How Small Wind Turbines can make a Big contribution to the Renewable Obligation

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Reducing Carbon Footprint

- 17 tons CO2 per turbine per year!
- 10 truck loads in 20 years lifetime!
- Equivalent amount of carbon which a 4 person household generates (electricity, heating, transport, flights,,,, ALL carbon generated)!
- A small wind turbine saves within a year the same amount of carbon required to manufacture it

Security of supply



- Replace imports of scarce oil resources
  by
- Usage of abundant wind energy from the UK

- Distributed generation; electricity is generated where it is used
  - Less grid transmission problems
  - Great opportunities for developing nations

Market Potential

- AWEA 'The US Small Wind Turbine Industry ROADMAP', june 2002:
  - ‘INDUSTRY GOAL for the US; 3.8 million small wind systems of on avarage 10 kW installed by 2020’
- Report ‘Husstandsmøller’ Denmark:
  - ‘Estimated market of 3000 small wind turbines in DK’
- For the UK:
  - Estimated market potential 100,000 small wind turbines
  - On average 10 kW that would mean 1 GW of small wind turbines; RO is approx 10 GW of installed wind energy

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Status & Future

- Survey by AWEA, 2006:
  - Installed worldwide: 16,000 small turbines,
  - Representing 37,000 kW
- UK (rough data) 2006, per year:
  - Installed 1,000 small turbines and 3,000 kW
- With a joint effort to remove hurdles in UK; capacity after 2010 grows to:
  - Install 10,000 small turbines in UK per year;
  - Installed capacity per 2020: 1 GigaWatt

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Hurdles

- Technical; output & reliability
- Economical; price reduction by growing numbers
- Planning;
  change ‘no, unless....’ into ‘yes, unless....’

Technical

- Due to siting and product quality, output of small turbines is not always reliable.
- Wind speeds close to ‘where you live’ are moderate; large rotor, high tower & open perspective needed to capture sufficient energy.
- Certification & testing according to international standards required to give consumers confidence in 20 years lifespan of products
- ‘Design of Gaia-Wind’ incorporates most issues

Economical

- Comparing costs; £ per energy (kWh per year):
  - Large wind turbines:
    - £1500 / kW, 2000 – 3000 kWh/yr;
    - £0.75 - £0.50 per (kWh/yr)
  - Small turbines:
    - £2700 / kW, 1700 – 3700 full load hrs;
    - £1.59 - £0.73 per (kWh/yr)
  - Now: small turbines attractive in good sites
- Where regular energy prices will keep growing, prices of small turbines will come down!

Planning

- Planning in rural areas and for small turbines is easier. Locations to focus on:
  - Country (farms, country houses,,,,,)
  - Edges of town (industrial areas, sports fields,,,,,)
- Low noise and exceptional safety systems required for putting turbines in (or close to) public spaces.
- Support for planning applications; planners should be informed about and gain experience with small turbines

Concluding

- Joint effort required to remove hurdles for small turbines:
  - Technical
  - Economical
  - Planning
- Then:

  Installing small wind turbines can make a huge difference!
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