



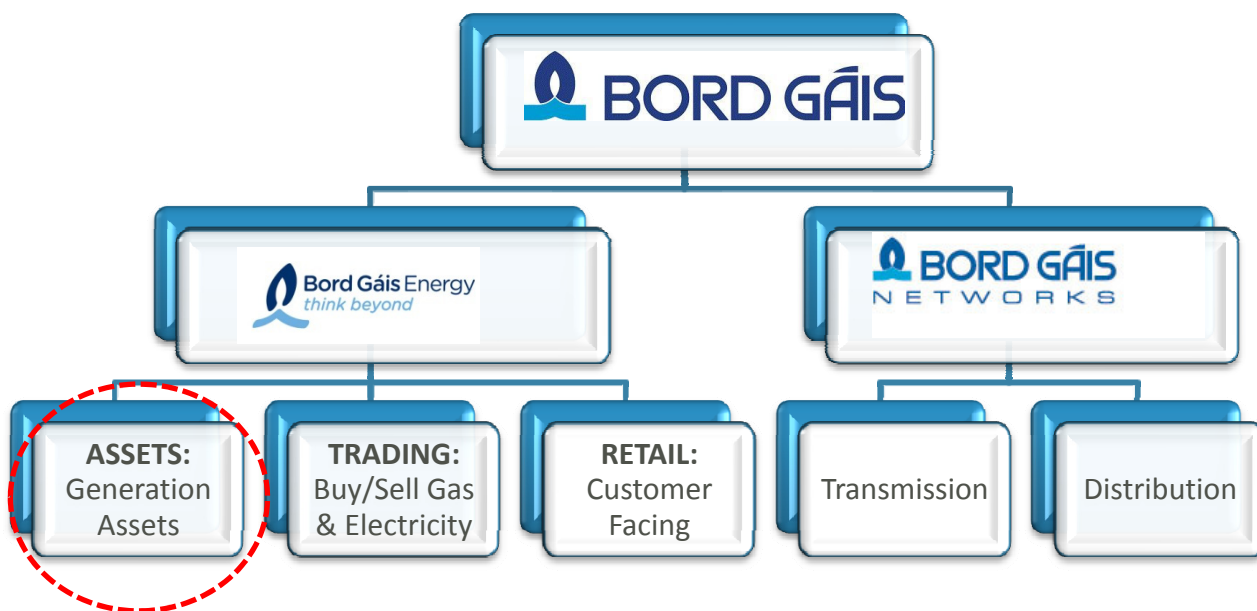
Wind Energy – Overview of BGE Assets Development Portfolio

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Introduction – Who are Assets?

Responsible for pursuing and developing growth opportunities in assets in the energy markets in Ireland, underpinning the strategy to become the leading dual-fuel energy company.



Overview of the Assets Division



Conventional Generation

- 445MW CCGT Whitegate Power Plant Operational since Nov 2010
- 3 x 100MW OCGT Peaking Plants to support increased wind penetration



Wind Generation

- Over 230MW of Operational Wind
- Development Pipeline of over 500MW of Wind on the island of Ireland



New Energy

- Identify future trends and track emerging technologies (Tidal Energy, Biomass, Smart Metering)
- Sustainable energy production



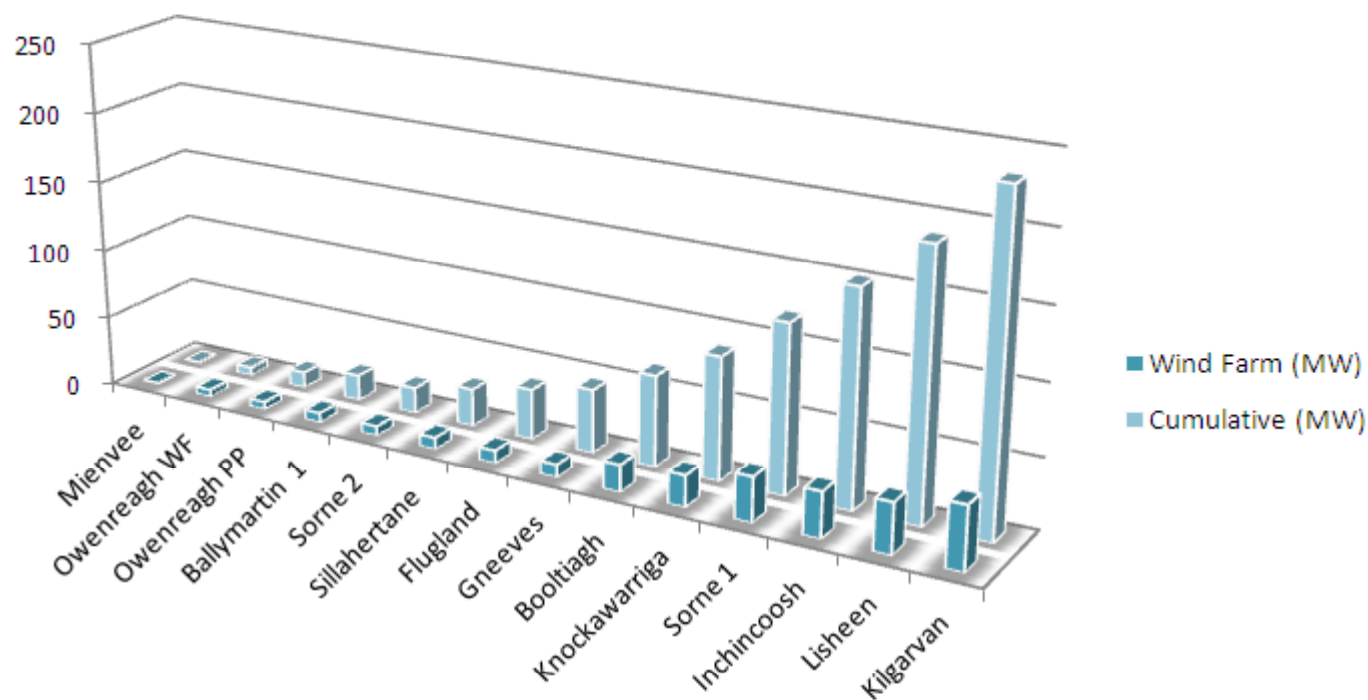
Gas Storage

- JV with Gas de France
- Located in Northern Ireland
- Seismic survey completed; preparing for test drill



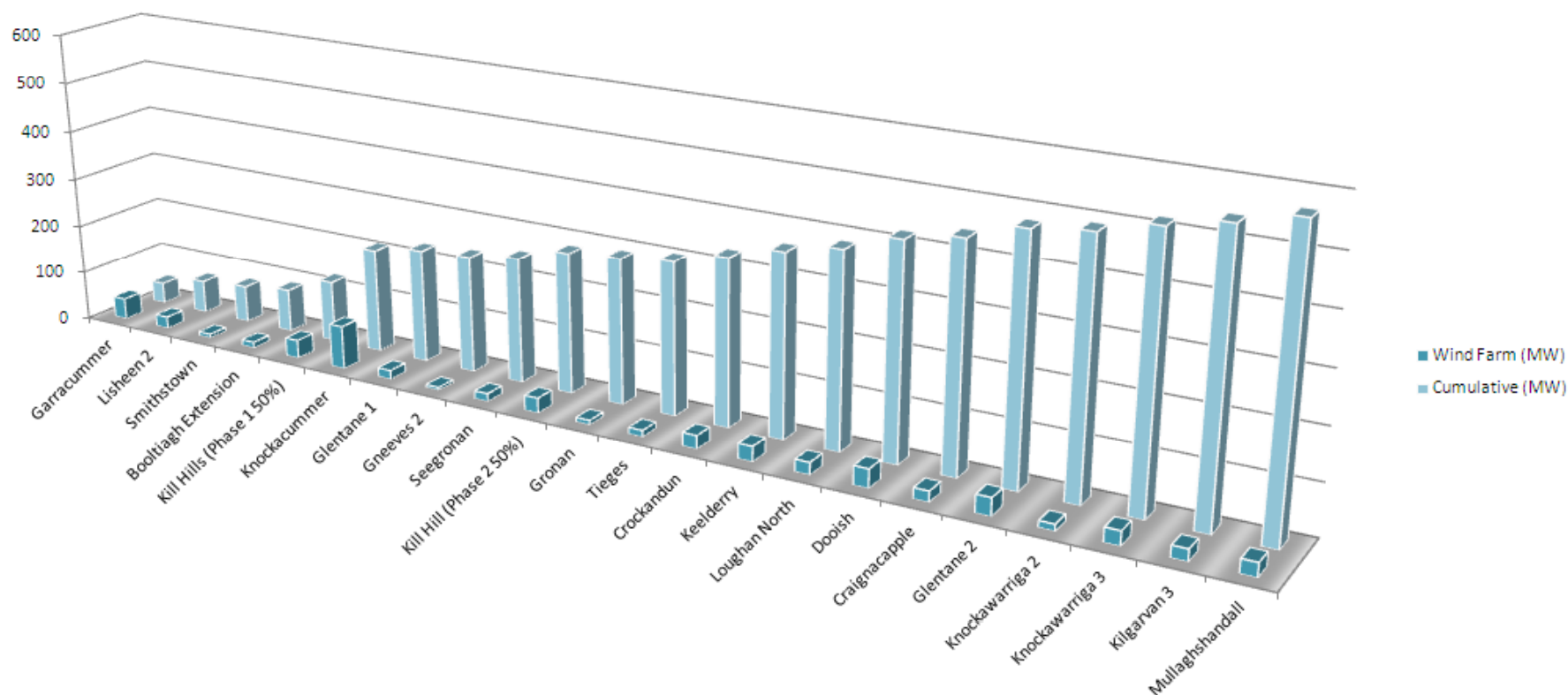
Operational - Wind Portfolio

- 14 windfarms
- 129 turbines across 5 manufacturers
- 239MW built capacity



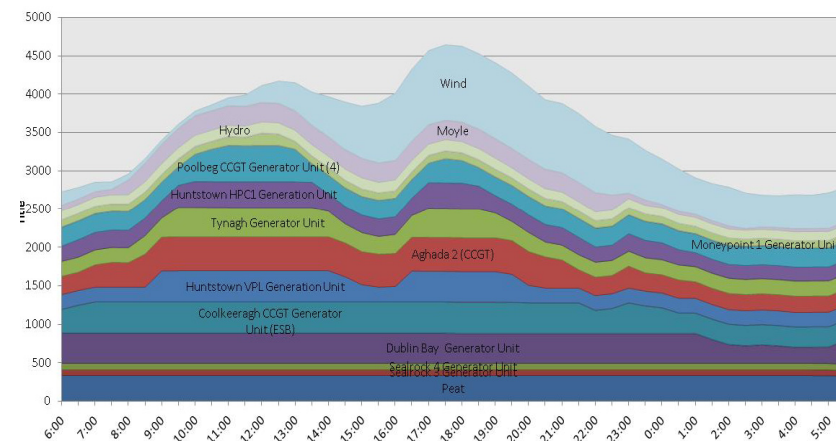
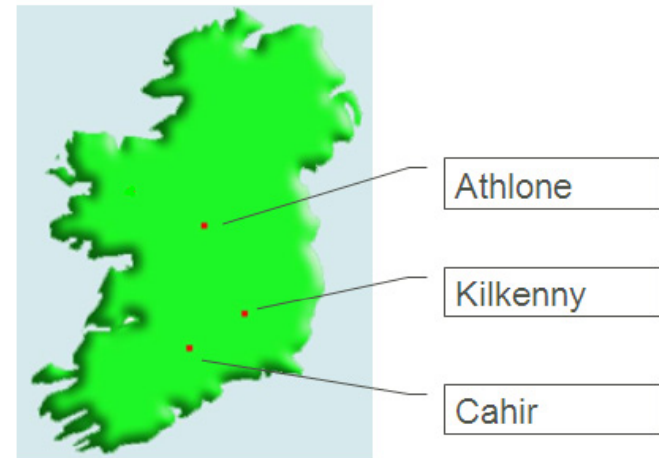
Development - Wind Portfolio

- Over 500MW of pipeline projects
- 6 of those projects will be operational in the next 2 years
- They will bring 210MW of additional wind on to the system



Development - OCGT Portfolio

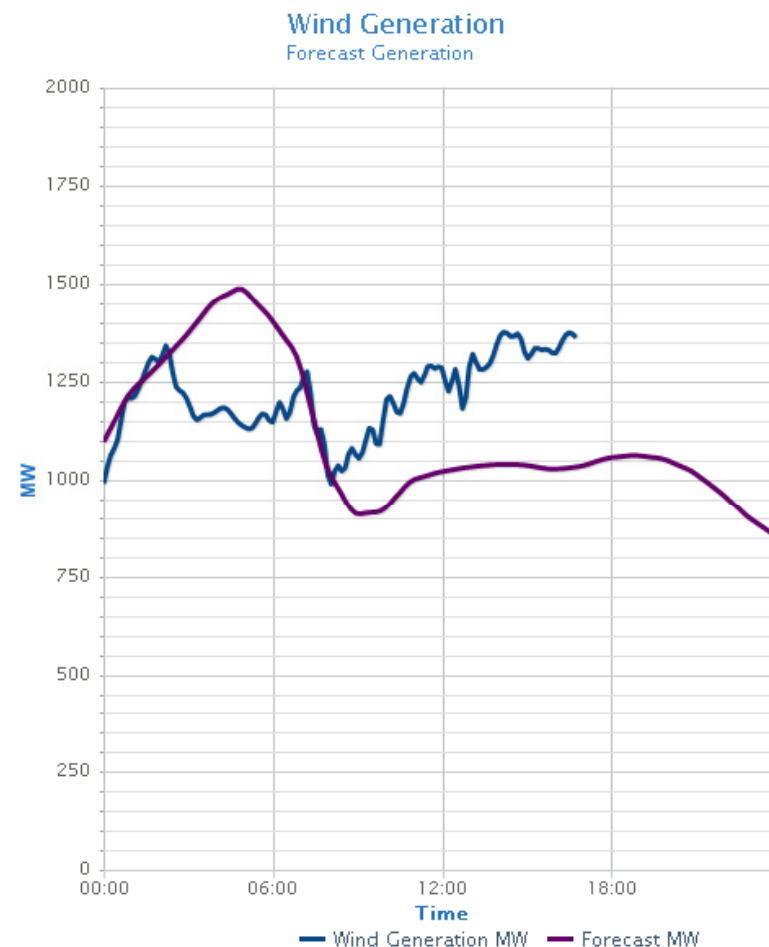
- OCGT = Open Cycle Gas Turbine.
- BGE has a JV company called Greener Ideas, who have 3 OCGT projects at various stages of the early development cycle.
- OCGT are typically 50-100MW aero-derivative turbines. Unlike a Combined Cycle Gas Turbine, there is no steam cycle – exhaust vents straight to atmosphere.
- Purpose is to fill the gap between volatile and intermittent wind, and base load CCGT.



Development - OCGT Portfolio (contd.)

Greener Ideas OCGT plants can:

- Achieve 41-46% efficiency with the technology proposed
- Provide power at part load as efficiently as most gas turbines at full load
- Provide grid support without load reduction – low stable generation & large reserve
- Provide 10 minute starts-from cold metal to full power
- Start/stop daily without impacting maintenance interval, and with little energy cost
- Provide 50MW of power in less than one-minute
- Provide load following and cycling capabilities



Development - Portfolio Roll-out

Between wind and OCGT, BGEs total development portfolio by the end of 2016 is potentially in excess of 800MW



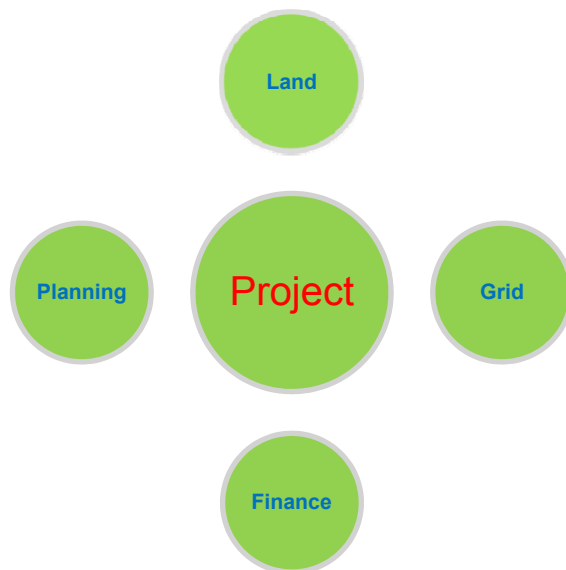
How are we going to do it?

Development - Portfolio Roll-out (contd.)

Numerous external challenges to delivery; some are out of our control

- Markets price of electricity
- Markets cost of capital
- Regulatory changes
- Political changes

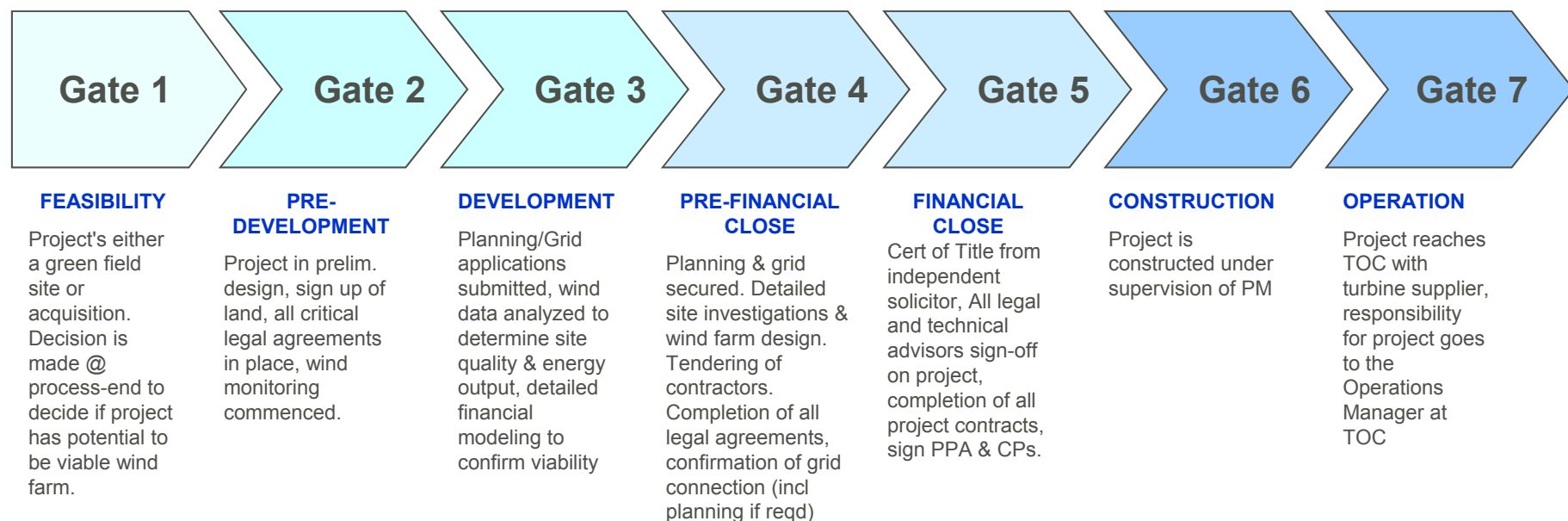
... but with the majority we have a say in our destiny. The key project delivery areas are:



A typical development project team comprises the following cross-functional members:

- **Project Manager** – manages the project
- **Environmental Lead** – responsible for planning permission and specific environmental aspects of the project
- **Grid Engineer** – responsible for delivery of grid connection to the Windfarm on time and within budget
- **Commercial** – support the PM in terms of commercial negotiations, financial appraisal, governance and risk management
- **Legal** – preparation and execution of all relevant legal contracts
- **Wind Analyst** – responsible for reviewing operational performance and forecasting wind production on development sites
- **EHS** – responsible for general environmental issues, and project specific health & safety requirements, interfacing with PSDP & PSCS etc.

Development - Project Delivery Process



- Each area (Grid, Finance, Operations etc) has specific Key Exit Criteria
- The project cannot pass into the next stage of the Tollgate process until these exit criteria are met
- Collaborative approach to projects: we challenge each other to continuously improve throughout all stages of development cycle to refine project plans and systems to take account of :
 - new methodologies & value engineering
 - experience from other developments
 - evolving best practice