SAARC ENERGY CENTRE
Energy for Peace & Prosperity

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Socioeconomic and Environmental Aspects of SMMHP Plants

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Learning Objectives:

Understanding of the socioeconomic and environmental impacts of SMMHP projects along with a case study

Socio-Economic and Environmental Impacts of SMMHP

- Compared to large hydropower projects, SMMHP schemes have relatively low negative environmental and socio-economic impacts.

- As recent evaluation studies on SMMHP and the along going electricity supply suggest, particularly socio-economic impacts of the plants are to be considered positive.

- Just like other off-grid renewable energy applications, MHP schemes have a variety of direct and indirect positive impacts, which are often interrelated.

Positive Socio-economic Impacts

- Electricity supplied by MHP enhances income generation (agro-processing and small service business such as mills and shops).
- Enables inhabitants to make savings on expenses on kerosene, gasoline, candles and batteries.
- Income increase and savings as well as the possibility to use refrigeration improve the diet and thus decrease malnutrition and hunger.
- Moreover, women's and children's work load decreases, since they spend less time on energy related household tasks such as the collection of fire wood and water gathering.
- The communities' safety in general improves due to street lighting at night
- Telecommunication is enhanced.
- People get more aware of the outside world which gives them more knowledge

Positive Environmental Impacts

- The MHP project raises the awareness of proper watershed management and reforestation to secure the sustainable use of water resources.

- Moreover the plants contribute to protect the environment and combat climate change through reduced use of kerosene/gasoline and small batteries.

Positive Impacts of SMMHP

1. End Poverty and Hunger

- MHP generated electricity can be useful for agro-processing and small service business (mills, shops etc), which generate jobs and income.
- Expenditures for candles and kerosene/gasoline decrease.
- Food processing and refrigeration allow an improvement of diet, contributing to reduction of hunger and malnutrition.

2. Universal Education

- Due to the electricity supplied by the MHP, students can study during evening hours and spend less time in energy related activities such as collection of firewood.
- Power supply in schools attracts teachers to rural areas and allows use of multimedia tools.

Positive Impacts of SMMHP

3. Gender Equality

- MHP generated electricity can reduce the time females spend on household tasks such as collection of fuel wood. Therefore, they have more time to study and become literate.

- Other jobs traditionally reserved to women such as shopkeeper or craftworks may improve with the access to electricity.

- Public lighting improves public safety in rural communities, which is very important for women.

Positive Impacts of SMMHP

4. Child Health Maternal Health

- MHP decreases indoor air pollution of kerosene/gasoline smoke and candles and improves safety around the house.

- In addition to the better diet and more hygienic cooking conditions, mothers and children can benefit from improved medical service.

- The electricity supplied by the MHP enables refrigeration, adequate lighting, telecommunication and use of medical technology, which in turn, permit vaccination, sterilization and an improvement in time and quality of the medical service.

- Electricity supply also allows the use of ground water pumps, thus water borne diseases due to contaminated surface water can be decreased.

Positive Impacts of SMMHP

5. Environmental Sustainability

- MHP contributes to the environmental sustainability and combats climate change through reduced use of kerosene/gasoline and small batteries.

- Additionally there is an increased awareness of the importance of a proper watershed management and reforestation to secure long term water resources.

6. Global Partnership

- MHP improves the access to information and telecommunication (via TV, radio, mobile phones).

- These are crucial inputs for raising awareness and allowing the creation of networks and interest groups.

Negative Environmental Impacts

- Since no large reservoirs are required, no resettlement programs and the along going negative impacts for the population occur.

- Since MHP schemes do not require a reservoir and divert only part of the stream water away from a portion of the river to power the turbine, they only have little impact on the flora and fauna of the vicinity.

- However they tend to create small, shallow pools which can cause problems such as sedimentation as well as eutrophication and can thus affect water quality and lead to greenhouse gas emission.

- Particularly a decrease of water quality can furthermore cause water borne diseases and thus affect the health situation of the population.

Negative Environmental Impacts

- Due to the MHP and the along going electricity supply, a population growth close to the powerhouse is likely to occur. Thus the pressure on natural resources and the risk of erosion in areas close to the powerhouse is increased.

- Further environmental impacts might be deforestation due to the construction of access roads and grid connection power lines

Environmental vs. Socio-economic Benefits

- It should be noted, that some features might be considered positive in socio-economic terms but negative in environmental terms and vice versa.
- Taking the construction of access roads as an example, it has negative impacts on the environment since increased deforestation occurs but positive socio-economic effects in terms of increased access to the market and (in some areas) increased income from tourism.
- The schemes' impacts on the health situation can be taken as an example: the plants' environmental impacts such as decreased water quality might affect population's health, nonetheless the electricity supply might also improve the overall health situation due to refrigeration, improved access and increased income to purchase medicine.
- Generally, negative impacts should be kept to a minimum by incorporating and implementing respective mitigation techniques already in the planning and construction phase of the MHP project

Clearances required in development of SHPs

1. State Pollution Control Board.
2. Forest Clearance
3. Irrigation Dept.
4. Minor Irrigation
5. PWD
6. Fisheries
7. District Eco Taskforce and Geologist
8. Drinking Water (Peyajal)

Clearances required in development of SHPs Cont..

9. Jal Sansthan
10. Gram Panchayat
11. Agriculture
12. Public Health Department
13. NOCs under Forest Dwellers Rights Act (this is now made mandatory for Forest Clearances)
14. Permission for use of explosives
15. Permission for installing Crusher at site
16. Permission for Tribal Affairs

Capacity Development Activities for scaling up Energy Access Programe

7 main activities under functional and technical capacity are:

1. Planning, oversight, and monitoring
2. Policies and regulation
3. Situational analysis
4. Stakeholder dialogue, communication, and community mobilization
5. Setting up and enhancing institutions
6. Training of community members and programme implementers
7. Implementation and management

Lessons to Renewable Energy Projects for Local Rural Development

- Involvement and active participation of local is crucial in promoting and providing momentum in implementation of distributed power generation activities.
- Involving the private sector effectively requires flexibility to keep up the pace of decentralized development (procurement policies & approach, business model, financing & disbursement parameters etc)
- An appropriate feed-in-tariffs policy & its consistent and transparent application are crucial to encourage growth of small scale and non-conventional renewable energy generation.
- The expansion of the grid should be coordinated with off-grid investments, and, where warranted, the off-grid facilities should be made grid-compatible to ensure their continued utility.

Local Participation in SMMHP

How to involve?

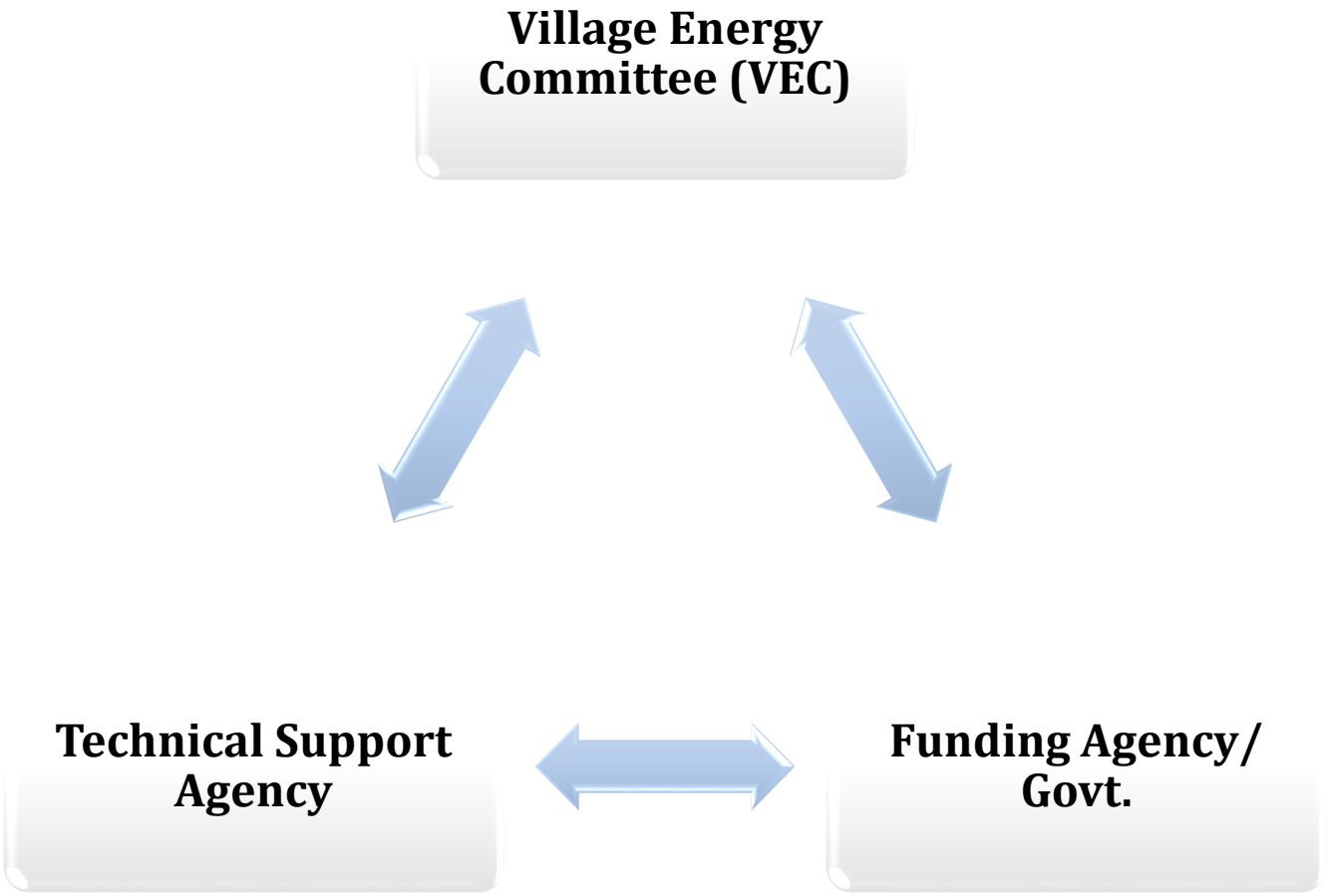
As Community

- being made partners
- being given responsibilities
- Having clearly defined rights

Where can be involved?

- Planning of projects
- Implementation of projects
- Operation & maintenance of projects
- Distribution of electricity bill and its recovery (off grid projects)
- Maintaining records, accounting etc

Project Implementation-Tripartite Agreement



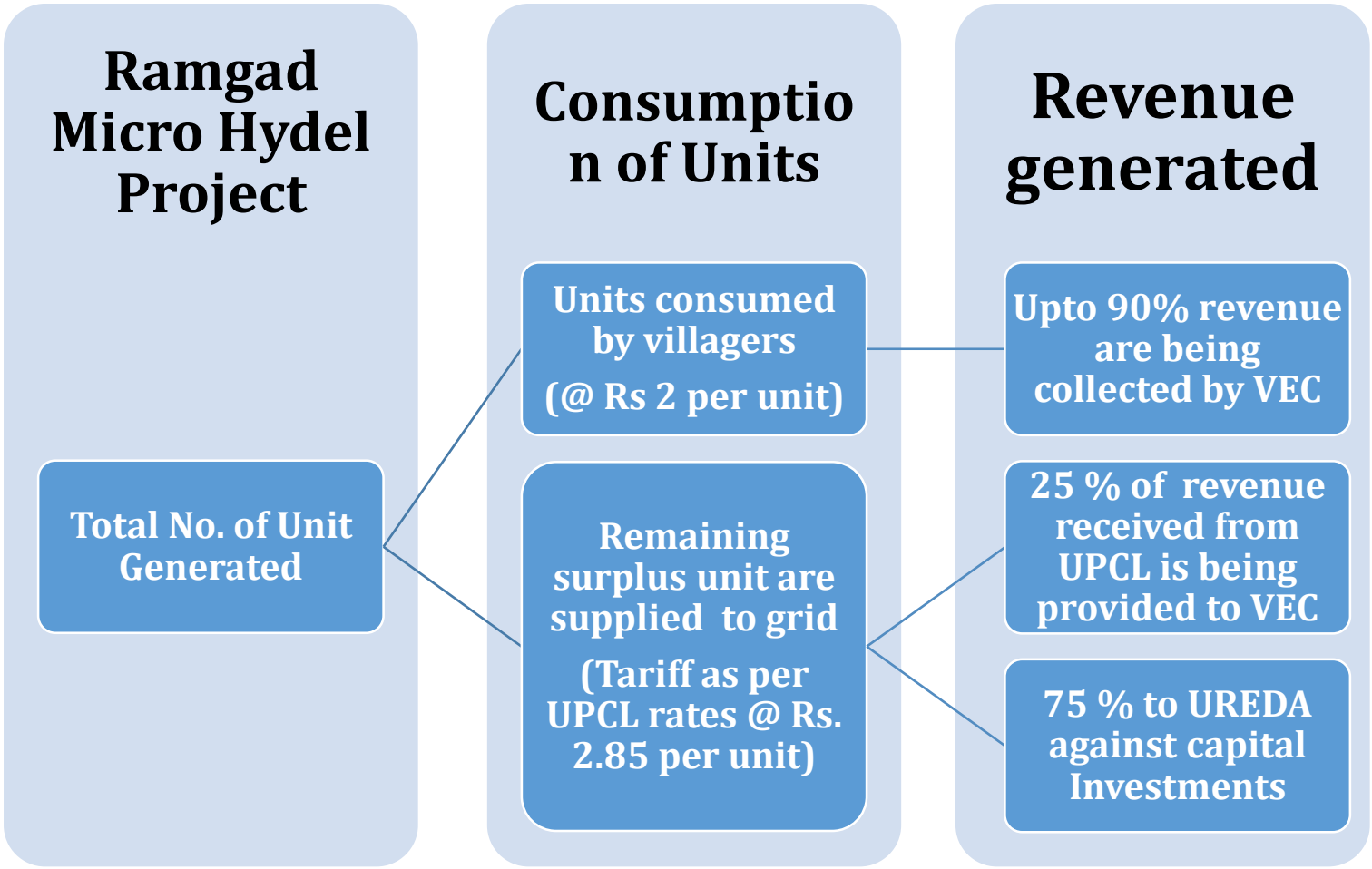
Roles and Responsibilities of different Entities

Village Energy Committee	Technical Support Agency	Funding Agency/ Govt.
• Forming their own bylaws: Legal status • Contribution in capital cost (cash/kind/labour) • Construction of various civil structures. • Purchase & storage of materials/equipments • Operation & maintenance of project, Record keeping and accounting • Insurance of structure & machinery • Selection and honorarium to Operators • Minor repair works	• Preparation of DPR • Making drawings, designs, tender documents, specifications of the equipments/material. • Inspection during construction for quality control. • Testing of the project. • Training to VEC members/operators. • Preparation of operation manuals	• Monitoring of the Project. • Provides guidance to VEC. • Quality checking. • Provide funds to VEC and Technical Support Agency as per tripartite agreement. • Support for other livelihood enhancement activities.

Case study of "Ramgad MHP" in District Nainital

- Installed Capacity = 100 KW
- Year of Installation = 1995 (and grid connected in 2004)
- No. of Unit = 2x50 KW
- Net Head = 50 m
- Design Discharge = 382 LPS
- No. of operators = 1x3(shifts)
- Electrician = 1 No.
- Electrification = 372 Households
- Local Grid Network = 15 Kms.
- Operate & Maintained by:- Ramgad Urja Samiti having 12 Members from user villages including 30% women members.

Ramgad Micro Hydel Project



Change in the Life style of the Villagers

Villagers Connected with World

Business During Night Hours

Late Night Working

Business Activities During Night

Cont..

Thank you