



# Wind Autoproduction

## Large scale wind in Industry

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# Presentation Over view

- @ What is Wind autoproduction
- @ Benefits of Wind Autoproduction
- @ Autoproduction Project development
- @ Planning issues
- @ Grid access
- @ Enablement of Wind autoproduction
- @ Investment models
- @ About RPG



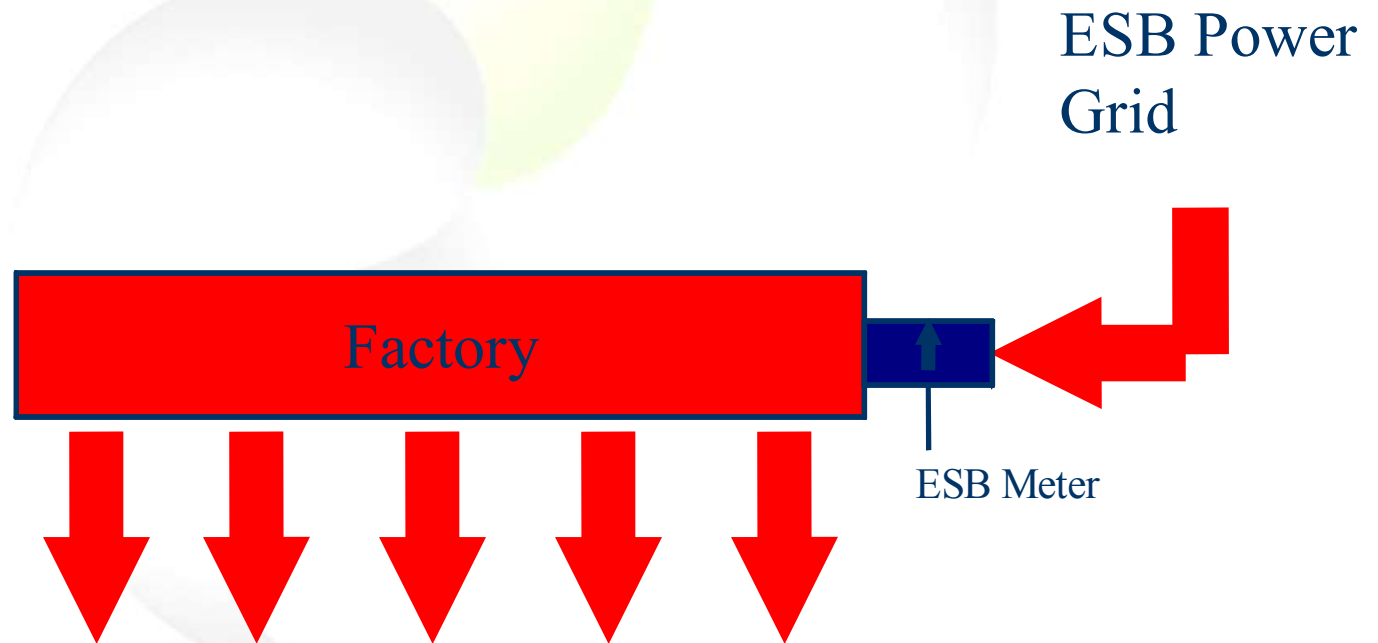
# Wind Auto-Production

## @ What is it?

- The generation of wind powered electricity on an industrial site for use on that site.
- Located on or near the industrial site at a mutually acceptable location
- Brownfield rather than Greenfield development. Connected directly into the site electrical system behind the meter.
- Grid connection remains as primary source of power.



# Wind Autoproduction - Turbine connection



# Wind Autoproduction - Turbine connection no output

Wind Turbine

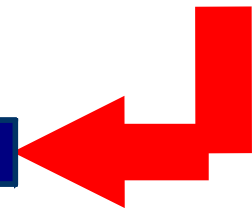


Factory



ESB Power Grid

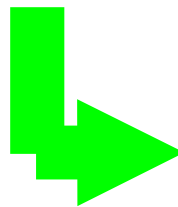
ESB Meter



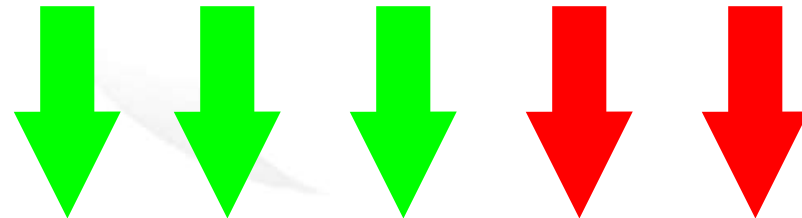
# Wind Autoproduction

## - Turbine output less than load

Wind Turbine

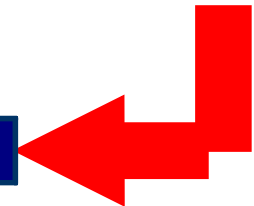


Factory



Power Usage

ESB Power Grid

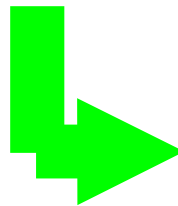


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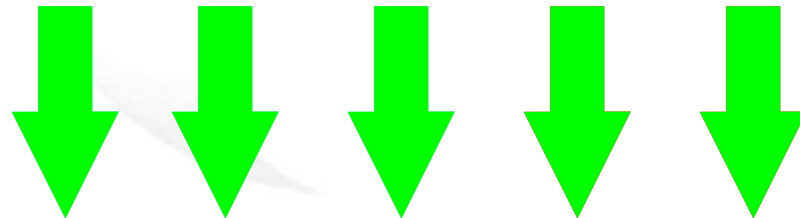


# Wind Autoproduction - Turbine output equals load

Wind Turbine

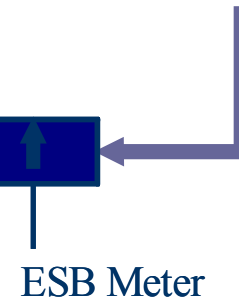


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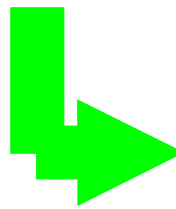
Power Usage

ESB Power  
Grid

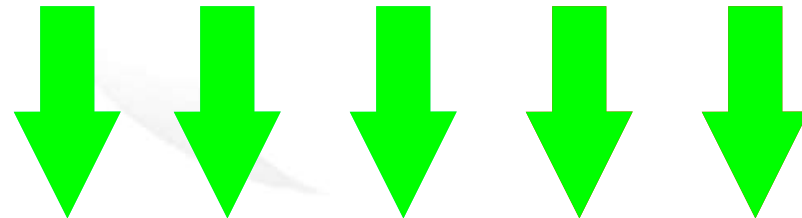


# Wind Autoproduction - Turbine output greater than load

Wind Turbine



Factory



Power Usage

ESB Power Grid



# Wind Autoproduction - Why? Benefits

- Competitive with traditional fossil fuel Generation
- Allows offset electricity at full retail price
- Zero fuel cost provides hedge against future rising energy costs
- Secure energy supply ensuring future industrial competitiveness and employment
- Zero carbon emissions – Better for the community, the environment and corporate responsibility
- Increased levels of wind energy with no new grid infrastructure



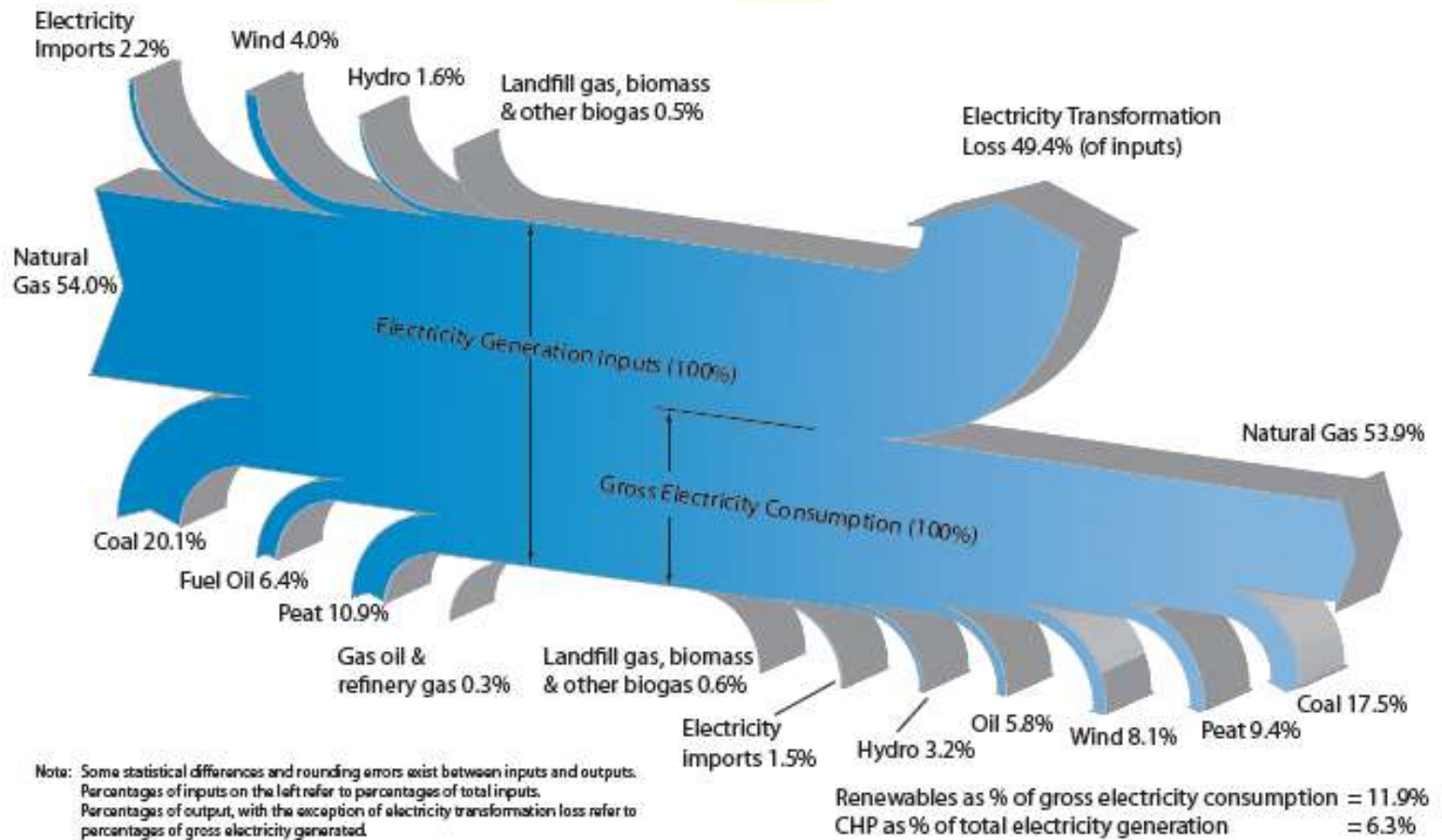
# Wind Autoproduction - Why? Benefits

- Utilising existing site grid infrastructure
- Unproductive land used to reduce overall costs
- Avoids network transformation losses
- Increased local and Irish employment
- Increased local authority rates



# Wind Autoproduction - Why?

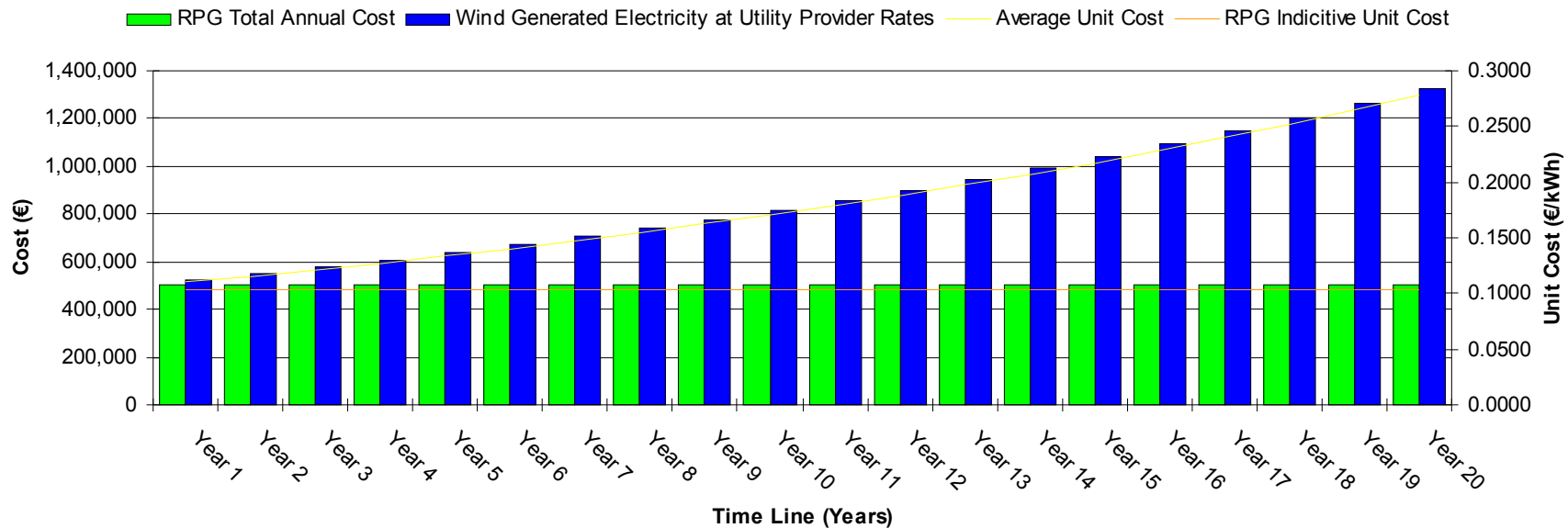
## Fuel and energy mix



# Wind Autoproduction - Why?

## Long term future cost trend

Future Price Comparison - Enercon E70



Ⓢ Predicted future electricity costs for an annual 3% rise in electricity costs.



# Wind Autoproduction - How?

## Development stages

Overall project development timelines of 2 to 4 years

- ① 1. Pre-feasibility study
- ② 2. Feasibility study
- ③ 3a. Planning activities
- ④ 3b. Wind resource assessment
- ⑤ 4. Post planning consent activities
- ⑥ 5. Construction activities
- ⑦ 6. Operation and maintenance



# Wind Autoproduction - How? Feasibility Study

- @ How suitable is the proposed site?
- @ Wind resource
- @ Planning
- @ Site Engineering Analysis
- @ Economic Analysis



# Wind Autoproduction - How? Feasibility Study

- Ⓜ Wind resource assessment
  - Measurement campaign
  - Roughness
  - Turbulence
  - Quality



# Wind Autoproduction - How? Feasibility Study

## @ Planning

- Landscape and visual impact
- Noise
- Shadow flicker
- Hydrology
- Air and climate
- Cultural heritage
- Ecology
- Existing land use
- Soils and geology
- Material assets
- Electro-magnetic effects
- Land designations
- Policy local and regional
- Transport



# Wind Autoproduction - How? Feasibility Study

- ④ Site Engineering
  - Electrical demand analysis
  - Generation-demand matching
  - Generation constraint analysis
  - Export capability
  - Turbine selection
  - Site suitability and scale
  - Physical constraint analysis
  - Receptor survey
  - Transportation issues
  - Turbine road and hard stand siting
  - Electrical design



# Wind Autoproduction - How? Feasibility Study

## @ Economic appraisal

- Capital costs
- Operation and maintenance costs
- Potential generation
- Production cost vs sales price per unit
- Project term
- Financing
- Gearing
- Simple payback
- Sensitivity analysis
- IRR
- Long term energy price
- REFIT



# Wind Autoproduction – Enablement Planning issues

- Ⓜ Planning guidelines designed for large scale Greenfield windfarms
- Ⓜ Brownfield sites have different attributes
  - Landscape and visual
  - Noise
  - Proximity to receptors
  - Lower wind speed sites – higher hub heights needed
  - Specific CDP targets for autoproduction



# Wind Autoproduction – Enablement Grid issues

- @ Designated as Low carbon technology
- @ Single premises - Electricity act 1999
- @ Third party lands access
- @ Interaction and non firm access at distribution level
- @ Generation portfolio mix complementary to wind
- @ Constraint and Curtailment



# Wind Autoproduction – Enablement Support issues

- @ REFIT for green electricity used on site
- @ Increased REFIT for wind autoproduction plus balancing payment
- @ Tradable guarantees of origin for green electricity
- @ Grants similar to those provided to CHP
- @ Develop a green public procurement policy



# Wind Autoproduction – Enablement Investment models

- Ⓜ Owner operator
  - Highest risk/reward model
  - Capital outlay from site owner
  - Integration and control linking to business goals
  - Not core business / Skillset / Time consuming



# Wind Autoproduction – Enablement Investment models

- ④ Energy Supply Company
  - ESCO develops, builds, owns and operates.
  - Minimal risk to site owner / reflected in reward
  - No capital outlay from site owner
  - Less control
  - Fixed electricity price over term or % below market rates
- ④ Joint Venture
  - Allows site owner to chose level of risk and reward

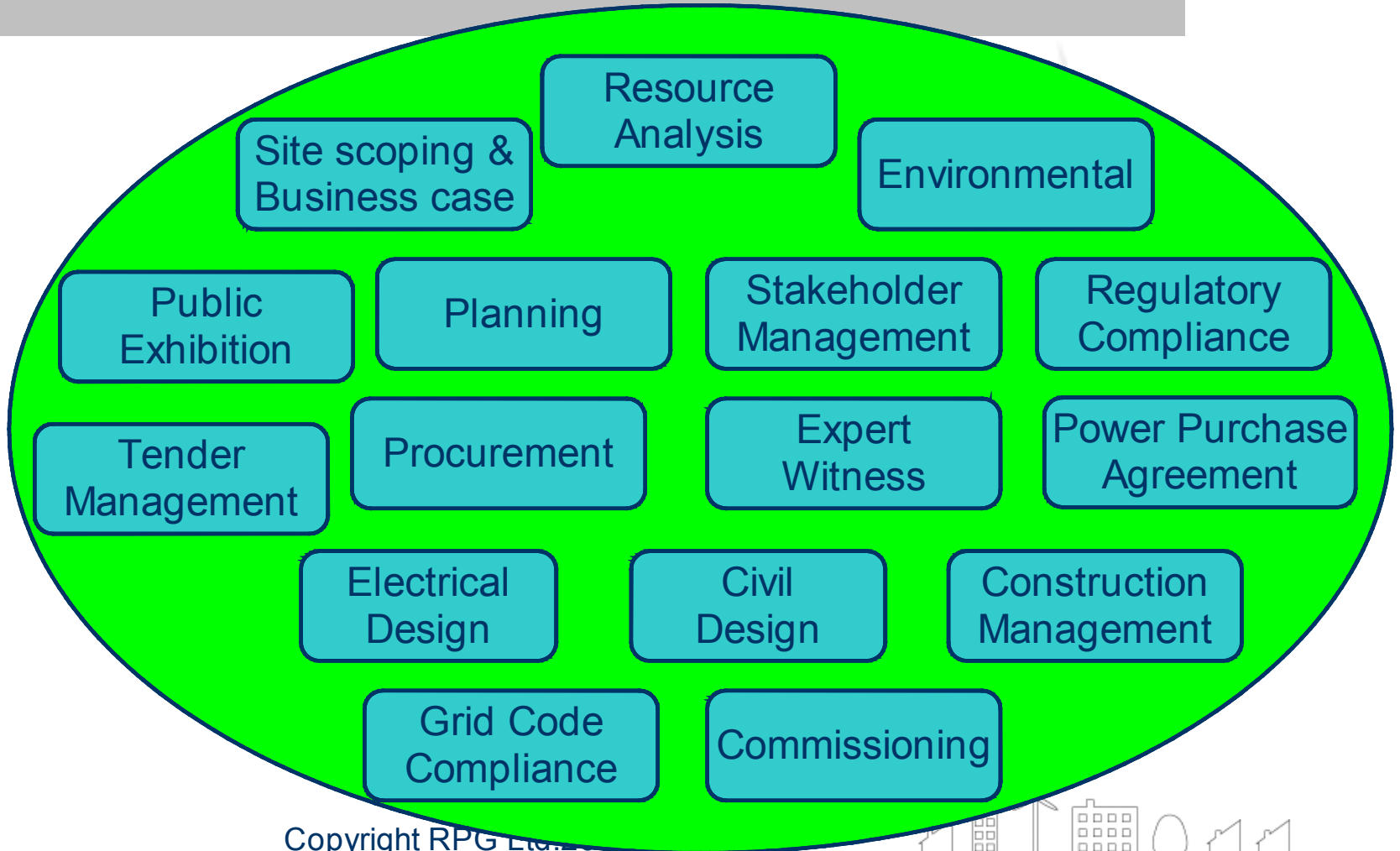


# Renewable Power Generation Ltd.

- ① Irish renewable energy company whose core business is wind electricity auto-production project development on industrial sites
- ① Engineering, project management, planning, financial and wind resource capabilities
- ① Full Develop Build Own Operate, turnkey development or consultancy services



# Renewable Power Generation Ltd.



# Wind Autoproduction

## Large scale wind in Industry

**Thank you for your attention**

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Fixed cost renewable energy to industry

