

Interlinkages between water and energy

Demand for energy and freshwater will increase significantly in the coming decades. This increase will present great challenges and a tremendous strain on water resources in nearly all regions, especially in developing and emerging economies. Sida recognizes the need for sustainable resource management of water supply that does not jeopardize present and future needs of neither energy nor water.

This brief provides a general overview of Sida's engagement in the area of water management and power generation and highlights a few examples relevant to the theme.

MAJOR CHALLENGES

Freshwater and energy are crucial for human well-being and sustainable socio-economic development. It is widely recognized that a number of development goals depend on improvements in access to water, sanitation, power and energy sources. Major regional and global crises – of climate, poverty, hunger, health and finance – that especially threaten the livelihood of the three billion people living on less than US\$2.50 per day, are interconnected through water and energy. Worldwide, an estimated 768 million people remain without access to an improved source of water – although by some estimates, the number of people whose right to water is not satisfied could be as high as 3.5 billion – and 2.5 billion remain without access to improved sanitation. More than 1.3 billion people still lack access to electricity, and roughly 2.6 billion use solid fuels (mainly biomass) for cooking.

WATER AND ENERGY ARE INTERLINKED

Choices made in one domain may have direct and indirect consequences on the other, positive or negative. The form of energy production being pursued determines the amount of water required to produce that energy. At the same time,

the availability and allocation of freshwater resources determine how much (or how little) water can be secured for energy production. Decisions on water use and energy production may have significant impact on each other – and these impacts often carry a mix of both positive and negative repercussions.



Less than three percent of the population in rural Tanzania have access to electricity. Photo: Anne-Lie Engvall/Sida

As a response to these challenges, Sida provides support through various channels to promote efficient, sustainable and equitable use of water and energy resources. To achieve a balance between different needs, Sida supports our cooperation partners in the application of Integrated Water Resources Management principles, IWRM. IWRM is a cross-sectorial policy approach, designed to replace a traditional, fragmented sectorial approach. IWRM is based on the understanding that water resources are an integral component of the ecosystem, a natural resource, and a social and economic good. This approach also includes substantial challenges in introducing appropriate incentives that stimulates a development in this direction, e.g. as regards pricing of water and the use of water efficient technology in energy production.

Examples of Swedish support related to water and energy

SIDA ADDRESSES THE INTERLINKAGES BETWEEN WATER AND ENERGY IN ORDER TO PROMOTE POVERTY ALLEVIATION

Sida promotes efficient, fair and sustainable water resources management to ensure environmental safety and sustainable development. The overall objective of Sida's support to the energy sector is to contribute to supporting the development of sustainable energy systems that enable poor people to improve their lives. Sida also promotes partner countries' regional cooperation on addressing the interlinkages between water and energy of shared water resources, i.e. in the Mekong and Nile river basins.

To address the challenges of securing water and energy services it is important that ecosystem services of importance are protected and sustained. Environmental assessments are made prior to taking decisions on a programme or project. Partner countries' own assessment and monitoring systems are normally used.

SUPPORT TO SUSTAINABLE ELECTRICITY GENERATION IN THE NILE BASIN

One of the major development challenges facing the Nile region is that of inadequate power. The Nile Basin Initiative (NBI) was created in 1999 and includes ten countries along the river. NBI's goal is to foster collaboration that will lead to poverty reduction and peace. NBI has a broad work program covering water resource management, irrigation, hydropower, electricity transmission and trade, public participation and capacity development.

The NBI centers are helping the Nile basin countries to address the shortage of power generation through various projects and analytical work. As hydropower is one of the primary sources of generation in the region, it is critical that its operation and development is understood in a regional context that includes water resources management considerations. Sweden is one of the major donors to NBI and Sweden's support has *inter alia* contributed to feasibility studies focusing on environmental and social aspects of hydropower expansion in Tanzania, Burundi and Rwanda.

POWERFUL SOFTWARE PROVIDES TOOLS FOR WATER AND ENERGY DEVELOPMENT

WEAP – (Water Evaluation and Planning System) is a software tool for integrated water resources planning developed by the Sida partner Stockholm Environment Institute (SEI). It provides a user-friendly framework for policy analysis that is frequently used to balance the needs

of water resources by different stakeholders. The WEAP tool has been successfully applied in many regions including the Middle East where it helps to establish alternative water development and allocation scenarios in a process involving both Israeli and Palestinian participants.

SEI has also developed LEAP, the Long range Energy Alternatives Planning System, for energy policy analysis and climate change mitigation assessment. LEAP is often applied in conjunction with WEAP to balance demand for energy and freshwater in development interventions.

EXPANSION OF THE ELECTRICITY GRID IN MOZAMBIQUE PROVIDES ECONOMIC GROWTH AND EMPLOYMENT

Sida's support to Mozambique has contributed to the expansion of the electricity grid and increased the share of population with direct access to electricity from the national network during the last years. With an increased number of users and demand for electricity, identification and exploration of new sources for generation of electricity to feed into the grid is necessary. Sida supports the Government of Mozambique to conduct studies on new sites for hydropower generation using already existing dam construction upstream. The feasibility studies takes into account and include consultations with relevant water authorities.



Rural electrification is an important precondition for economic growth in Mozambique. Upgrading of existing hydropower plants is a sustainable way to provide additional power to the grid. Photo: Klas Palm/Sida

Policy direction – water and sanitation

Sweden promotes efficient, fair and sustainable management of water and sanitation, and energy. Sida's interventions are directed by results strategies at country, regional and global levels.