

# *Barriers and incentives to wind energy development*

Dr. Manuel Fuentes

*"Seguridad Energética en América Latina:*

*Energía Renovable como Alternativa Viable"*



- Despite abundant wind resources may be found throughout Latin America and the Caribbean, wind energy has not become a significant source of electricity and the region lags well behind other regions in the world.
- After decades of massive financial, political and structural support to conventional technologies, wind power remains at a competitive disadvantage.

# *Barriers to wind development*

# *Institutional Barriers*

- **Unfair competition.** Compared with wind energy, nuclear and fossil fuel technologies enjoy a considerable advantage in government subsidies for research and development.
- **Internalization of generating costs.** Wind energy will be unable to compete on a level playing field with conventional generation until new policies are adopted to internalize the public costs of these fossil and nuclear fuel sources.
- **Lack of knowledge.** Local electricity companies may be unfamiliar with wind energy. Most utilities have not studied how renewable resources could fit into their systems. For example, few have investigated how the output of wind technologies matches their system peak load.

# *Regulatory Barriers*

- **Interconnection Standards.** There is a lack of uniform interconnection standards for wind technologies. The responsibilities of utilities and generators with respect to interconnection have not been clearly defined, and as a result, the cost (or even feasibility) of interconnection to the grid often becomes a significant barrier to smaller projects.
- **Licensing requirements.** Stringent licensing requirements could also pose a barrier if for example, a small cooperative selling power only to its members were required to be licensed as an energy service provider. Similarly, the licensing of generation facilities could be particularly onerous for small developers.
- **Unfair competitive disadvantage.** Wind often face an unfair competitive disadvantage because public policies do not generally fully account for the environmental and social costs of conventional electricity supply technologies.

# *Investment Barriers*

- **Lack of a model.** Since there are few wind projects in the region, project developers are understandably unfamiliar with wind power, and even less comfortable with the risks involved.
- **Difficulty raising local equity.** Local developers have limited investment capacity, and there are many projects competing for investment capital. As an unfamiliar and potentially risky investment with uncertain returns, wind power does not immediately emerge as a clear winner.
- **Obtaining capital resources.** Proper risk allocation and mitigation are fundamental concerns for wind developers seeking to secure project funding. In a typical wind project, there are common barriers to accessing capital resources, such as the availability of “financeable” offtaker agreements, construction cost over-runs, longterm reliability of turbines, and the risk of wind-bearing ability.

# *Technical Barriers*

- **Wind resource assessment.** The wind maps developed by some countries (OLADE/SWERA) are not enough for project developers. High resolution wind maps are needed.
- **Intermittency.** Because the wind blows intermittently, wind power can only supply a portion of a consumer's, community's, or region's electricity needs. In grid-connected applications, owners of wind capacity must negotiate supply contracts that account for wind's intermittent nature.
- **Wind in rural areas.** Rural small grids would require upgrading to three-phase before interconnecting wind turbines larger than 20-25 kW. Without standard agreements concerning each party's responsibilities in paying for necessary upgrades, this weakness in the grid is a significant barrier to wind development in rural areas.

# *Commercialization Barriers*

- **Infrastructure.** Developing new wind sites requires large initial investments to build infrastructure. These investments increase the cost of providing wind electricity, especially during early years.
- **Prospecting.** Developers must find publicly acceptable sites with good resources and with access to transmission lines. Potential wind sites can require several years of monitoring to determine whether they are suitable.
- **Permitting.** Planning permission issues for conventional energy technologies are generally well understood, and the process and standards for review are well defined. In contrast, wind energy often involve new types of issues.
- **Marketing.** Individuals have no choices about the sources of their electricity. But electricity deregulation could open the market so that customers have a variety of choices.

# *Market Barriers*

- **Small Size.** Renewables projects and companies are generally small. Thus they have fewer resources than large generation companies or integrated utilities. They will have less clout negotiating favorable terms with larger market players. And they are less able to participate in regulatory or legislative proceedings, or in industry forums defining new electricity market rules.
- **High Transaction Costs.** Small projects have high transaction costs at many stages of the development cycle. For example, it costs more for financial institutions to evaluate the credit-worthiness of many small projects than of one large project.

## *Market Barriers (2)*

- **High Financing Costs.** Wind developers and customers may have difficulty obtaining financing at rates as low as may be available for conventional energy facilities.
- **Lack of Information.** Financial institutions are generally unfamiliar with the new technologies and likely to perceive them as risky, so that they may lend money at higher rates.
- **Transmission Costs.** Wind projects may also be charged higher transmission costs than conventional technologies or may be subject to other discriminatory grid policies.

*Instruments to overcome barriers.*



REUNIÓN MINISTERIAL IBEROAMERICANA, Uruguay, 26-27 de Septiembre de 2006

- Goals and objectives have to be established at a regional level based on the experience that individual countries have developed up to know.
- Having established its goals and objectives, decision makers can design policy tools that seek to fulfill them.
- Regulatory reforms should be considered to ensure that wind energy project could feed into the power grids. Further, policy makers may elect to adopt targeted measures that address specific barriers to wind energy and promote investments in such systems.

# *Market Incentives*

- **Wind Energy Targets.** The Interconnected System could guarantee minimum percentage of wind energy to be part of the overall energy supply portfolio. The recently approved PROINFA Program in Brazil follows this approach by requiring that the government owned utility - Eletrobras - purchase a minimum amount of renewables-based electricity by a certain date.
- **Specific subsidies for wind energy.** This system is basically a tax collected from all power services, which goes into a fund to support wind energy developments. The U.K has had a variation of this with its competitively bid "Non-Fossil Fuel Obligation" program. The government imposes a levy on all retail electricity sales to help finance renewable energy projects.

# *Tax Incentives*

- **Tax-free generation** is found primarily in Sweden and Denmark, where each member of a cooperative, commune, or partnership is not taxed on his or her share of the income from the turbine's production as long as the income (or the amount of electricity produced) does not exceed that member's annual expenditure on (or consumption of) electricity.
- **Favorable depreciation.** Businesses are allowed to depreciate the value of a wind turbine by up to 30% each year using the declining balance method, and to use the depreciation expense to offset other forms of business income. Swedish and Danish farmers have installed one or more wind turbines on their property as part of their farming business – to defer taxation on their other farming profits.

# *Standard Interconnection Agreements*

- Distribution utilities should be required to interconnect wind projects to the grid according to a pre-determined set of rules defining technical requirements and division of financial responsibility.
- Pre-defining interconnection requirements and responsibilities (both technical and financial) enables a wind project to accurately estimate the cost of interconnection in advance.
- These factors reduce the project owners' risk.

# *Wind Turbine Manufacturing Base*

- World-class wind turbine manufacturing industry has played an important role in developing wind energy in many countries. The very existence of a domestic wind turbine manufacturing industry has no doubt influenced politicians in those countries to favor policies that are friendly towards domestic ownership.
- Brazil has followed this path with an incipient but strong wind turbine manufacturing industry.

# *Tariff schemes*

- **Voluntary approaches** like green tariffs and green shareholder programmes are based on a high consumers' willingness to pay for "green electricity".
- **Feed-in tariffs.** It guarantees to all wind energy producers up to certain level of the current domestic sale price of electricity for every kilowatt hour they generate. This is both administratively simple and effective in practice mechanism for promoting wind energy. It has created a stable, profitable, and essentially unlimited market for wind power, and one that can be accessed with very low transactions costs.

# Conclusions

- Three key levels of strategic planning
  - *Electricity Market,*
  - *Electricity Network*
  - *Spatial Planning,*

They need to be integrated into a plan led approach to wind energy deployment.

# Muchas Gracias!!!

Dr. Manuel Fuentes

[Manuel.fuentes@itpower.co.uk](mailto:Manuel.fuentes@itpower.co.uk)

IT Power, Reino Unido

