

Lough Ree Technology Cluster Study

Presentation of Progress to the
Department of the Environment, Climate and Communications

29th June 2022

Funded By:



An Roinn Comhshaoil,
Aeráide agus Cumarsáide
Department of the Environment,
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Background – Lough Ree Technology Cluster Study

- Objectives of the study
 - Provide employment & attract new enterprises
 - Produce a document that illustrates the opportunities for enterprise to locate in West Longford and East Roscommon and utilise clean energy.
 - Demonstrate the suitability of Lanesborough and Ballyleague as locations for clustering of businesses from the bioeconomy, circular economy and manufacturing sectors, similar to that of technology clusters in other regions.
 - Show how step changes in rural communities can be delivered through a holistic approach to renewable energy and circular economy.
- Impacts & Outcomes
 - Identify circular economic opportunities (focus area for 2022)
 - Identify clean energy technology for energy hub
 - Identify possible sites for development
 - Potential for demonstrator projects/communities
 - Education of community on plans and future capacity building projects
- Outputs
 - 20 direct jobs
 - 100 indirect jobs
 - 4-6 enterprises supported
 - €7M per annum additional revenue

What is a “Technology Cluster”?

- A widely used term.
- Any group of businesses with something in common and links to an educational institution.
- Usually but not always geographically close to each other.
- Usually but not always a similar type of industry

Drivers for this work are both personal and professional

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Original Stated Study Focus (July 2020)

1. End Users

Speak to various potential users; Local businesses, potential start-ups and potential investors and determine what their energy, water and data requirements would be (to name just three requirements). This would also entail an investigation into what circular economy opportunities exist from a co-ordinated approach.

2. Energy Services

Assess the power plant site and the surrounding areas and determine what is the ideal infrastructure to put in place to meet business and community needs. Depending on feasibility and the activities of other parties, this may take the form of one or both of the following:

- Stand-alone clean energy hub, with hot, cold and electrical energy storage for businesses and the community (probably in the 10 MW or lower range)
- A clean energy hub utilising excess energy from the repurposed power plant, again with hot, cold and electrical energy storage for businesses and the community – there may be crossover with the DCCAIE / ESB study in this scenario, but the ‘value add’ would be that the FDT study would offer perspective from the end user and also seek to maximise all waste streams.

3. Symbiosis

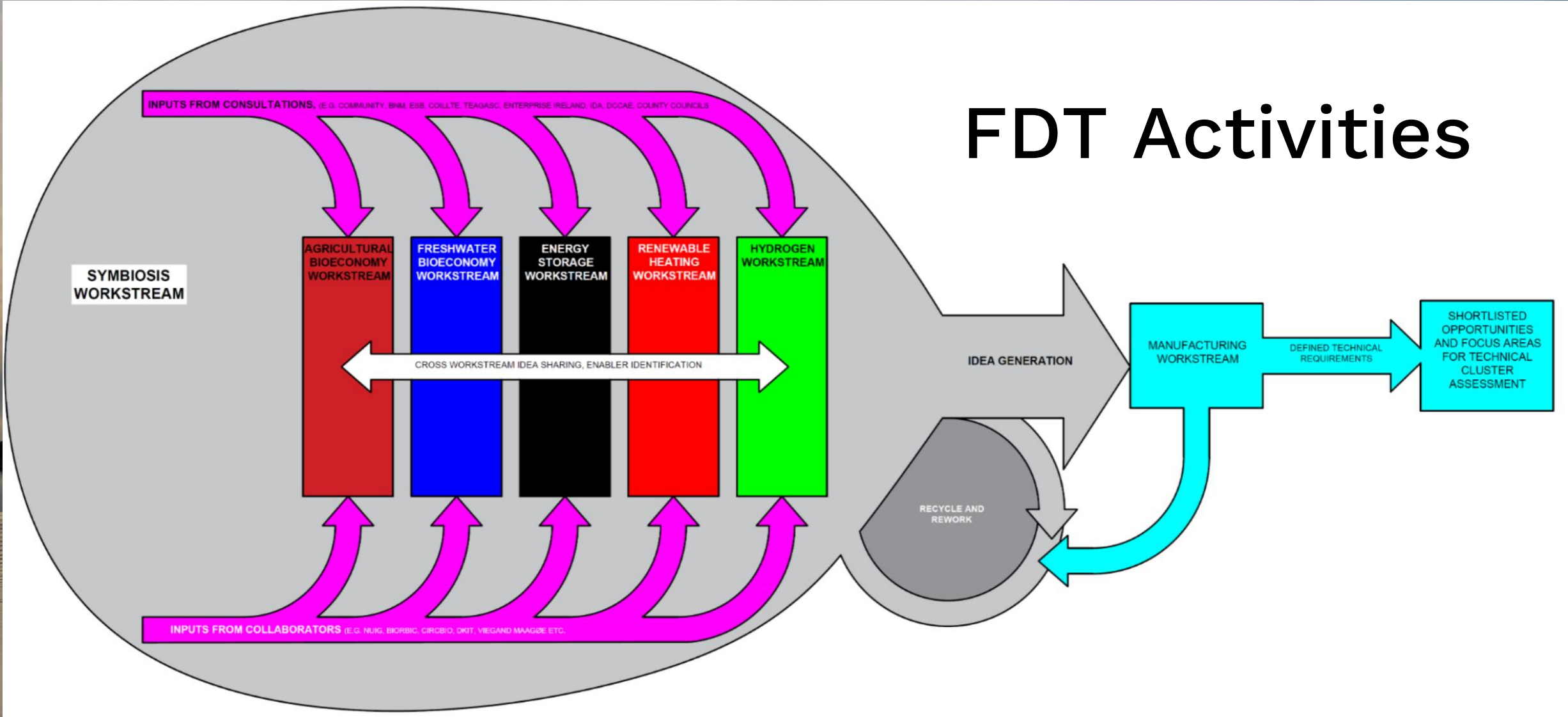
The study is to investigate if an approach to a symbiosis case similar in intent to the one adopted in Kalundborg in Denmark, where companies and authorities work together and adopt a circular approach to production.

In the Kalundborg symbiosis case, a local partnership has been established where partners provide, share and reuse resources to create a shared value and where partnerships are continually renewed by identifying and attracting new members. Originally in Kalundborg, a small number of mutually compatible enterprises formed the kernel around which the symbiosis approach flourished.

In the case of Lanesborough and Ballyleague, these enterprises would be necessary to unlock similar potential. What Lanesborough does have however, is an extensive electrical infrastructure and natural resources. Therefore, from an energy perspective, this study will also consider what opportunities can be unlocked in Lanesborough to ensure clean energy can be utilised by existing and future businesses, the community and potentially the transport sector.

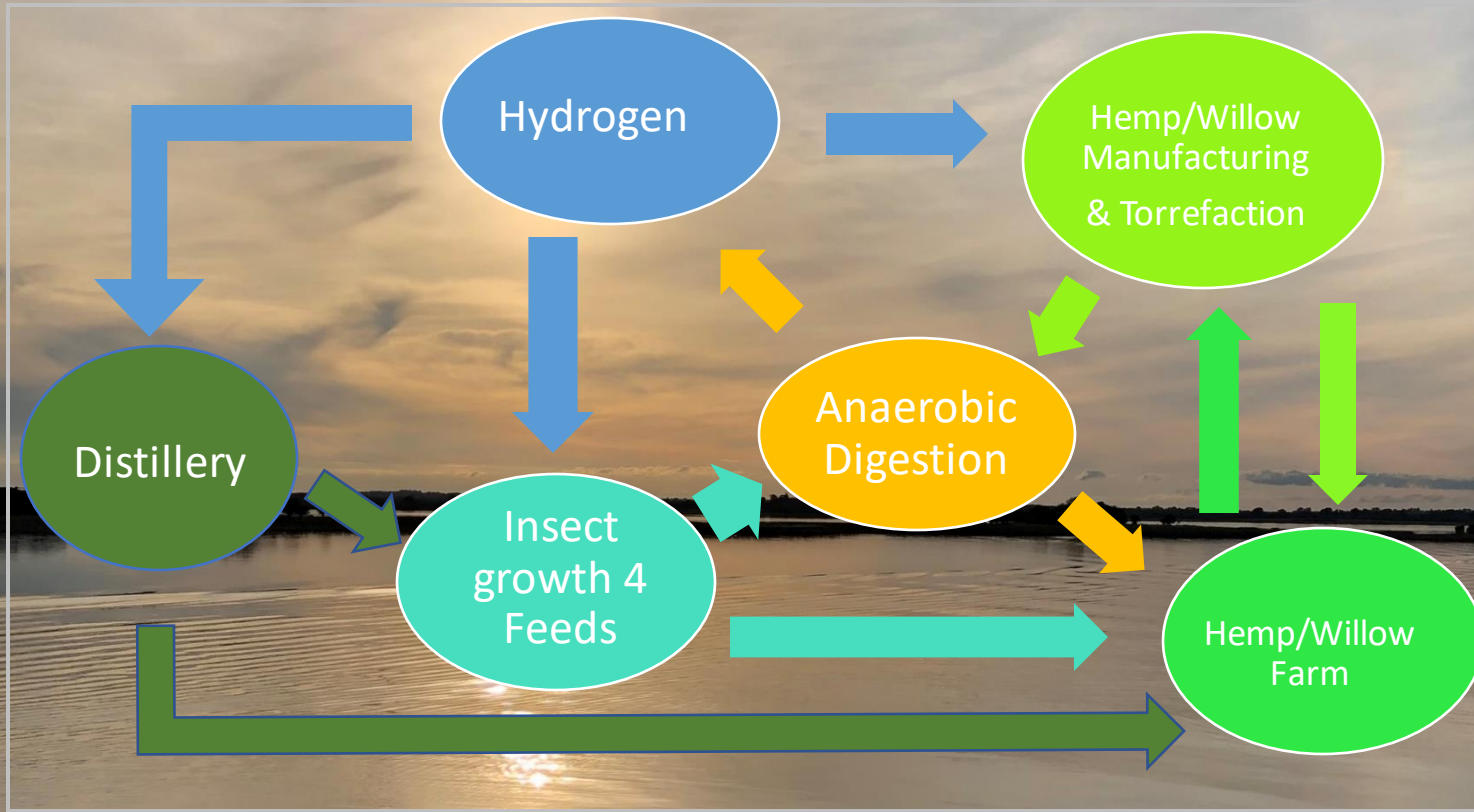
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FDT Activities



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Feasible ideas



Support and collaboration



The work undertaken in 2020 and 2021 and consultations have identified the arrangement above warrants additional focus in 2022 to determine the most feasible clustering opportunities.

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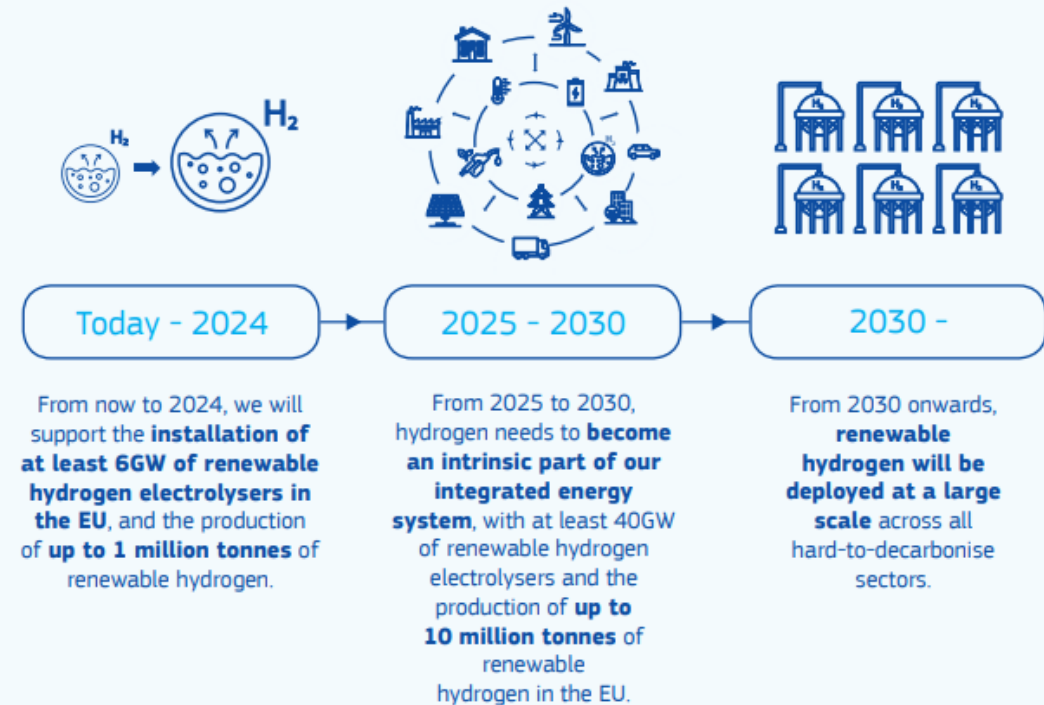
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1. Hydrogen Opportunities in the Midlands' Energy Transition - *Lough Ree Technology Cluster*

Support from NUI Galway

- Hydrogen can aid the growth of renewable electricity sources and decarbonise heat and transport
- The Midlands is suitable for hydrogen production
 - Wind and solar energy
 - Energy industry experience and infrastructure
- Modelled production cost of hydrogen for 2030
 - €0.22/km for trucks
 - 7.2 c/kWh natural gas/fuel oil equivalent
- **Just Transition** - green jobs and zero carbon energy for the midlands

The path towards a European hydrogen eco-system step by step :



Hydrogen results are from May 2021, these results will be updated in 2022 to reflect latest energy market conditions

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Hydrogen at Lough Ree

Production

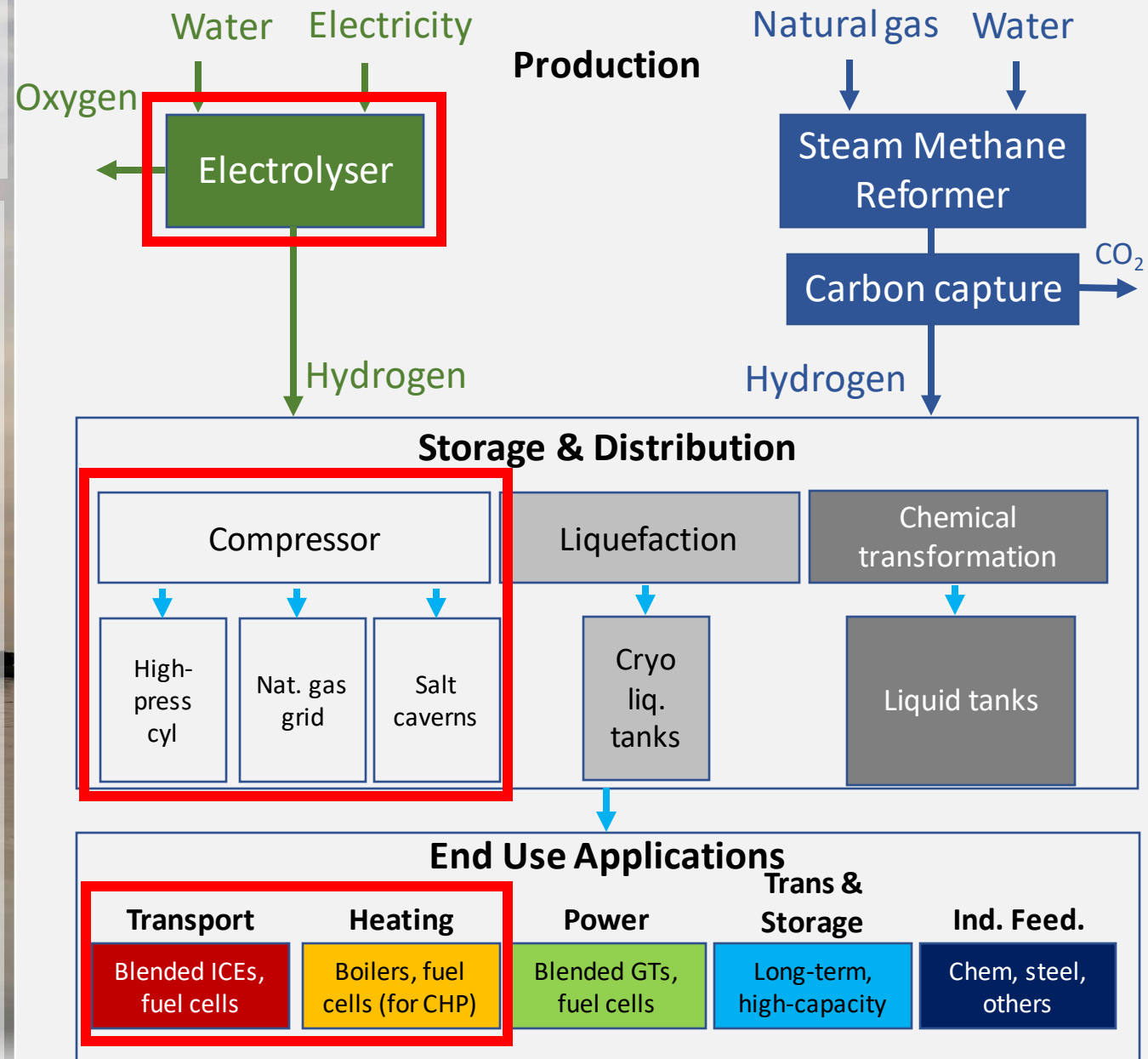
- Hydrogen can be produced by electrolysis at the Lanesboro site. The hydrogen can then be compressed at the site and trucked in tube trailers to the demand location
- Can use infrastructure and expertise at Lanesboro power station and existing and proposed wind farms
- Can make use of renewable electricity from local wind and solar farms

Demand

- Can fuel trucks for significant haulage industry in the region.
- Can be injected into the natural gas grid near Athlone.
- Can displace heavy fuel oil used for industrial heat.
- Proximity to transport networks in urban centres
- Other niche applications include heavy duty vehicles for waste management/quarries/etc, forklifts, tractors, and other vehicles for agriculture

Potential 2030 Scenarios

- 30-50 hydrogen trucks from a large fleet in the region
- Injection into the natural gas grid at blends of up to 20% by volume
- Hydrogen boilers would provide heat for large industry in the region



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Hydrogen Outlook

WHAT DOES THIS MEAN FOR THE MIDLANDS?

EMISSION REDUCTIONS

Offset fossil fuel usage with H2

New H₂ applications to replace carbon-emitting processes

Reduce reliance on imported carbon fuels

Focus on hydrogen for heat and goods across Ireland

Skilled Job Creation – wind, solar, and hydrogen

Proximity to potential hydrogen markets

ENERGY DIVERSITY

ECONOMIC BENEFITS

RES EXPANSION

Utilise large renewables potential

Large green H₂ Potential

Prove viability of technology

Midlands gas grid injection

Energy industry expertise

Operational skills, expertise and added value

H₂ TECH TESTING GROUND

LANESBORO EXPERTISE

Drivers

Opportunities

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2. Insect Production for Protein

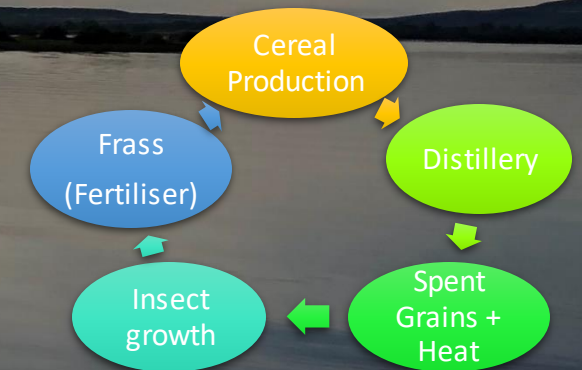
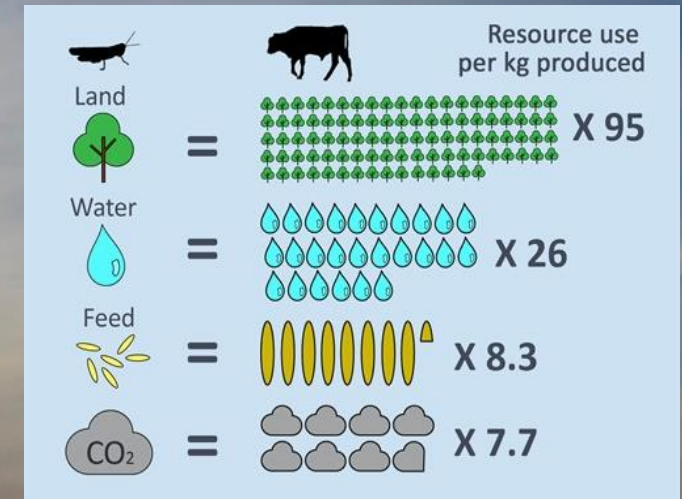
- World population growing from 7.8 billion in 2020 to 11 billion in 2050, lead to increased demand for protein sources to feed the population
- Uses for the Insects fall into 2 categories
 - **Food and Feed** :Human and animal feed (Pets and farmed animals)
 - **Technical uses**: Cosmetics, Biofuels, Bioplastics

Circular Bioeconomy Potential

Insect protein can form a part of the circular economy if co-located with the right industry i.e. Distillery

Insects have a valuable waste product frass that can be used as a fertiliser

Investigations ongoing to determine good industry 'fits' for this opportunity: food, agricultural waste, distillery co-products etc.

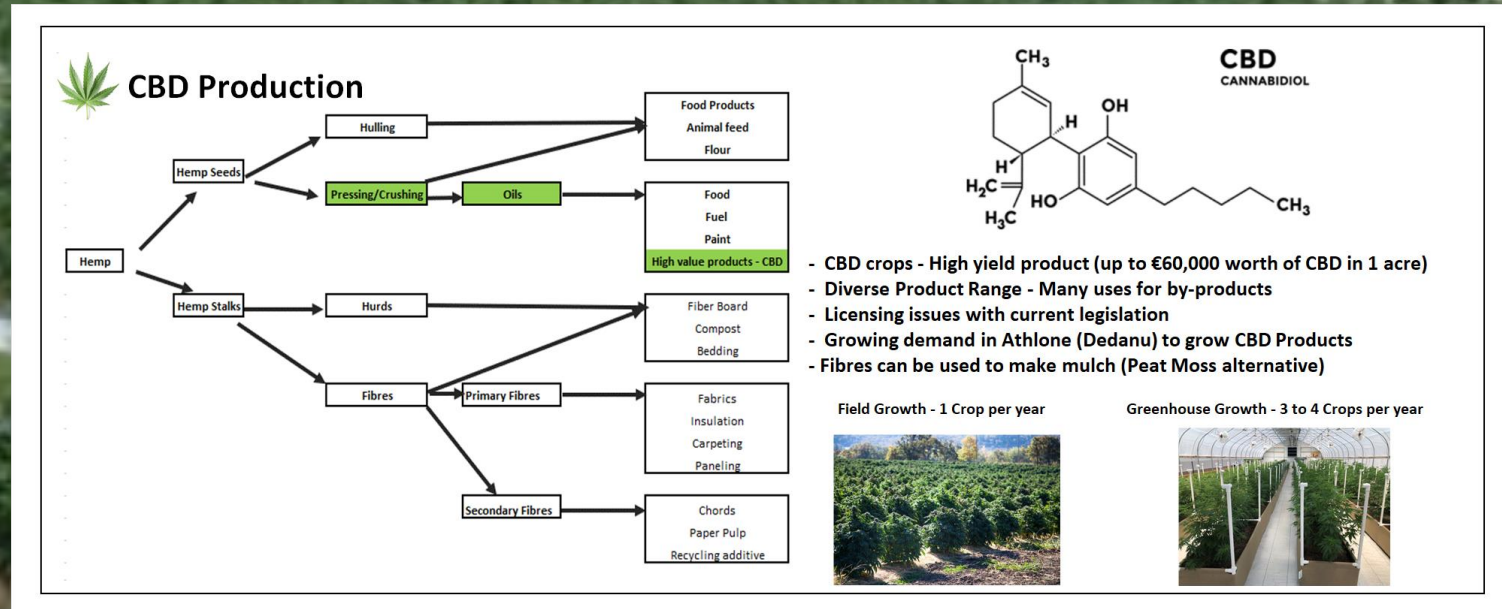


This topic will be a focus area for investigatory work in 2022

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3. Hemp Growing and Processing

- Important to not confuse with caraboid plants
- 3 distinct types,
 - plants grown for fibres 3-4m tall
 - Plants grown for seeds 1m tall
 - Hybrid varieties
- Plants grown for fibres can be used in construction sector: insulation, hemp crete
- Plants grown for seeds used in health food/medicine sector: CBD oil
- Hemp claimed to have up to 50,000 uses



4. Willow torrefaction

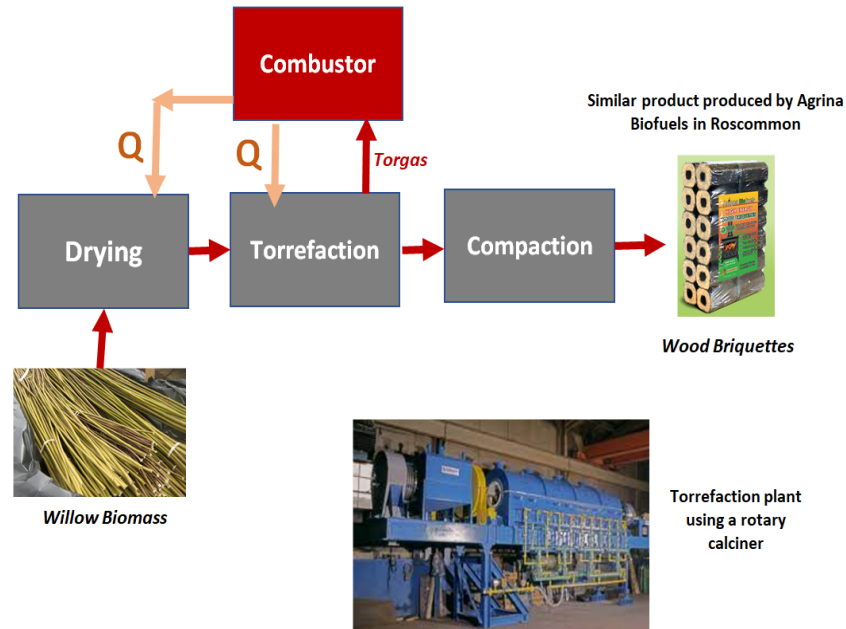
Willow Torrefaction

Local Region

- "Fuel Poverty" in area with reduction in peat turf supply
- Best replacement for peat - minimal retrofits required
- Alternative fuel sources
 - Oil (Popular in region but requires retrofits to homes)
 - Gas (Poor pipe connections - will require new installations)
 - Heat Pumps (Need upgrade to electrical infrastructure)
 - **Wood is a viable resource for area**

Willow as fuel source

- Very good energy source for boiler burning
- Quick turnaround on growth (3-5 years per crop)
- High Genetic diversity
- Vigorously resprout after each harvest.
- Similar heat emitted to other hardwoods
- Not very good in open fire - needs to be processed into briquettes
- Irish & EU grants available - competitive crop
- Profit between €211-383/ha/yr



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Studied Energy Hubs

(Source: Viegand Maagøe)

1. Kalundborg Symbiosis - Bilateral commercial agreements - building on trust and mutual business benefits. More than 50 years in operation and still developing

<http://www.symbiosis.dk/en/>

2. Greenlab – A green industrial park in rural Denmark – attracting EUR 200 mill. in private investments studied

<https://www.greenlab.dk>

3. BioRefinery Billund – Resource recovery, innovation and energy for local public district heating and the power grid

www.billundvand.dk

4. Maabjerg Energy Concept - Large-scale biogas and bioethanol concept

<https://www.maabjergenergycenter.dk/>

5. PtX Triangle Region - Industrial-scale green hydrogen project under development; Focus area - green fuels such as methane, methanol, ammonia and hydrogen.

And many more...

The successful energy hubs - elements that matter

- Local resources – locally sourced materials and energy sources
- Rural renewable energy, surplus heat and Energy Efficiency
- Circular Economy - Symbiosis – recirculation of nutrients and materials
- Cooperation model – commercial approach – all parties
- Job creation and local development

Other lessons learned

- Important to start with a viable business opportunity!
- Build trust and viable business relations – then new opportunities emerge
- The Danish model of cooperation!
- Viable collaboration requires win-win for all parties involved
- Rural development requires focus on rural opportunities

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Next Steps

June to December 2022

- High level technical and economic analysis of shortlisted ideas
- Identify possible sites for development

February - June 2023

- Final presentation of ideas through webinars, presentations and brochures
- Potential for demonstrator projects/communities
- Education of community on plans and future capacity building projects

January - February 2023

- Finalise detailed comprehensive report

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Questions and Answers

Please e-mail your questions and feedback to john.hanley@fdt.ie

Thanks to everyone who took the time to engage in the study for discussions to date:

FDT Staff, Ballyleague Lanesboro Collaboration Group, Longford Co Co, IESA, BNM, ESB, Just Transition Commissioner, Enterprise Ireland, IDA, Coillte, Teagasc, Energia, SSE, O'Brien Energy Consulting, Viegand Maagoe, NUIG, BiOrbic, CIRC BIO, IBF, TUD, Highview Power, DCCAE, BIM, DPD, AIT, Paul MacArtain, JAE, IWMA, Local TD's, Kenny MacAuley, KPMG/Future Analytics, MaREI and others

For additional information not covered in this pack, below is a link to an Engineers Ireland talk FDT gave on the 10th of March 2021:

Video

<https://www.youtube.com/watch?v=q8l4NDFxPyg>

Slides

<https://prezi.com/view/xlO15hoYdCmkOfEC10gi/>

Also, below is a link to the MRTT FDT and partners delivered on the 26th May 2021:

Video

<https://www.youtube.com/watch?v=ibrpW07zpZU>

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