Renewable Power Generation

Industrial Wind Generation Auto-Production

Dave McNamara

Renewable Power Generation Ltd.

Irish Wind Energy Conference
Burlington Hotel Dublin
Friday 30th March 2007

Presentation Format

- Company background
- Industrial Wind Electricity Auto-production explanation and benefits
- Project development process
- Sample project
- Project financial costs and returns
- Project examples

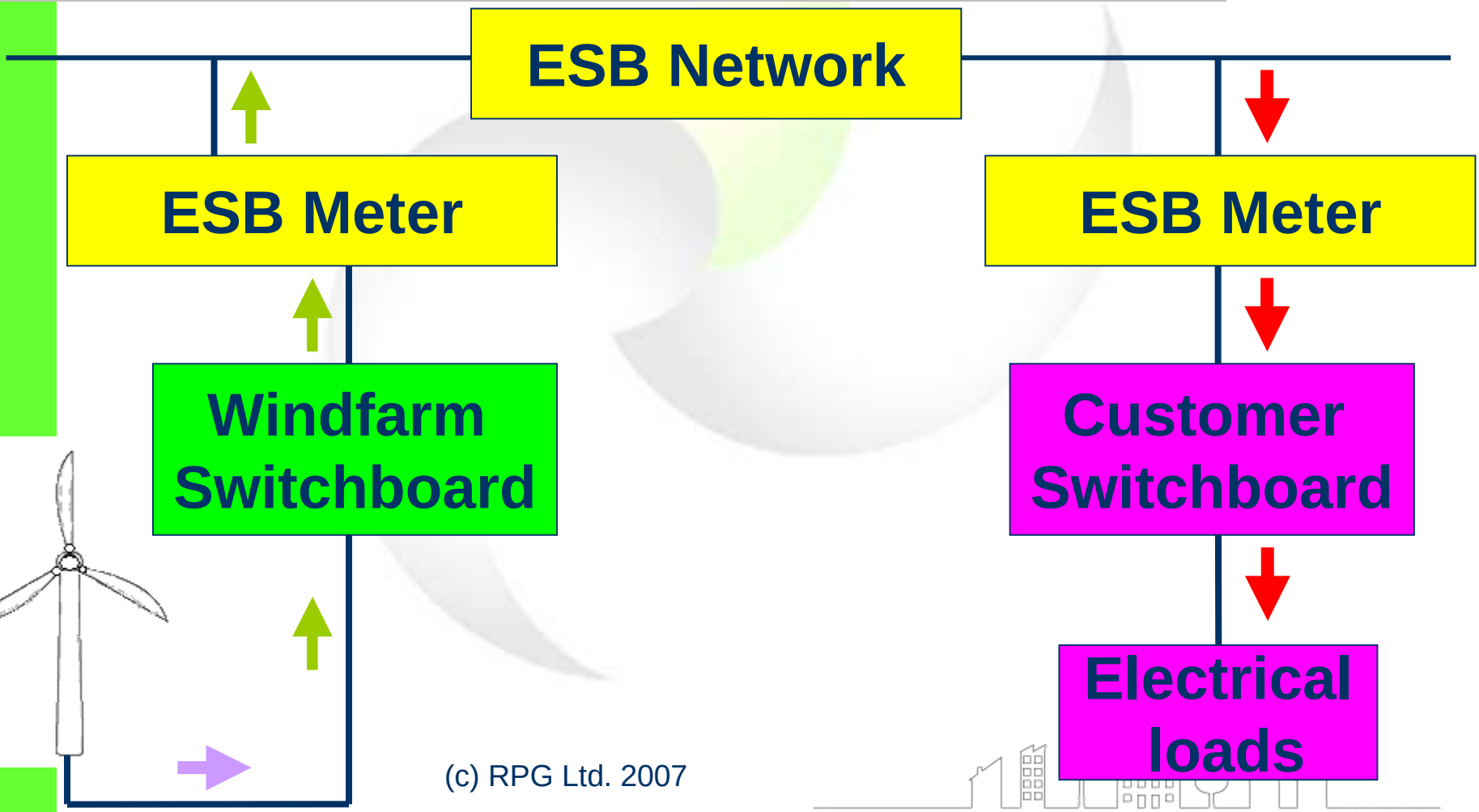
Renewable Power Generation Ltd.

- Only 100% Irish owned company whose core business is wind electricity auto-production project development on industrial sites
- Supply of fixed price electricity to suitable industrial site owners. No development cost to site owners.
- Engineering, project management, planning, financial and wind resource capabilities
- Full turnkey development and consultancy services

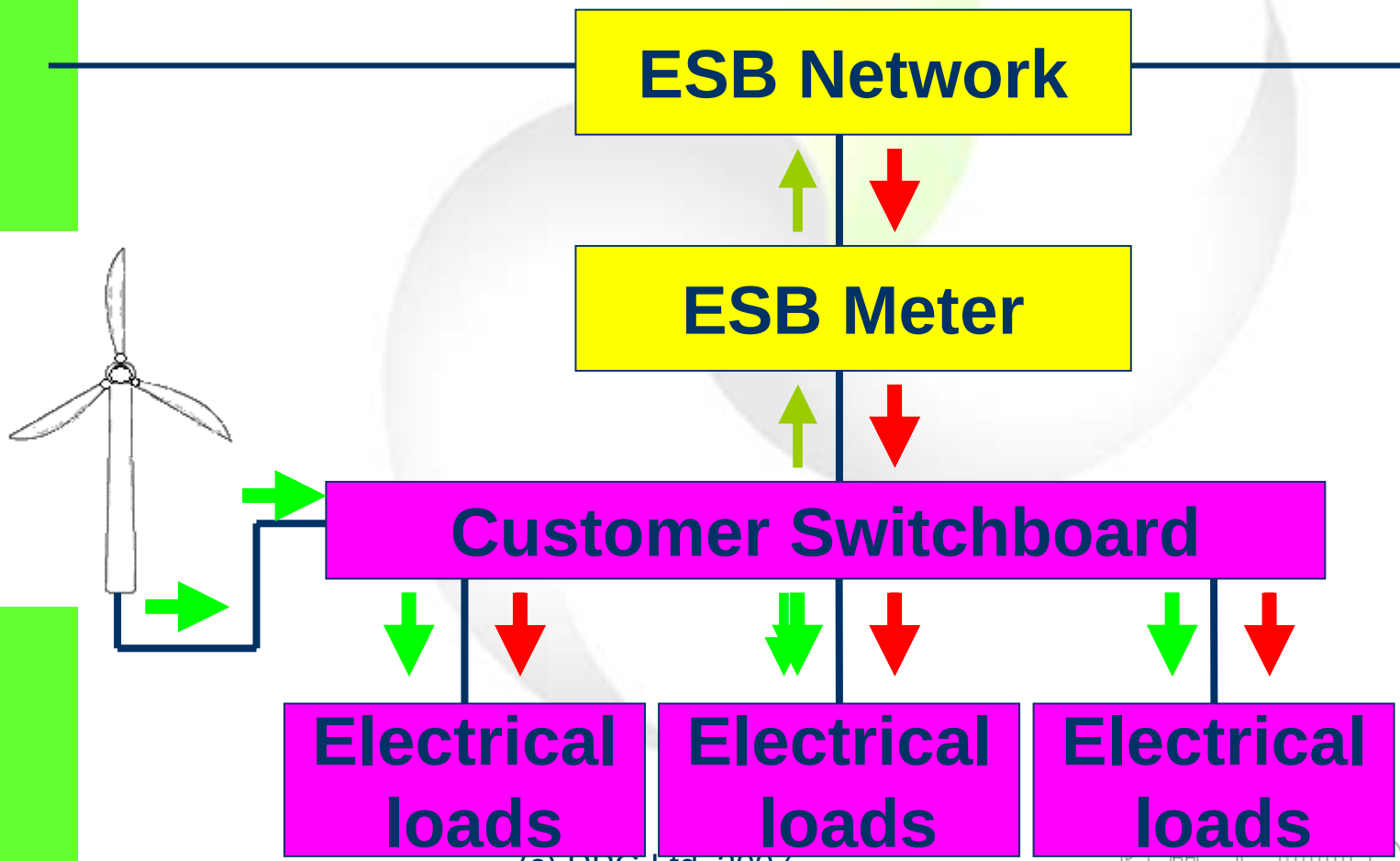
Wind Electricity Auto-production

- Auto-production of electricity is defined as generation of electricity essentially for own use.
- One or more large scale wind turbines are located on or near an industrial site and connected directly into the site electrical system, supplying electrical demand.
- Existing grid connection remains in place providing seamless back-up.

Conventional Wind Generation



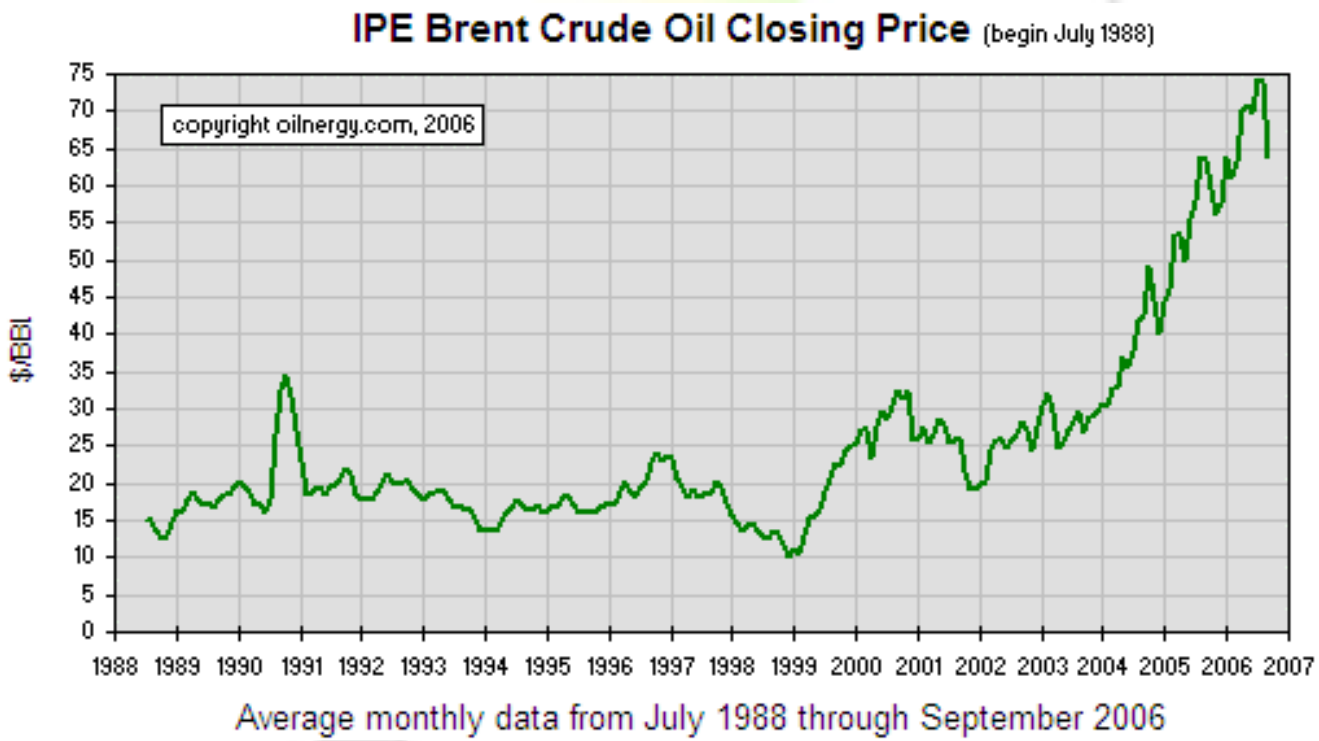
Wind Auto-production



Wind Auto production Benefits to Site-owners

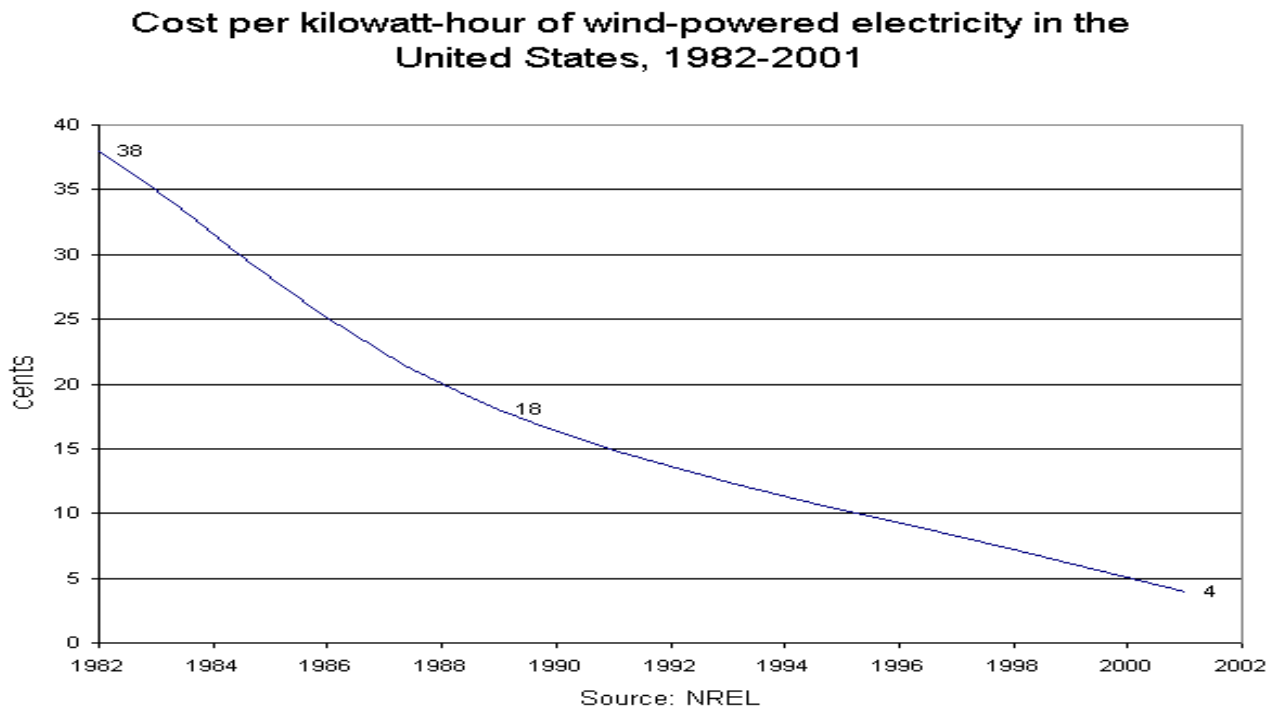
- Lower cost fixed price electricity
- Secure energy supply ensuring future competitiveness
- Future Carbon Emissions policy
- New income generation - unproductive land used to reduce overall costs
- Positive Public Relations

Non-fixed fuel cost pricing trends



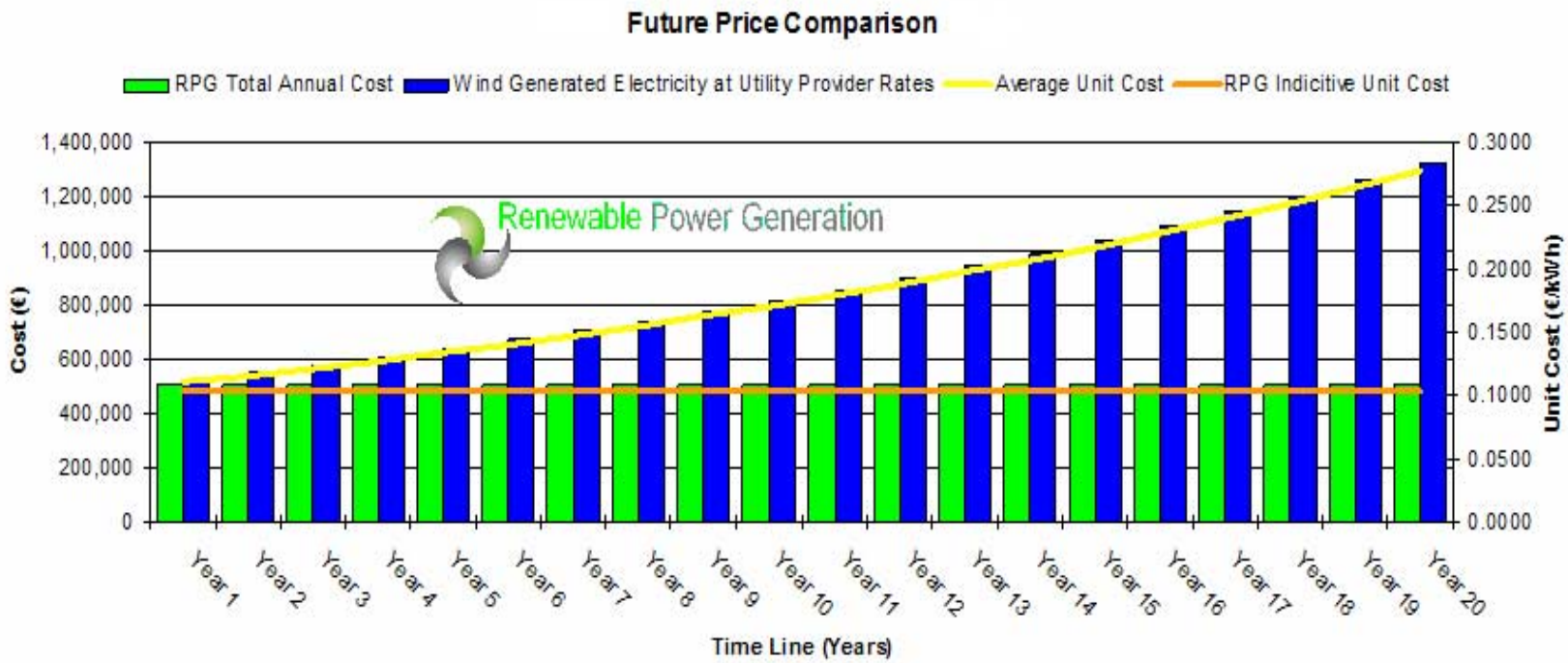
- Increase in cost of crude oil in previous 18 years

Fixed fuel cost pricing trends



- Reduction in cost of wind power generated electricity in 20 Years

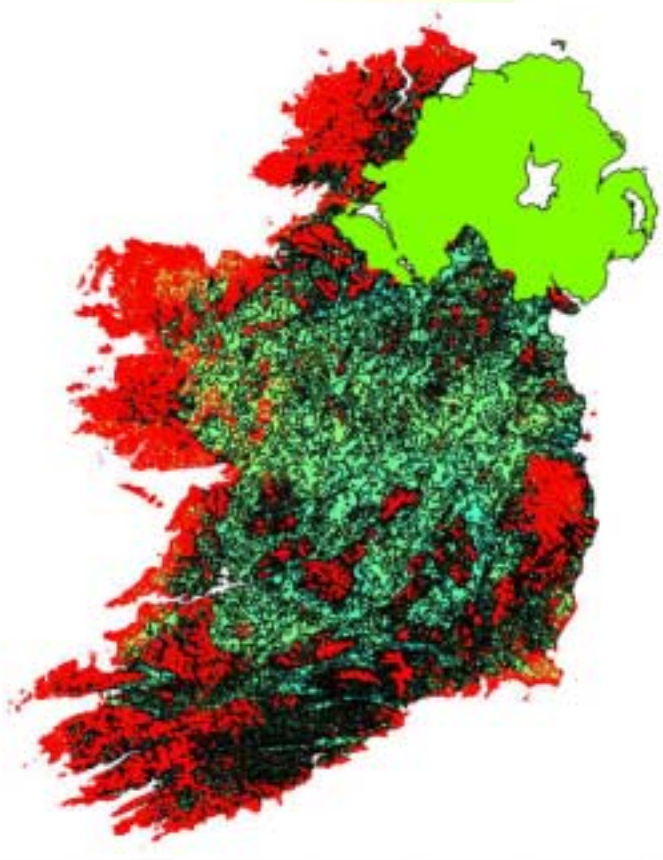
Electricity cost pricing trends



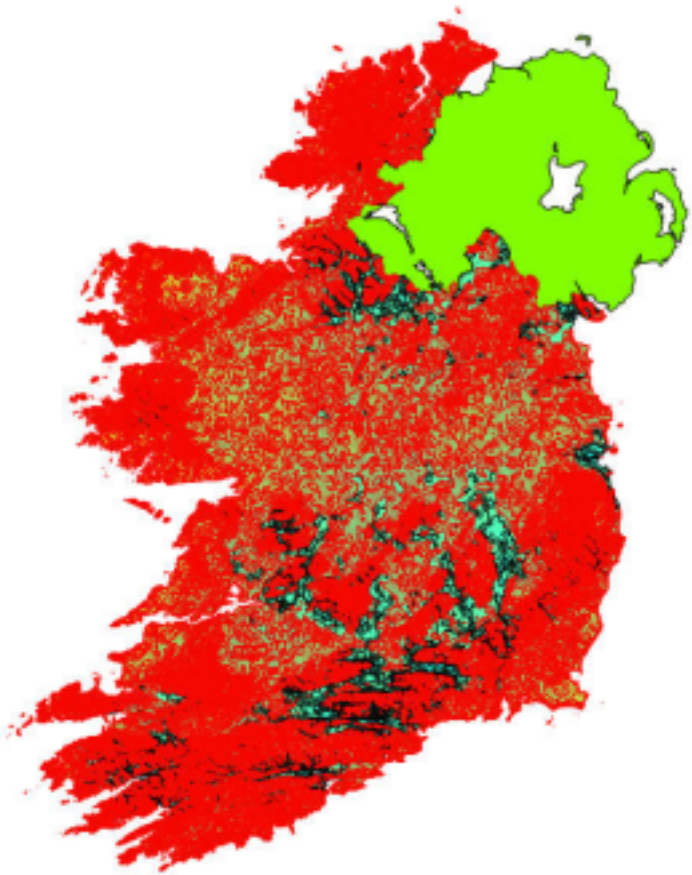
Wind Auto Production Project enablers

- Existing grid connections
- Good access
- Fewer environmental obstacles
- Internal electricity consumption prices
- Less windy sites can be viable

Windspeed 7.5m/sec or more



Windspeed 6.5m/sec or more



Wind Auto Production Development options

- Site Owner - developer and operator
- Site Owner partnership with developer
- Energy Supply Co. develops site.

Wind project development process

- Feasibility
- Planning permission activities
- Wind Measurement
- Project finance
- Source wind turbine generators
- Electrical and civil project detailed design
- Project management installation and commissioning

Cost to planning

~ €30-70,000 for feasibility and preparing planning permission

- Can increase significantly if:
  - A comprehensive Environmental Impact Statement is required-
  - Ecology issues - Bird studies, ecology studies etc
  - Technical issues - Aviation, communications studies etc
  - There is significant local opposition

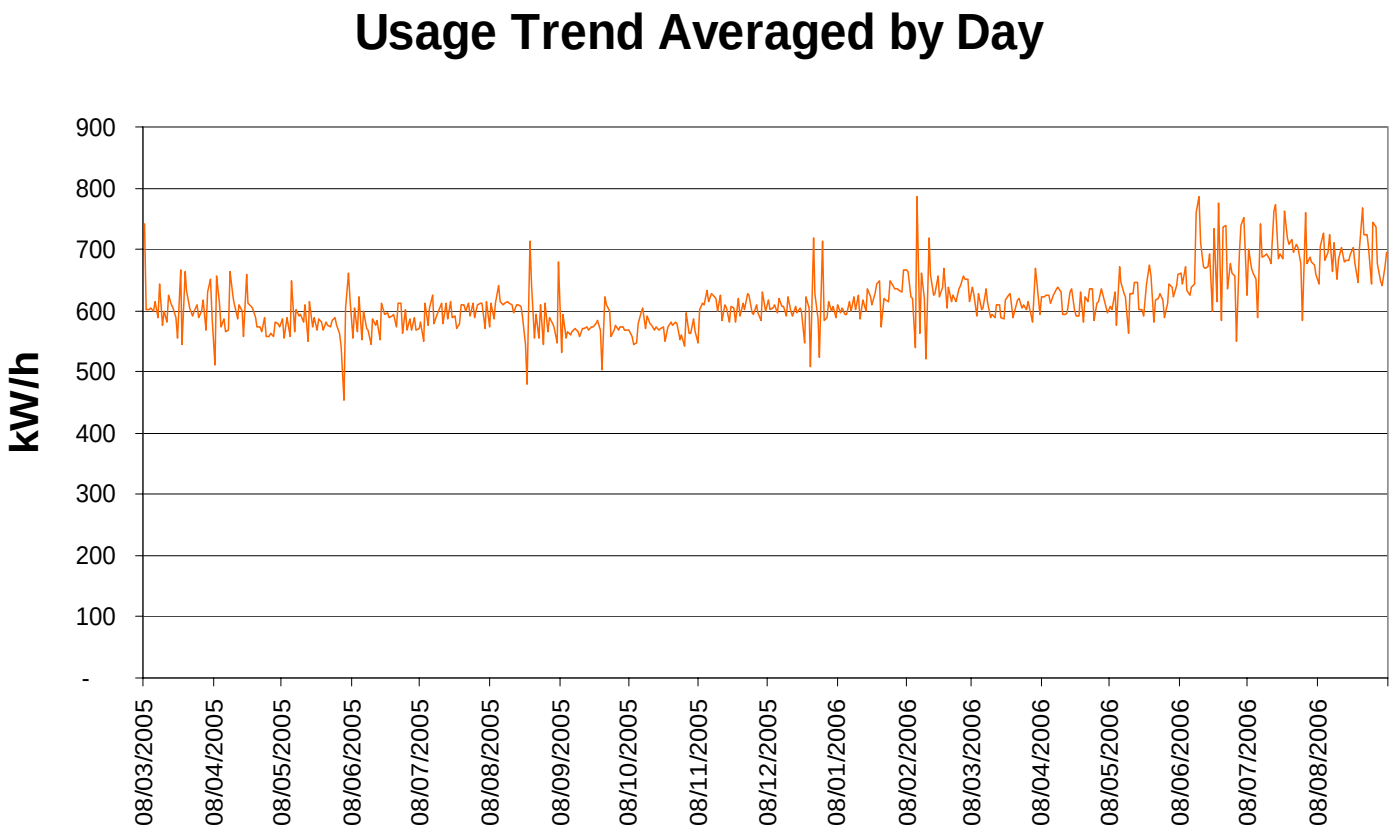
Project costs

- Approximately €1.3m per MW
- Projects range from 0.3MW upwards
- Typical breakdown for a >1MW project is
  - Feasibility 5%
  - Development 5%
  - Engineering 3%
  - Turbines 69%
  - Balance of Plant 13%
  - Miscellaneous 5%

Project returns

- These are dependent on a number of factors:
  - Cost of bought in electricity replaced
  - Wind-speed
  - Constraint level of generators
  - Size of wind turbine generators

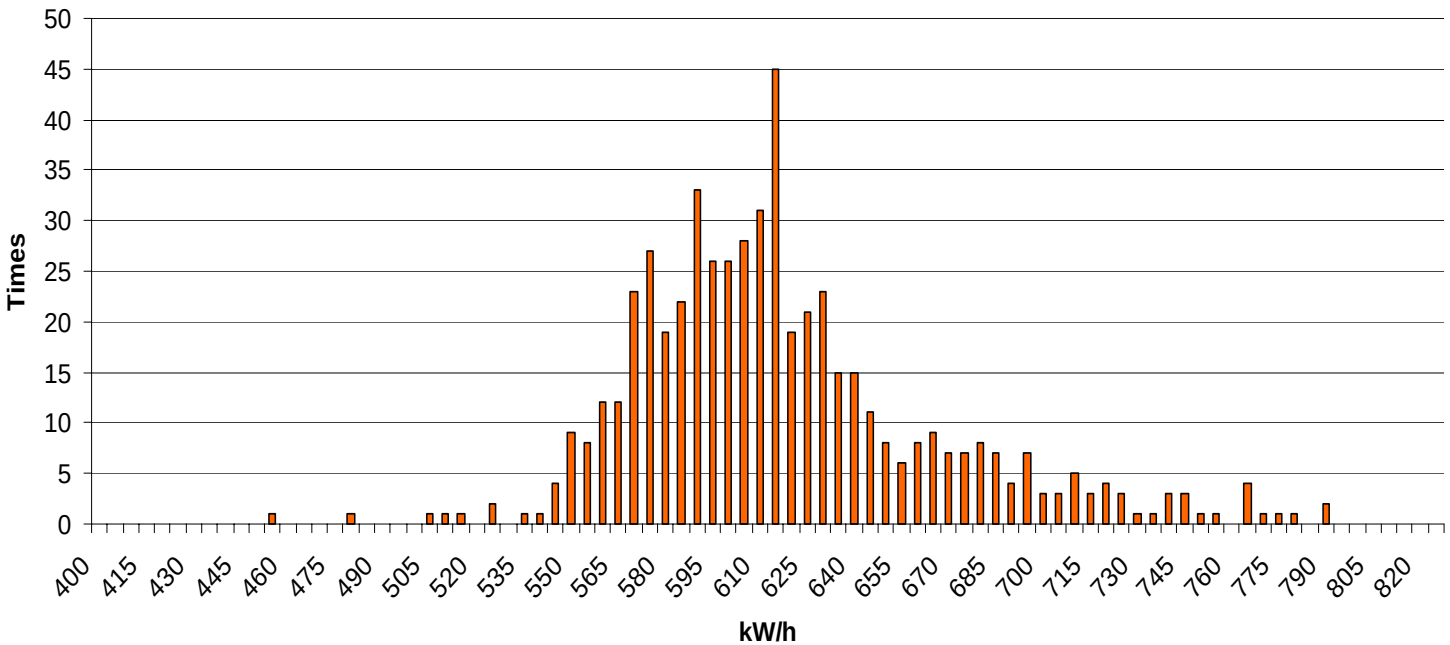
Sample Project - Electrical Demand Analysis



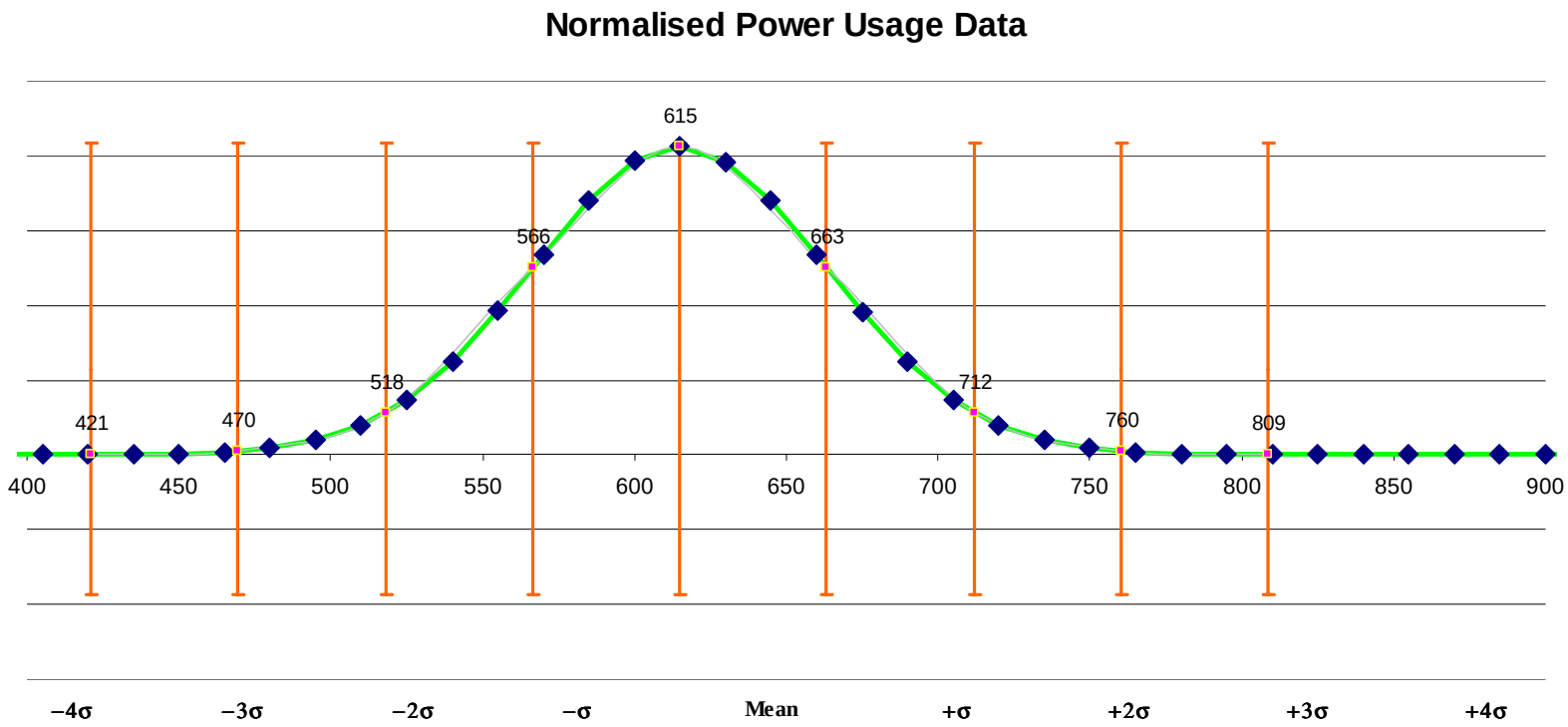
Sample Project - Electrical Demand Analysis

Frequency Distribution

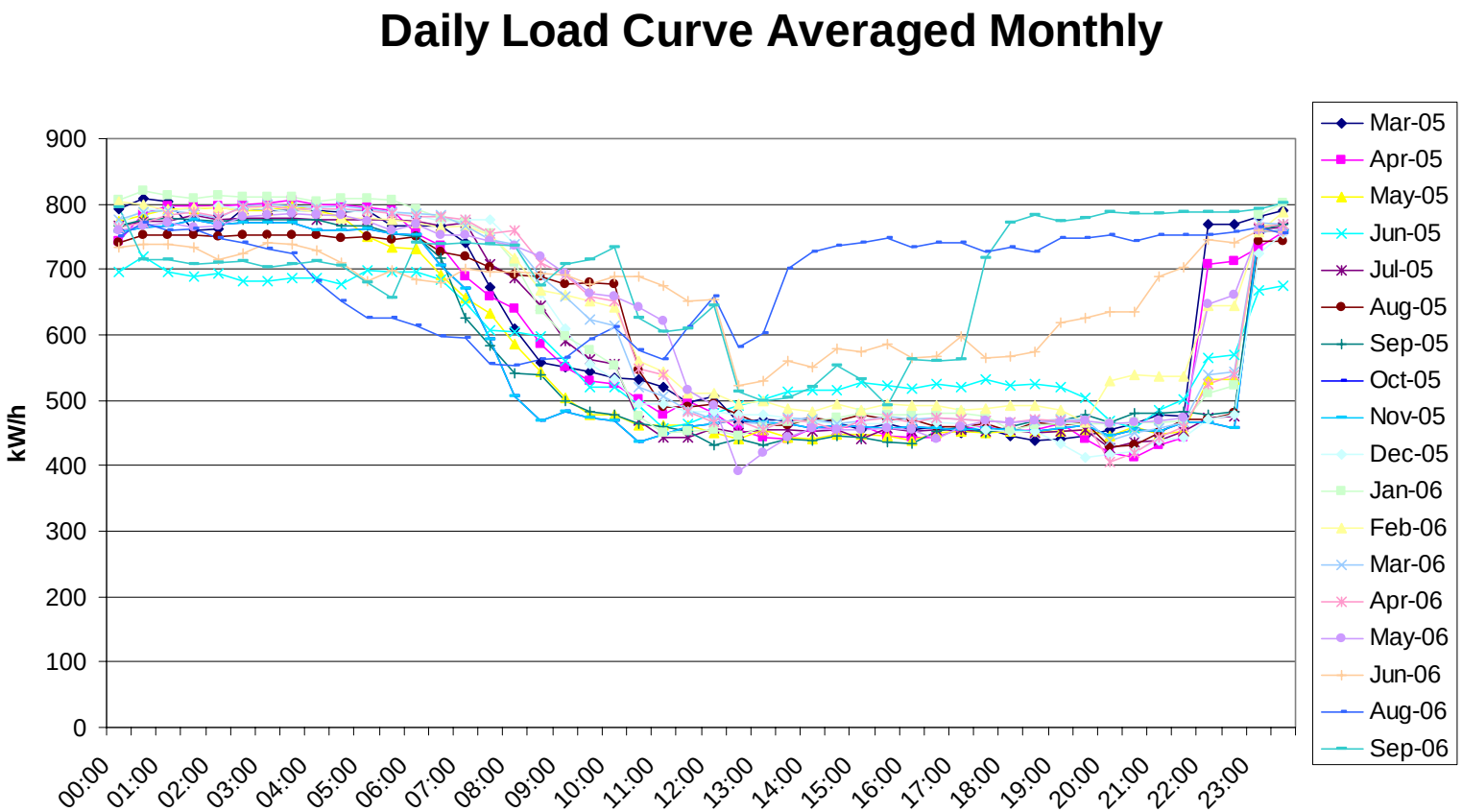
Based on Average Daily Usage and 5kW/h intervals



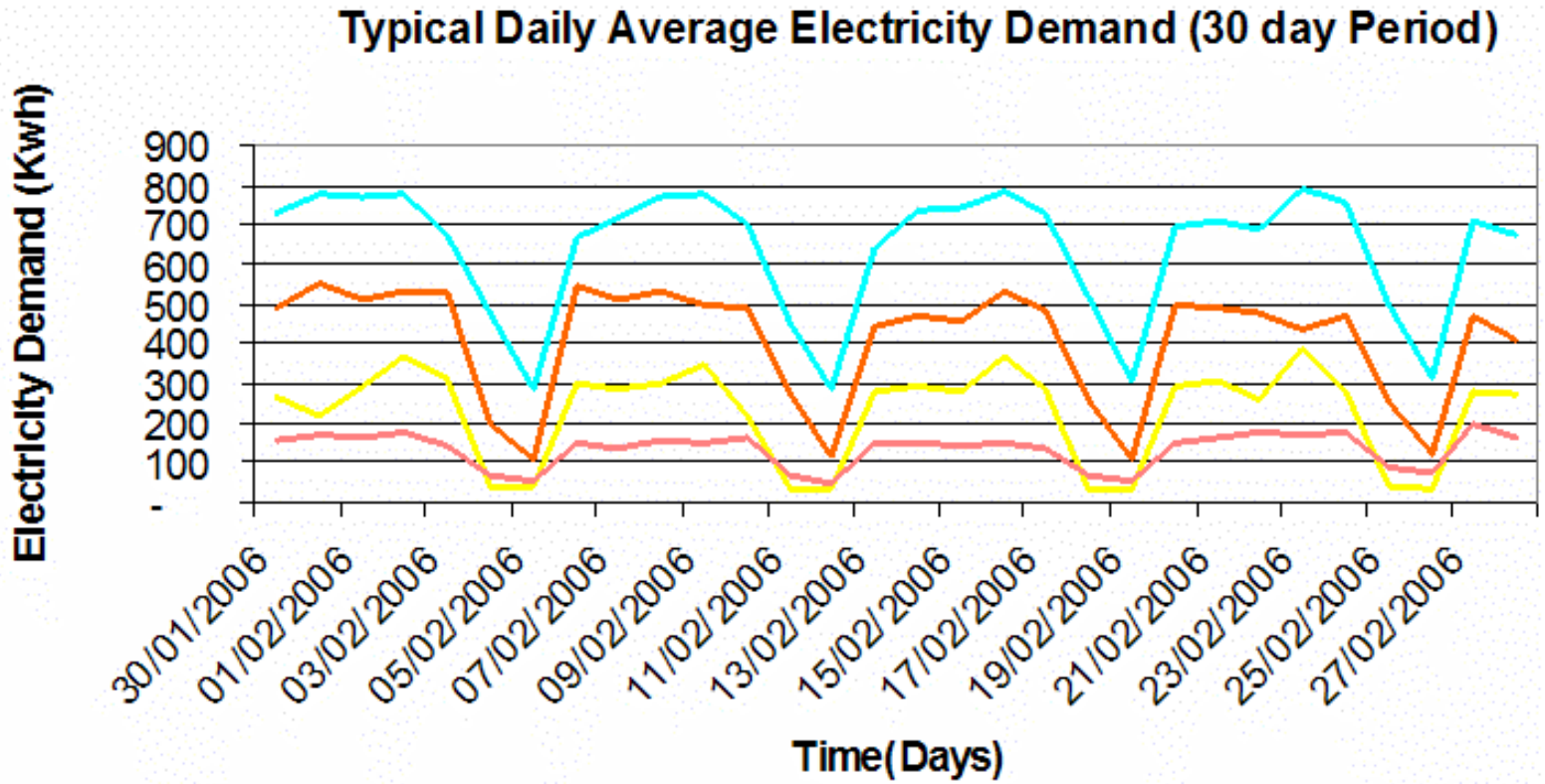
Sample Project - Electrical Demand Analysis



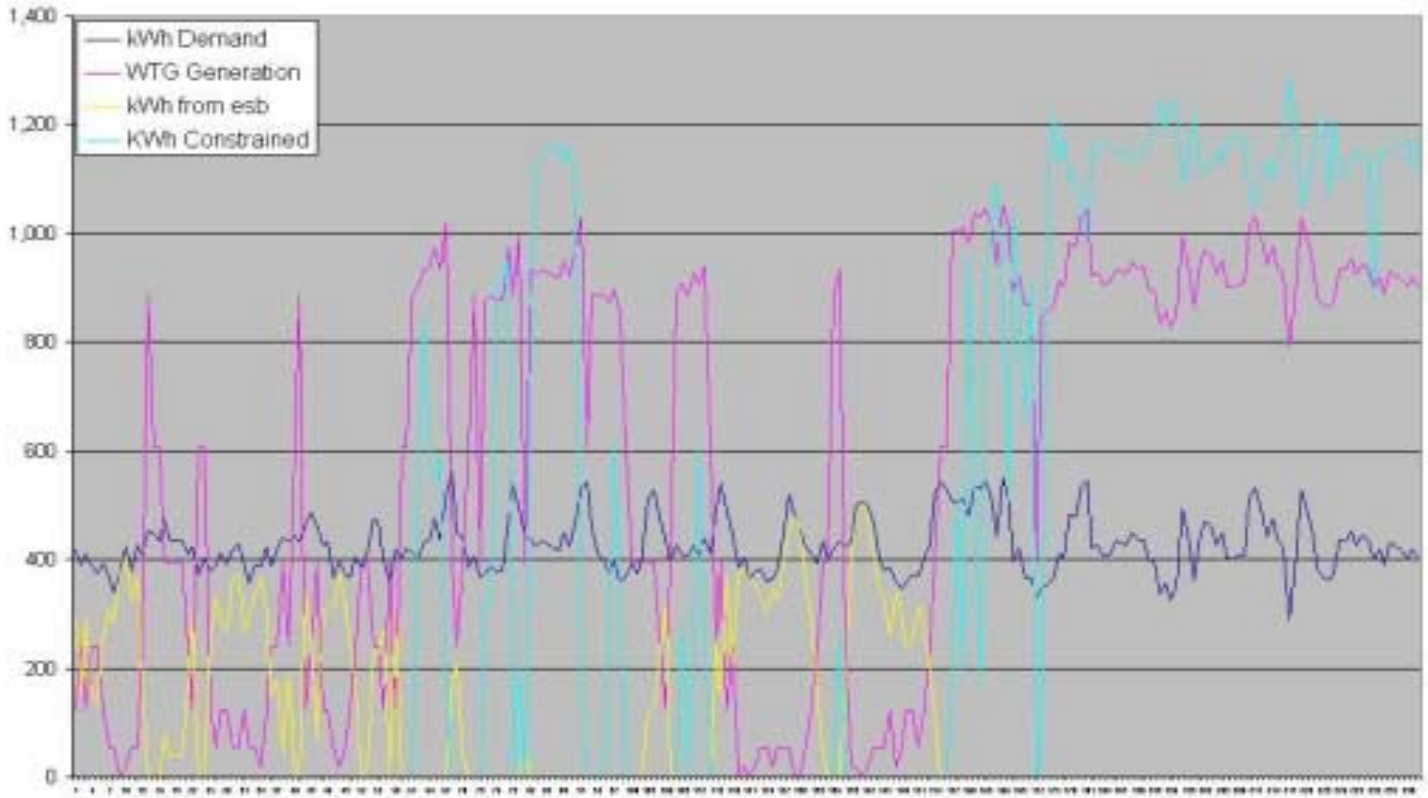
Sample Project - Electrical Demand Analysis



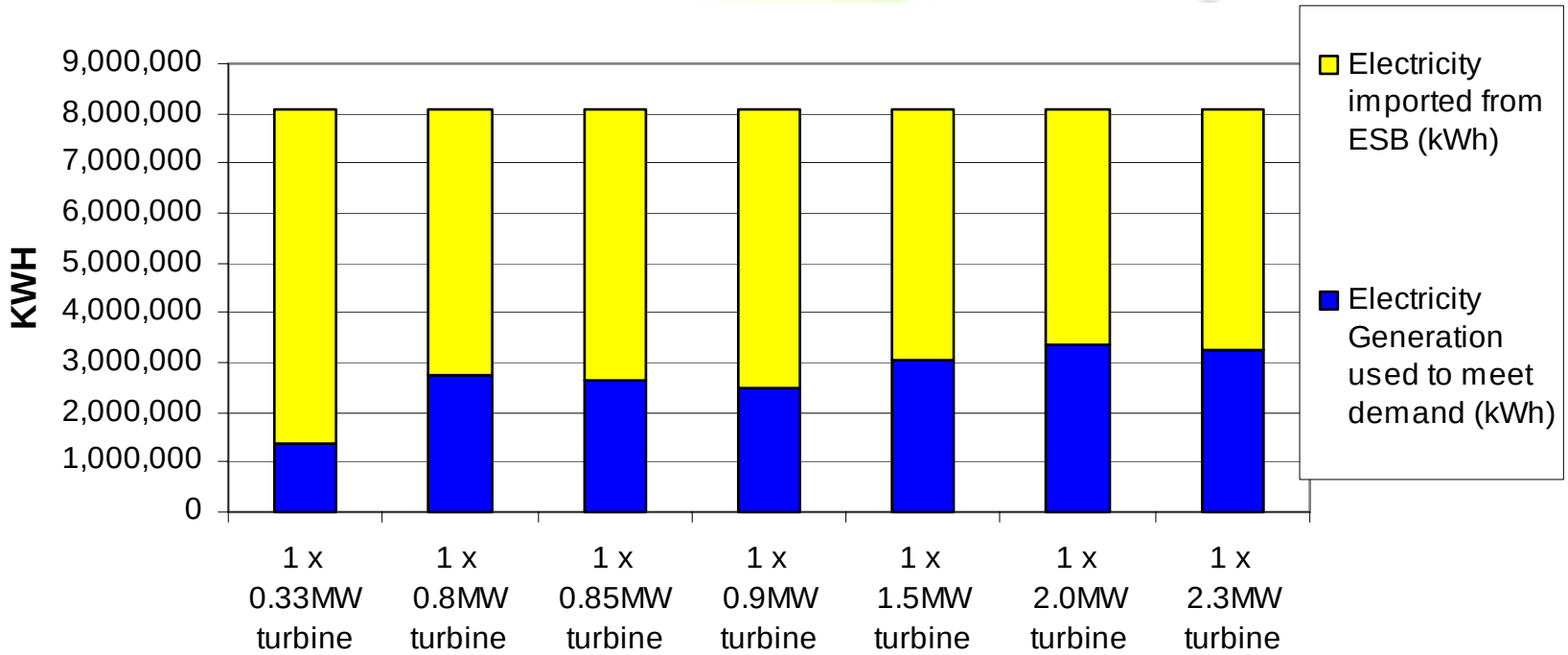
Sample Project - Electrical Demand Analysis



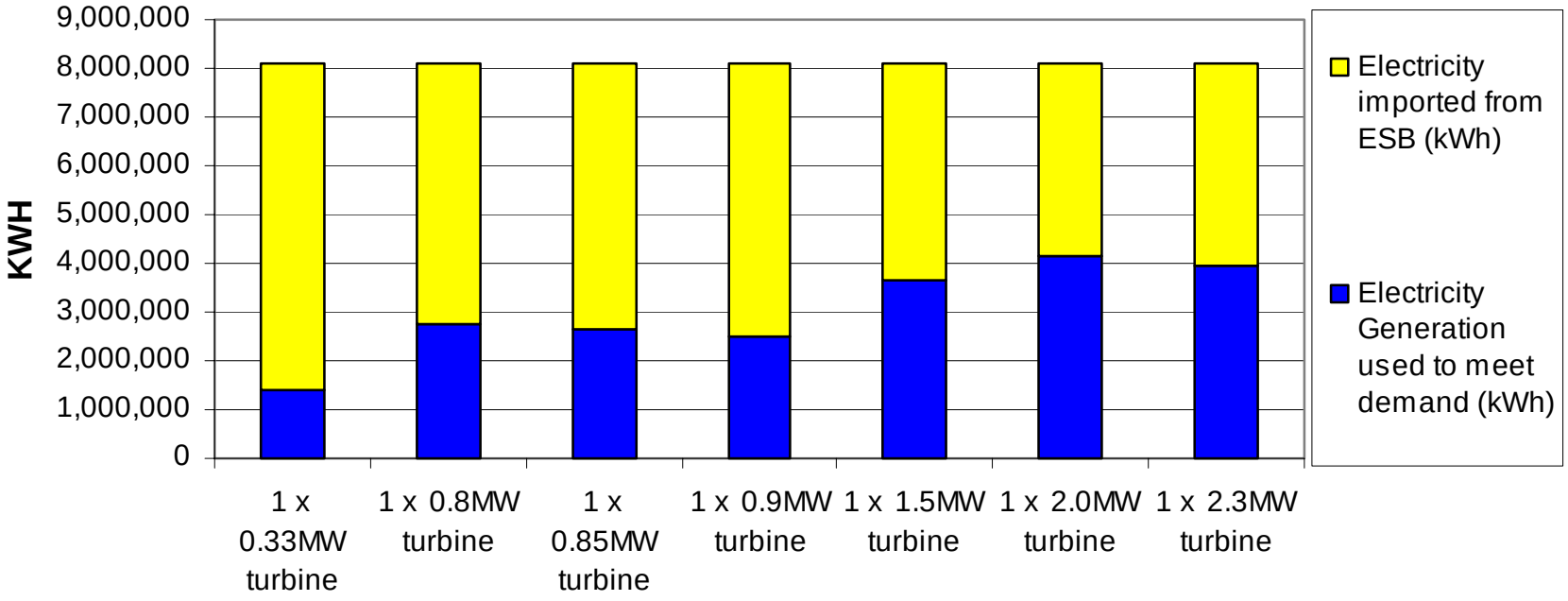
Sample Project –Turbine Selection - 1 x 2.30MW



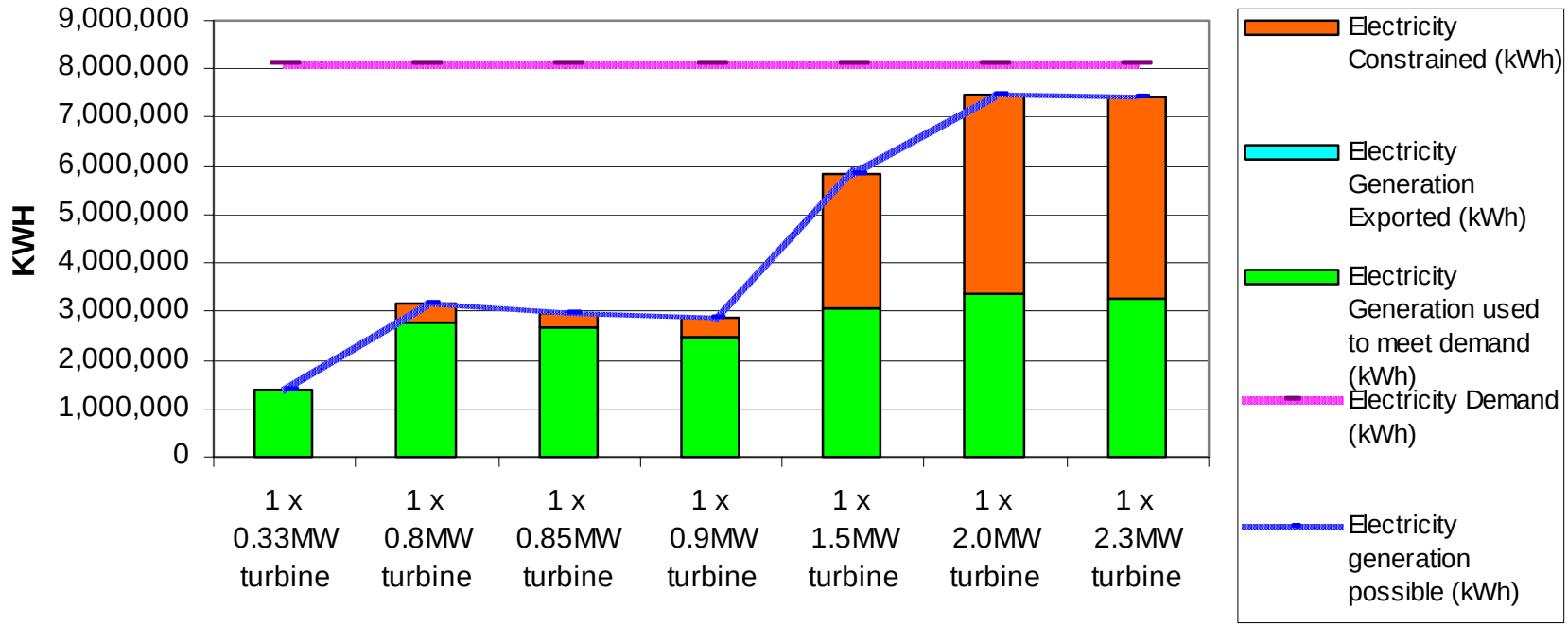
Sample Project – Economics - 0kw export



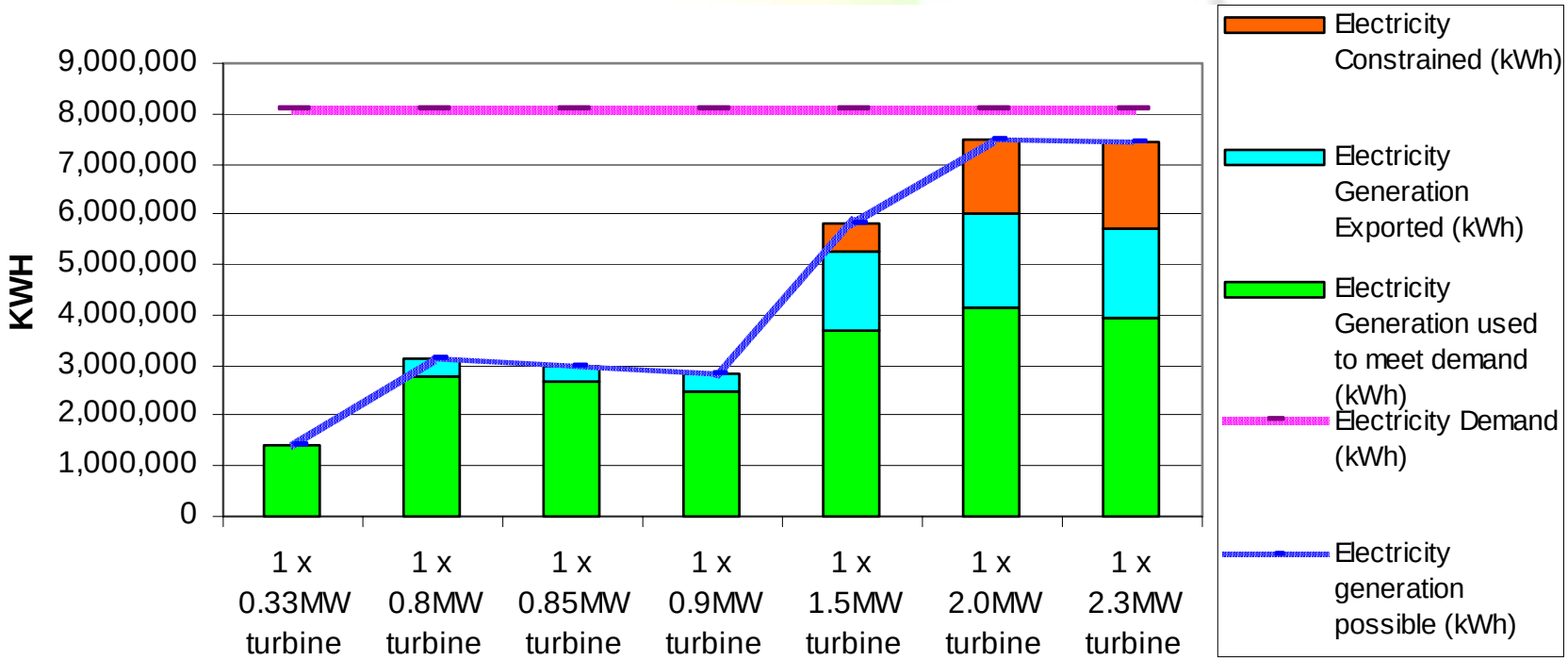
Sample Project – Economics - 500kw export



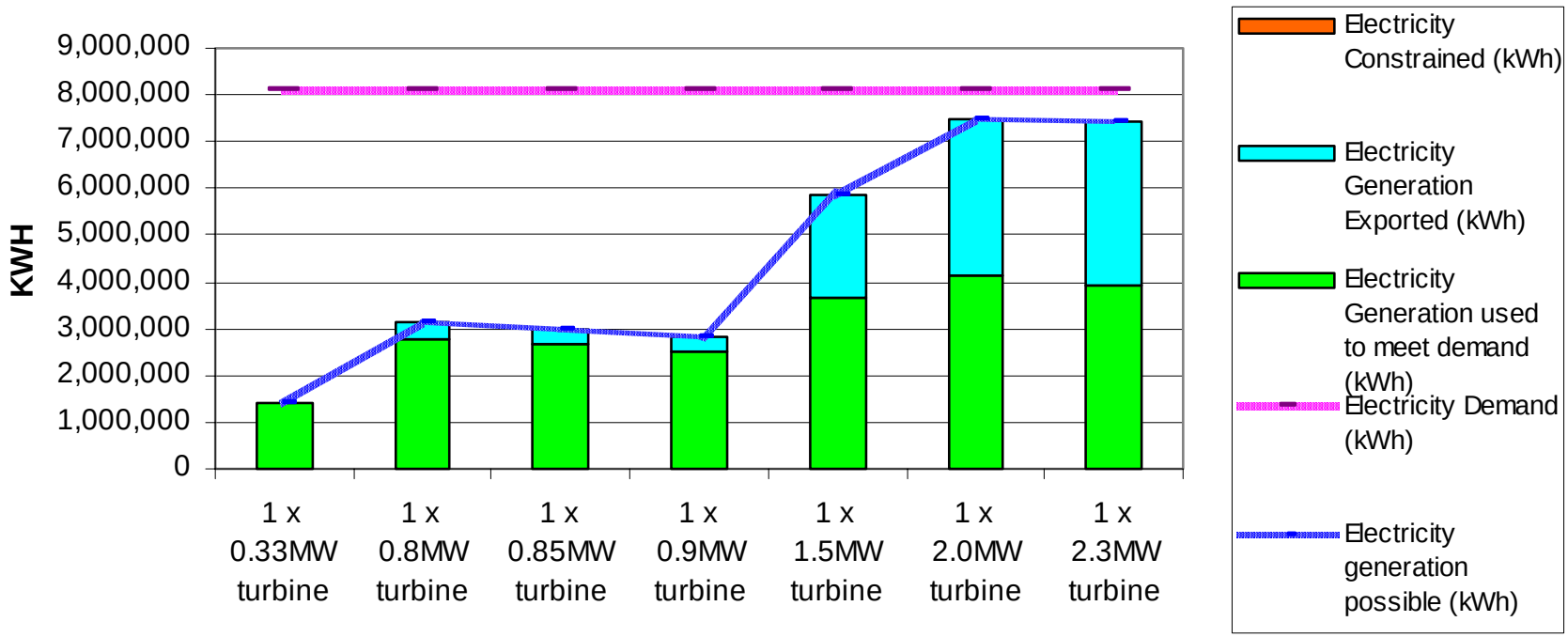
Sample Project – Economics - 0kw export



Sample Project – Economics - 500kw export



Sample Project – Economics - 3000kw export



Dundalk Institute of Technology

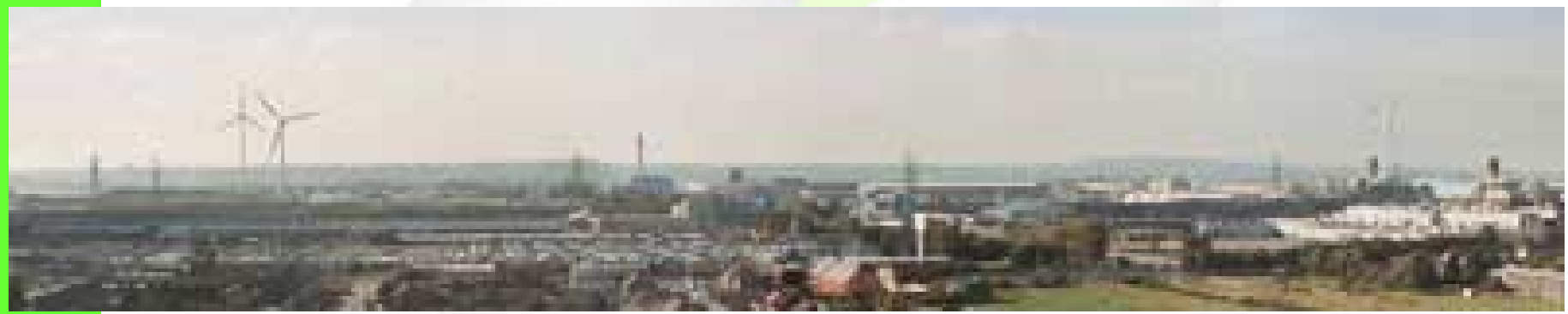
- One 850kW turbine feeds institute load and exports excess electricity generation.

Burtonport Fisheries Co-op

- One 660kW auto-producer turbine providing electricity for fish icing process at Burtonport Harbour.

Dagenham

- Two 1.8MW turbines installed at the Ford Motor company Dagenham England.



Nissan UK

- Sunderland 6 x 660kW second hand turbines installed

Wind Auto production summary

- Long term fixed price electricity
- Competitive pricing option to existing suppliers
- Unproductive land used to reduce overall costs
- Environmentally friendly power generation
- Various methods of developing projects
- A number of factors which determine site feasibility
- Suitable sites can deliver short payback periods and long term cost avoidance or revenue
- Considerable risk up to planning stage
- Use of a specialist will increase probability of successful project

Thank you for your attention

Dave McNamara

Managing Director
Renewable Power Generation Ltd.
Unit 21 Synergy Centre
Institute of Technology
Tallaght
Dublin 24
T: +353 (0)1 4361841 / +353 (0)1 6535095
M: +353 (0)86 8260516
F: +353 (0)1 4430669
E: dave.mcnamara@r-p-g.ie
W: www.r-p-g.ie
Fixed cost renewable energy to industry