



## Flexibility market

### Efficient and sustainable electricity market design

Renewable energy sources play an increasingly important role in the European electricity production system. In order to integrate this renewable energy into the electricity market of the future, new technical and economic measures are needed to make the electricity system more flexible. Swissgrid is working towards an efficient and sustainable electricity market design with efficient price signals and minimum market distortions.

#### **Flexible production is necessary for system stability**

Currently, production by renewable energy sources (wind and solar power) across the entire European grid is highly volatile and can only be controlled and predicted to a limited extent. This leads to frequency fluctuations and unpredictable electricity flows over the grid. Flexible gas or hydropower plants as well as, increasingly, technical measures such as load management can counteract these fluctuations. Flexible production is thus of primary importance for system stability across the entire European grid.

#### **Economic viability of flexibility threatened**

Electricity prices have been declining on European electricity exchanges due to several factors. Support for rapid expansion of renewable energy production; surplus capacities in the power plant sector; as well as low CO<sub>2</sub> prices have caused the wholesale prices in Europe to sink dramatically over the last few years. Consequently, investment in stabilising production capacities has been increasingly threatened. The main problem is that they provide something that is not suitably valued in today's electricity market design: flexibility.

#### **The current «energy-only market» is showing its limitations**

Today's electricity market is designed as an «energy-only market». It remunerates power plant operators

for the amount of energy produced. According to the merit-order principle, this means that the power plants with the lowest marginal costs will be used to meet the current demand. The influences of different types of power plants on the electricity system are not well considered in today's electricity market. Power plants' volatility and flexibility – important factors for system stability – are not suitably priced: Increasingly volatile power production and the electricity market design that dominates Europe today (which was developed in the 1990s) no longer fit sufficiently each other.

#### **New challenges for the electricity market**

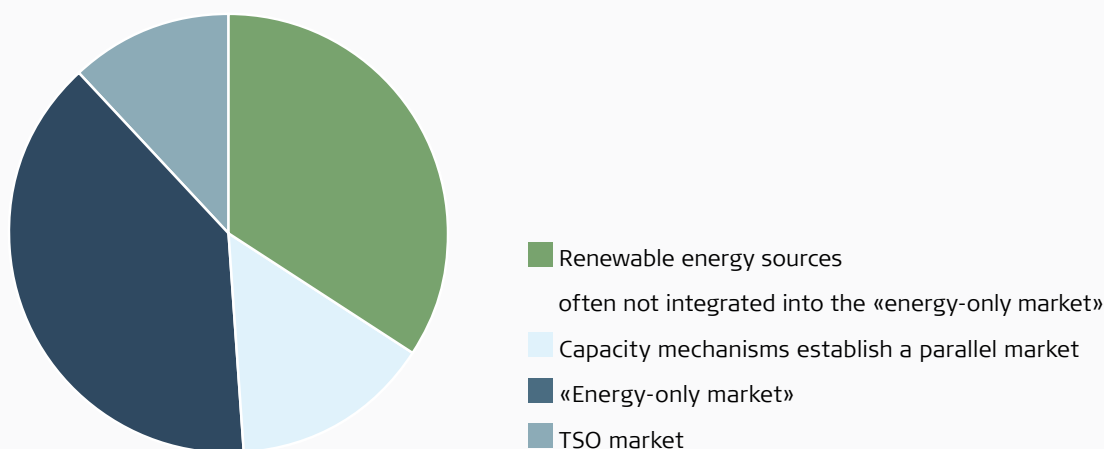
The major challenge for the future electricity market is to match production and consumption continuously as the proportion of production from wind and solar energy sources increases. The goal is to ensure a secure energy supply in the most environmental-friendly and cost-efficient manner.

The market must be designed so that sufficient power plant capacities are available at any time whenever and wherever they are needed and that they are utilised to the degree required. To achieve this, it is necessary to obtain the most efficient price signals possible. These signals should also provide additional incentives for the development of future-oriented technologies and marketing concepts.

## Different concepts across Europe

European countries are currently adjusting the market design with, for instance, concepts for capacity reserves and capacity markets. However, this has a disadvantage: These concepts minimise the efficiency of the international electricity market because (1) they are focused on individual nations, (2) they do not strengthen price signals, and (3) they establish a parallel market in addition to the «energy-only market» that requires special regulations. They therefore do not provide a market-based approach for long-term, efficient integration of renewable energy into the electricity system.

**Today, renewable energy sources are often not integrated into the «energy-only market».**  
**Capacity mechanisms establish a parallel market.**



## Increasing electricity system flexibility and optimizing it internationally

The concept of a «flexibility market» that Swissgrid has created and developed with its partners centres on a market-based, internationally coordinated adaptation of the existing «energy-only market».

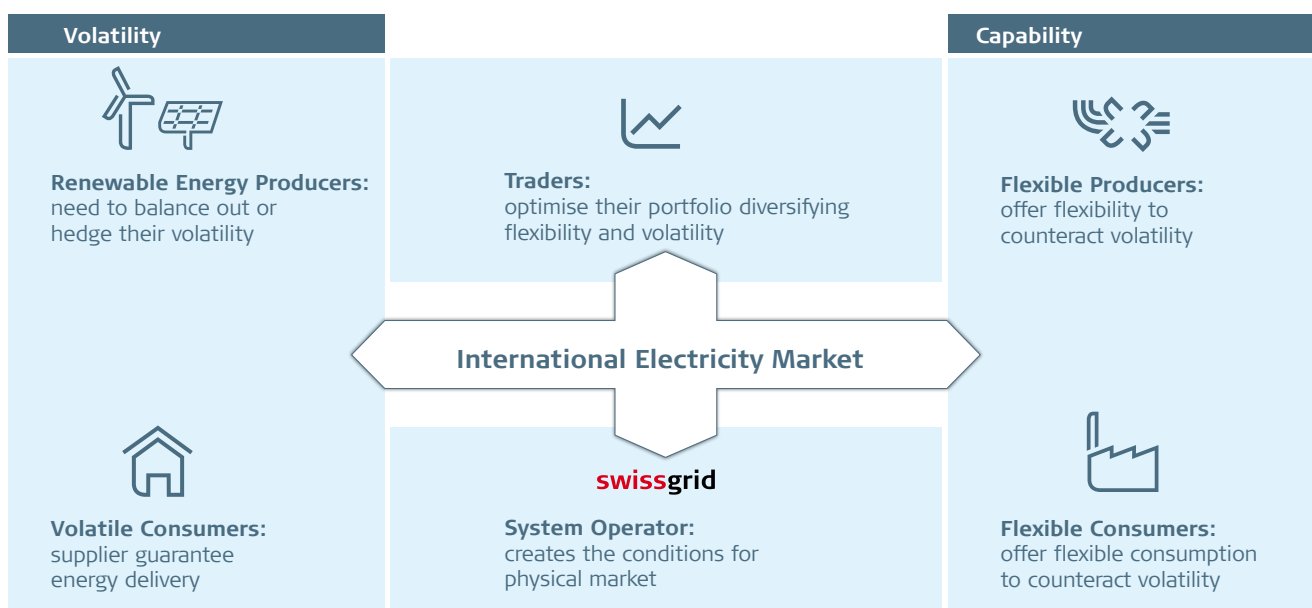
It strives for a market design that increases the real-cost pricing in the electricity system by including all the consumption and production related costs. Open markets and international trade ensure that the potential of volatile, renewable energy as well as flexible production and flexible consumption can be used in an optimised way. Doing so, capacity mechanisms may be reduced or avoided.

## Efficient integration of flexibility into the electricity market

An international flexibility market makes it possible to provide the additional flexibility required for the electricity system in a market-oriented way.

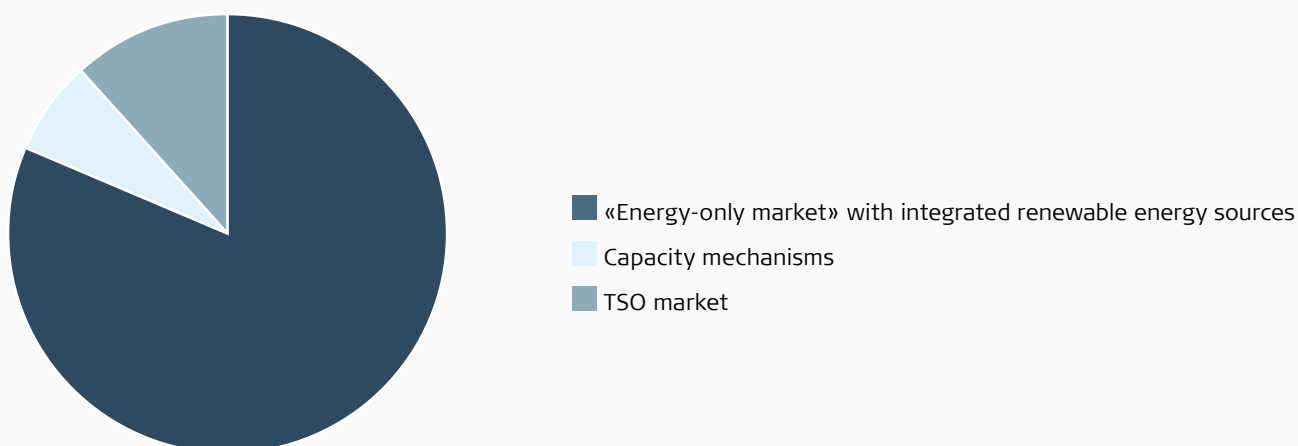
If the market design is sophisticated enough, fluctuations in power production and consumption can be eliminated and/or invoiced at the parties responsible for them.

Establishing a market that can achieve this requires clarifying responsibility of the balance groups that electricity supply for end users. According to the user pays principle, they will be required to balance production and consumption according to their prognoses, whereas the TSO will balance out only very short term deviations.



The total costs that arise from these deviations will be the responsibility of those balance groups who require them. Accordingly, also renewable energies are to be integrated into balancing groups. The system so resulted generates an incentive to develop new products and services for short- and long-term electricity trading. These give market actors the possibility, for example, to account for volatility with flexibility in a market-based way. At the same time, the system's clear price signals encourage innovative technologies such as the substantial integration of load management. Flexible consumers can play a crucial role in counteracting volatility.

**The flexibility market integrates the renewable energy sources into the «energy-only market». Capacity mechanisms can be reduced or avoided.**



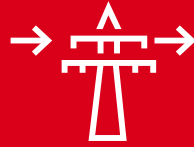
Swissgrid is convinced that Switzerland and Europe can jointly develop a secure, sustainable and cost efficient power system. A contribution is required from all market parties. It will be vital to support the numerous already existing initiatives and to promote the development of new ideas. Tomorrow's electricity market needs openness and engagement for innovative solutions.



**12 000**  
electricity pylons  
in Switzerland



**41**  
connections to  
foreign countries



**78 435 GWh**  
of energy  
transported  
in 2014



**140**  
switching  
substations for  
transforming  
the electricity

# 6700 km

Length of the Swiss  
transmission grid

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