



Our future is renewable!
The power of tomorrow 2012–2050.

ewz

Die Energie



Ein Unternehmen
der Stadt Zürich

Power production today and in the future.

Challenges for ewz.

Exit from nuclear power, climate goals, market liberalization, new technologies: The electricity market is changing at a fast pace and thereby posing major challenges to power producers, suppliers and distributors as well as to politics and society in general. ewz has analyzed today's situation and developed possible scenarios for future power production and sales.

ewz targets to expand its renewable energies portfolio on a large scale and maintain its hydropower production on a long-term basis. At the same time ewz allows existing holdings and procurement rights for nuclear power plants to expire.

Just like ewz, other power supply companies must find solutions to integrate highly fluctuating production of wind and solar power into the grid system. In addition, there is the progressive liberalization of the market, the dependency of electricity prices on the European wholesale market, and the appreciation of the Swiss franc. As a result of this, competition is getting more intensive and pressure on margins is getting higher.



ewz power production 2011.

Technology	Annual production
Hydropower	2265 GWh ¹
Nuclear power	2159 GWh ¹
New renewable energies	200 GWh
■ Wind	167 GWh
■ Photovoltaic (incl. ewz solar power exchange)	13 GWh
■ Solar thermal energy	(ab 2012: 5 GWh)
■ Biomass	20 GWh

¹ Average production 2002 to 2011; share of ewz where applicable.

Impacts of market liberalization.

The Swiss electricity market has been partly liberalized since 2009 and larger customers are allowed to choose their power suppliers freely. Two thirds of the power sold by ewz is subject to the free market already. According to the Federal Electricity Supply Act all customers will be able to choose their supplier freely in the near future. But power market liberalization also entails new possibilities for sales. For example, ewz will spread its activities all across Switzerland in order to assert itself within the new market structure.



Production scenarios.

An overview.

In the report 'Power of tomorrow 2012–2050' four production scenarios are analyzed and evaluated with respect to energetic, ecological and financial criteria. Ecological impacts of the individual technologies, their level of maturity as well as their potential are used as inputs for the analysis.

Scenario 1

- No relicensing of hydropower plants (i.e. no possibility of using hydropower in the canton of Grisons in the long-term)
- Moderate expansion of new renewable energies

Scenario 2

- Successful relicensing of hydropower plants (i.e. possibility of using hydropower in the canton of Grisons in the long-term)
- Moderate expansion of new renewable energies

Scenario 3

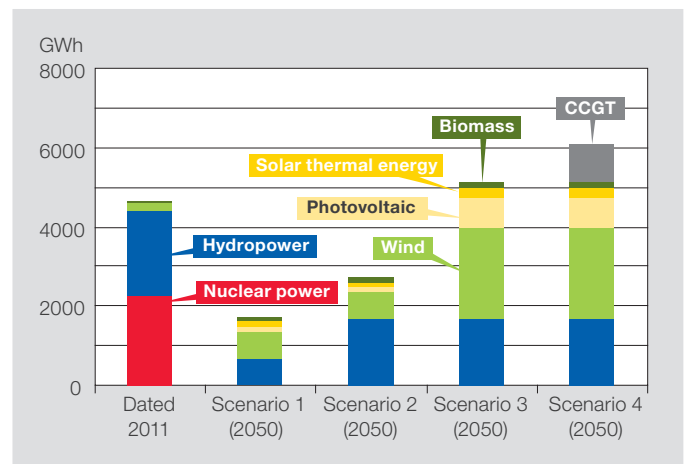
- Successful relicensing of hydropower plants
- Major expansion of new renewable energies

Scenario 4

- Successful relicensing of hydropower plants
- Major expansion of new renewable energies
- Investment in flexible combined cycle gas turbine power plants (CCGT) in addition to weather-dependent wind and solar power plants

The following assumption applies to all scenarios: at the latest by 2034 all investments in nuclear power plants will expire and the construction of additional wind and solar power plants will mainly be realized abroad.

Production based on technologies today and in the year 2050.



The power of tomorrow. Our future is renewable!

ewz and its owner – the city of Zurich – are pursuing production scenario 3 and aiming to invest particularly in wind and solar energy as well as hydropower plants and their relicensing.

There are a variety of reasons in favor of a major expansion of renewable energies and relicensing hydropower plants: decreasing cost of renewable technologies; expiration of procurement rights to nuclear power plants along with some of these plants reaching the end of their lifetime; and the ecological targets set by the city of Zurich towards becoming a '2000 Watt society'. In line with the goals of the city of Zurich, ewz is pursuing the vision of becoming the leading power supply company in Switzerland and a forerunner in the areas of ecology and energy efficiency.

ewz power production 2050.

Technology	Annual production
Hydropower	1700 GWh
Nuclear power	0 GWh
New renewable energies	3425 GWh
■ Wind	2300 GWh
■ Photovoltaic (incl. ewz solar power exchange)	750 GWh
■ Solar thermal energy	250 GWh
■ Biomass	125 GWh



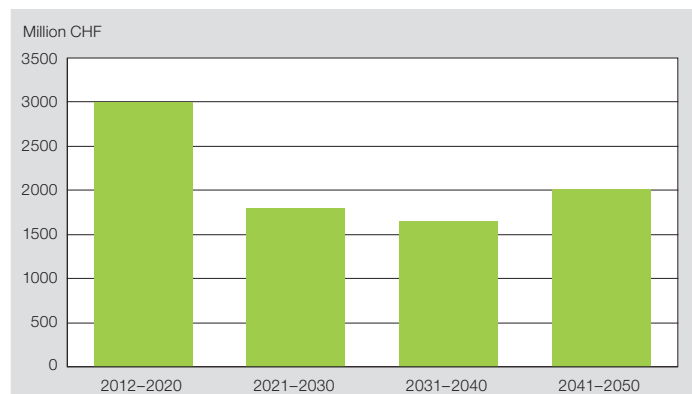
The power of tomorrow. High investments required.

In order to achieve the goals of the scenario pursued, ewz must provide the necessary funds for relicensing the hydropower plants and for the development of new renewable energies.

The investments for new renewable energies will mainly occur in two periods. In the first period, from today until the year 2020, new plants will be built; in the second period (2030 to 2040) many plants will have to be renewed. The projected expansion requires investments of approx. 100 to 400 million Swiss francs per year in these periods. The main part of these funds will be invested abroad.

Investments in hydropower and relicensing of the plants will lead to high spending in individual years. Such investments will mainly take place within the years 2040 to 2050 when the licenses for several large hydropower plants (partner plants) will have to be renewed.

Investments up to 2050.



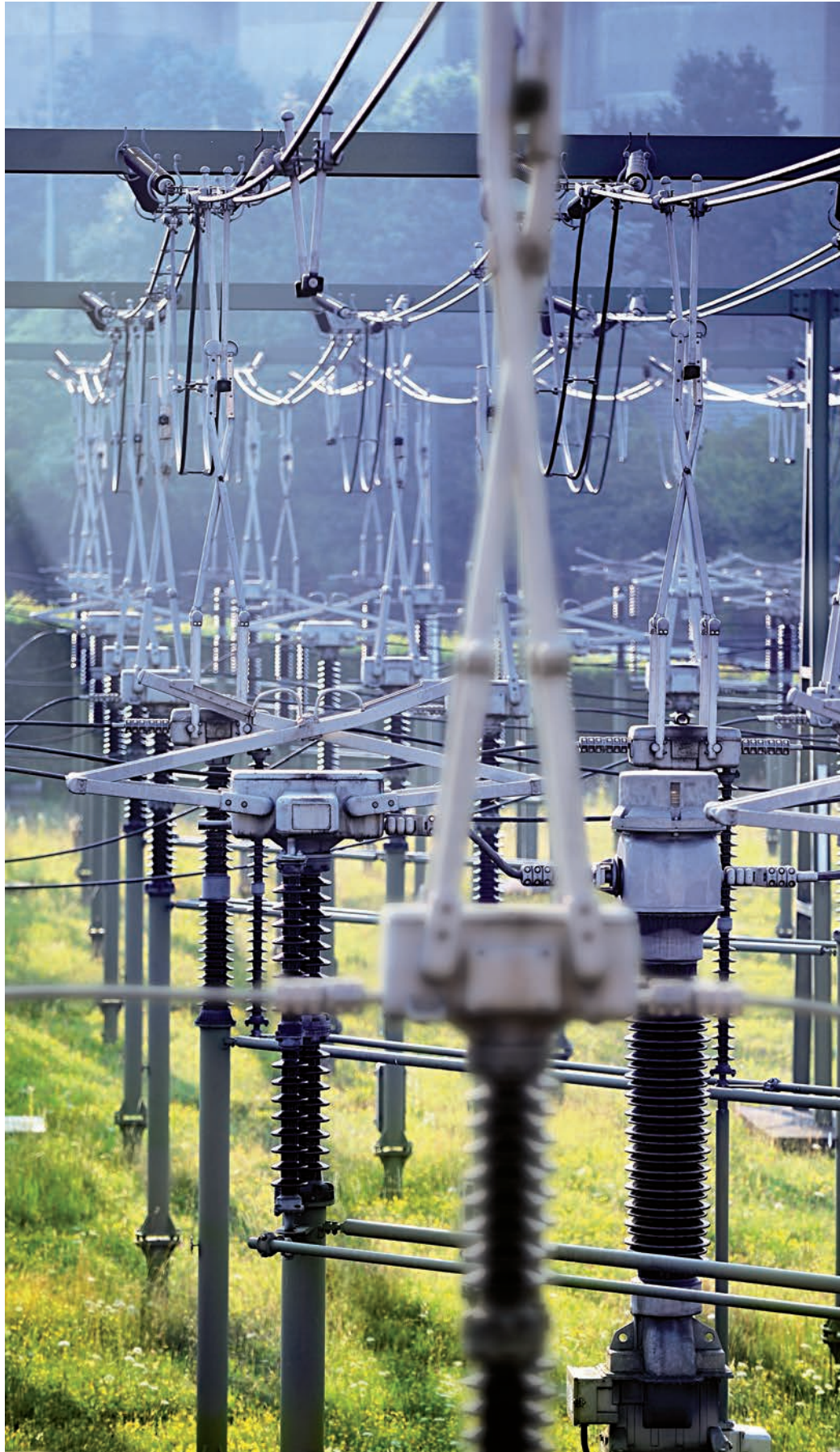
The power of tomorrow.

Effects on the grid system.

In production scenario 3, the proportion of wind and solar power plants will increase to 60 percent of total production. Power from renewable energies will be produced at numerous locations and requires an adequate grid infrastructure. Weather forecasts are becoming more and more accurate, and therefore so are predictions of the quantity produced in solar and wind power plants. Nevertheless, production planning will be more difficult with the increasing number of such plants. Ways and means are needed to make sure the grid system remains stable and the power supply is ensured. This involves grid reinforcements, power storage, and flexible thermal power plants such as combined cycle gas turbine power plants or pure gas turbine power plants. Furthermore, a system for balancing demand and production will become necessary.

As a result of these challenges, ewz is pursuing the following goals:

- ewz is operating an efficient distribution grid and offering high availability at low costs.
- ewz is ensuring efficient and innovative grid services.
- ewz is being innovative in redesigning the grid (e.g. smart metering – www.ewz.ch/smartmetering).
- ewz is investing in new storage technologies.



Additional information. Contact.

The complete report 'Power of tomorrow
2012–2050' is available for downloading
at www.ewz.ch/stromzukunft.

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