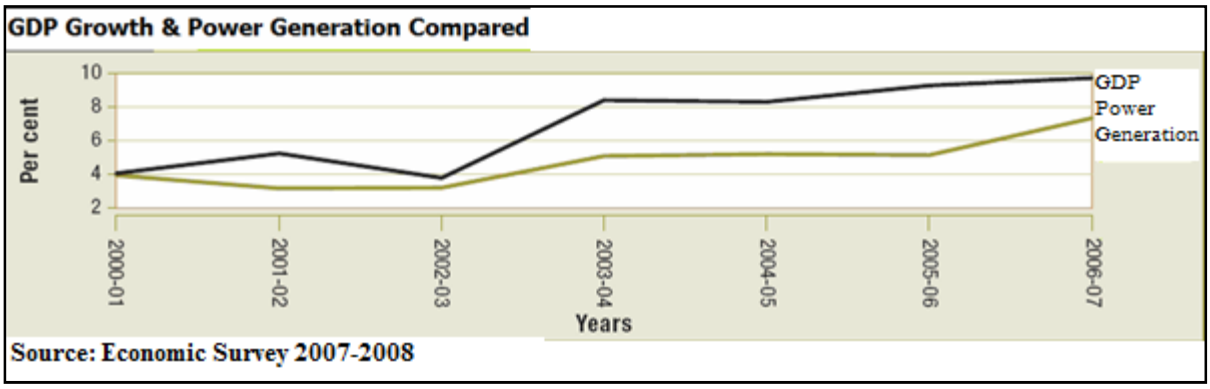
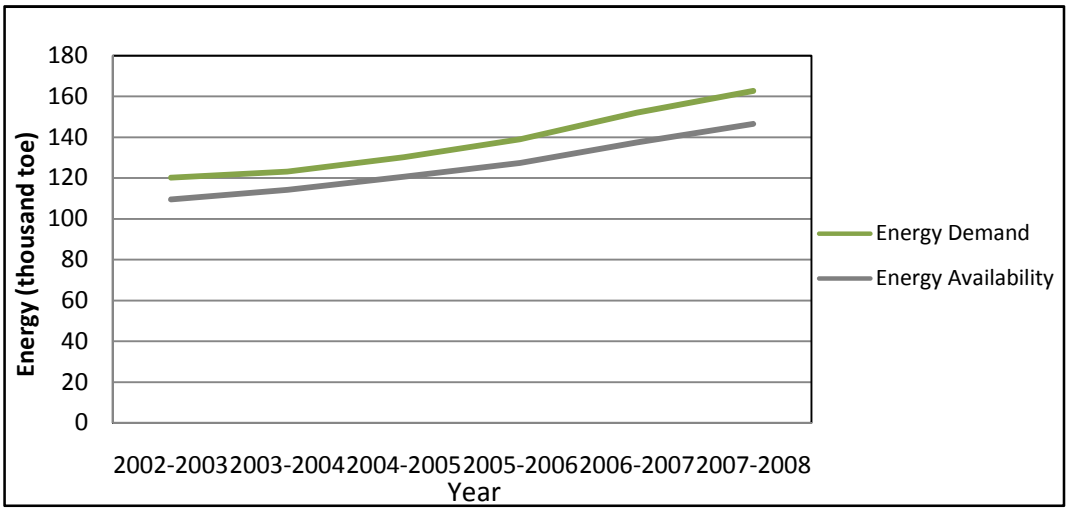
Public Private Partnership in Wind Power in India

Introduction

India is the one of the fastest growing economies in the world. In the last five years, India has averaged a phenomenal 8.775% growth, as measured by GDP at constant prices. In spite of the ongoing economic downturn faced by the world, India's growth rate is projected to remain the second highest in the world, next only to China[1].
To sustain this tremendous growth led by infrastructure, services and manufacturing, India needs to be 'Energy Self-Sufficient'. India's energy demand has been growing at a far greater pace than its economy. As a result, as seen in figure 1, the gap between the GDP growth and power generation has been consistently increasing since the start of this century[2].



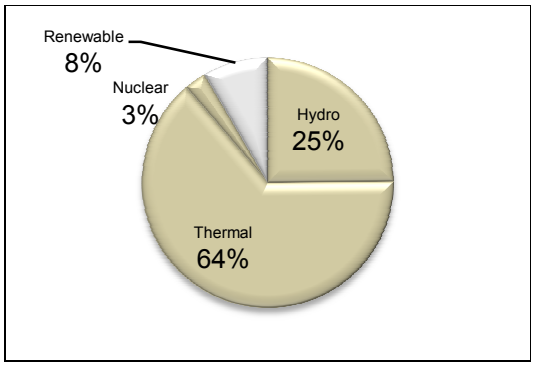
The same fact is reflected in the comparison between the total energy demand and energy availability in India. It is found that India has a total energy-demand deficit of 10% as of 2008 and this deficit is growing year on year at a cumulative annual growth rate of 7.29%. [3]



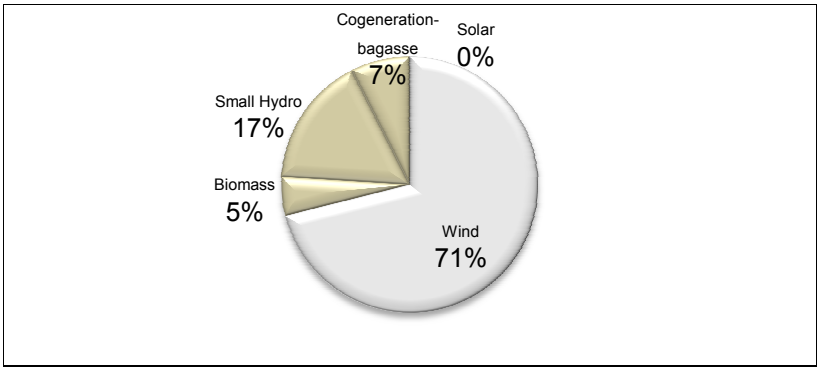
[1] World Economic Outlook Update, January 28, 2009, IMF
[2] Indian Economic Survey 2007-08
[3] Power Scenario at a glance; CEA

Energy Scenario in India

With an energy demand in excess of 160 thousand tonnes of oil equivalent per year and an equally large amount of carbon emissions, it is imperative that we shift our reliance from fossil fuels like coal and petroleum to renewable sources like wind, solar and biomass.
The share of renewable sources in the installed energy capacity stands at a mere 8.37%[4] at 12194.57 MW, while the fossil fuels still account for the major share of the energy consumption in India.



Wind power is the largest energy source among the renewable sources. According to the report on Wind Power by the Ministry of Non-Conventional Energy Sources of India, installed wind power contributes more than 70% to the renewable share of the energy capacity of India.



Why Wind Power

Wind is an inexhaustible source of energy and is one of the most cleanest in terms of impact on the environment. The turbines used produce no harmful emissions and use a perennial source to generate power. The most important economic benefits of wind power is that it reduces the exposure of our economies to fuel price volatility[5]. This is important for a country like India that has to import a major part of its fuel requirement. Wind power also helps diversify the economies of rural communities as it provides new sources of income in

[4] Generation Installed Capacity, Ministry of Power, Govt. of India

[5] The Economics of Wind Energy, March 2009, The European Wind Energy Association,

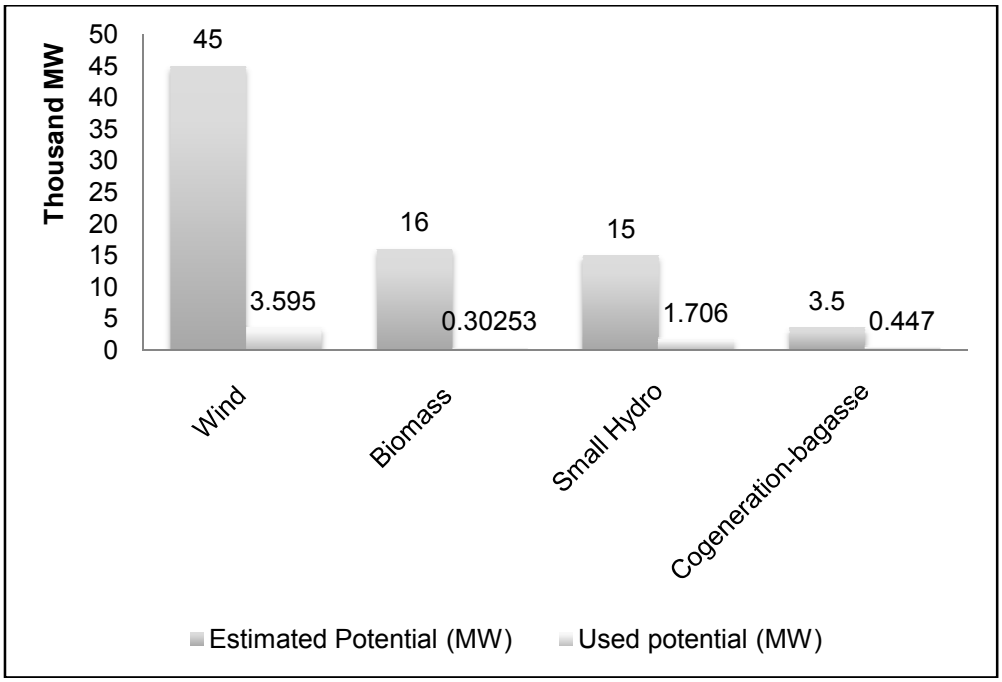
rural areas, as well as jobs for people who set up and maintain the turbines or manage wind farms[6].

There has been many significant changes in the wind energy sector since the times when we used to see small wind-mills operating in isolated areas, noisily producing little amount of energy that could be used only to draw water. Wind turbines now are typically 100 times more powerful than early versions and employ sophisticated materials, electronics, and aerodynamics. Costs have declined, making wind more competitive with other power generation options[7]. Modern wind turbines have been designed to reduce aerodynamic noise.

But, there has been some opposition to wind turbine installation for environmental, aesthetic, or aviation security reasons.

State of Wind Power in India

In India, Wind has the highest potential among all renewable sources. The estimated wind potential is 45 thousand megawatts, out of which only 8% is being used at present[8]. Figure xx shows the estimated and used potential of all the renewable sources.



The Government has identified 216 potential sites for wind power projects in the country. These places have a wind power density (WPD) greater than 200 W/m2 at a height of 50 mgal[9]. If we consider the state-wise distribution of estimated wind-potential, as shown in figure xx, there are nine prominent states that account for more than 85% of the total wind capacity of India.

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[6] European Union (EU) Energy Research
[7] R. Wiser and M. Bolinger, Annual Report on U.S. Wind Power Installation, Cost and Performance Trends: 2007, U.S. Department of Energy (DOE), May 2008, p.14.
[8] C-WET, MNRE
[9] Source: www.cwet.tn.nic.in as on 04.09.2008

State	Estimated Wind Potential (MW)	Installed Wind Potential (MW)
Andhra Pradesh	**8197**	**101**
Gujarat	**6522**	**219**
Karnataka	**6281**	**276**
Rajasthan	**5846**	**263**
Madhya Pradesh	**4520**	**29**
Maharashtra	**3727**	**411**
Tamil Nadu	**2132**	**1677**
Orissa	**1045**	**0**
Kerala	**938**	**2**

The wind power market in India is unique amongst the current world wind markets. Here, It is the wind turbine manufacturers that are also the project developers for the corporate who were the owners of these wind-farms. The main advantage that the corporate derived from owning the wind farms was the tax shelter granted by the Government[10]. More than 95% of the wind farms set up in India is for such corporate, like *Suzlon Energy Ltd*, *MSPL Ltd*, *Essel Mining Ltd*, *Bajaj Auto Ltd*, etc [11]. A major part of the electricity generated for the corporate owners are for captive purposes and the excess is wheeled to the state electricity board. The component suppliers like *Siva Wind turbine India Pvt. Ltd.*, *RRB Energy Ltd*, *Ghodawat Industries (I) Ltd* play a major role in the wind turbine set up and maintenance.

Characteristics of Public Private Partnership

Public Private Partnership, as the name suggests, is a symbiotic relationship between a private entity and a public or government body for the completion of a project. The main characteristics of PPP is that there is a creation of a Special Purpose Vehicle and the risks in the project are assigned to the party that is best suited to handle the risk. This creates a 'win-win' situation for both the participating parties, as the project is delivered on-time within the allocated budget, in contrast to the delays and cost-over-runs in case only the Government undertakes such project[12].

Depending on the risk-allocation, PPP projects can be of many types, a few of them are Build-Operate-Transfer (BOT), Build-Operate-Own-Transfer (BOOT), Build-Operate-Lease-Transfer (BOLT). Following characteristics of PPP makes it ideally suitable for infrastructure projects:

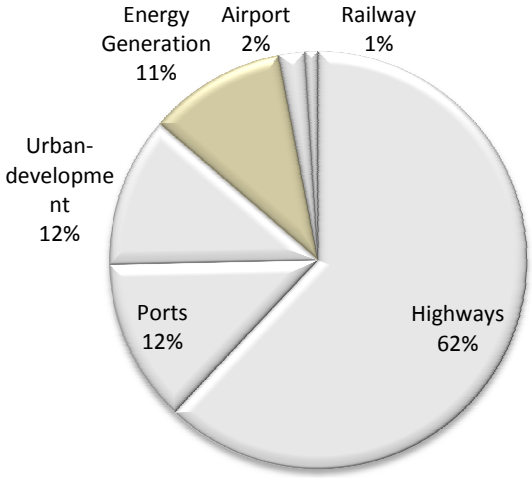
[10] Grant Hauber (EWEA/Acquero), Jan 2007, Wind Energy Finance Mobilising European Investment in the Indian Wind Sector

[11] Source: www.windpowerindia.com as on 21.11.2008

[12] Sinha, Aparna; "*The Public-Private Partnership*" Yojana, 49, May 2005

State of Public Private Partnership in Energy sector in India

As on 21st November 2008, 280 projects had been sanctioned to be completed via the PPP route, out of which only 32 projects were in the energy sector[13]. The pie chart below shows the percentage of various sectors in the PPP pie.



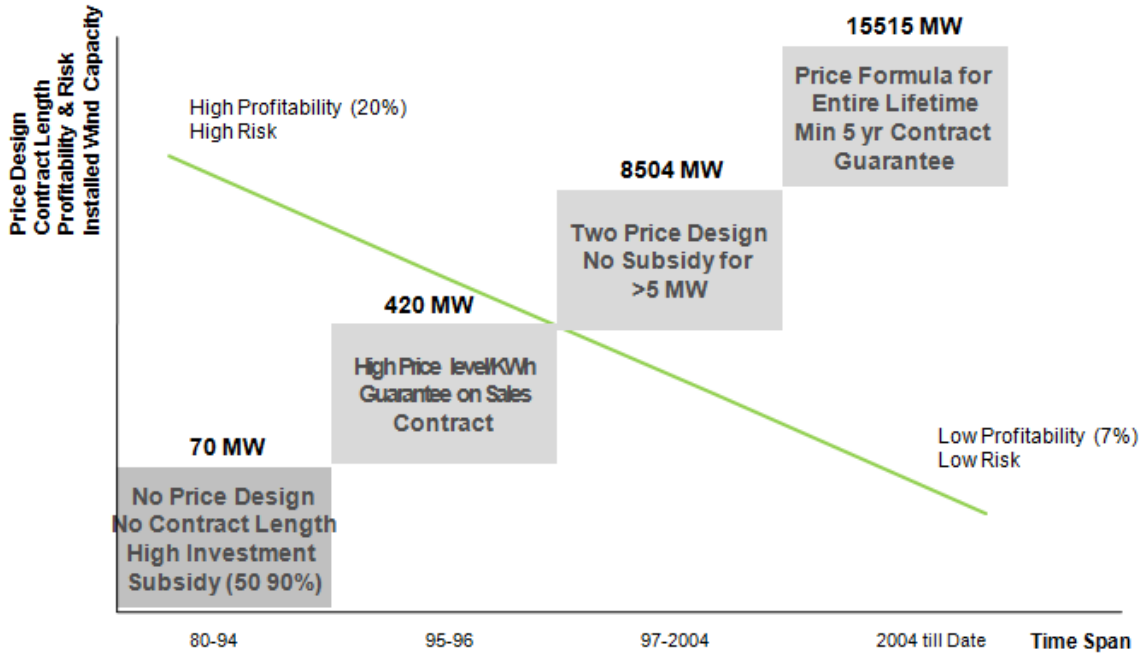
Source: www.pppindiadatabase.com

On comparison of the various sectors according to the cost-outlay of the projects, the energy sector accounts for only $ 3.56 billon, which is just over 13% of the total planned outlay for PPP projects. This is mainly due to large investments required in the development of highways and ports. So, PPP in the energy sector in India is in a nascent stage of development[14], but the number of such projects are growing.

Public Private Partnership in Wind Power in mature PPP markets

One of the countries that has used public private partnership to develop its energy sector, particularly the wind-energy sector, is Spain[15]. In the eighties, there was no price design and no defined contract length in the wind-energy sector. This was coupled with high investment subsidy, as is prevalent in India at present. This subsidy was as high as 50 to 90%, so wind-farms were set up only by the corporate who were interested in getting the subsidy. This led to slow growth and as such the installed capacity of wind-farms was only 70 MW. Since there was a lack of proper price mechanism, the prce-risks associated were also high. Typical profitability during this time was around 20%, mainly due to the high investment subsidy.

[13] Source: www.pppindiadatabase.com as on 21.11.2008
[14] Closing the Infrastructure Gap: The Role of Public-Private Partnerships, Deloitte 2006
[15] *V. Dinica, Energy Policy 36 (2008) 3562–3571*



During the nineties, the Spanish Government enacted a few laws in this sector and set up price mechanisms and contracts on the guarantee of sale of electricity produced by wind-power. The price design was single-level, mainly margined higher than the conventional tariff rates. The investment subsidy was reduced in this period and was substituted with the higher tariff structure. This led to a decrease in the profitability as well as risk of the wind power projects undertaken through the PPP route. There was a moderate growth of the installed capacity by 350 MW[16].

It was in 1997 that the Government introduced the two-level tariff system. It also eliminated the subsidy for wind-power projects of capacity over 5 MW, which reduced the profitability of larger projects. But, the two-level price design, which aimed at eliminating the risk in the operation of wind-farms, was highly successful and the installed capacity rose to astounding 8504 MW in just seven years, from 1997 to 2004.

A uniform price formula for the entire lifetime of the project was proposed in 2004, which reduced the risks associated with the setting up of the wind-farms. A minimum contract-guarantee of five years was also introduced which further reduced the risks. This was accompanied by a decrease in profitability of wind-power project which dropped to just over 7%. But, the wind-energy sector in Spain is now in maturity-stage of PPP lifecycle[17], with 15515 MW of installed capacity. It has transitioned through many stages of PPP in a quarter century.

[16] Source: *Spanish Wind Energy Association*
[17] Closing the Infrastructure Gap: The Role of Public-Private Partnerships, Deloitte 2006

Effective allocation of risks of Wind Power through PPP

The various risks associated with setting up of wind-farms in India can be effectively addressed through the PPP route, as has been seen in the case of Spain. The main risks that need to be mitigated are as follows:

- High costs
- Technology intensive
- Long payback period
- Local opposition
- Dependence on Government Policies for tariff structure

In a typical public private partnership set-up, there is a private player that often brings with it the technology, standardized contract and 'best practices' as experience gained in other PPP markets. The government as the second party of the PPP, allocates favourable tariffs and policies along with concession on import duty and excise duty exemption. There can also be provisions of soft-loan from Indian Renewable Energy Development Agency (IREDA), IIFCL, IDFC and other such bodies.

Once a PPP in wind power is in place, there can be a series of benefits, as mentioned below, that will help in driving the growth of electricity generated through wind-power.

- Easy and Priority-financing by financial-bodies like IIFCL, IDFC
- In-time completion avoids cost over-run
- Technology transfer from the private technically superior entity
- Immunity to changing policies, since a fixed policy framework is put in place
- Avoids opposition from land owners and environmentalists
- Economically viable tariff plan through 'Power Purchase Agreement'