



Wind Power and the Market

REWP, Paris

24 March 2015

C0 Members



C1, C2 and C3 Members



Associations



Outline:

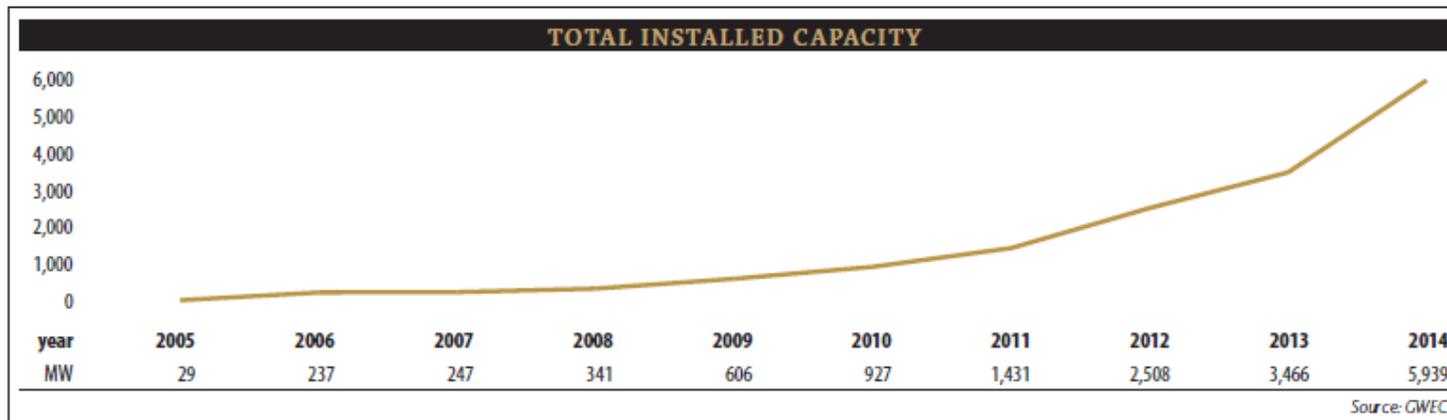
1. Introduction
2. Brazil
3. Mexico
4. South Africa
5. Turkey
6. US
7. Future Market Design

How much does wind power cost?

- Very site specific:
 - Wind resource - location
 - Competition among suppliers – machines available
 - Cost/availability of Finance
 - Regulatory Regime
 - Planning process
 - Flexibility/size of grid
- Range of what utilities/offtakers pay at present:
 - <\$0.02/kwh (Great Plains, US) - \$0.24/kwh (Japan)
 - IRENA 2014 costing study has ‘average’ at \$0.06-0.07/kwh
(presumably will have gone down in the last 2 months due to rise in value of the dollar)

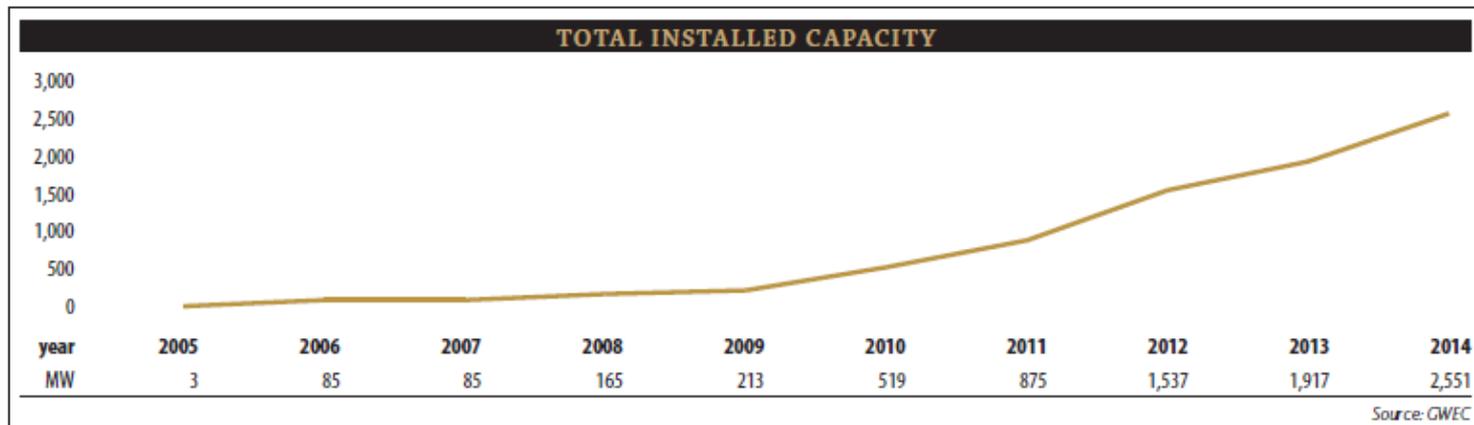
BRAZIL

- Cheapest source of new generation capacity – avg price last auction <\$0.05/kwh on 20 yr ppa ; roughly 1/3 cheaper than thermal;
- Support available through less-than-market price finance (BNDES), but same available to all others as well – but at a ‘price’ due to FINAME rules;
- First few self-supply contracts – Honda factory
- ‘Free market’ not very well developed



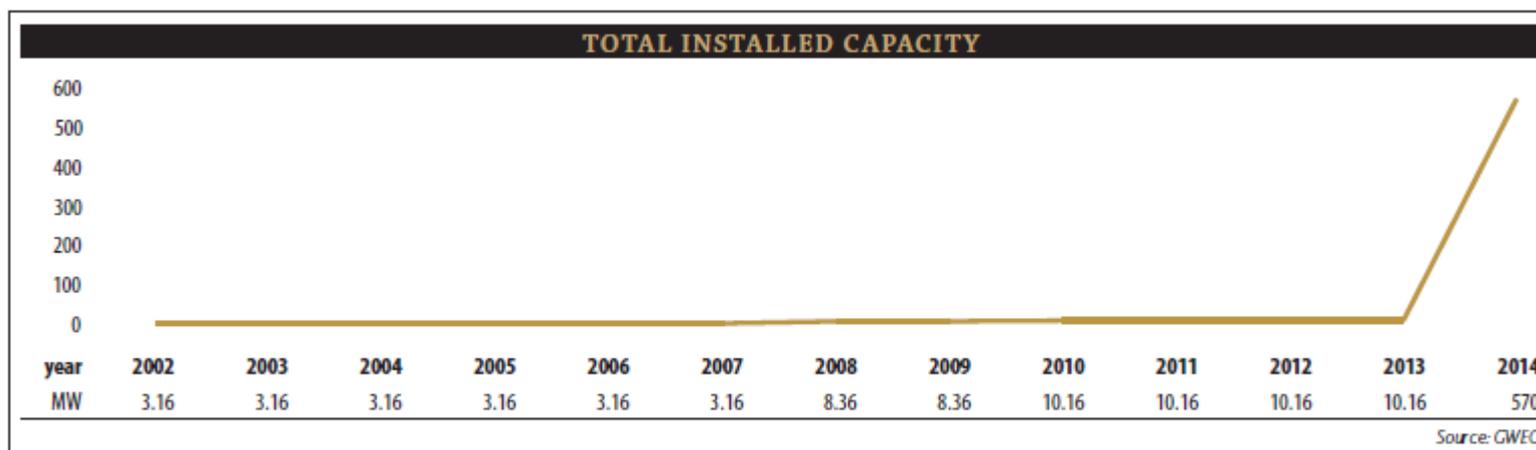
MEXICO

- To date, all wind through self-supply contracts;
- Heavily regulated vertically-integrated system – impossible to determine ‘price’ for anything;
- Energy Reform moving towards more liberalised system;
- Aggressive targets of 9500 MW by 2018, and 12,000+ by 2020;
- Auctioning will begin late 2015/early 2016 (maybe) – we’ll have first real indications of ‘real’ prices at that time.



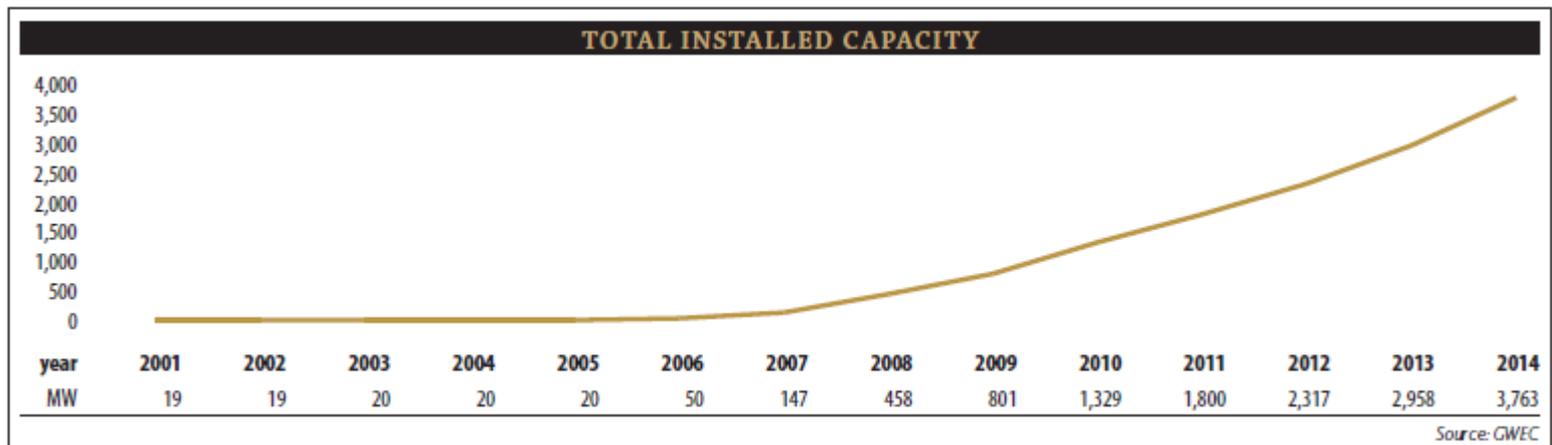
SOUTH AFRICA

- Just getting underway, but cheapest on the market. Now going for about <\$ 0.055/kwh. New coal is ~ \$ 0.09/kwh;
- 20 year ppa – with strong local content requirements, price may go up as these kick in more, current pipeline of about 4 (8) GW;
- Selling price of electricity is generally below generation cost
- Main utility (ESKOM) in dire financial straits.



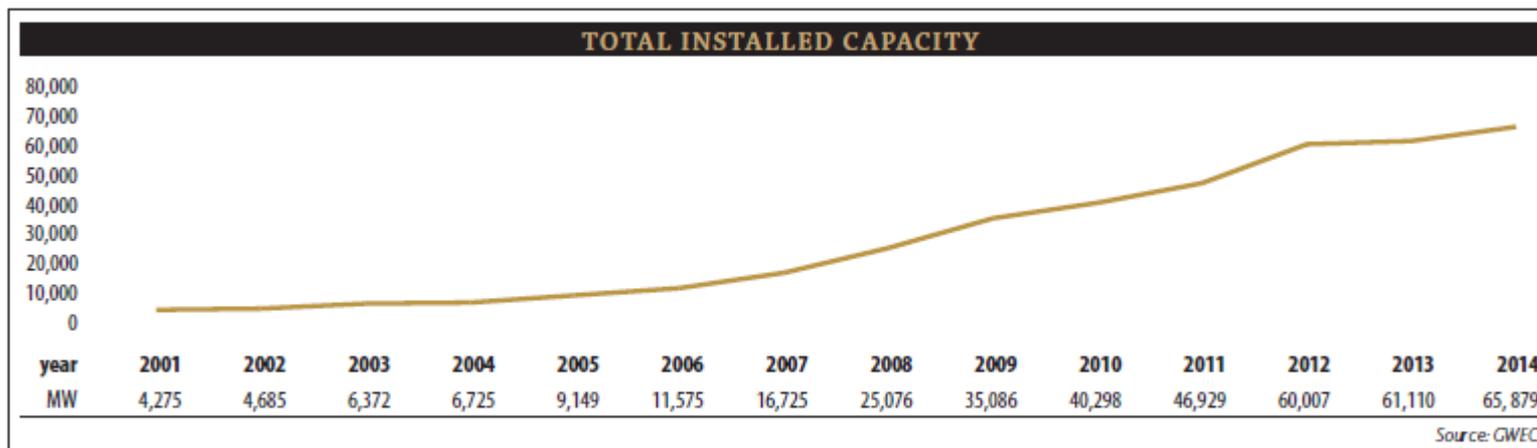
TURKEY

- Most wind to date has been sold on the spot market; FIT (2005) deemed too low (\$ 0.073/kw);
- However, this is changing due to the availability of 'local content' which can rise the price up to \$ 0.037/kwh (i.e., max \$ 0.10/kwh);
- High wholesale prices and liquid market (and increasing demand) have made this a good market for wind (along with the good wind resources, of course).



UNITED STATES

- Average PPA prices in 2013 across the country were \$0.025/kwh, exclusive of PTC, ITC, etc., so 'costs' were \$0.04 - \$0.048;
- At the lower end of the national average wholesale price; competitive with new-build gas;
- Lowest PPAs were \$ 0.016/kwh;
- Increasing # of direct supply contracts, but still small %'
- Wide regional variability;



Missing from all of these

- Cost of CO2
- Cost of water
- Costs of integration
- Costs of (lack of) SOX,NOX etc.
- Effect on balance of payments/foreign exchange
- Effect on employment and local economic development
- Effect of price stability
- Costs of fossil fuel subsidies
- Costs of nuclear insurance and decommissioning costs

New Market Design: what we need

- A price on carbon - and some of the other externalities which the competition currently gets for free would be good;
- PPAs, preferably 20 yrs, to get affordable finance;
- A way to reward flexible generation: to make the system work, to avoid curtailment caused by inflexible generation, etc.;
- Ways to sell electricity for transport and heat as well as power.



Thank you!

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