

Electricity market 2030

– a vision of a European electricity market

- Carbon-neutral future • Renewable energy • Secure electricity supply • Competitive market
- Many opportunities for consumers

Change is safeguarded by competition

Energy production costs and carbon dioxide emissions did not play a significant part in the past. Electricity generation was adapted to the needs of electricity consumption. Power plants were started up as and when more electricity was needed. Correspondingly, some customers had their power switched off if it looked like there may be a shortage of electricity. In order to avoid power outages, reserve capacity was built in every country.

This is going to change. Old coal-fired power plants are taken out of use, and utilisation of renewable energy in electricity generation will increase. However, the strength of wind and sunshine do not follow the preferences of electricity users. The price is lower when there is plenty of electricity available. When there is no wind, the price of electricity rises. It pays to use electricity when it is offered at an ad-

vantageous price. Therefore, we are entering a world where it is advantageous for electricity users to take production changes into account.

Major electricity users already may schedule their consumption in order to reduce their electricity bills. This will also be possible for small consumers in the near future.

A strong transmission network balances out regional variations in electricity generation. An opportunity to transmit electricity is, therefore, the key requirement for increasing renewable energy production.

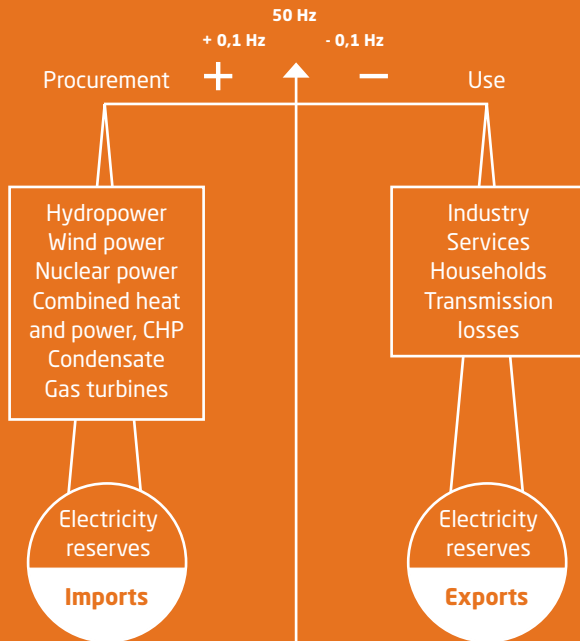
Not going to happen, if *the market rules, transmission network, utilisation of metering data and the electricity customers' awareness do not develop in pace with renewable energy production.*

Why market orientation?

- Customers' needs as a driving force of change
- Economic efficiency: correct use of resources
- Customer's power to choose: seller, product, production method, etc.
- Price signals of the need for production investment
- Balancing of supply and demand
- Ability to establish a cross-border single market

How to implement it?

- Competitive electricity production and sales
- Regulated electricity network as a marketplace for customers, electricity producers and electricity vendors
- Unbundling
- Transparency



Electricity network at your service

Transmission networks connect major power plants, towns and large-scale industry, and also different countries. Distribution networks connect households and companies to the transmission network and the electricity market.

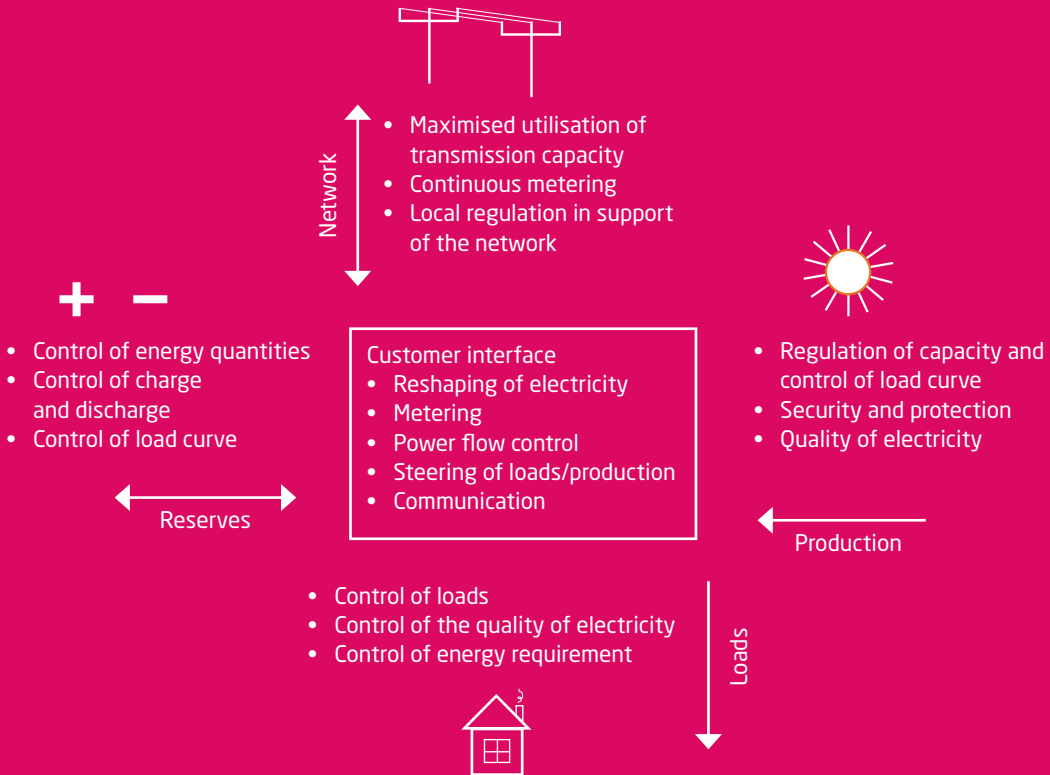
In a sufficiently strong electricity network, electricity is transmitted to its users from the most advantageous and efficient places of production.

When planning transmission networks, you have to look far into the future: where will electricity generation and consumption be placed? Network design takes time and construction is expensive.

Inevitably, the network has some bottlenecks, or transmission congestions. From time to time, these congestions restrict electricity transmission from what would otherwise be required by supply and demand. Where significant congestion exists, the electricity market area is divided into price areas. The wholesale price of electricity within a price area is always the same at certain times.

Large price areas enable efficient utilisation of the electricity production capacity. They also increase customers' choices and competition in the market.

Not going to happen, if the electricity network is not expanded sufficiently and the markets are fragmented into smaller and smaller entities.



A sufficient amount of electricity - fewer emissions

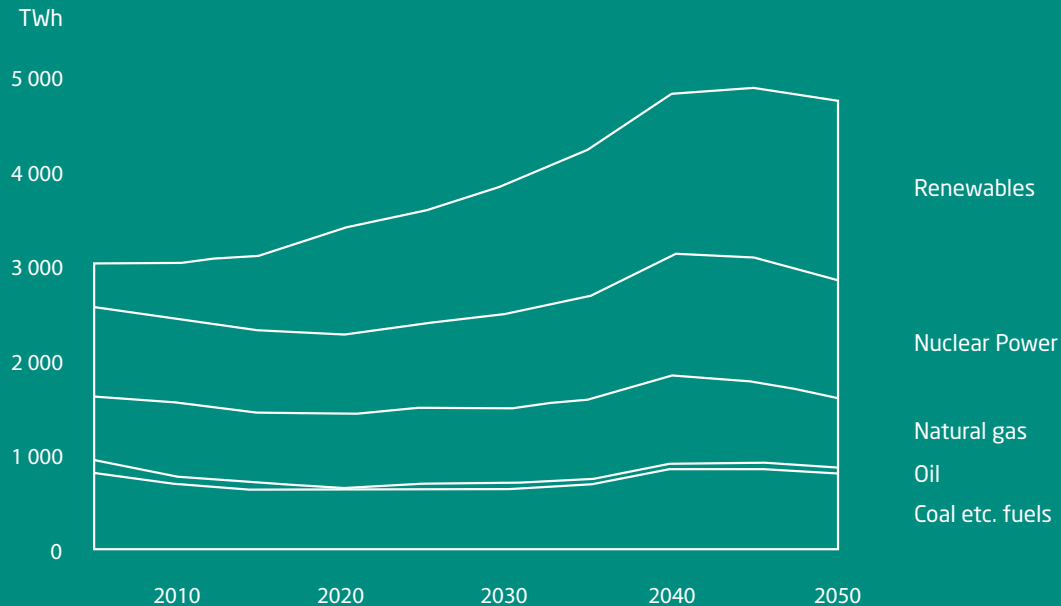
In a well-functioning market model, electricity is always produced with the most advantageous methods available. The price of electricity is formed on the basis of supply and demand in the electricity market place, i.e. on the electricity exchange, with the aid of marginal pricing. With the price formed, the producers generate exactly the amount of electricity desired at that price.

We are moving towards a lower-emission electricity production structure when the utilisation of renewable energy and nuclear power increases. In future, the increased prices of emission allowances and the falling costs of renewable electricity production will reduce the support needed for renewable energy.

In the future, electricity generation will not be supported or maintained with tax payers money, but investments in new production capacity will be funded with the incomes of electricity. The price of carbon-dioxide emissions will direct investments towards low-emission production forms. Yet, Europe cannot be responsible for emissions reduction alone: we need a global emissions reduction system.

Not going to happen, if *the regulation of electricity production prevents the implementation of market-driven investments and, as a result, the sufficiency of production capacity would have to be ensured with subsidies. Regulation would become very complicated.*

Prospects for European electricity generation



Source: Eurelectric, Power Choices 2050

Customers participate and make decisions

A strong transmission network and extensive price areas provide an opportunity for effective utilisation of the electricity generation capacity and promotion of competition in the wholesale and retail electricity markets. Producers operating in the same price area compete with one another without restrictions in electricity transmission. In the retail market, electricity vendors get the electricity they need from the wholesale market and can offer versatile electricity products for a large number of customers. Competition will increase.

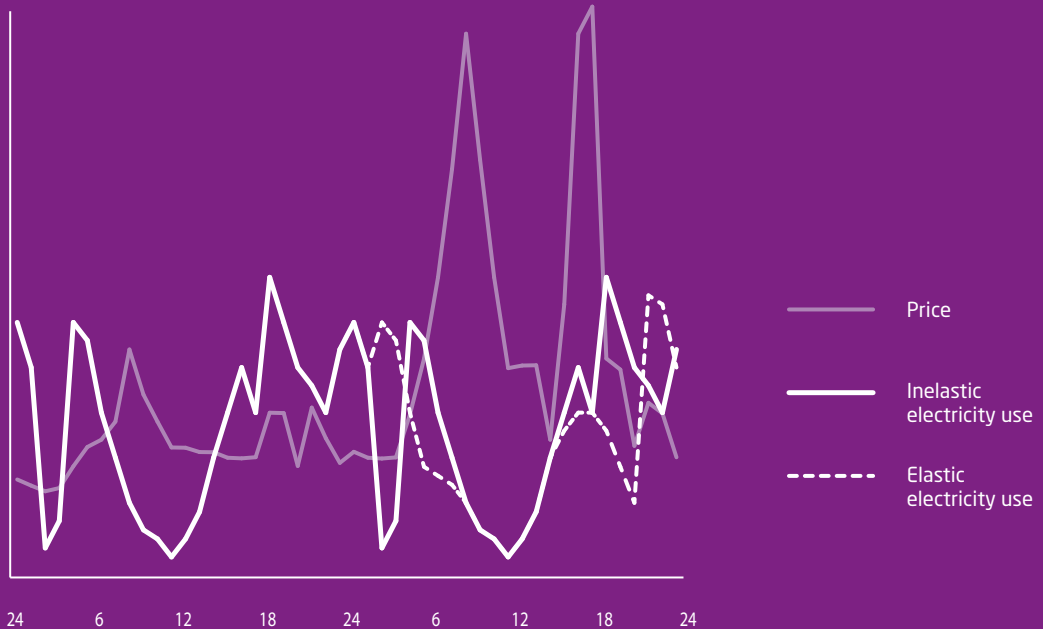
The customers have power. With new electricity meters and services, customers will understand and control their electricity usage and gain full benefits from correct timing of electricity consumption.

The growing supply of renewable energy will increase the hourly variation in the price of electricity. Consumers will have an impact on their own electricity bill and promote the environmental targets of energy generation by using or storing electricity whenever there is plenty of it on offer.

Smart grids with their versatile metering services will enable the customers' own small-scale electricity generation.

Not going to happen, if *price regulation is used for preventing viable competition in the retail market and the customers cannot operate on the market.*

Price of electricity and flexible consumption in a 24-hour period



The customer takes changes in the price of electricity into account in his electricity consumption. He will be able to reduce his electricity costs by transferring consumption to low-priced hours and reducing consumption during high-priced hours, for example, with electric storage heating. This flexibility may take place with automatic controls.

A united Europe

Instead of using national solutions, the European countries will achieve targets better in mutual co-operation. A well-functioning internal market and good transmission links will reduce the threat of crises in energy supply and boost the efficient use of production resources. A well-functioning internal market will also facilitate the market entry of renewable energy when, for example, increased use of wind power in different countries can be utilised across borders.

The preconditions for a European electricity market are created with common electricity market rules and a market model, as well as an adequate transmission network. These are the best tools for the industry and households to utilise the European electricity generation resources.

A common market requires common rules to safeguard equality. The European Union is in the process of drawing up common internal market rules, based on the internal energy market legislation that entered into force in early 2011.

The three basic targets of the EU energy policy are:

1. Good availability and security of energy supply
2. Efficient utilisation of resources and support for EU's competitiveness
3. Sustainable development, especially support for the climate policy targets.

Not going to happen, if *the drawing up of common market rules is delayed, for example, due to major differences in the views of regulation authorities, grid companies and electricity exchanges, or if the member states slow down the implementation of rules.*

Targets of the EU energy policy



Preconditions for the implementation of the vision:

- Sufficient electricity transmission capacity
- European viewpoint to building of transmission network
- Market participation of electricity users
- Free price formation in the market
- Integration of the energy market
- No structural obstacles to market entry of various production forms

The Vision for European Electricity market in 2030 was created to support the development path towards a carbon-neutral future and to promote access to the European electricity production capacity by companies and homes in the best possible way. The vision and its background reports were drawn up by the Lappeenranta University of Technology. The vision project was commissioned and funded by Finnish Electricity Research Pool, Finnish Energy Industries, the Finnish Forest Industries Federation, the Federation of Finnish Technology Industries, Suomen Elfi Oy, and Nord Pool Spot AS. The vision report is available on the Finnish Energy Industries website at www.energia.fi/fi/julkaisut/visiot2050.