The technology defines the resource

The potential role of small scale renewable energy in meeting NZ's electricity needs

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Electricity Commission Workshop, "Transmission to Enable Renewables" Dec 17 '07

Disclaimer: This presentation was produced during the meeting itself and not discussed with other SEF management; many thanks to the Commission for allowing and facilitating this.

Distributed renewable energy, examples

- **Biomass CHP, typically $5/watt (Ankur gasifier at 10 kWe, 40 kW heat); using wood chip grown very few km from generator, provides security, can create carbon sequestration above and below ground. Good for remote areas where network costs can = 80% of full cost. Consider carbon-zero tourist lodges!**

- **Wind generation 100-500 kW claimed less cost/kWh than 2-3 MW turbine; Windflow (I disclose I am a shareholder) uses ½ as much concrete and steel per MW as 3 MW turbine, 80 tonne crane instead of say 400, can use farm roads, grid-friendly**

- **Firewood in homes: technology defines the resource! V.v. low particulates, can scrub flue gases, can store energy for dry years thru firelogs (1 yr supply in 2m x 1.5 m x 20 cm on garage wall), wood chip a low-cost alternative to pellets. Security of supply in blackouts, replacement of wood burners by heat pumps is driving new transmission and generation investment**

How does this relate to transmission (TX)?

- **This workshop responds to generators' concern that they need more TX to support remote generation. This is a competitor to distributed generation (DG) and distributed storage.**
- **The workshop also responds also to government's intention to have 90% renewable electricity by 2025.**
- **Transmission pricing is central to whether TX is needed to "enable" new renewables: note another presentation today said that ½ the cost of new TX may be land acquisition and easements! This makes remote renewables very expensive.**
- **TX Cost benefit analysis (CBA) costs exclude peak oil and emissions pricing costs**
- **Approval of new TX means consumers will pay for interconnection costs - typically 4 times the connection costs**
- **This is not user pays, does not meet EC's preference as stated in Transmission Pricing Methodology consultation**

Benefits of embedded renewable DG

- **Security of supply, whether remote rural or even urban (home wood burning)**
- **Diversity reduces cost of accommodating concentrated intermittent generators**
- **Reduced RMA problems; public don't like Think Big wind farms! While community owned wind generation may reduce landscape complaints, and give financial return to more landowners**
- **Public enthusiasm for renewable energy; many prepared to make effort to reduce carbon costs, as national identity!**
- **Small scale woody biomass for local use sequesters carbon above and below ground (note this is not an Electricity Commission (EC) concern)**

If DG is so good why don't we have much of it? Specific Barriers!

- **Major barrier is TX pricing, with large scale competitors not facing most of the network costs of their generation**
- **Embedded generators don't pay TX charges, but face major transactions costs negotiating network connections**
- **Distributed generators cannot afford to become Market Participants – onerous prudential and information requirements**
- **Embedded generators must sell output to Market Participants, who have little incentive to offer good terms**
- **DG gets charged for many "ancillary" costs but not rewarded for ancillary benefits e.g. synchronous generators in Windflow – or carbon sequestration and similar benefits (not of course a EC responsibility)**

General barriers to DG

- **Planning! Small scale resources usually not "counted" e.g. in the SOO. Viewed as myriad tiny resources that don't add up to much**

- **Example: domestic wood burning, shown in Energy Data files as 2.6 PJ/yr from 1996-2004, HEEP showed it was 8 PJ/yr.**
  - **Domestic wood burning doesn't "count" in FRST-funded EnergyScape project, which only counts wood residues for industrial use**
  - **Yet in CH, half firewood resource is "gathered" (EECA)**

- **Economic wind resource may be much larger if roading needs reduced through use of 100-500 kW turbines. Resource map must be meaningful for those entrepreneurs**

- **Geothermal energy could be much larger if low grade heat from generator used to dry sawdust for pellets or firelogs (which near-doubles their energy content)**

- **Transaction costs! Each DG project requires the business to negotiate connection with (feisty) lines co, energy price with (competing) generator-retailer, resource consent, etc. Not bankable until bank accepts all those risks – entrepreneur must put many ducks in a row for small energy yield.**

What should the E Commission do?

- **Recognise DG and distributed energy storage as a significant resource that has significant benefits to NZ electricity system**

- **Recognise playing field is not level:**
  - **TX interconnection charges are paid for by consumers,**
  - **building TX ahead of generation increases certainty for competing remote generators**
- **Ensure SOO gives generous space for DG, distributed storage**

- **Ensure Electricity Market Review addresses these and other biases in favour of Electricity Market Participants, compared to small generators and demand side participation**

- **Accept more representatives of non-Market Participants in EC advisory structures (including consumers who can offer DG and energy storage)**

- **Encourage Government to recognise difficulties to small players: fragmentation; DG practitioners cannot monitor EC, Commerce Commission, MED (DG connection regs), etc etc**

- **Gov't must consider one-stop shop for DG entrepreneurs**