



Small Hydro in India

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Small Hydro definitions

- $2\text{MW} < \text{Small Hydro} < 25\text{MW}$
- $100\text{kW} < \text{Mini Hydro} < 2\text{MW}$
- $10\text{kW} < \text{Micro Hydro} < 100\text{kW}$
- $0\text{kW} < \text{Pico Hydro} < 10\text{kW}$

Small hydro technologies available

- Run Off River Projects
- Canal Based projects
- Micro/Pico Hydro stand alone systems

Development of small hydro

- First micro hydro project of 130kW was set up at Sidrapong in 1897.
- Formation of MNES gave an impetus to small hydro development
- Indigenized manufacturing.

Recent trends

- More emphasis on Irrigation canal based small hydro projects (Orissa, A.P)
- Investment seen from private sector in grid connected run off river projects (Uttaranchal, H.P)
- More no of stand alone systems for rural electrification being implemented

Recent trends(cont)

- Improvements in Turbine designs for all small hydro technologies
- Packaged plant developments
- Environmental issues – fish passage

Source: MNES, AHEC, Roorkee

R&D Trends

- Design of pico turbines (500W range)
- Design of battery chargers from small hydro power
- Increase in efficiency Electronic Load Controller for micro hydro
- Cost reductions in E&M
- Usage of composites for components
- Use of COANDA system to improve overall small hydro system efficiency

Source: AHEC Roorkee

Benchmarking of Overall Efficiency

- Upto 10 kW - 50%
- 10 - 25 kW - 60%
- 25 - 50 kW - 65%
- > 50 kW - 70%

Source: MNES

Future capacity additions

- Target for 2006-2007 is 600MW and 100MW for renovation.
- 2000MW up to 2012.

Thrust areas for future development

- SHP to be developed at state sector as well as through private sector participation in various states
- Nation-wise resource assessment and GIS mapping.
- Renovation and modernization of old shp projects
- More industry based research and development in new materials for cost reduction and also increasing efficiency of the system on the whole.
- Manuals, books, databases for information dissemination of best practices
- Quality testing and monitoring of projects implemented

Costs

- Present costs of generation: around
Rs 1.5/kWhr
 - The future costs would marginally increase
(about 5%) (Source: AHEC, Roorkee)
 - Capital costs
Pico Hydro – Rs 2.0 lakh/kW
Micro Hydro – Rs 1.5 lakh/kW
Mini and Small Hydro – Rs 0.6 lakh/kW
Operation and Maintenance costs : 2% of capital
costs
- Source: From our databases



Thank You one and all

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