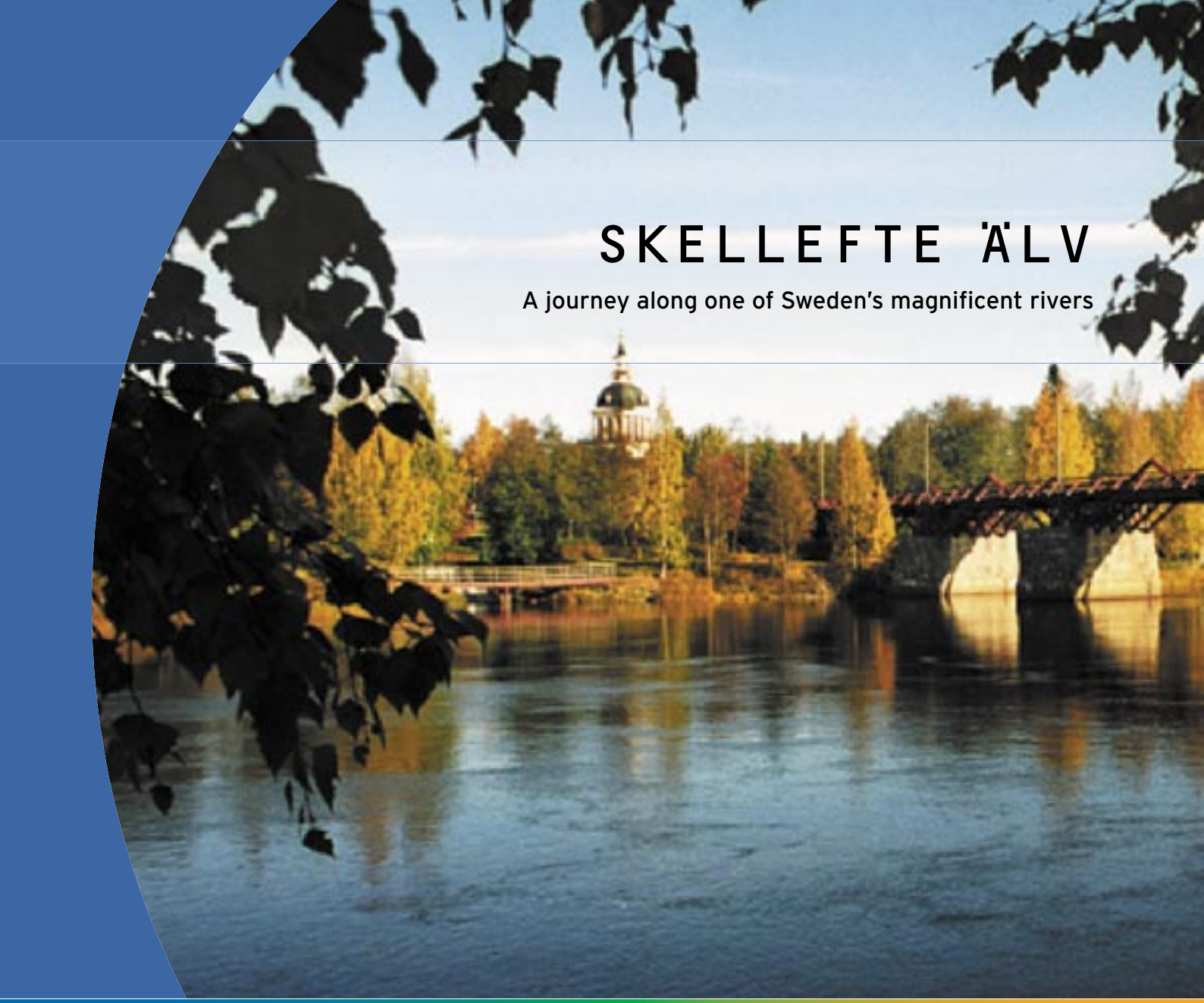


SKELLEFTE ÄLV

A journey along one of Sweden's magnificent rivers

VATTENFALL

SKELLEFTE ÄLV HAS BROUGHT PROSPERITY. FROM ITS SOURCE, LAKE IKESJAURE, VIA THE DEEP WATERS OF LAKE HORNAVAN, PAST MILE AFTER MILE OF WOODED SHORES FLOWS SKELLEFTE ÄLV. TIMBER FELLED ALONG THE VALLEY AND DRIVEN DOWN THE RIVER, TOGETHER WITH ORE, MADE VÄSTERBOTTEN PROSPER.

AFTER MORE THAN 400 KILOMETRES, THE RIVER'S JOURNEY ENDS OUTSIDE SKELLEFTEÅ, IN THE BAY OF BOTHNIA.

VINTER REKLAMBYRA. PRINTING: GTC PRINT AB. PHOTO: HANS-JÖRGEN RAMSTEDT, PER MAGNUS PERSSON/JOHNÉR BILDBYRÅ, ERLAND SEGERSTEDT, BO HALLQUIST/NORRLANDIA, ROLAND NILSSON AND OTHERS. ILLUSTRATION: LISA KARLSSON.

THE HISTORIC JOURNEY — FROM THE ICE AGE TO THE FUTURE.

About 12,000 years ago, the inland ice receded. The climate grew successively warmer and Scandinavia, entombed under three kilometres of ice for tens of thousands of years, would soon burgeon forth. The inland ice melted quickly, retreating to the point when, after only a couple of thousand years, eternal winter was replaced by a new landscape. Meltwater followed ancient furrows, eroding mountains and transforming the face of the land. The water deposited fertile soil along the river valleys. And where the ice had released its grip, people lost no time in finding new grounds in which to hunt and gather.

The first inhabitants, hunters and gatherers, lived well on the plentiful game and fish. Soon, they also learned to farm the fertile river valleys and, eventually, that the power of the rivers could be harnessed. Waterpower was utilized as early as the 1200s. Gristmills and sawmills were built, logs were floated downstream and the rivers became vital for transport. But their most important contribution to the development of society had yet to be realized.

With the late industrial revolution came large-scale use of electricity. For centuries, only a tiny fraction of the kinetic energy from the rivers had been utilized. Then, at the turn of the last century, engineers began to see the enormous potential of hydropower. In 1910, Sweden's first hydropower plant, Olidan, on the Göta River, began to supply power for industry and the railway. That signalled the start of the development of our rivers. Today, hydropower accounts for nearly half of Sweden's total electricity demand. In the future, hydropower will continue to play an important role, perhaps the most important role, as a renewable energy source.

The rapid melting of the inland ice contributed to the formation of river valleys and enriched the soil. For thousands of years, the rivers have played an important role in the development of society. The power of the river, once used for log driving, now accounts for nearly half of our total electricity demand.

WATER IS ON A NEVER-ENDING JOURNEY.

Waterpower is a sensible way of using a natural eco-cycle. Water vapour, which forms when the sun warms the lakes and oceans, rises to the higher, colder layers of air, where it condenses and forms clouds. When the clouds move in over the land, they release their burden in the form of rain or snow. That rain and snow is what keeps our rivers flowing. On its journey to the coast, we take advantage of the water's potential energy. Still within the eco-cycle, the water returns to the lakes and the sea, and the process begins again. Hydropower comes from a renewable source and makes use of Nature on Nature's terms.

Average annual rainfall in Sweden is between 600 and 700 mm. Abisko, on the other hand, gets about 300 mm of rain per year, which is about the same as the Gobi Desert.

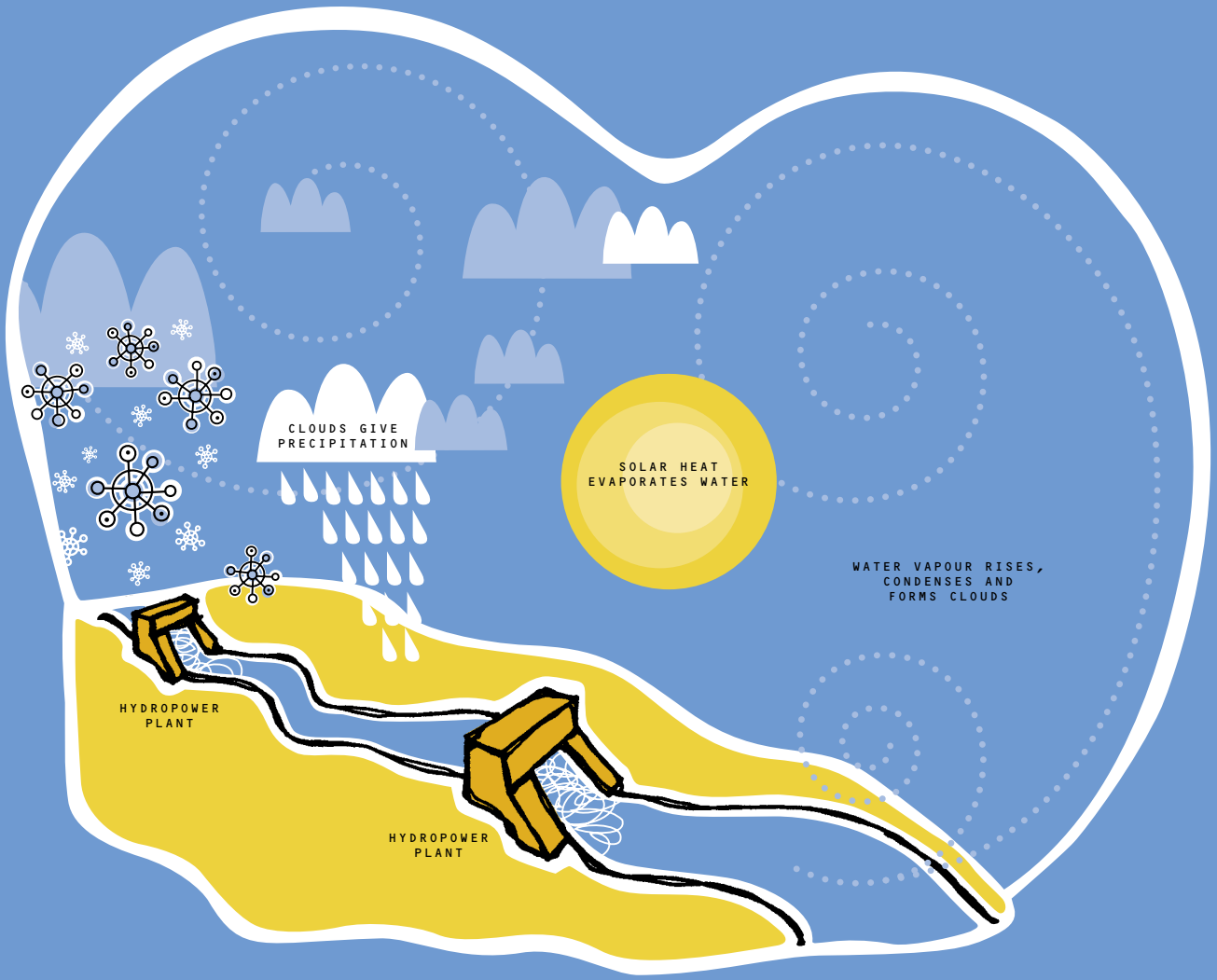
ENERGY DEMAND CONTROLS PRODUCTION.

Electricity from large-scale production cannot be stored, but must be used the instant it is produced. That is why we control hydroelectric generation with the help of reservoirs.

During the spring and early summer when the snow melts, and even during the autumn when it rains more often, huge volumes of water are stored. We can then use this water to produce electricity during the winter months, when power demand is greatest and the rivers receive no inflow from precipitation. In a river that has been developed for hydro production, water levels are controlled very carefully. The release of water from reservoirs is determined by energy demand in accordance with regulations establishing water levels and flow rates.

FOR VATTENFALL, THE ENVIRONMENT COMES FIRST.

Hydropower is a green energy source that does not harm the air we breathe or the water in our rivers. The process creates no hazardous wastes and no emissions are discharged to the air or water. Even so, hydropower production does give rise to a certain degree of environmental impact. The power stations, dams and reservoirs that are essential for utilizing the power of rivers have a great impact on the flora and fauna, both upstream and downstream. The natural reproduction of salmon species is disrupted. Vattenfall is therefore working to minimize the environmental impact caused by hydropower production. Salmon ladders have been built to help the fish bypass the dams. Vattenfall also releases around 1.3 million salmon and sea trout smolt annually in order to maintain the balance of growth. Today, environmental aspects are given very careful consideration when hydro stations are renovated or enlarged. Together with other power companies, Vattenfall is also involved in several projects of which the aim is to reduce environmental impact on our regulated waterways.



THE WATER CYCLE IS ETERNAL. THE SOURCE OF ALL LIFE.
BY USING NATURE ON NATURE'S TERMS, WE HAVE ACCESS TO A
SUSTAINABLE, RENEWABLE ENERGY SOURCE.

HYDRO TALK

How much energy does it take to light a 60-watt light bulb for 24 hours, to vacuum for one hour, or to watch a full-length film on TV?

Look at your household electrical appliances. Somewhere you'll find a label stating power requirement (in watts). If you multiply the power in kW by the number of hours you use the appliance, you get the total power requirement (in kWh).

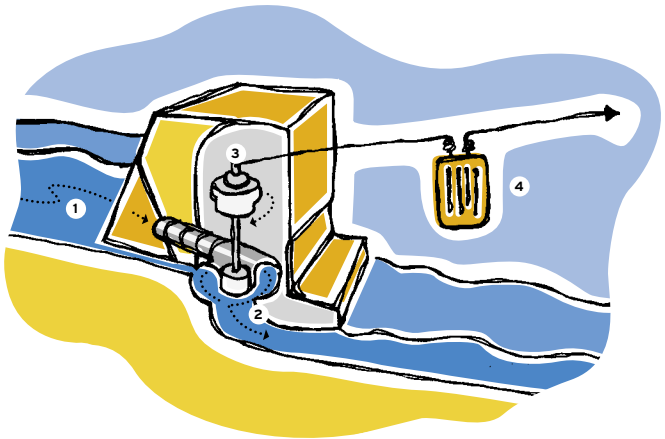
Example: 60W light bulb for 24 hours: 0.006 kW x 24 = 0.144 kWh.

VATTENFALL'S HYDROPOWER PLANTS ON SKELLEFTE ÄLV

1. Bastusel
2. Gallejaur
3. Vargfors

THE ENERGY JOURNEY — FROM RIVER TO CUSTOMER.

The amount of energy that can be converted is directly related to two factors: head and flow. Head is the difference in height between the water surface above and below the dam. Flow is the amount of water passing the turbine per unit of time. Since power is the product of head and flow, a higher head and a higher flow give a higher output. The energy utilized is referred to as potential energy. Quite simply, we make use of the height difference between two water surfaces to drive a turbine, which in turn drives a generator. The generator converts mechanical kinetic energy from the turbine into electricity. A transformer steps up the voltage and the electricity can be distributed around the country.



1. Reservoir
Water is dammed up to create higher head and for storage, so that power production can be controlled.

2. Turbine
On its way to the lower level below the dam, the water passes through a turbine. The turbine shaft, driven by the flowing water, drives a generator.

3. Generator
The generator converts mechanical energy from the rotating turbine shaft into electricity.

4. Transformer
In order for the transmission lines to carry the electricity efficiently over long distances, the low generator voltage is increased to a higher transmission voltage by a step-up transformer.

VATTENFALL'S HYDROPOWER PLANTS ON SKELLEFTE ÄLV

Station	Starting year	Normal annual prod. GWh	Max. output MW
Bastusel	1972	520	107
Gallejaur	1964	705	219
Vargfors	1961	445	120

GWh = Gigawatt hours MW = Megawatts

There are 15 hydropower plants on the Skellefte älv, of which Vattenfall owns three.

YOUR OWN JOURNEY OF DISCOVERY ON SKELLEFTE ÄLV.

Even the name is enticing: Silvervägen – the Silver Highway. From the coast, it follows Skellefte älv all the way through Västerbotten and Lappmarken to the Atlantic coast at Bodø, Norway. On your trip along the river valley and Silvervägen there are any number of pleasant places to stop, enjoy the scenery and excellent fishing or become acquainted with local culture and history. Hornavan, for example, Sweden's deepest lake, is stocked each year with three-year-old Bergnäs trout. When you have fished to your heart's content, take the opportunity to visit the Silver Museum in Arjeplog. Learn about pioneer history and the Sami culture, and see the fabulous silver treasure. If you still haven't seen enough cultural history, your next stop is the local heritage museum Hängengården, in Glommersträsk, featuring a farmstead from the 1700s with large collections of artefacts and utility items. The world's longest cable-car line, between Örträsk and Mensträsk, is a fantastic ride that gives you an incredible view and an incomparable nature experience.

LOG DRIVING AND CULTURAL HISTORY

In Adak, the Saga, an old-time cinema in original condition, is still open to the public. Each year, the friends of the Saga arrange a film festival that even attracts the interest of big-city culture personalities. And if you'd like to find out more about the history of log driving and the lives and working conditions of the loggers, stop at Svansele Wilderness Centre. There's plenty here for inquiring minds, including exhibits of the four seasons with wild animals in their natural habitats. A short drive from Silvervägen takes you to the village of Gallejaur, a national heritage site with numerous multi-building farmsteads grouped in a traditional manner. The Gallejaur hydropower station, Vattenfall's largest Skellefte River hydro station, receives its water via a seven-kilometre-long canal, the longest of its kind in Sweden.

With a depth of more than 200 metres, **Hornavan** is Sweden's deepest lake.

Kristineberg's underground church in the old Boliden mine.

The world's longest cable-car line, built in 1942, gives you an incredible view.

Svansele Wilderness Centre. Exhibits with wild animals in their natural habitats.

1 The Silver Museum

In 1922, Einar Wallquist, the so-called Lapland doctor, moved to Arjeplog, where he was to spend the rest of his days. His collection formed the basis of what is now known as the Silver Museum. The silver collection, which is the largest of its kind, comprises nearly 700 individual pieces of silver dating from mediaeval times to the 1900s.

2 Glommersträsk Local Heritage Museum

Hängengården is one of the region's most interesting local heritage museums. The 18th-century farmstead has twelve buildings and large collections of artefacts from the early period of Lappmarken settlement. Hängengården also features one of the country's first schoolrooms, from the 1840s, as well as a gunsmith's shop in working order.

3 The world's longest cable-car line

The ride between Örträsk and Mensträsk is one you'll never forget. Gliding along at 10 kph over forests, lakes and streams, the view is fantastic. In its heyday, the 13-km-long cable-car line carried 12 million tonnes of ore concentrate for Boliden Mineral.

4 The Saga cinema in Adak

It's as if time has stood still since the 1940s. In Adak, this cinema, now a designated cultural heritage building, tells the story of Östen Dahlberg, miner, musician and visionary. A monument to his dream, the cinema is in original condition. Don't miss the film festival in Adak – always the third week in July.

5 Svansele Wilderness Centre

A 1,200-square-metre exhibit with more than 450 stuffed animals in authentic settings from the four seasons. A model of Skellefte älv runs through an exhibit of the logging era, which describes just about everything having to do with one of the Skellefte River Valley's most important industries.

6 Gallejaur village and hydropower station

On the boundary that divides the counties of Norrbotten and Västerbotten lies Gallejaur, a village of national cultural heritage status where traditional 19th-century patterns of livelihood have been preserved. With a head of 80 metres, the Gallejaur hydropower station is Vattenfall's largest Skellefte River hydro station.

VATTENFALL'S JOURNEY — FROM HYDRO PIONEERING TO HIGH-TECH GENERATION.

As early as 1909, Vattenfall was producing electricity from the Trollhätte Canal and waterworks. Sweden's growing industries, railways and cities had an insatiable hunger for inexpensive energy. The power stations at Porjus, Olidan and Älvkarleby were built mainly to supply the railways with electricity. This was the start of hydropower development and a major step forward for Swedish industry.

HYDRO, NUCLEAR AND WIND POWER.

Today, by means of hydro, nuclear and wind power, as well as with fossil fuels, biofuels and waste, Vattenfall produces both electricity and district heat. In Sweden, hydro and nuclear energy are the basis of electrical power production. We operate three nuclear power stations and about a hundred hydropower plants. With forty wind-power plants, we are one of Sweden's largest producers of wind-generated electricity.

ONE OF EUROPE'S LEADING ENERGY COMPANIES.

Deregulation has enabled Vattenfall to expand its market area over a large part of Europe. Our goal is to become one of Europe's leading power producers. We have the capacity and know-how to supply our customers with energy, mainly electricity and heat, that is economical, makes good sense environmentally and is tailored to individual needs. We give our customers value for money by providing energy for quality of life, heat, light, comfort, safety and security, with reliability and good resource management. Now and in the future.

EFFICIENCY AND ENVIRONMENT.

We are making an ongoing effort to improve efficiency and the environment in our production facilities, always keeping human health and wellbeing, working environment and safety in focus. Vattenfall works in compliance with recognized environmental management systems.

Our customers can now choose to take delivery of environmentally friendly electricity from our renewable power sources. We guarantee that 95% of this electricity is from hydropower sources and 5% is from wind power. We also offer VattenEl EPD, which means that the electricity is produced on the Lule and Ume Rivers. EPD stands for Environmental Product Declaration.

We are committed to the environmentally sound development of future energy alternatives and to making Vattenfall the customers' number-one choice where both economy and environment are concerned.


POWER YOU CAN RELY ON

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