

WIND ENERGY

Railway is the most fuel efficient mode of transport and committed to make efforts to improve energy efficiency and adopt environment friendly technologies in manufacture, maintenance & operation activities, reduce electricity charges. Focus during the XI Plan is to improve overall productivity, fully exploit the additional capacity created in rolling assets through innovative operations and maintenance practices and undertake strategic low-cost investments with short gestation lags. The XI Plan projections for freight and passenger traffic are as under:

10.1 XI FIVE YEAR PLAN PROJECTION FOR FREIGHT & PASSENGER TRAFFIC

| | 2006-07 | 2011-12 | %increase (per annum) |
|---|---------|---------|--------------------------|
| Originating Freight (Million Tonnes) | 726 | 1100 | 10.3 |
| Originating Passenger (Million) | 6242 | 8400 | 6.9 |
| Passenger Kms (Billions) | 700 | 880 | 12.9 |

To cater to the growth in traffic during the XI Plan period, number of capacity enhancement projects like new lines, gauge conversion, doubling, electrification, metropolitan transport project and new terminal facilities are to be created which would require additional use of electrical energy .

2.0 ELECTRICAL ENERGY CONSUMPTION IN TRACTION DURING X PLAN.

| YEAR | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | Growth Percentage (per annum) |
|--|---------|---------|---------|---------|---------|----------------------------------|
| Electrical Energy consumed in billion Kwhrs. | 8.99 | 9.48 | 10.13 | 10.4 | 11.03 | 5.25% |

2.1 ELECTRICAL ENERGY CONSUMPTION IN NON-TRACTION DURING X PLAN.

| Year | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | Growth Percentage (per annum) |
|---|---------|---------|---------|---------|---------|----------------------------------|
| Total electrical energy consumed in billion Kwhrs | 2.36 | 2.22 | 2.43 | 2.31 | 2.32 | (-) 0.25% |

2.2 The anticipated requirement of energy at the end of XI Plan is expected to be as under.

| | 2006-07 | 2011-12 | % increase (per annum) |
|-----------------------------------|---------|---------|------------------------|
| Electrical Energy (Billion Kwhrs) | 13.3 | 17.15 | 5.5% |
| Diesel Oil (Billion liters) | 2.08 | 2.23 | 1.5% |

The growth during XI Plan is pegged at 8% and electric energy requirement for traction is expected to grow at 7-8% .

3.0 Power generation through wind is one of the most rapidly growing cost effective renewable energy technology. The installed capacity of wind energy in India is about 6000 MW, which is about 4% total estimated potential of India. India is the 4th largest producer of Wind energy after Germany, Spain & US. Globally, wind energy generation capacity has increased by 27% in year 2002 and is expected to expand 15 fold in next 20 years. Wind energy technology has matured and large capacity in turbines upto 2 MW are now being manufactured in India. The minimum wind velocity required for power generation is above 2.5 m/s and the maximum is 30 m/s. the cost of installation of wind turbine is now available at Rs. 6 crore per MW.

The wind potential is particularly high in states of Tamil Nadu, A.P, Karnataka some part of Maharashtra, Gujarat and Rajasthan in India. In T.N the plant load factor upto 25-30% is now possible. Large scale wind energy requires an interface with the grid and this power can be availed through open access after Electricity Act, 2003 by paying transmission and wheeling charges from the wind farm. Many State Electricity regulators are promoting use of wind energy giving concessional wheeling and banking arrangement. It is a high time that Indian Railways looks at wind energy as potential source which is now commercially proven technology and is growing at a very pace as a source of energy all over the world. As wind energy uses green fuel, there is a potential of earning additional revenue in form of carbon credit that could accrue from production of wind energy from wind farm set up by IR.

3.1 The project report was made by Energy Management cell of Railway Board after **taking consultation of Indian Wind Association and as a pilot project 10 MW wind plant for ICF was sanctioned in Supplementary 2007-08.**

3.2 The tender was invited by ICF on 22.4.08 and tender was awarded by ICF on M/s. Suzlon. These wind turbines are installed in Kasturirengapuram and Urumangalam villages, Radhapuram Taluk, Tirunelveli District of Tamil Nadu in a record time of four months from the issue of Letter of Acceptance. The green energy generated through these windmills will completely offset total energy needs of ICF, which are presently being met through Tamilnadu State Electricity Board. **All the seven mills have been commissioned on 30.3.09. The project has been completed within a record time of 18 months after sanction.**

3.3 The project will save Rs. 7.47 cr per annum as energy prices and will earn 1.47 cr per annum as carbon credit on a conservative plant load factor of 0.25.

3.4 Lot of wind potential exist today in India and therefore, Indian Railways shall install similar plans in wind areas of Rajasthan, Gujarat, Maharashtra, Andhra Pradesh and Tamilnadu. Indian Railways has also issued major policy decision to harness solar and wind energy in big way for feeding signalling and emergency lighting load at all category of stations in a phased manner.

These are path breaking steps taken by Railways. These will also meet the Government of India's directives enshrined in the policy guidelines issued by Prime Minister recently for use of non-conventional energy sources, to provide green and clean environments.

We need to develop more projects in other States like Rajasthan, Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu.

3.5 The expected saving from the projects are given below:

SAVINGS

Energy saving expected

| | |
|------------------------------|---|
| Plant load factor | 0.25 |
| CAPACITY | 10.5 MW |
| Energy produced by wind | $0.25 \times 10^3 \times 365 \times 24 \times 10.5$ =22.95 MUs |
| Energy available for railway | $0.93 \times 22.95 = 21.34$ MU |
| Energy saving in TN | 21.34×3.50 =Rs. 74.69 million |
| Carbon credits (CER) in ton | $22.95 \times 0.8 \times 10^{-3} \times 10^6$ =18360 |
| Revenue through (CER) | $17240 \times 12 \times 67$ = 1.47 cr |

4.0 At present IR consume 13.7 billion unit and if 10% of its consumption is planned through wind power, then IR need to develop 600 MW power from wind. The investment for achieving the target will be $600 \times 6 = 3600$ cr in XIth plan. With this financial crisis, it will be difficult to arrange all the funds through Internal resources, there will be need of at least Rs. 2000 cr from external resources like ADB/World Bank.

