

# Smart Grids in Vattenfall

Johan Söderbom, R&D manager Smart Grids, Vattenfall AB



# Vattenfall in brief

## Net sales 2011:

181 billion SEK (20 billion €)

**7.8 million electricity customers**

**5.8 million grid customers**

**2.1 million gas customers**

**38,000 employees**

**Sweden, Germany and Benelux as core markets**

**De-regulated markets with significant unbundling**

**Owned by the Swedish state**

## Electricity Generation:

166,7 TWh

## Heat Generation

41,6 TWh

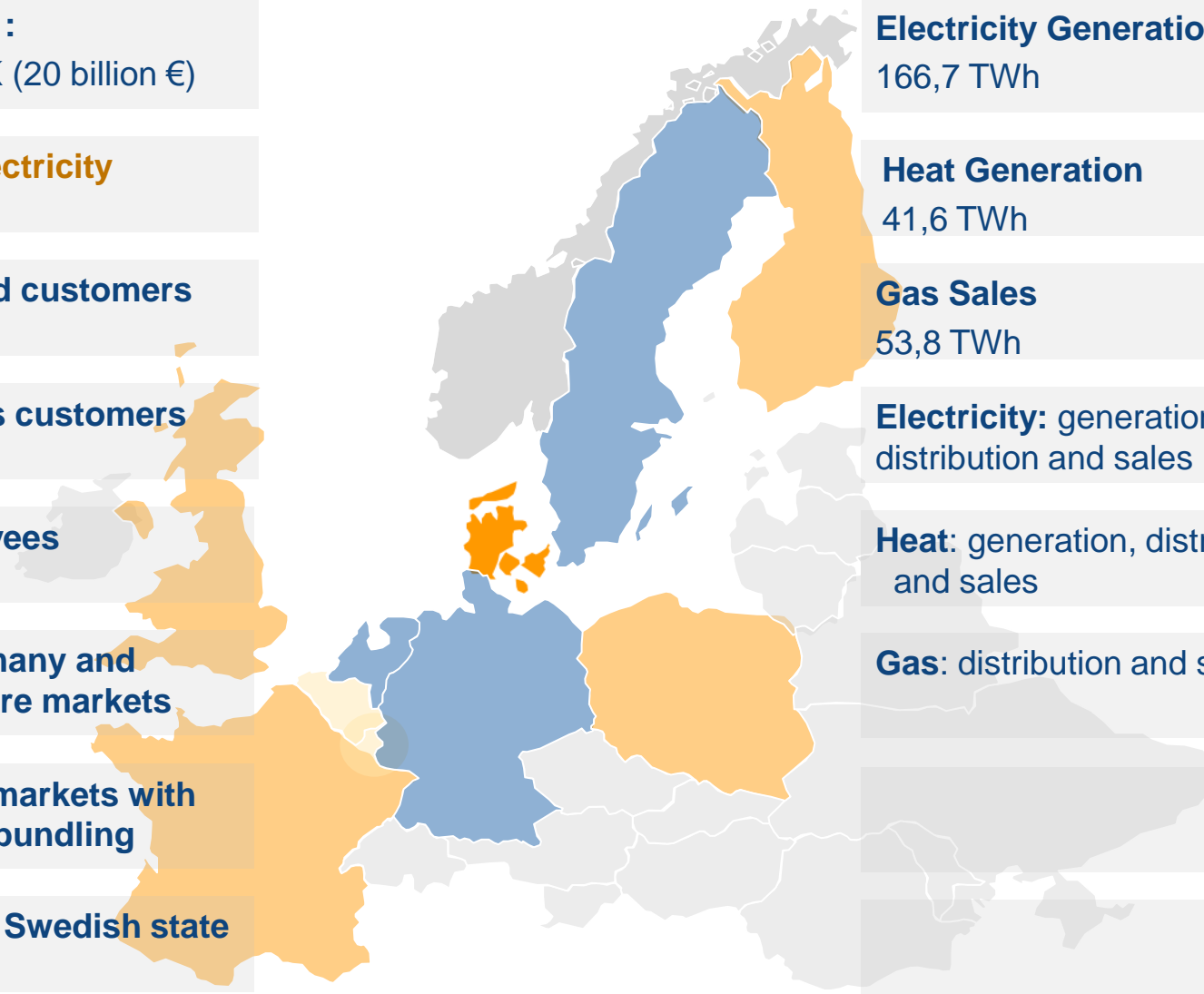
## Gas Sales

53,8 TWh

**Electricity:** generation, distribution and sales

**Heat:** generation, distribution and sales

**Gas:** distribution and sales



# The European Electric Energy system of today and drivers of a change

- **Designed in the 20th century.**
  - large-scale centralized generation
  - Generation following load
  - Unidirectional power flow
  - dimensioned for peak conditions
- **Country/region specific power system planning and expansion**
  - Weak interconnections
  - Country/region specific market rules
- **No considerable changes in technology/way of planning and designing the system for many decades**

- **A growing demand for energy**
- **European goals on security of supply**
  - European primary fuels
- **20/20/20 to 2020 targets of Europe**
- **A harmonised and deregulated market**
  - Various maturity but rapidly being implemented
- **Ageing System**
  - Most of the European Energy system assets are 30-50 years old
- **Recent technology development**
  - Novel technology mainly due to green field exploitations in e.g. China



# How does this affect the industry?

In 2030 the Smart Grid is the technical arena where our goals are realised

**To meet EU's climate commitments by optimal use of sustainable energy sources in electricity generation**

**Environmentally and economically rational use of electricity in society**

**Electricity as the reliable and available energy carrier**

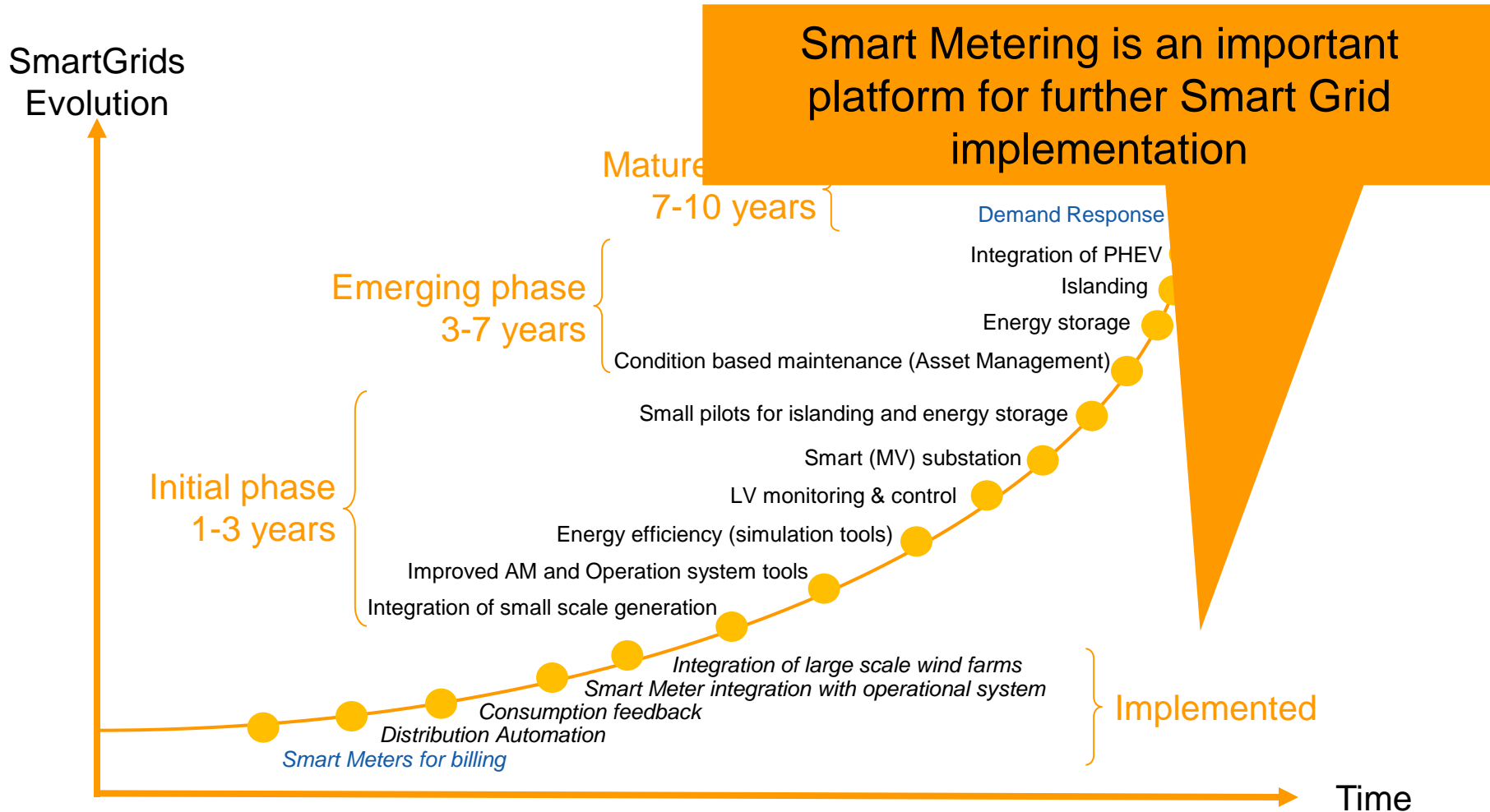
**A transition towards sustainable road transport**

**To take action on future business opportunities**



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# Smart Grids Evolution – example from the Nordic market

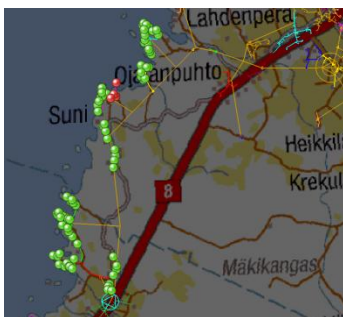


# Smart Metering enables Smart Grids functionality



## Process improvement:

- Improved customer processes, Billing, Move in/out, Retailer switch
- Improved network planning
- Customer outage management



## Low voltage monitoring & control

- Instant knowledge of customer supply status
- Improved and optimized (restoration) outage management
- Improved safety, reliability and availability

Total förbrukning under perioden: 114 kWh



## Customer relation :

- Consumption feed back to the customer
- Improved customer service

# Evaluation of the first Smart Meter related services

Business case
Original – Implemented
Monthly billing
Move in – out
Supplier change
Non-technical network losses
Extended – Implemented
0-faults
Power outage –compensation to customers
Remote switch off/on
Presentation of daily/hourly values to customers
Extended – Evaluation
Detect wrong fuse size
Optimize network losses – hourly values
Power outage - remaining faults and restoration
Power quality

- Original business case
- Extended business cases – implemented and under evaluation

- Evaluation in different categories
  - Financial benefits
  - Non-financial benefits:
    - Quality&Customer satisfaction
    - Reduction of environmental impact
    - Safety

## The Smart Meter investment is positive and ...

- has generated financial benefits from the original business case close to 8 MEUR per year:
  - Lower cost for meter readings using AMR: ~1 MEUR yearly
  - Reduction of non-technical network losses: ~7 MEUR yearly
- has generated financial benefits from extended business cases of around 2,5 MEUR yearly
- has contributed to major non-financial benefits like Quality & Customer satisfaction, Safety and Reduction of environmental impact
- will also be a platform enabling more benefits in the future ...



An aerial night photograph of a city, likely Stockholm, Sweden, showing a dense network of lights reflecting on the water. The lights are concentrated in the urban areas, creating a bright, glowing pattern against the dark water and sky. The perspective is from a high angle, looking down at the city and its surrounding waterways.

**Thank you!**

Johan Söderbom

Manager R&D for Distribution and Sales

Vattenfall AB

Email: [johan.soderbom@vattenfall.com](mailto:johan.soderbom@vattenfall.com)