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Novus Modus Investing in Bioenergy Projects



Overview of Novus Modus

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- Fund manager on behalf of ESB, the leading Irish utility group
- €200 million investment fund
- Investing in equity and equity like instruments
- Operating out of Dublin and London
- Typically investing between €5m and €20m
- Providing expert skills and technological know how to investment partners

A new fund for renewable and cleantech sectors

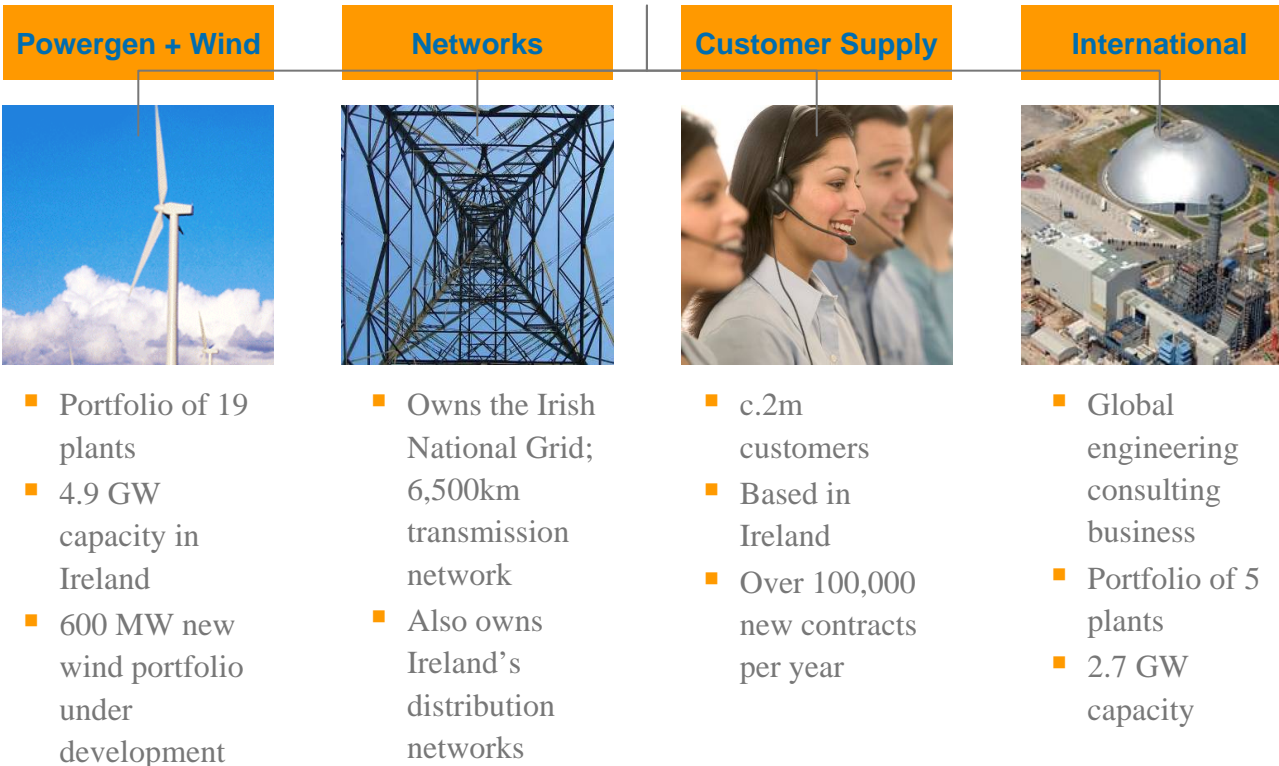
Irish utility with €22bn renewable programme



- Approaching 8,000 employees
- Over €3.3bn turnover
- €6.5bn asset value



- €22bn investment programme
- 30% CO2 Reduction by 2012
- 50% carbon reduction by 2020



Novus Modus Investment Strategy

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- Targeting initial investment of at least €5m and typically committing up to €20m
- We seek significant minority or controlling equity positions. We aim to serve on the board of directors
- Business development: corporate joint venture, greenfield business launches
- Expansion stage financing: funding new product introductions, capital asset purchases and add on acquisitions
- Corporate: shareholder liquidity, fund-to-fund secondaries, founder net worth diversification, recapitalisation, management buyouts and corporate divestitures

Seeking meaningful positions within portfolio companies, Investing across a range of situations

Novus Modus Investment Areas



- Proven & proving technologies
- Companies/projects
 - large addressable markets
 - niche exploiter
- Clear funding milestones

Renewable Power and Heat Plants

Biomass, AD, Wave, Tidal, Mini-hydro, Geothermal, Small Wind

Cleantech Technology

Biomass (Gasification, Pyrolysis, AD, Fermentation), Wave, Tidal, Solar, Wind, Waste Recovery, Algae

Low Carbon and Energy Efficiency

Smart Grids, Intelligent Buildings, Efficient Lighting, Energy Storage, CHP & Distributed Heating

Electric Vehicles, Clean Transportation

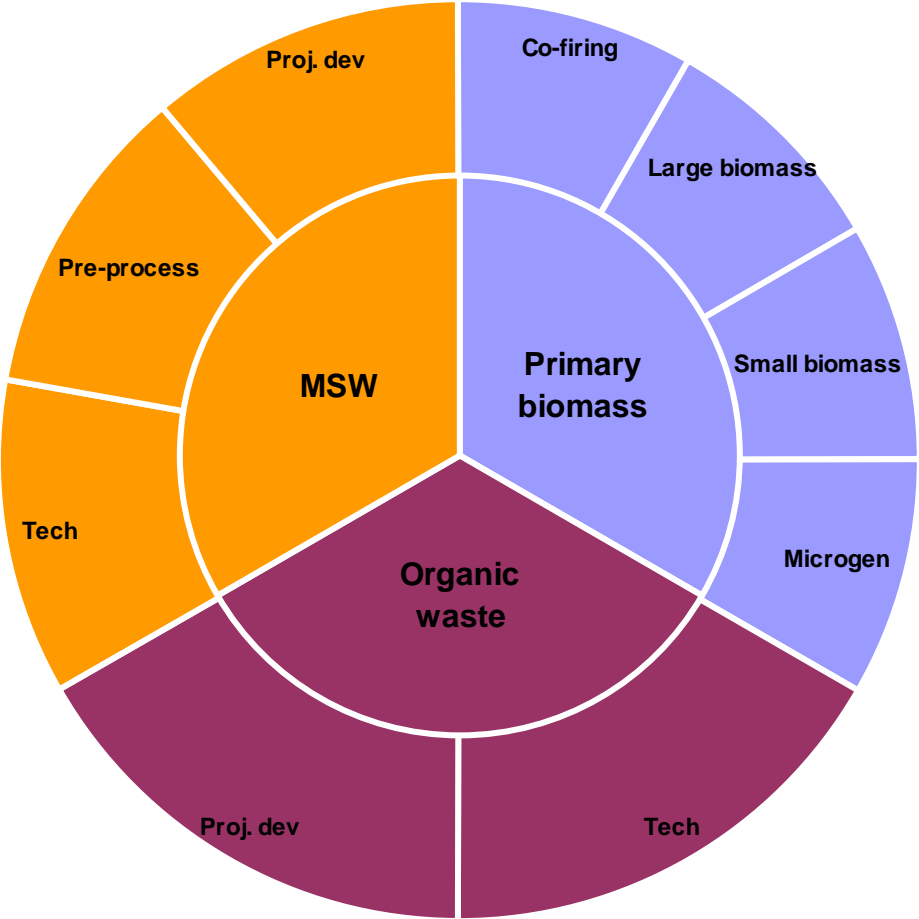
Batteries, Charging Infrastructure, Fuel Cells, Fuel Processing, Biofuels, Finance, etc

Other

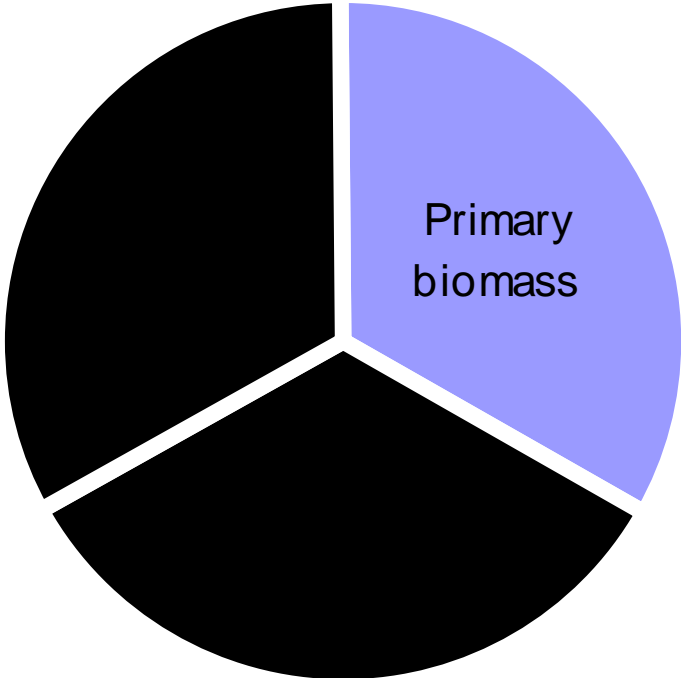
Service Companies, Recycling, Other Funds

Investment	Country	Brief description
VantagePoint	USA	<ul style="list-style-type: none">• Fund involved in diverse early stage investments• Solar, EV infrastructure, smart grid, LED's, etc• Opportunity to learn and partner
Nualight	Ireland	<ul style="list-style-type: none">• LED lighting for supermarket chilling units• Energy saving: no subsidy• Slow retrofit market
Airvolution	UK	<ul style="list-style-type: none">• Sub 10MW (less than 3 turbines) distributed wind• Partnership with Savills and PEP

Novus Modus Biomass Investment Areas



Primary Biomass



Types of Feedstock Available in Ireland

Wood

- Good supply of forest wood available
- Some wood waste but complex accessing it
- Well proven on existing technology
- Drying provides option to increase calorific value

Miscanthus/Willow

- Limited amounts grown in Irish markets
- Not very proven on existing technology
- Difficulty in securing long term contracts

Straw

- Limited supply of straw due to high cattle grazing population
 - Ireland is a net user of straw
- Technology currently requires large plants to be built

Primary Biomass

Large Biomass Projects

Feedstock

- Significant amount of feedstock required
- Very few parties capable of providing long term contract
- Projects typically have imported feedstock

Economics

- Heat off-taker difficult
- Project Financing required

Management

- Experience and track record of large scale engineering projects

Regulatory/Planning

- Issues regarding planning/grid connection
- Feedstock movement issues

Technology

- Availability of EPC wrap



Primary Biomass

Small Biomass Projects

Feedstock

- Long term security is key
- Size of projects allows for opportunity to secure local feedstock and/or partner
- Pellets v woodchip
- Quality of feedstock (moisture content) and drying options important

Economics

- Project Financing is required
- Cost of feedstock and feed-in tariff are key
- Easier to obtain heat off-take

Management

- Track record in development and operations
- Ability to deliver pipeline of projects

Technology

- Gasification vs conventional steam chp
- Drying or pelleting equipment

Organic Waste



Anaerobic Digestion



Feedstock Mix

- Availability of long term contracts or tonnage available short terms at high gate fee
- Maximise gas yield with feedstock available in region

Management and operational team

- Operational experience key

Economics

- Returns need to be reflective of technology risks

Technology provider and EPC contractor

- Who is partner (agri experience v waste experience)
- Reference plants

Digestate disposal

- Long term solution required
- PAS 110 requirements
- ABP regulations, particularly on category 1& 2 waste

Planning/regulatory

- Site location
- NIMBY issues

Summary

- **Project requires secure a long term secure source of feedstock**
 - Ireland is well positioned to provide this
 - Good supply of forest wood
 - Food waste is area of real possibility
- **New CER ruling on grid connection should help kick start sector**
- **Location of project is key**
 - Confidence of heat off-take required
 - Supportive planning regime
- **Economics currently less attractive in Ireland compared with UK due to REFIT v 2 ROCs**

