Smart Metering in Finland

European Conference on Smart Metering Deployment in the EU

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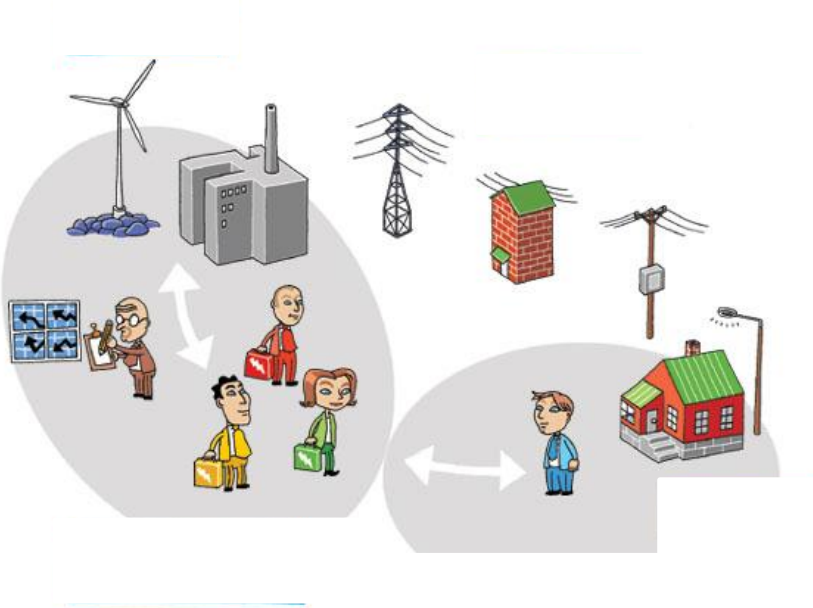
TYÖ- JA ELINKEINOMINISTERIÖ
ARBETS- OCH NÄRINGSMINISTERIET
MINISTRY OF EMPLOYMENT AND THE ECONOMY

Facts about Finland

- 5,4 million inhabitants (17th in EU27)
- Area 338 000 km^2 (5th in EU 27)
- High energy consumption per capita
  - high share of manufacturing industry, EU's coldest Member State, long distances within the country and to the EU and other markets
- High energy efficiency in buildings (triple windows etc.)
- Electricity consumption 80...90 TWh/a
  - 3.4 million metering points
- District heat consumption 30...35 TWh/a
  - Ca. 46% of all space heating
  - 2.7 million people living in district heated buildings
  - 140 000 end customers

Electricity retail market in Finland

- Over 80 DSOs of different size
- Approximately 30 active suppliers operating nationally
- Second lowest household electricity prices when expressed in purchasing power standards and 12th lowest when expressed in euro (Eurostat, 2013)
- Supplier switching is easy and free of charge for customers
- Annual switching rate about 10%



Hourly metering in Finland
Requirements for electricity metering

- Requirements set in the legislation (66/2009) for the metering
  - remote reading daily
  - shall register over 3 minute black-out time
  - remote demand response feature (1 relay)
  - data storage in DSO systems
  - security of data (meters and systems)
  - Same set of data has to sent to suppliers, balance settlement and customers day after delivery
  - 3rd parties may access the data free of charge (customers acceptance required)
- Customers have access to their hourly measurements via web service by DSO
- Standard open interface for real time consumption data has to be provided from the meter on customer request

Hourly metering in Finland
(electricity)

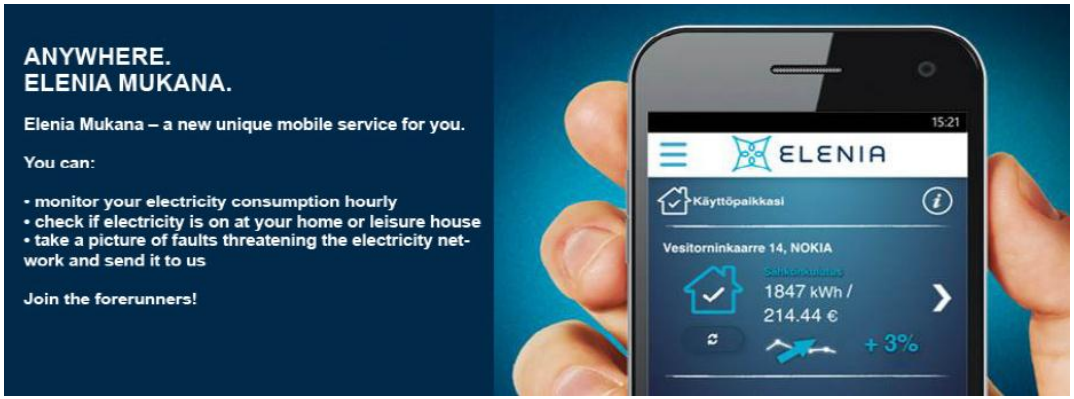
- DSOs are responsible for metering, several metering service providers
- From the beginning of 2014 ca **97%* within AMR** (Automatic Meter Reading). Legal requirement 80%
  - DSOs are aiming at 100% coverage of AMR
  - **Smart metering roll-out was initiated by the industry!**
- AMR meters (97% of meters) are read daily, Non-AMR meters 3 times a year.
- **Balance settlement is based on daily read hourly values** for all customers with AMR (97%) and on type-loading curves for customers without AMR (3%)
- Balance settlement window open for 14 days after delivery (final data)

**DSO questionnaire, November 2013*

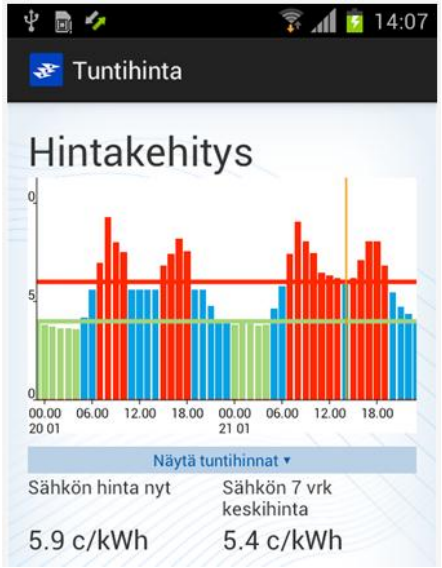
Hourly metering in Finland
Positive experiences for the customers
(electricity)

- Billing based on actual consumption (not annually reconciled estimates)
  - Electricity bills are a lot easier to understand and you only pay for what you use
  - Instant feed-back from energy efficiency measures
- Automatic connection and disconnection
  - Quicker and cheaper connection and disconnections in different market situation (e.g. move in)
- New services and products (most require hourly settlement)
  - Innovative pricing: spot price, peak power price, fixed price - basically any pricing method the customer wants!
  - Possibility to develop more cost reflective network tariffs
  - New services: and home demand side management automation services, reporting services and in home displays, suppliers buying micro generated electricity (voluntary, market based approach, no subsidies)
- Better information to customers about network status – interruptions
- The platform is now ready for the innovative market!

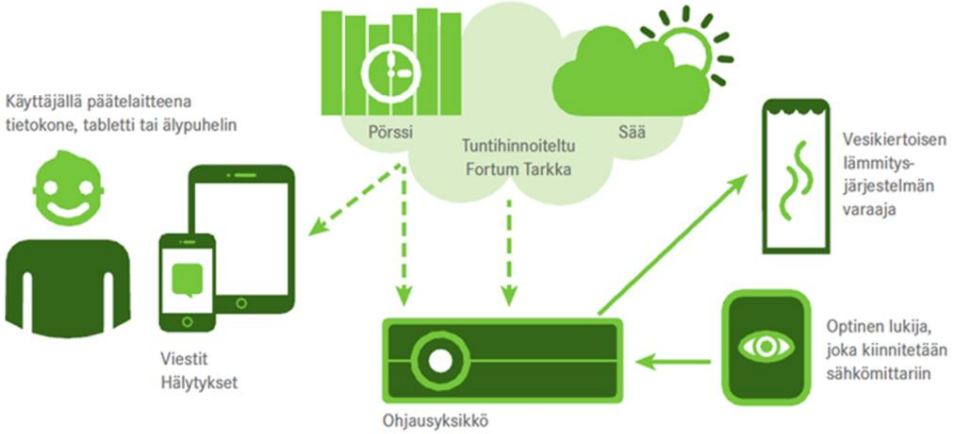
Examples of new products



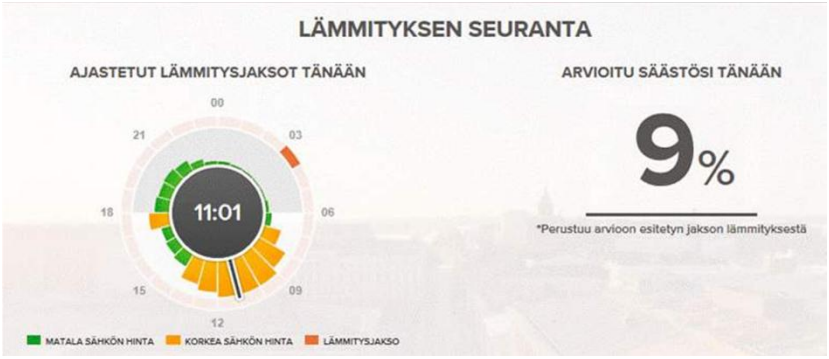
Elenia Mukana



Fingrid, Tuntihinta



Fortum Fiksu



Helsingin Energia Termo

Customers get information

Example of a DSO's web service, daily view (Helsingin Energia www.helen.fi)

Customers get information

Example of a DSO's web service, comparison to similar customers (Helsingin Energia www.helen.fi)

Price comparison tool

energimyndigheten

http://www.sahkonhinta.fi

Skriv ut

Jämförelse av elpriser > Sök prisuppgifter > Resultaten av prisjämförelsen

Käyttämäsi hakuehdot:_sv

Årsförbrukning (kWh)	3500
Ursprunget till leverantörernas el	Obegränsad
Säkringsstorlek	3x25A
Förbrukningsställe	Permanent bostad

Tillbaka | Ny jämförelse | Precisera jämförelsen | Information om förnybara energikällor

Produkter som gäller tillsvidare (5.3.2014)

Elförsäljarna kan ändra det hittills giltiga priset för avtal som gäller tillsvidare efter det att kontraktet har trätt i kraft. Var noga med att följa utveclingen av ditt elpris regelbundet och jämförä det med andra tillgängliga priser.

Säljare	Produktnamn	Totalt €/år	Medelpris cent/kWh	Ursprunget till leverantörernas el	Tilläggsuppgifter	Erbjudandets utgångsdatum
220 Energia Oy	Perus - Talviale! Voita kylpyläviikonloppu!	174,65	4,99			Tillsvidare ikraft varande
Market Energia Sähkönmyynti Oy	Market Tapio	175,00	5,00			Tillsvidare ikraft varande
Market Energia Sähkönmyynti Oy	Market Ahti	192,15	5,49			Tillsvidare ikraft varande
Pohjois-Karjalan Sähkö Oy	PKS Optimi perushinnaston maaliskuun hinta	215,84	6,17			Tillsvidare ikraft varande
KSS Energia Oy	KSS Prime	216,25	6,18			Tillsvidare ikraft varande
Vaasan Sähkö Oy	Yleissähkö	238,14	6,80			Tillsvidare ikraft varande
Leppäkosken Energia Oy	Yleissähkö YMPÄRISTÖ	239,00	6,83			
Kokkolan Energia	Yleissähkö Up	241,58	6,90			
Forssan Energia Oy	ForE KUUKAUSI yksiaika	244,30	6,98			
Kymenlaakson Sähkö Oy	Varttikymppi Yleissähkö	249,61	7,13			
Kokkolan Energia	Ekovleissähkö Up		7,25			Tillsvidare ikraft varande
KSS Energia Oy	KSS PrimeVartti		7,29			Tillsvidare ikraft varande

Origin of the electricity

Buys electricity from the customer

Utilising smart metering in network monitoring

- AMR-DMS integration allows the extension of remotely monitored network to cover the low voltage network
  - Verification of power supply at customer premises
  - Recognition of zero conductor faults, phase faults and faults in the customer network
  - Location of broken medium voltage conductors

- Shortens outage duration and improves efficiency
- Improves customer service
- Reduces unnecessary visits to customer sites
- Improves safety

Remotely monitored network with AMR-DMS integration

Remotely monitored network earlier

High voltage network

Substations

Medium voltage network

Distribution transformers

Low voltage network

Customers

Heat metering in Finland
(district heat)

- District heat company is responsible for metering
- There is no requirements in the legislation regarding smart metering of heat

  BUT
- **80% of all customers have a remote read meter in place**, either monthly or hourly metering data.
- A few district heat companies still have manually read meters or self read meters (the customers themselves read the meters and then inform the company of the readings)

Example of a heat web service
monthly data (left) – hourly data (right)