



ÇAKIT POWER PLANT



The Çakıt hydropower plant is a run-of-river plant utilising the Çakıt River close to Karaisalı in Adana province in Turkey. It has an installed capacity of 20 MW and will have an average annual production of 95 GWh. This amounts to the electricity consumption of about 32 000 Turkish households.

To collect water and to give sufficient head for power production, the waterways start by a small concrete regulator dam with necessary gates for minimum water release to the river and overflow weir. The regulator dam has also necessary trash racks as well as arrangement for de-silting of the water.

From the regulator dam the water for production is diverted from its original route through the Çakıt canyon in Kapıkaya village into a new waterway. The system consists of two concrete channels and two tunnels before entering into a concrete head pond. The total length of channels and tunnels is 5433 m.

When filled up, the head pond is on elevation 298 and the water is then pressurized via a steel penstock down to the power plant.

With the turbine floor on elevation 154 this creates the gross head of 144 m to the turbines.

TWO YEARS CONSTRUCTION

The construction works started April 2008. Çakıt was one of several projects in the company Yeşil Enerji, which Statkraft acquired in June 2009. Since then, Statkraft completed the construction works and the power plant was commissioned in May 2010, started commercial production in June 2010 and was officially opened 12 October 2010.

SUSTAINABILITY

The Çakıt hydropower plant is certified under the SOCIALCARBON Standard and Voluntary Carbon Standard (VCS). Adherence to the SOCIALCARBON Standard ensures that the project creates demonstrable social, environmental and economic benefits for project stakeholders.

KEY FACTS

- Estimated annual production: 95 GWh
- Installed capacity: 20.4 MW
- Gross head: 144 m
- Maximum discharge: 16.5 m³/s
- The installation consists of:
 - Two horizontal Francis turbines of 10,356 kW
 - 2 synchronous generators 11870 kVA
 - 33 kV switchgear
 - Step-up transformer and auxiliaries
 - 34 kV transmission line, 11,5 km, 47 power line poles
 - Connection to substation and feeder

LOCATION



HYDROPOWER

Hydropower is an environment-friendly and renewable energy source. Worldwide, hydropower contributes around one sixth of the total electricity supply.

The advantages of hydro are many – it is renewable, it is clean, it is reliable, it is flexible and can serve many generations with low-cost electricity from a local resource. Also, the potential is largest in areas where the energy needs are greatest, such as South America, Asia and Africa. In many developed countries there is an opportunity to optimize the existing plants.

THE PRINCIPLE OF HYDROPOWER

The principle behind the production of hydropower is simple; it uses the energy of flowing water. Many hydropower plants benefit from several storage schemes, and in some river systems a number of power stations are positioned in cascade one after the other, so that the water's energy can be exploited several times before it finally flows out into the sea. Inside the power station, the water drives a turbine, whose mechanical energy is turned into electrical energy in the generator. Hydropower is a highly flexible energy source, since the water can be stored in the reservoirs until needed. Hydropower schemes without reservoirs are often called run-of-river.

HYDROPOWER IN STATKRAFT

The majority of the Statkraft Group's energy production is generated through hydropower. Production takes place in more than 230 hydropower plants in Europe, South America and Asia. The hydropower plants have a total annual generation capacity just above 50 TWh.

Statkraft is involved in other hydropower projects in the many regions of Europe. The Group is also developing new production capacity in selected countries in South America and Asia through the company SN Power, in which Statkraft has a 60% shareholding.

ENVIRONMENTAL ASPECTS

Hydropower is an environment-friendly and renewable source of energy. It pro-

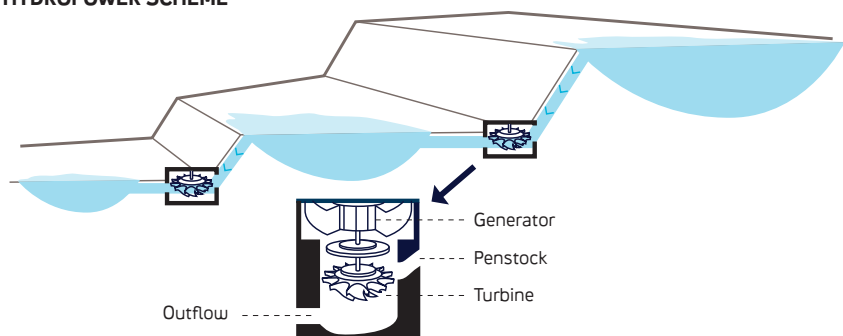
duces no air pollutants, and shows the best Green House Gases (GHG) emission performances of all power generation technologies. This is an extremely important factor, since the stabilisation of GHG emissions is one of the greatest environmental challenges facing the world today. Besides its positive contributions to combat resource depletion and global warming, hydropower affects river systems. While river regulation helps to protect people and the environment from droughts and floods, the modification of a river's flow pattern also affects fish and biodiversity. Statkraft's aim is to maintain healthy river systems. Hence the company has developed considerable expertise in taking care of environmental issues and implementation of mitigation measures. Examples of such measures include ecologically determined water flow, the construction of fish ladders, restocking and biotope protection.

In the context of meeting the effects of climate change, hydropower with storage capacity will even be more useful, as the reservoirs will be an important tool to mitigate floods and droughts while generating clean, renewable and affordable energy.

FACTS HYDROPOWER

- Hydropower has the best CO₂ performance, highest energy efficiency rate and longest life span of all power generation technologies.
- Hydropower with reservoirs provides the required backup energy to sustain other renewables with intermittent service and ensures electricity supply in times when there is no wind or sun.
- By storing water, hydropower reservoirs reduce our vulnerability to floods and droughts.
- Hydropower is available in a broad range of project scales and types. Projects can be designed to suit particular needs and specific site conditions.

EXAMPLE OF A HYDROPOWER SCHEME



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