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Energy Recovery through Advanced Pyrolysis of Composite and Organic Wastes

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FUTURECAST

Powering technological innovation in
Quarrying and Construction

Based in Manorhamilton, driving innovation in manufacturing and construction by integrating advanced waste-to-energy solutions.

Through this pyrolysis initiative, we empower industry with sustainable technologies that transform waste into opportunity."

Executive summary

- Innovative pyrolysis facility targeting hard-to-recycle waste
- Examples: wind turbine blades, tyres, ESB poles, and sheep wool.
- Converts waste into electricity, syngas, oils, and biochar-like residues.
- Combines circular economy principles with advanced thermal technology.
- Multiple revenue streams + strong environmental impact.

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The Problem

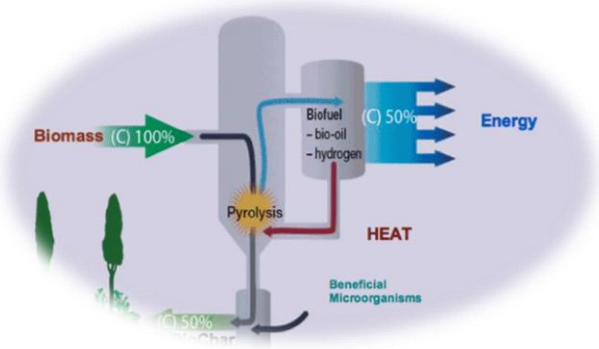
Wind Turbine Blades: Fibre glass composites—non-recyclable, growing disposal issue.

Tyres: Hazardous waste with high energy potential, limited recycling options.

ESB Poles: Toxic treated wood—cannot be repurposed easily.

Sheep Wool: Low market value, often discarded or stockpiled.

Solution



- ✓ Advanced pyrolysis: oxygen-free thermal breakdown of complex waste.
- ✓ Neutralises toxins, recovers energy and materials.
- ✓ Integrates multiple waste streams into one scalable process.

Project Objectives

- Divert composite/organic waste from landfill/incineration.
- Generate renewable electricity and heat.
- Produce reusable pyrolysis oil, syngas, and solid residues.
- Demonstrate scalable innovation in waste-to-energy.
- Support rural economies via wool valorisation.

PARTNERS

- ✓ **Industry Partners** – Waste mgt firms, renewable energy providers, and manufacturers seeking sustainable feedstocks.
- ✓ **Agricultural Co-ops** – Wool producers, rural networks ready to valorise surplus materials.
- ✓ **Technology Innovators** – Engineering firms, automation specialists, and pyrolysis system developers.
- ✓ **Academic & Research Institutions** – For joint R&D, pilot trials, and knowledge exchange.
- ✓ **Public Sector & Funders** – Local authorities, green transition agencies, and EU programme stakeholders.

Technical overview

Input Materials:
Wind blades, tyres, ESB poles, sheep wool.
Pre-treatment:
Shredding, cutting, cleaning, baling.
Pyrolysis System:
Continuous-feed reactor (450–700°C).
Modular design for varied feedstocks.
Emissions control via scrubbing and filtration.

Outputs and applications

- **Syngas**: Onsite power or CHP systems.
- **Pyrolysis Oil**: Industrial fuel or refining.
- **Solid Residue/Char**: Cement filler, activated carbon.
- **Recovered Materials**: Glass fibres, carbon black, steel wire.

Timeline & budget

Phase 1 (Months 1–12): Feasibility & R&D
Feedstock testing, pilot trials, permitting.

Phase 2 (Months 13–30): Engineering & Construction
Plant design, equipment procurement, site build.

Phase 3 (Months 31–60): Operation & Optimisation
Commercial launch, product sales, process scale-up.

Capital investment €20-30m
Sources: Horizon, LIFE, National funding, Industry

Risks

- **Regulatory**: Early EPA engagement, ongoing monitoring.
- **Feedstock Variability**: Modular system design.
- **Market Acceptance**: Secure off-take agreements.
- **Financial**: Blend of private, public, and EU funding.

To conclude

- ✓ A transformative solution for composite and organic waste.
- ✓ Aligns with EU Green Deal & Ireland's circular economy goals.
- ✓ Delivers environmental, economic, and social benefits.
- ✓ Ready to lead Europe in sustainable waste-to-energy innovation.

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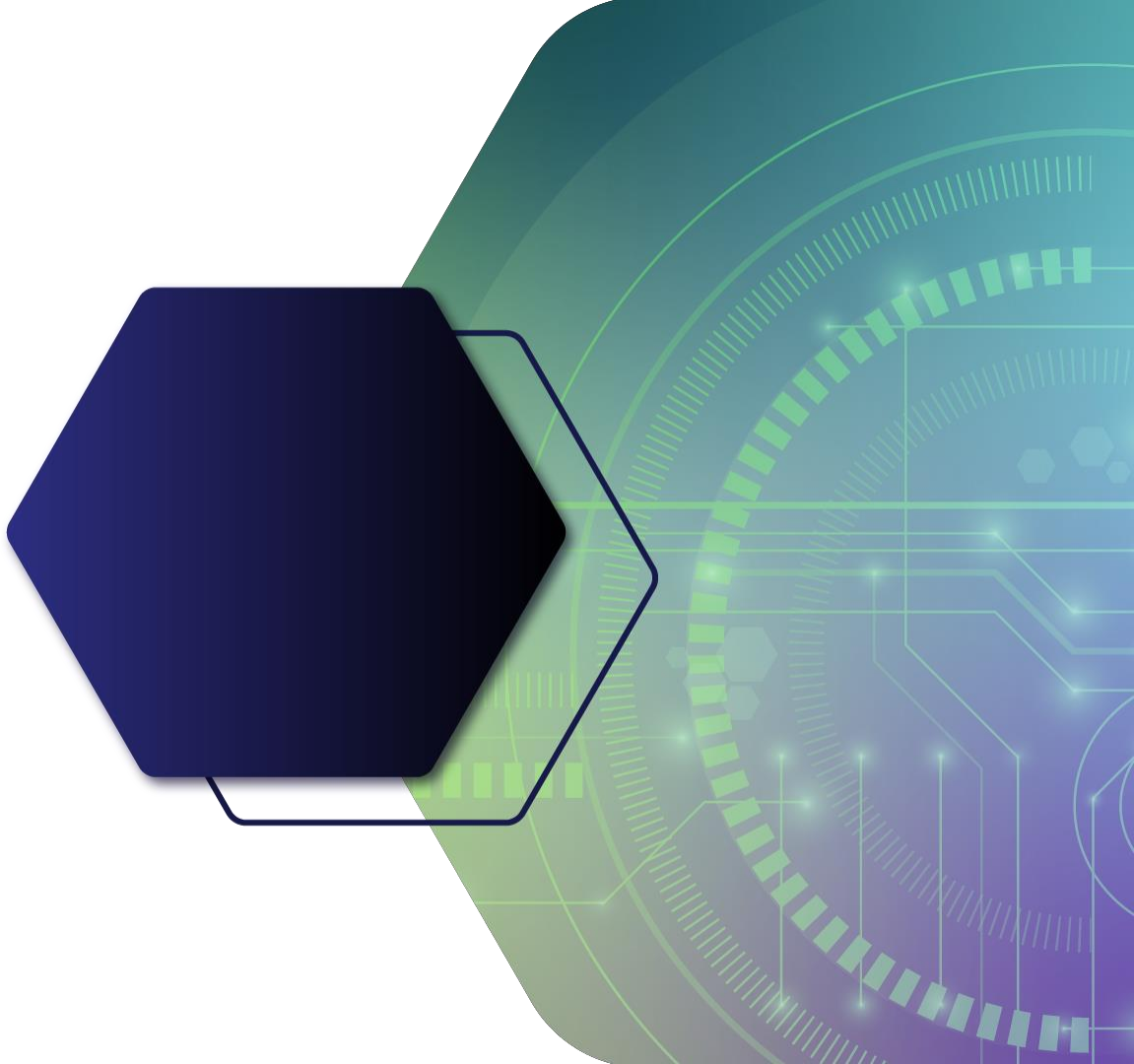

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