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# Small-Scale Hydropower

## Strategic energy solutions for developing countries

**T**he availability and consumption rate of energy is an economic index for measuring the development of any community. It is a commodity on which goods and services depend. Harnessing the hydroelectric potential of rivers and streams has become important in today's global renewable technologies.

The World Bank estimates that 70% of the economically feasible hydro potential lies in developing countries with 93% of the potential in Africa remaining unexploited. Lending for hydro projects exceeded \$1 billion in 2009, most of it going into the development of small-scale or micro-hydro projects.

### Current Situation with Associated Problems

**Energy and poverty:** Studies have shown that there is a strong correlation between energy consumption and growth. Access to modern energy services contributes directly to economic growth and poverty reduction through the creation of income generating activities. This reduces poverty by freeing up time for other productive activities.

**Hydropower and climate change:** Energy harnessed from flowing rivers and streams is environmentally benign. Small hydropower does not emit green-house gases and thus, does not contribute to global warming.

**Access to capital/funding:** Although renewable energy has become the priority of governments of emerging economies, energy infrastructure financing coupled with unstable political situations have led to worsening economic growth, poverty, and disease.

**Other factors:** Social, historical, cultural, geographical, attitudinal, and religious factors are major obstacles to the smooth implementation of such projects.

### Benefits of Small Hydro Plants

Some benefits of small hydro which make the technology more fascinating and economically viable are:

- It is the most proven, efficient, flexible, and reliable source of energy fuelled by water.

- It is capable of responding to environmental challenges and is free from green-house emissions and preserves the environment.
- It increases the access of modern energy services to the rural poor communities.
- This technology facilitates the development and even distribution of resources which contributes to the needed economic opportunities to improve standards of living.
- It is the motivating factor for meeting the expectations and aspirations of rural communities.

### Solution (Considering Mini Hydro: The OSSBERGER Concept)

Based on experiences with non-governmental organizations as well as private investors, OSSBERGER worked out a concept concerning the realization of typical small hydropower stations for the decentralized supply of electric energy in developing countries with the participation and active cooperation of Regional Governmental Electricity Boards.

The company has over a century's worth of experience and expertise. OSSBERGER's services cover a wide range of customers in Africa, notably non-governmental organizations, governments, and farmers.



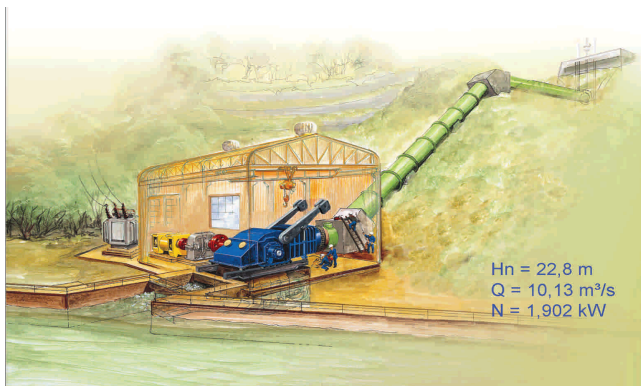
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OSSBERGER turbines are very simple to mount, robust, and are designed using proven technology to meet the peculiar conditions of the terrains where they are installed by blending precision with experience. The company has installed almost 10,000 decentralized power plants worldwide including within 15 African countries.

The OSSBERGER Cross-Flow Turbines run at high efficiencies with low admission rates coupled with a range of controllers, developed and manufactured by its own. The system is a multifunctional unit that can be freely configured as well as a specially designed power pack for a reliable operation which does not require repeated supervision.

## Comparisons with other Alternative Technologies

Other complementary decentralized accessible energy sources such as solar, wind, and biomass energy are often cited as competing options.



The cost of a kW/h for a micro hydro project can be as cheap as about one-half of the locally made wind systems and about one-tenth of the unit energy cost of solar home systems for decentralized rural application.

- A. Diesel and gasoline-engine generators: Though not expensive, fuel and maintenance in the long-term increase the costs due to unstable imposition of fuel costs. The efficiency of the generator also depends on the quality of fuel which corresponds with its price.
- B. Wind-electric generators: The efficiency of wind turbines depends on the amount of wind, being usually 20% to 30% of the total amount per year, even at the best locations due to weather conditions.
- C. Photovoltaic cells: These are more sensitive to weather conditions with the actual amount of energy generated being only about 10% to 20% at the maximum. The cost of such a system is about three to four times too high for most applications.

### Conclusion

Investing in small decentralized hydropower stations has ecological, socio-ecological, as well as economical benefits for governments of countries and emerging economies.

If there is potential for hydro, this kind of power generation which is capable of responding to the major challenges of climate change, energy security and access to clean energy, is more cost-effective than any other option. **FE**

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