

# Smart Meter – a field report from Sweden

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# Statement

Smart metering offers much more than the kWh. Benefits can be seen for the customers, the electricity market, DSO and the society (energy efficiency)

DSO needs to integrate Smart Metering deep into back end systems in order to get full business benefits. If this is not possible, only limited benefits are reached.

To get the benefits, message handling has to be automated between the market actors

# Vattenfall Group in brief



- Europe's fifth largest generator of electricity and the largest producer of heat
- Net sales 2008: EUR 15,041 Million
- Vision: To be a leading European energy company
- Operations in Sweden, Finland, Denmark, Germany, Poland and the UK with a total of 6 Million customers
- Electricity: generation, transmission, distribution and sales
- Heat: production, distribution and sales
- More than 32,000 employees
- Vattenfall AB is wholly owned by the Swedish state

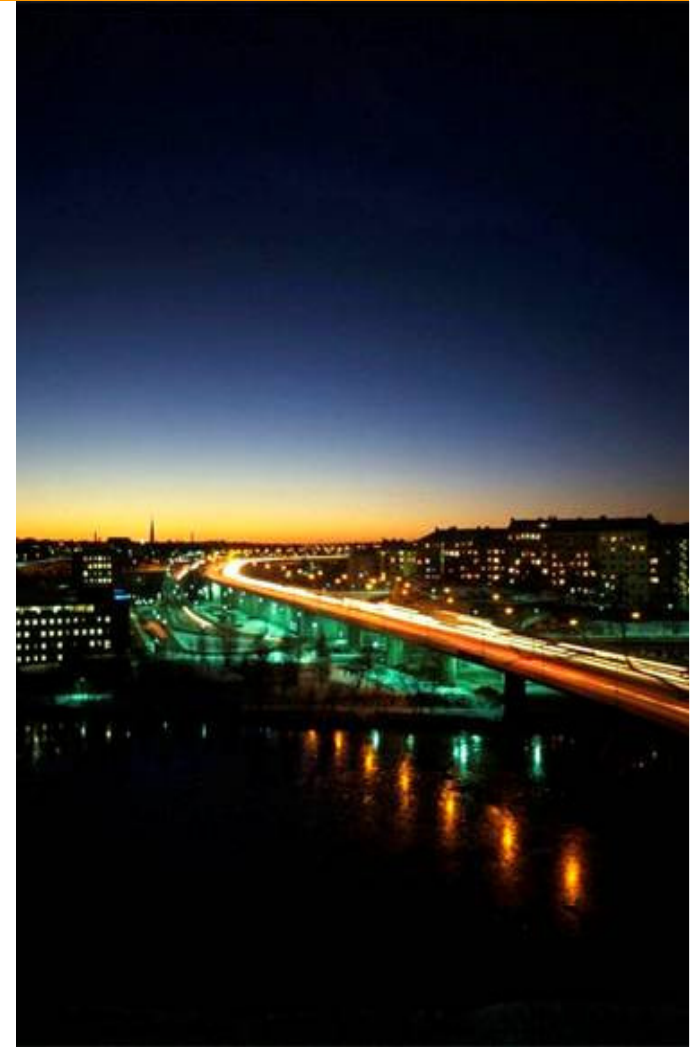
# Vattenfall AMR project in Sweden 2002 - 2008

Goal was to install Automated Meter Reading for all 850 000 distribution customers in Sweden latest by end of June 2009 to

- support billing based on actual consumption
- energy efficiency by enhancement of visualizing energy consumption

# Project AMR – status

- ✓ The AMR Project roll-out completed 27:th of June 2008. About 98 % of 870 000 exchanged. Clean-Up installations ongoing.
- ✓ The AMR system includes much more functions and technology than originally required by the regulator, such as power outage reporting, power quality reporting and alarms, power/peak control and remote switching.
- ✓ In time – In budget – Good quality



# Project AMR – Roll-out



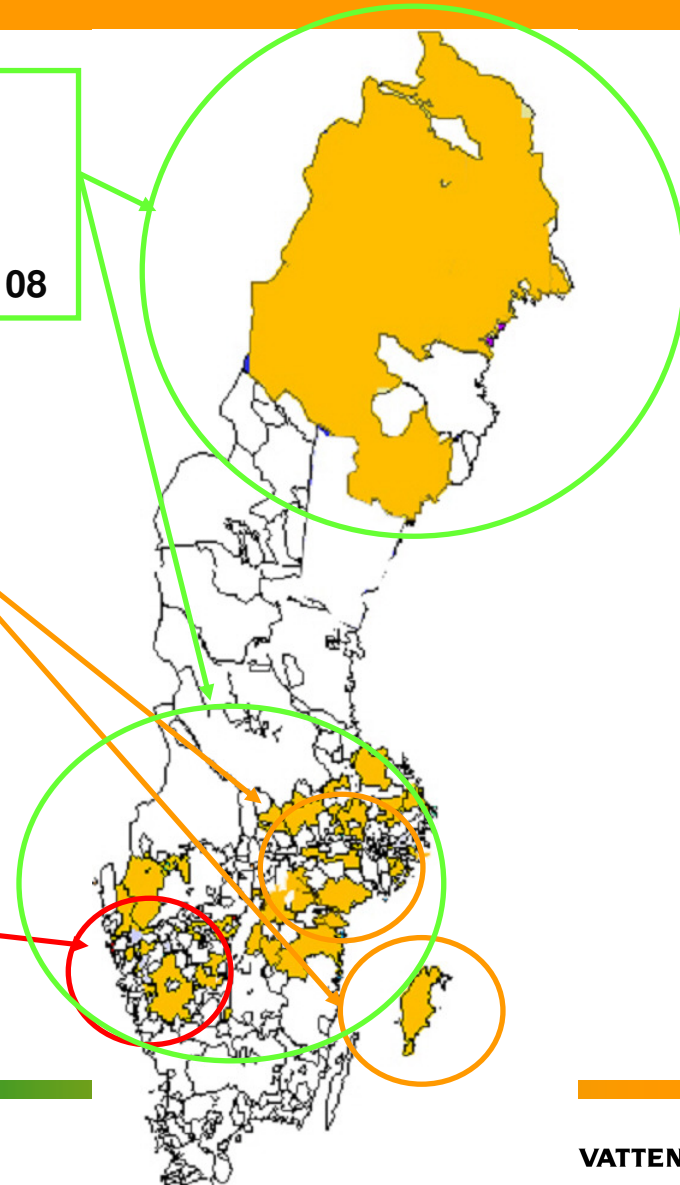
**AMR 3- Telvent (Dec 2005)**  
Residential Meters, 590 000 installed  
Pilot 2400 meters in June 2006  
Massive roll-out started up in August 2006  
in three regions, 590 000 Completed in June 08



**AMR 2 – Iskraemeco (July 2004)**  
Residential & Hourly Meters,  
150 000 installed  
Main part installed in Central Sweden  
and Gotland  
Residential finalised in June 2006 and  
Hourly Read Meters in September  
2006



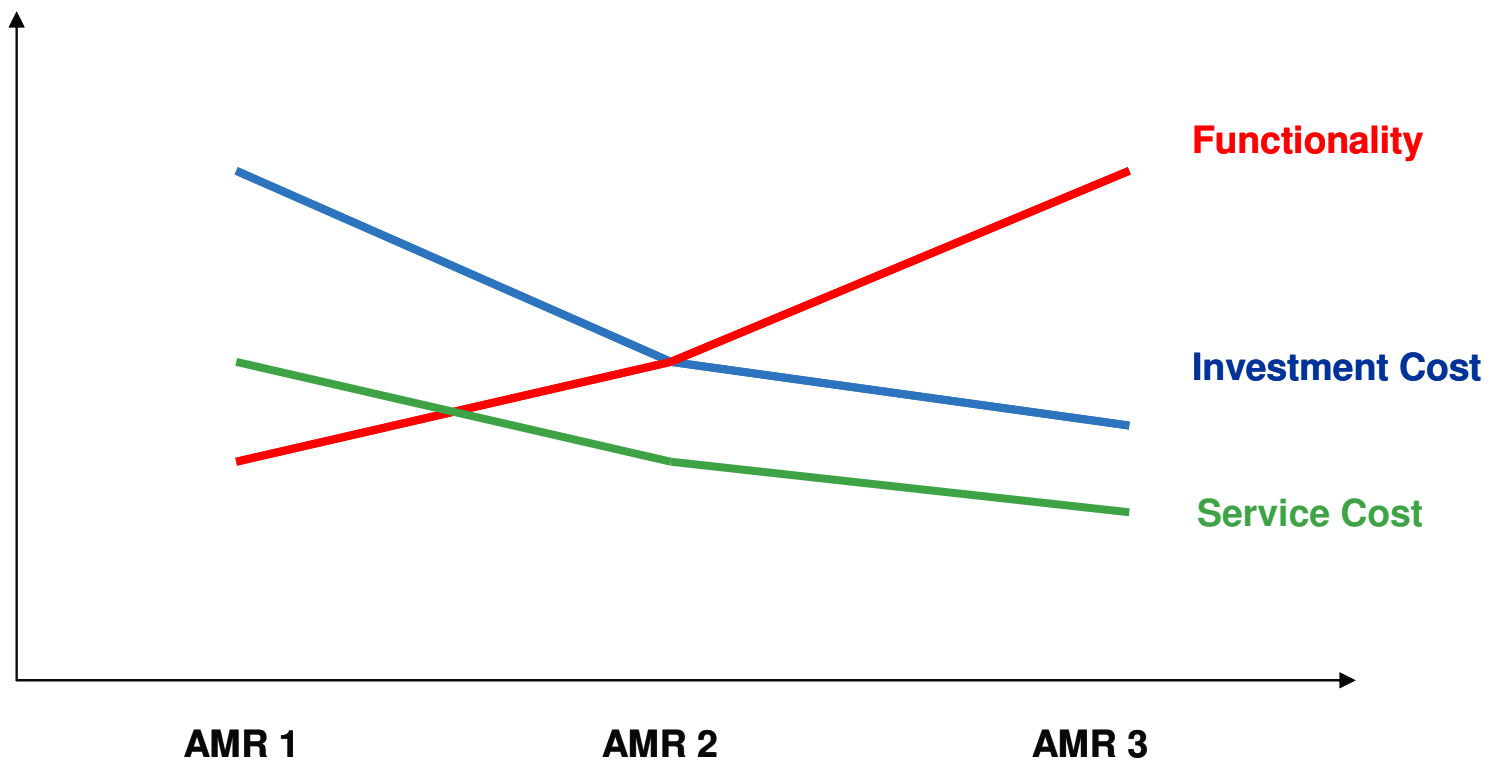
**AMR 1- Actaris (June 2003)**  
Residential Meters, 110 000 installed  
Main part installed in South Sweden  
Finalised in June 2006



# AMR meter functionality – residential customers

	AMR1 13 %	AMR2 17 %	AMR3 70%
<u>Hourly reading</u> Meters manage to read hourly			
<u>Remote upgrading</u> Remote upgrade of meter software			
<u>Power Outages</u> Reporting of power outages > 3 minutes			
Reporting during outages - on demand			
Reporting during outages - automatic			
<u>Power Quality</u> Reporting of power quality, e.g. over/under voltage			
<u>Power Control</u> Remotely disconnect customers			
Remote load control of customer equipment			
<u>Tamper detection</u> Alarm of tamper - Terminal Cover Removal			
Alarm of tamper - Magnetic Tamper			

# AMR / AMM Market development





## Identified business opportunities in AMM

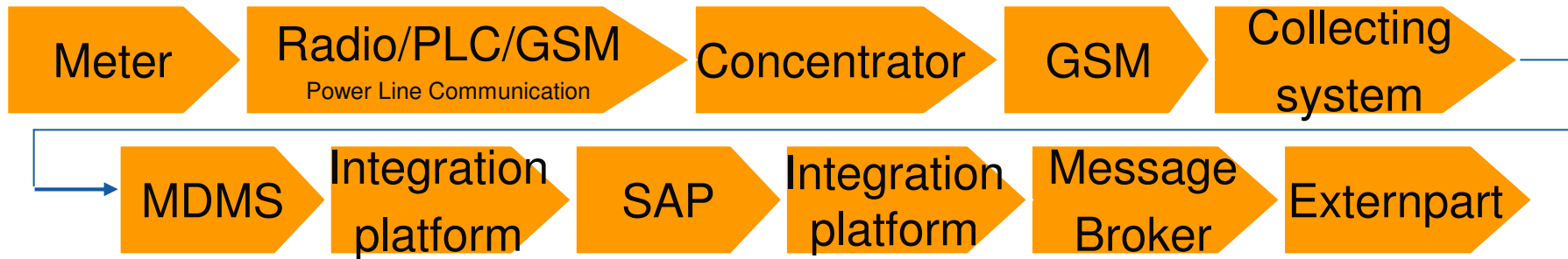
- Customer Information regarding consumption based on meter values (monthly, daily, hourly)
- Customer Complaints handling based on event data, Power Quality and Power Outage
- Outage data handling based on real time alarms and statistics
- Operation planning based on meter values (hourly)
- Network planning based on meter values (hourly) and PQ-data



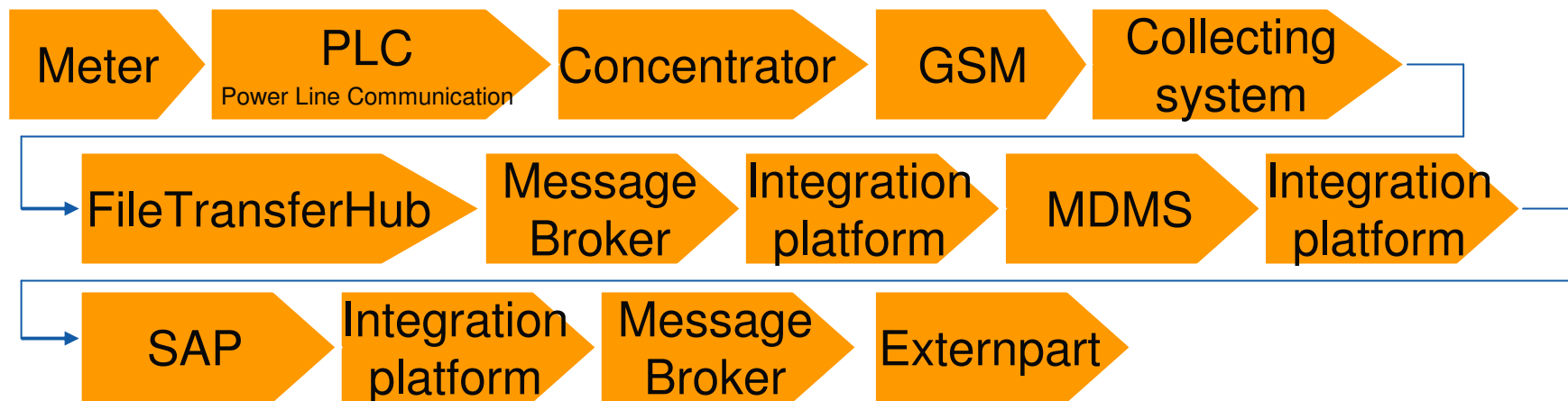
- Additional business cases have typically a pay back time of 1-2 years after the implementation of Smart Metering

# Example of challenges: The life of the little meter value....or how can it be so d..... difficult???!??!

## AMR1&2



## AMR3



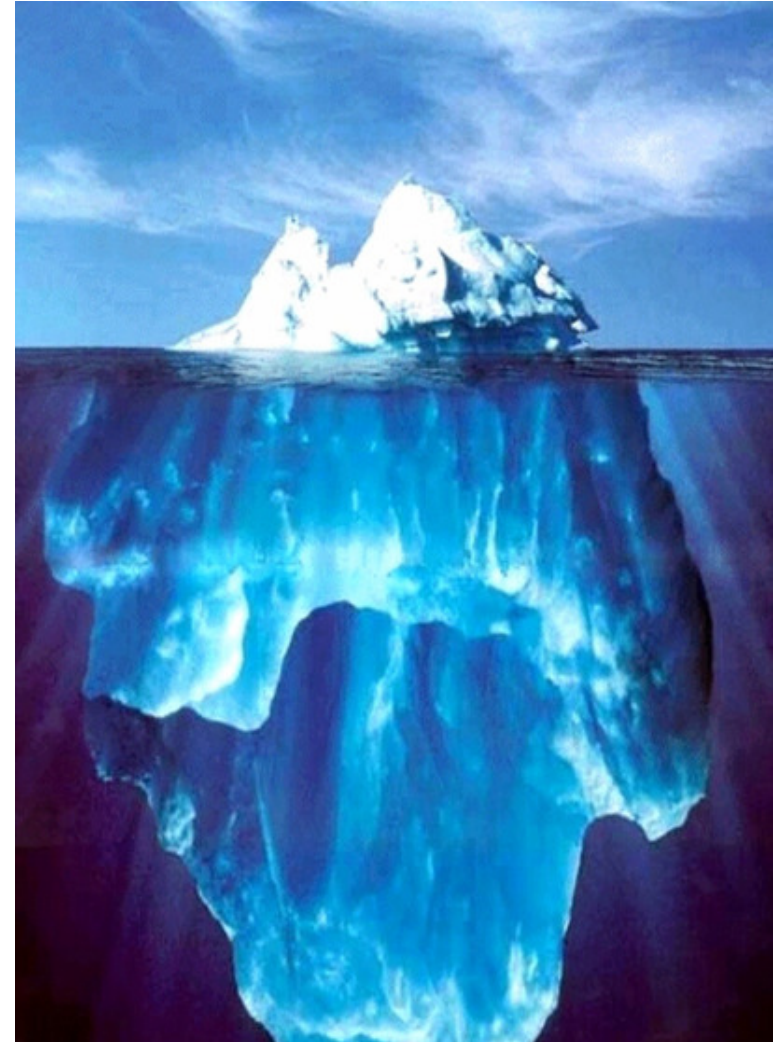
# How to handle remaining meters that need to be changed?

- A few groups of exceptions where no AMR meters could be installed were identified in the AMR roll out project:
  - EMF
  - Temporary Disconnected premise
  - Temporary premise
  - Premise requires rebuilding before meter can be installed
  - Meter and customer non available
- These exceptions are handled in the AMR Clean Up project



# We have just seen the tip of the iceberg.....

- **Remote Meter Reading**
- **Customer Relationship Management**
- Value Added Service
- Demand-side Management



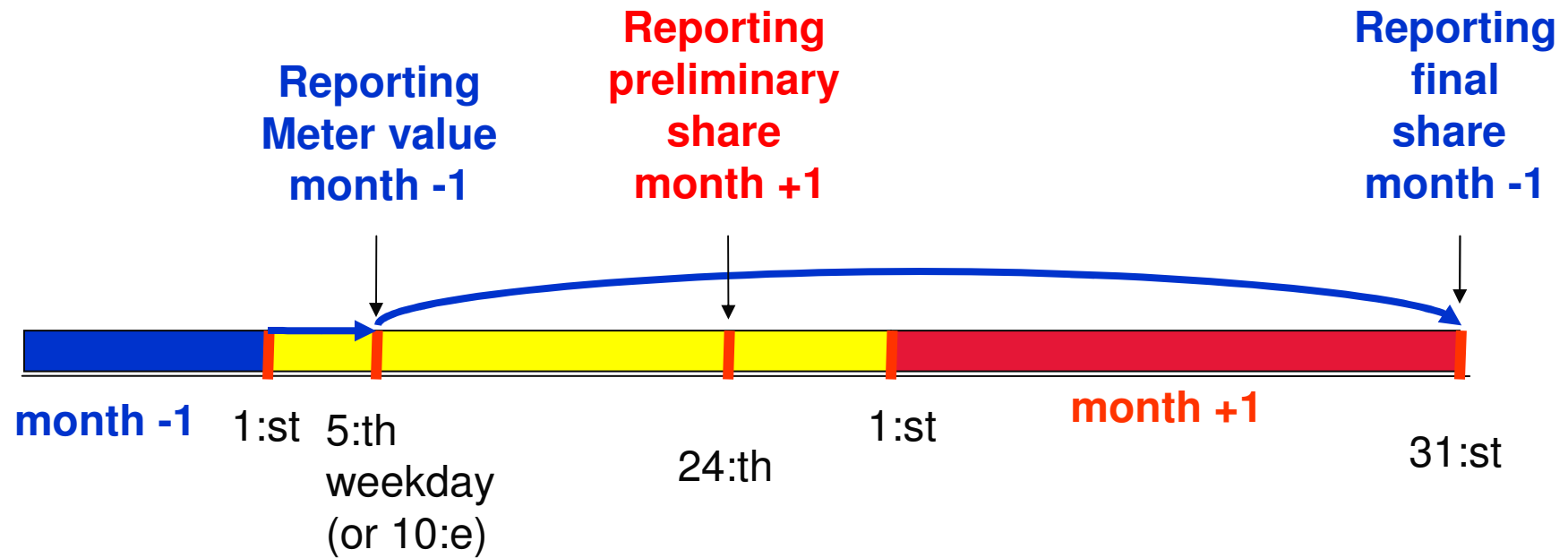
# Regulation in Sweden

- 1 July 2009 Sweden will move to monthly billing with actual consumption. Extrapolation will not be allowed.
- The purpose with the meter stipulations is to give the customers a better understanding of their invoice based on real meter values instead of estimated.
- Time to correct the billing and settlement will be shortened from 13 months to 2 months. Lead time for exporting meter readings to suppliers is shortened from 30 days to 5 days.
- Message handling is changed from MSCONS and DELFOR to UTILTS. This is a big project for all utilities, since it includes much more functionality than before.
- Volume of message handling will be ~25 times higher compared to pre Smart metering time!
- Sweden is working for having a country wide message handling hub (EMIX).

# New meter stipulations "management summary"

- Monthly reading instead of once a year
  - The meter reading must have a time stamp 00.00 day 1 every month and have a status mark "first-rate" (prima)
- IF a meter reading is missing, extrapolation is not allowed (forward estimation) but intrapolate (a later meter reading must exist)
  - The meter reading will get the status "calculated" and can be used for invoicing and settlement

# New meter stipulations– reporting & settlement



## What is in the new meter stipulations?

- Calculated yearly consumption is not approved, as of today, to be estimated but needs to be based on actual consumption over the last 12 months calendar months.
- A message of prognosis for the coming 12 months must be sent to the energy supplier at start of delivery (customer shift and supplier switch) and is based on the latest 12 months period.
- For new connections, an equivalent prognosis must be decided based on calculated consumption for the installation.
- Consumption statistics must be given to the energy user, at latest on the invoice and cover last 13 months. Can be given through the web (My Pages) or customer invoice.

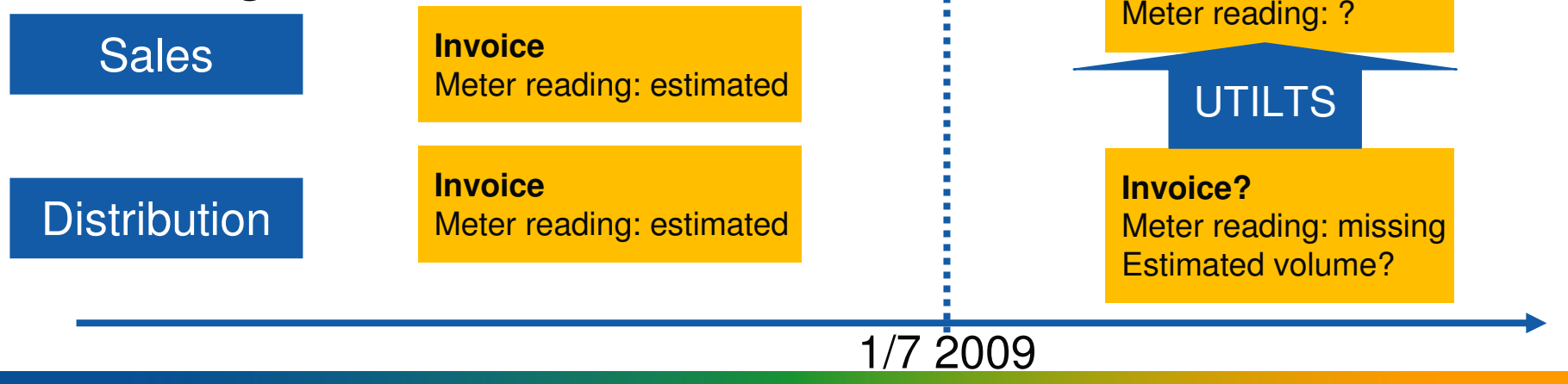


# Scenarios from a customer perspective when a meter value is missing

## Existing real meter value



## Non-existing real meter value



## Practical experience with new metering stipulation

- National test bench is very much recommended.
- Changes affect many systems, so the rules have to be clear from the beginning.
- It takes time and effort to change from estimated values to exact billing. This is underestimated in many companies and by the regulator.
- To get the benefits out of Smart Metering, regulator has to make clear rules for the DSO's.
- There has to be incentive for the DSO's to do it. Customer benefits are good, so the regulation model has to take into account higher costs for the metering.

**Thank you!**

Iiro Rinta-Jouppi