



ELENIA

# Investments in the Security of Supply and Smart Grid

**GEODE Spring Seminar 2018, Brussels**

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# Elenia Oy / Elenia Group

Revenue 2017

**263 / 339 M€**

Personnel (FTE)

**173 / 332**

Customers

**425,000**

Market share

**12%**

## Partnerships

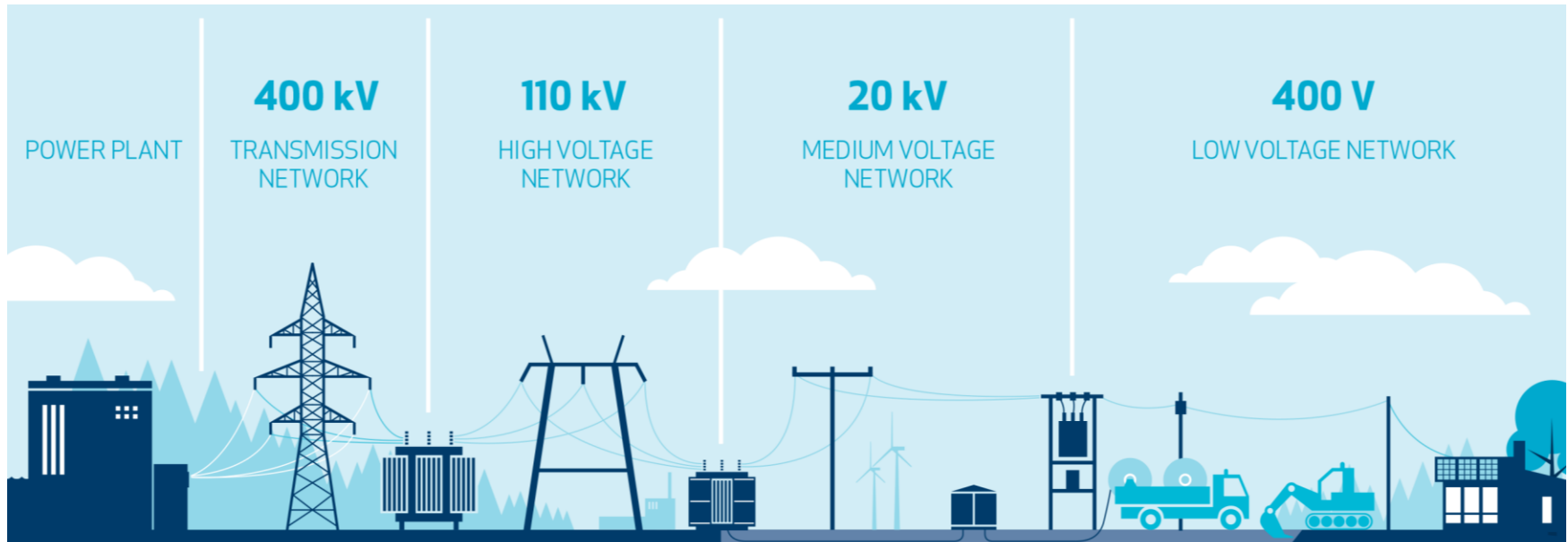
- Electricity network services
- Electricity metering
- Data transfer services
- Administrative services
- 700–800 person-years

## Quality

- Asset Management Systems ISO 55001 and PAS 55
- Occupational Health and Safety Management System ISO 45001
- Environmental Management System ISO 14001

- 160 metres of network per customer
- 70,000 km of network i.e. 1.5 times around the globe
- Underground cabling rate 41%

# Electricity transmission and distribution system in Finland



- The length of distribution networks in Finland is appr. 400,000 km
- The market is very fragmented as there are 79 DSOs in total
- Elenia Oy is the 2<sup>nd</sup> largest DSO in Finland
- Fingrid Oyj is the TSO in Finland



## BUSINESS ENVIRONMENT

Requirements stipulated by the Electricity Market Act concerning the reliability of electricity distribution.

Power outages caused by storms or snow loads shall not exceed **6 hours** in zoned areas and **36 hours** in other areas, as follows

50 % 

OF CUSTOMERS BY THE END OF **2019**

75 % 

OF CUSTOMERS BY THE END OF **2023**

100 % 

OF CUSTOMERS BY THE END OF **2028**





# Security of Supply in power distribution



## Maintenance & tree clearance



## Management of outages & major power disruptions



PROCESSES

## Elenia Weatherproof



## Network automation & ICT



TECHNOLOGY

# Elenia Weatherproof



## ELENIA WEATHERPROOF

- Our underground-cabled electricity network is safe from winds, thunderstorms and snow loads
- We are modernising the network in cooperation with our partner contractors
- **Look at the map** to see where we are improving the reliability of electricity distribution

We care.



70,000 km

Elenia has 70,000 kilometres of electricity network – 1.5 times around the world – in Häme, Pirkanmaa, Central Finland, and South and North Ostrobothnia. 41% of the network is underground cabled.

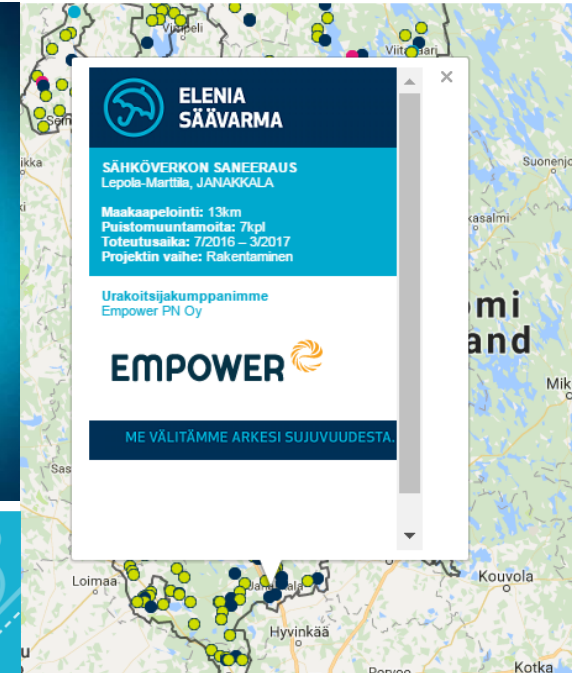


3,000 km

We construct 3,000 km of underground cables per year.

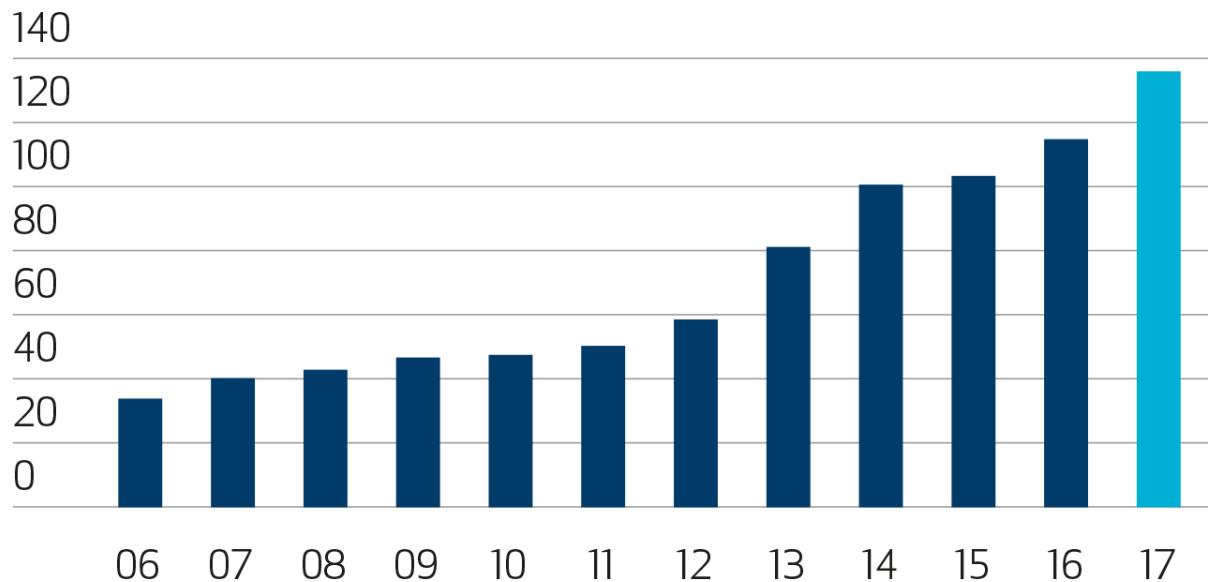
75%

Our goal is to increase the proportion of underground cabling in our distribution network to 75% by 2028. At the same time, we'll bring work to the regions where we operate.



# Elenia Oy's network investments

ELENIA OY'S TOTAL INVESTMENTS IN ITS  
ELECTRICITY NETWORK 2006-2017, EUR MILLION\*



\* excludes ICT system investments and the street lighting network

# Elenia at the forefront of innovation



## Smart Meters

Smart meters for all our customers

## Outage Map

Our service map of electricity outages is the first in Finland

## Voluntary Outage Compensation

Only distribution company in Finland to compensate customers for outages lasting over 6 hours (and less than 12 hours)

## Elenia Aina Digital Service

Elenia mobile app introduced as a free-of-charge service channel. Including monitoring of electricity consumption and possibility to compare electricity retail prices, ability to check whether electricity is on or off and to photograph threats to the distribution networks. Elenia Weatherproof as an online map service on underground cable construction.

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

## Storm Janika

Officials propose the 6-hour outage cut-off after storm Janika hits

## Automation of Overhead Network

Overhead line network made more secure through automation

## SMS Service

First SMS outage service in Finland

## Elenia Weatherproof

€600 million in Elenia Weatherproof investments. In 2017, 3,000 kilometres of underground cabling completed

## Underground cabling

First rural DSO in Finland to decide to invest in underground cabling after a comprehensive research and development period

## Next Generation Meters

Allow for a virtual power plant and demand flexibility 2017 →

ELENIA WEATHERPROOF



ELENIA ALWAYS



# Smart Grid development

2002

2006

2008

2010

2012

2014

2016

2018

2020

2022



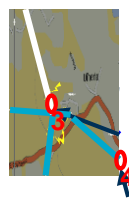
Smart network control and monitoring



Network automation – Overhead lines



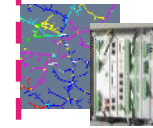
Smart field communication



Automatic fault location, isolation and power restoration



Network automation – Cable network



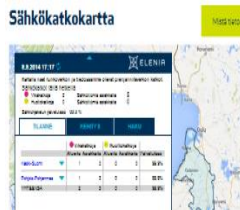
Sensors in network management



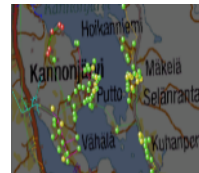
Storages



1st and 2nd generation smart meters (AMR & AIM)



Information of power outages



Low voltage network monitoring



Mobile applications for customers



3rd generation smart meters



Decentralized generation



Next generation smart meters



3D inspections of the network



Hourly-based consumption reports to customers



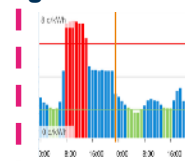
Smart substations



New map services on web



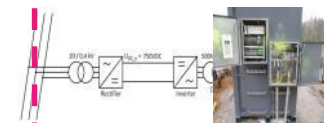
Big Data



Demand response & flexibility



E-mobility



LVDC technology



Satellite data

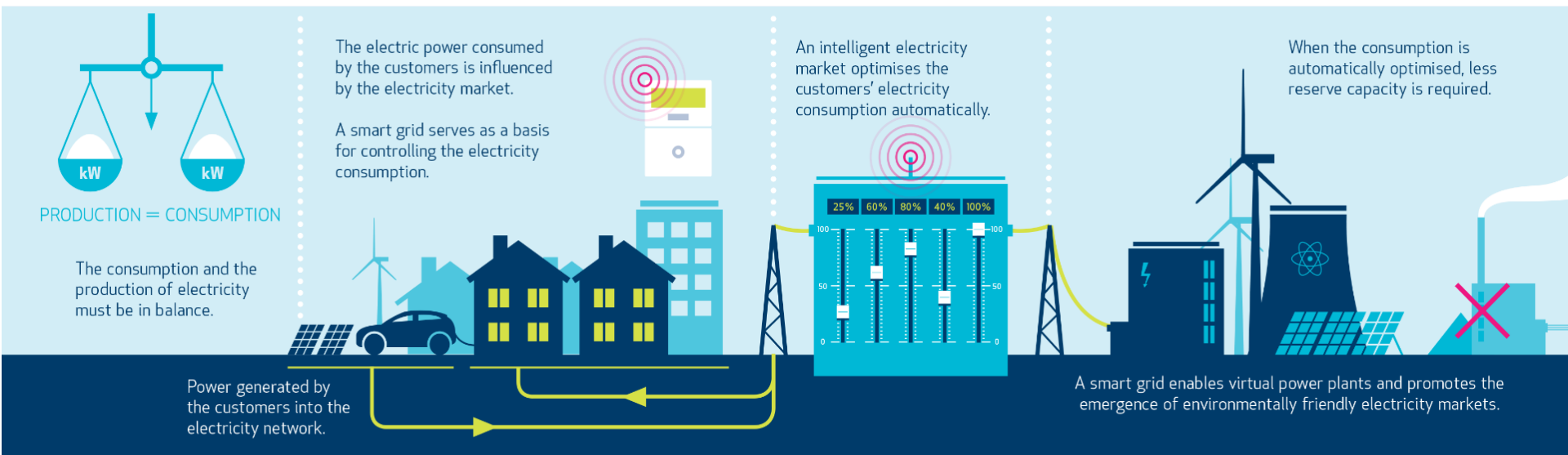


ELENIA  
WEATHERPROOF



# DSO as an enabler for the flexibility

- The Finnish energy market is facing a structural reform
- Customers will participate more actively on the market
- Flexibility and demand response services are essential to retain market balance
- DSOs' smart meters shall support customers' participation and flexibility services
  - Smart meters already today control water boilers which are used for house heating
  - The same smart meter infrastructure could provide an easy access to the flexibility market
  - Aggregators can utilise DSOs' smart meters to develop new services for customers



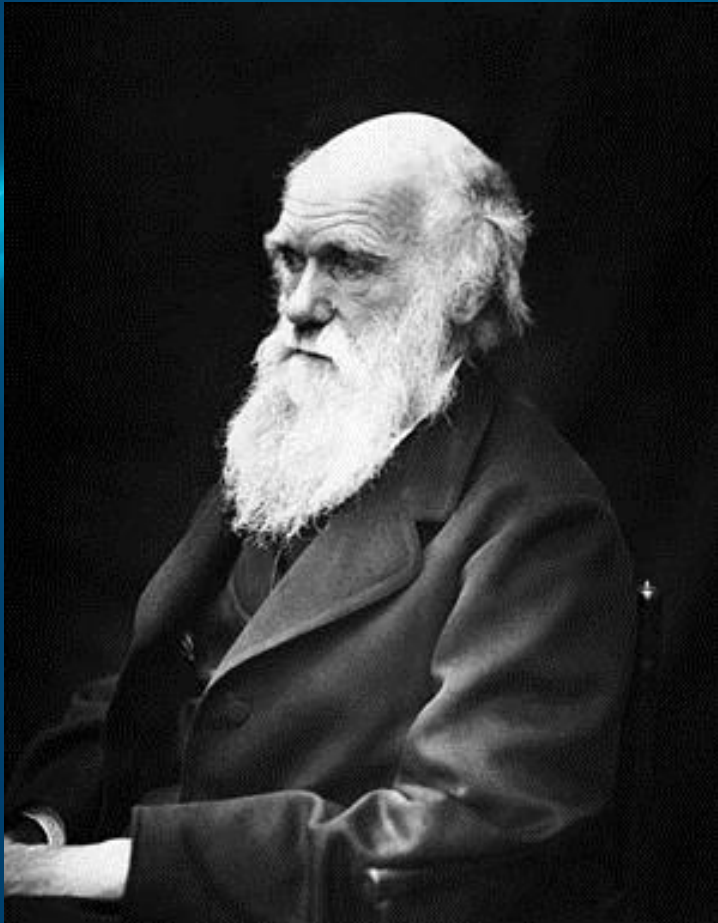
# DSO as a neutral service platform for digitalization and integration

- Customer and stakeholder services
  - Transparent and real-time information available 24/7
  - Energy efficiency
  - Mobile applications for customers
- Operational efficiency and quality
  - Distribution automation
  - Robotics and data analytics
  - Mobile applications for contractors
- Development of the electricity market
  - Service platform for market players
  - Decentralized generation, storages and e-mobility
  - Demand response and flexibility services
- Security of supply
  - Balance between consumption and generation
  - Network congestion management
  - Virtual power plants





# Prerequisite for the reform of the electricity market...



***"It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change"***

**- Charles Darwin**

**Close to the customer**

**Courage to renew**



**Accountable partner**

**Achieving together**

**Elenia – Electrifying life**