Micro Hydro Mini-grid in Remote Villages of Eastern Ghats

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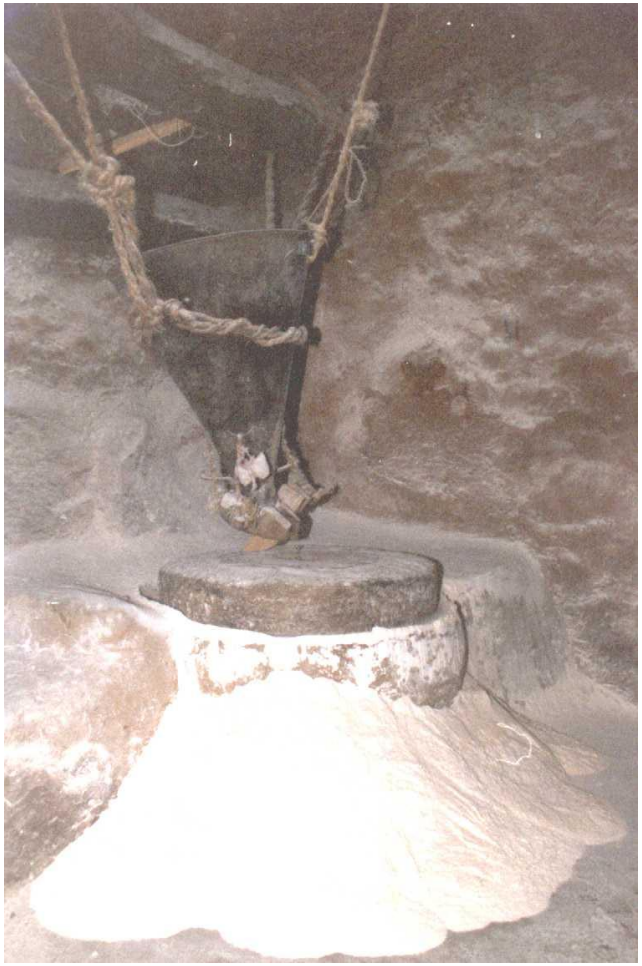
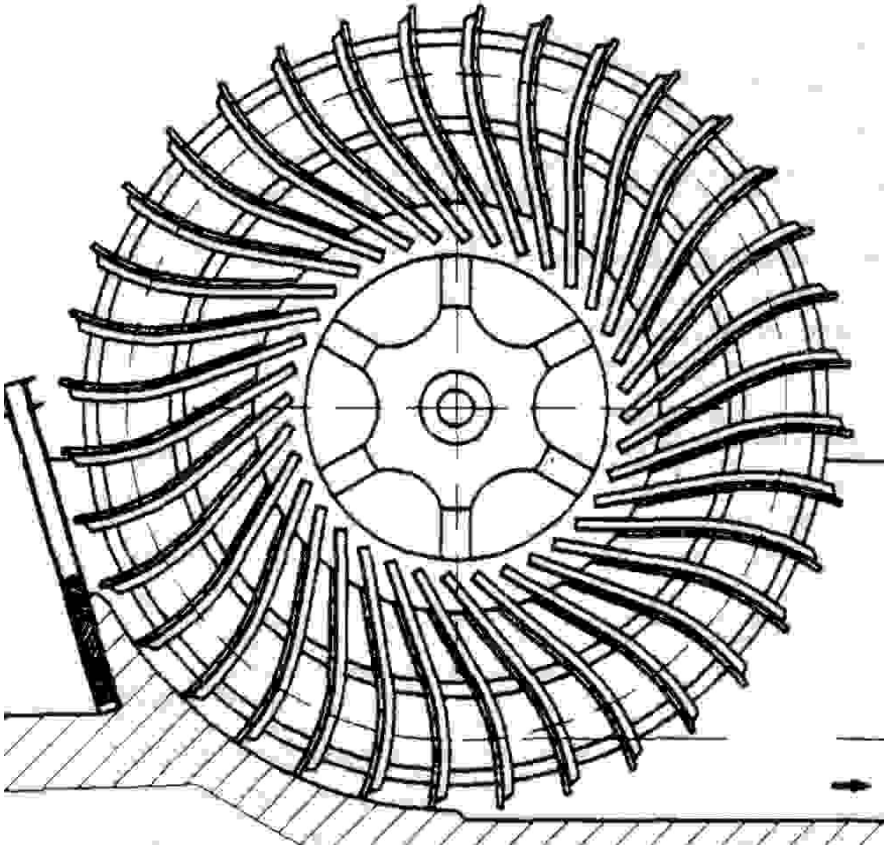
Traditional Watermill





HYDRO POWER

Micro hydro power offers the best solution for many remote/rural electrification projects.

No. of Community based Hydro schemes facilitated by our technical experts

Name of the Site	Name of the District	State	No. of Villages covered	No. of HH Covered	Year of Commissioning	Generation Capacity in kW	Implementing Organization
Putsil	Koraput	Odisha	1	120	1999	14	IRDWSI
Gangamaguda	Koraput	Odisha	3	130	2005	10	IRDWSI
Bodamanjari	Koraput	Odisha	2	90	2006	40	IRDWSI
Karlapet	Kalahandi	Odisha	1	135	2006	25	Gram Vikas
Keshkeri	Rayagada	Odisha	3	95	2008	15	Agragamee
Karnivel	Kalahandi	Odisha	1	30	2009	9	Gram Vikas
Desughati	Kondhamal	Odisha	1	45	2009	10	Seva Bharati
Pipalpadar	Raygada	Odisha	2	65	2010	9	Agragamee
Bonjangi	Vishakapatnam	Andhra Pradesh	2	65	2011	9	LAYA
Mununga lapudi	E. Godavery	Andhra Pradesh	1	20	2013	3	LAYA

Layout of a Micro Hydro Scheme - Bodamanjari

enstock Pipe)


There's community television.

Decentralized Power Project, Micro-Hydel

The core issues are addressed through this intervention:

- **An appropriate alternative to empower the community in terms of addressing village energy security.**
- **Micro-hydro schemes can facilitate better community management process in all terms.**
- **Drudgery of women is eased out by providing necessary grain processing machineries.**
- **Community based catchment area development**
- **People centered water management**
- **Transfer of power generation technology & management to community representatives.**

Advantage Micro Hydro

- ✓ It does not consume the water, after use it is available for other purposes
- ✓ power is usually continuously available on demand,
- ✓ given a reasonable head, it is a concentrated energy source,
- ✓ the energy available is predictable,
- ✓ no fuel and limited maintenance are required, so running costs are low (compared with diesel power)
- ✓ it is a long-lasting and robust technology; systems can last for 35 years or more without major new investments.
- ✓ Technology is simple enough to be transferred and accessed in the remote rural areas.

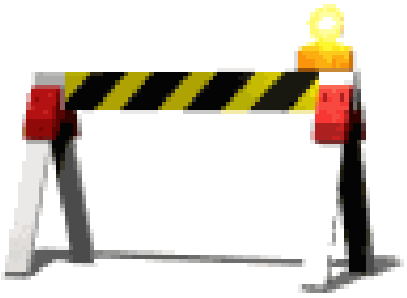
Social Aspects

- Allows direct access of water resources by the community and could meet its energy requirements
- Is small enough to avoid over exploitation of natural resources.
- Is a decentralised unit and could provide wider access to the decision making process of the community.

Limitations

- ↓ Mostly site specific.
- ↓ Reliable site data has to be collected for guaranteeing output.
- ↓ maximum useful power output is limited for a site, making capacity expansion difficult.
- ↓ Seasonal variations affect the performance

Non Technical but very Critical factors



1. Load Management
2. Operation & Maintenance

Load Management

- Micro-hydro has a definite power output. Can not supply more than this.
- Power has to be equally distributed to the end users.
- Load limiters are used to make sure the end-user cant draw more power than what he has paid for.

Commonly used Load limiters:

- Miniature Circuit Breakers
- PTCs (Positive Temperature Coefficient Thermistor) – for currents below 1 amp.

Community Control Mechanism:

- The houses are divided in cluster – 10 to 12 HHs
- Each cluster is fixed with Load Limiter
- Creating a pear group pressure
- Periodical surprise visit to the consumer HH by the operating members.

Operation & Maintenance

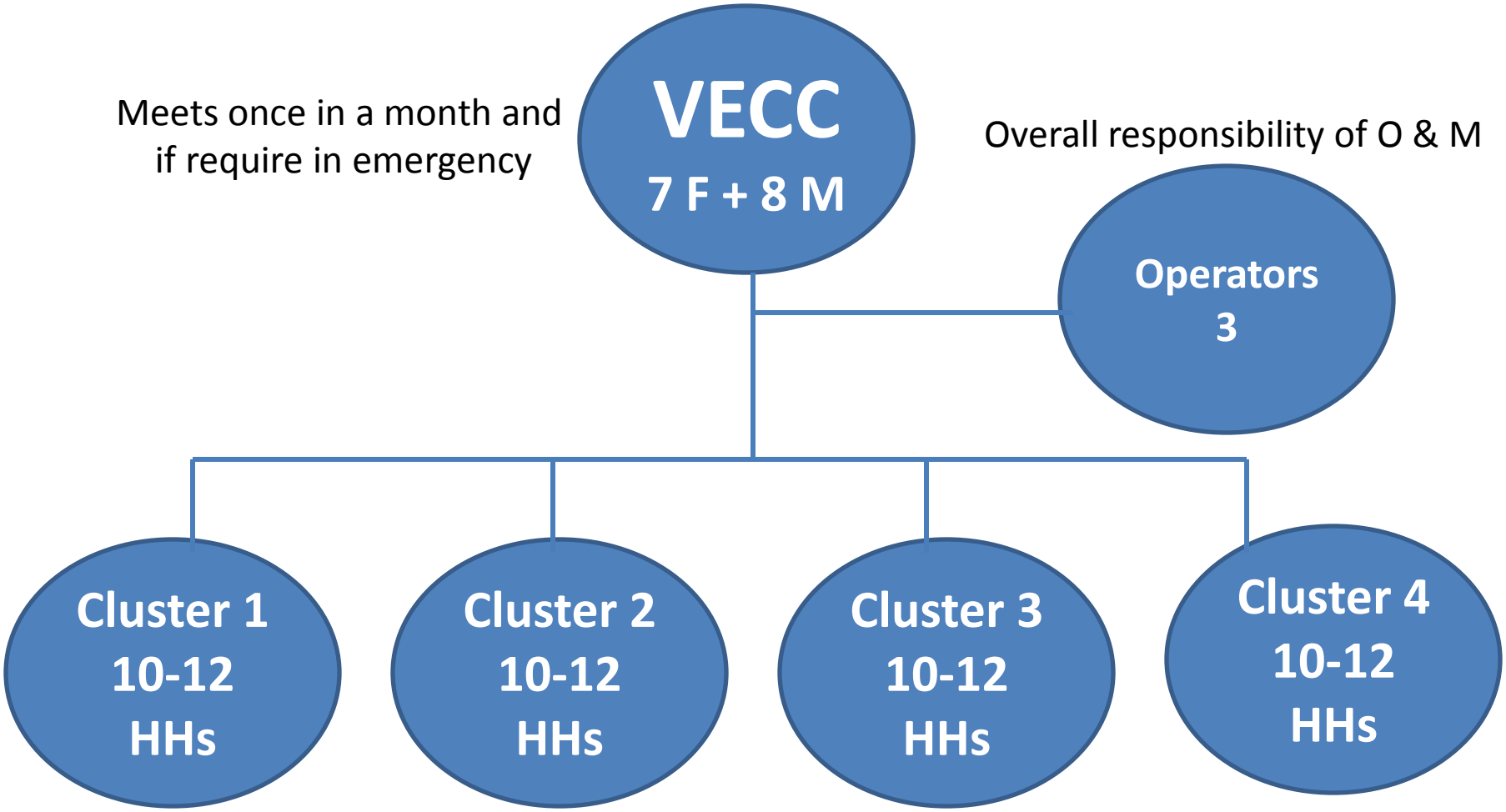
- To recover the investment, the scheme has to run efficiently throughout its life.
- Proper plan of O&M procedures
- Adequately train the local youth on O & M.
- Skilled operation.
- There are 3 operators in the village do rotational duty for 10 days each in a month.

Roles of the Project implementer

should be aware of the economic realities in the community.

- to facilitate the design process and assess the project costs,
- to empower the community institution,
- to identify what portion can be covered up-front, and
- to configure a tariff structure that covers the balance of these costs and ensures equitable access to electricity by all consumers.

Community Institution



Takes the responsibility of Load Management and Tariff collection

Tariff

- Critical Factor for the ongoing success of the plant.
- A tariff must be designed to generate revenues to cover all the construction and operating costs of the scheme, plus a profit or margin if required.

- The tariff is decided by the Village Electricity Consumer Committee
- Rs.40/- is collected during peak period of harvesting i.e. for 6 months and Rs.20/- for other 6 months lean period.
- Apart from the tariff, each HH provides one work days to the operators for their agriculture work twice in a year.
- The collected tariff is deposited in a bank account opened in the name of VECC with a joint signatory.
- 25% from the grain processing mill goes to VEC fund

Costing

- Total Project Cost – Rs. 30 Lakh
- People's contribution (Labour) – Rs.2.8 Lakh
- Civil cost - 50%
- Electro-mechanical -35%
- Capacity building - 3%
- Community mobilization – 2%
- Administration – 10%

- Total HH - 90
- Head – 39 Mtr
- Design Discharge – 121 lps
- Total generation capacity – 40 Kw
- End use
  - Light - 3 (15w CFL)
  - Street light – 22 watt
  - Grain Processing

Challenges

- Construction requires periodical maintenance
- ELC is not user friendly
- Untrained operation
- Multi community dynamics
- Natural disasters
- Dependence on external expertise for maintenance of electro-mechanical equipments – Turbine & Generator
- Monitoring the regular collection of tariff

Thank you all