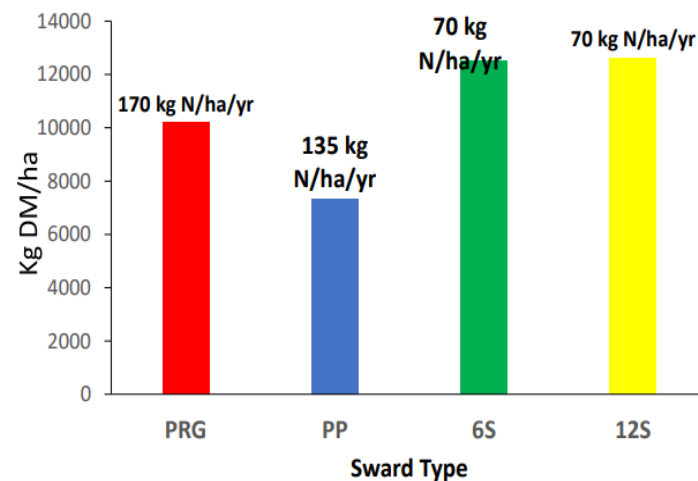
As outlined in the graph below, using a multi-species sward, with a mix of slurry c.45% (by mass) has the ability to meet both 2021 and 2026 RED II criteria. These preliminary results are part of ongoing work by Ricardo, SEAI with data input from Devenish Nutrition Limited.

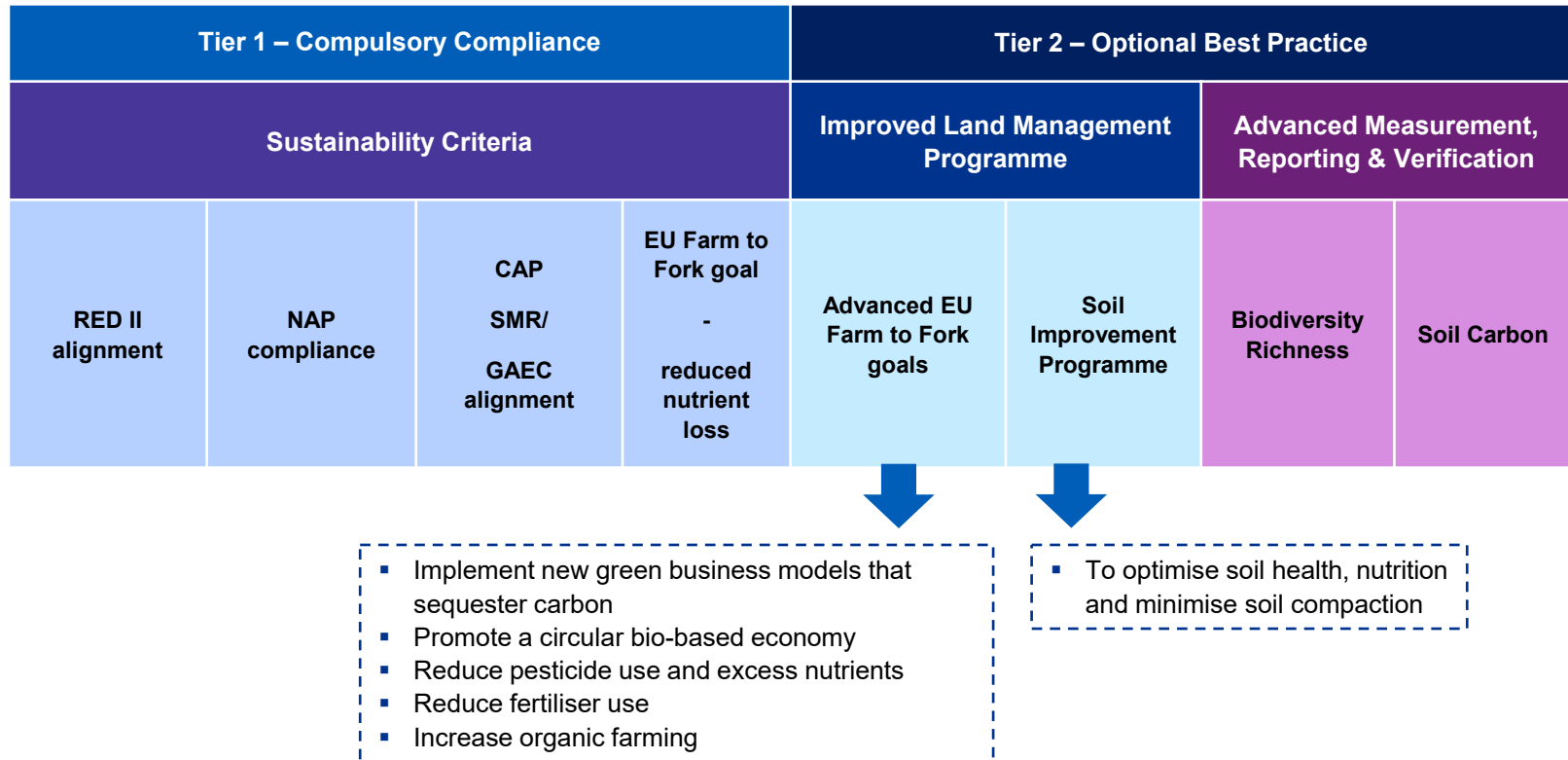


## Ability to grow Incremental Feedstock

It is envisaged that surplus yields could be diverted as feedstock for AD without impacting the provision of feed whilst reducing the overall requirement for chemical fertiliser.

Results from Dowth farm (Shackleton, 2020) also show that multi-species swards can have positive impacts on biodiversity and may improve carbon sequestration.





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# Organic Fertiliser & Soil Carbon Sequestration

## Policy, legislation & certification

- Policy developments at an EU and national level support the use of organic fertilisers
- EU Fertiliser Regulations extended to integrate organic fertilisers
- Use of digestate can displace Nitrates Directive issues for farmers

## Processing technologies

- Assessed a number of innovative technologies to process digestate into a more usable form
- Key technology under consideration is Valordig – which is a mobile unit capable of dewatering the digestate and producing nutrient selective fertiliser products

## Environmental, climate & fertiliser performance

- Digestate can displace emissions associated with chemical fertiliser production and slurry
- Digestate can reduce pathogen load to the environment compared with slurry
- Digestate has the potential to displace up to c.80-90% chemical fertiliser (over time)

## Commercialising digestate

- Identified potential to commercialise digestate but still in a developing stage
- Value of digestate depends on NPK content (variable) and nutrient availability (variable)
- Lack of dedicated market for digestate and barriers to overcome with farmers

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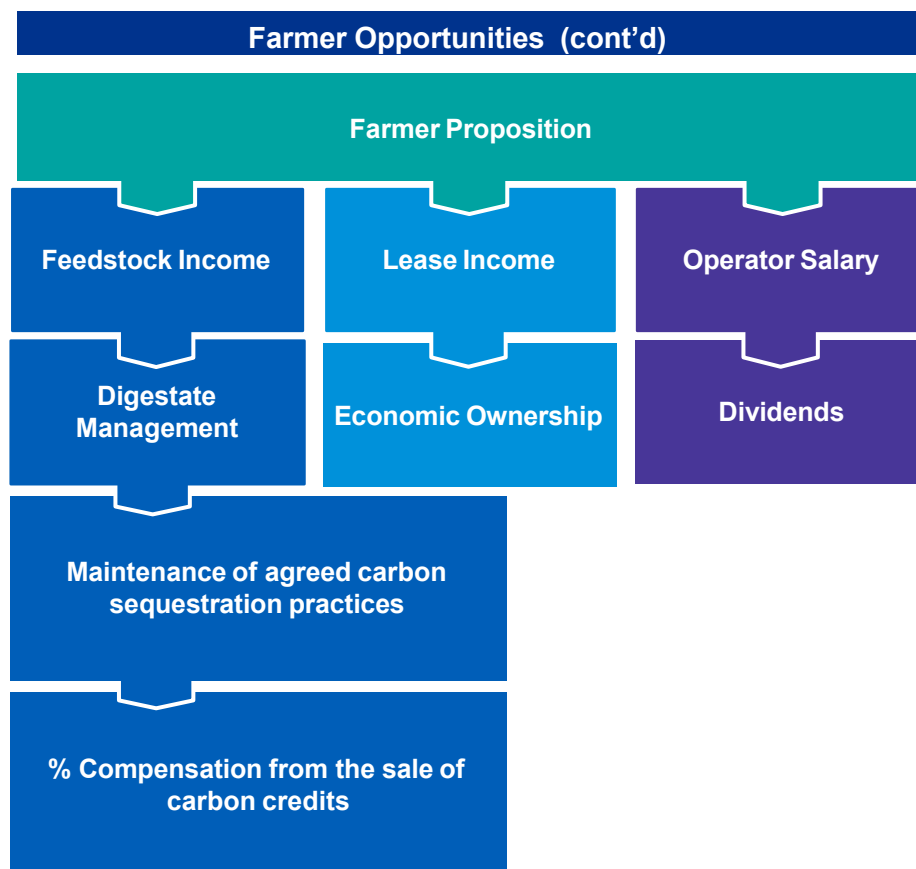


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# Farmer Proposition

Farmer Opportunities	
<b>Feedstock Income</b>	<ul style="list-style-type: none"> <li>The farmer enters into a medium-long term agreement to provide up to 100% of the feedstock requirement for the AD plant.</li> <li>The farmer guarantees feedstock obligations to a reasonable cap.</li> <li>The farmer may be required to provide financial guarantees over the performance of the feedstock contract.</li> </ul>
<b>Lease Income</b>	<ul style="list-style-type: none"> <li>The farmer provides the AD plant site.</li> </ul>
<b>Operator Salary</b>	<ul style="list-style-type: none"> <li>The farmer will be responsible for the day to day operations of the plant, supported by a third party maintenance and support company.</li> </ul>
<b>Digestate</b>	<ul style="list-style-type: none"> <li>The farmer will be responsible for managing digestate produced by the AD plant.</li> </ul>
<b>Carbon Sequestration</b>	<ul style="list-style-type: none"> <li>The farmer implements agreed practices to enhance soil carbon sequestration.</li> <li>% compensation from sale of carbon credits.</li> </ul>
<b>Economic Ownership</b>	<ul style="list-style-type: none"> <li>A core finding of research conducted is the need for farmers to have “skin in the game” to deliver a high performing AD plant.</li> <li>Farmers should have equity ownership.</li> </ul>
<b>Dividends</b>	<ul style="list-style-type: none"> <li>The farmer carries out the required tasks and ensure the plant is performing optimally.</li> </ul>



- Due to our grass-based agricultural system, Ireland has the potential to be a leader in biomethane production, using on-farm Anaerobic Digestion (AD).
- Biomethane has the potential to decarbonise some of the hardest to address carbon emitting processes
- Project Clover addresses Agri food sustainability and competitiveness - it will enable industry to decarbonise thermal energy requirements and also supports the decarbonisation of the wider supply (Scope 1, 2 and 3).
- While the study has successfully demonstrated the feasibility of Project Clover's three workstreams, before moving to Phase 2, industry members require clarity from Government in support of the long term funding model.
- Specific asks of Government are :
  - Policy recognition and support for biomethane
  - Capital Funding of 50% to match and complement indicative ISIF funding
  - The early implementation of Article 23, which requires suppliers to socialise the cost through a renewable heat fuel obligation scheme.



# Project Clover – Feasibility Conclusions & Recommendations

Prepared on behalf of

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Core Contributors

