



Cost benefit of smart meters in Norway

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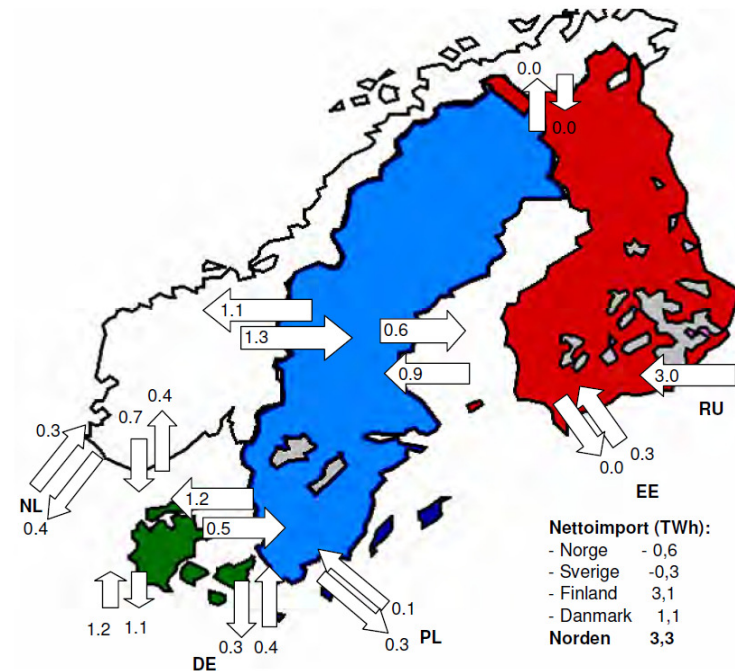
Content

- The Norwegian electricity market
- Cost benefit of smart meters
- Status for Smart meters in Norway



Electricity in Norway

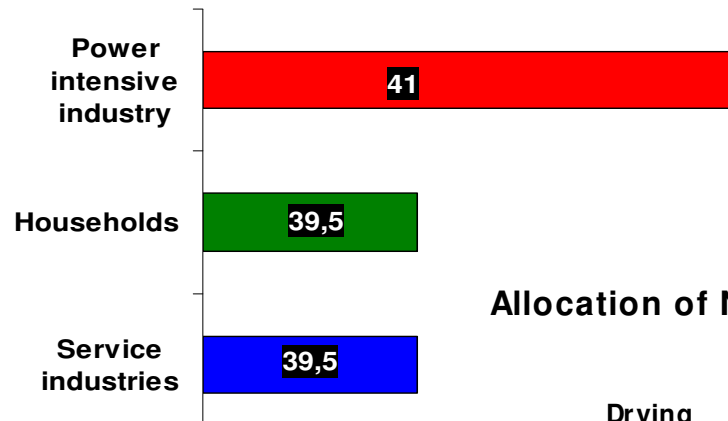
- 142,4 TWh production in 2008, 98,5 % Hydro.
- 128,6 TWh consumption in 2008.
- A common Nordic wholesale market
- 2,4 million household customers and 0,3 million business customers



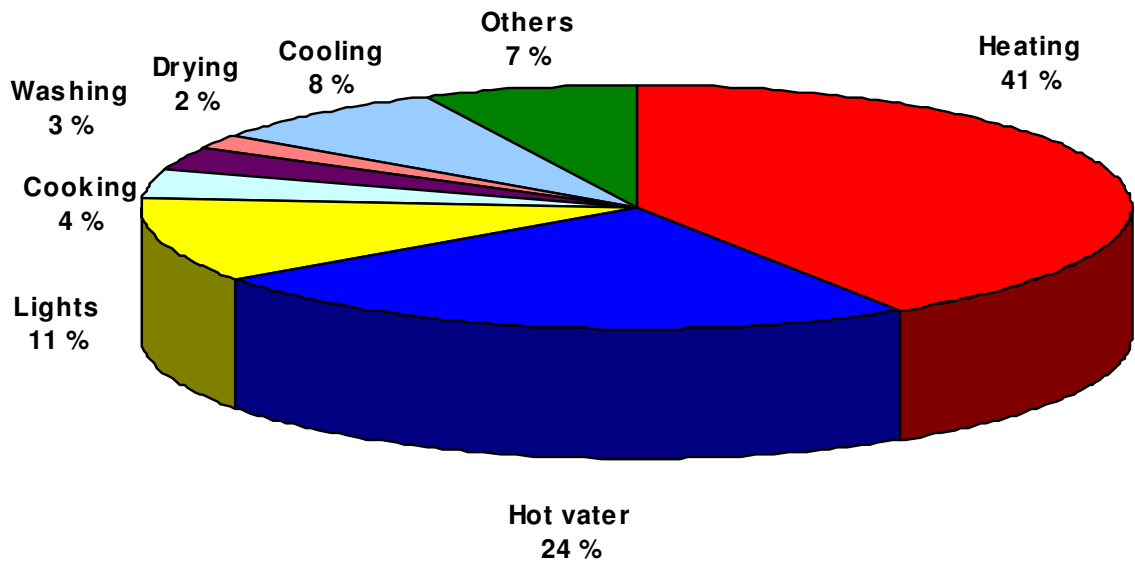


Average household Consumption of 18 000 kWh/year

Totally consumption 120TWh/year



Allocation of Norwegian households' electricity consumption*

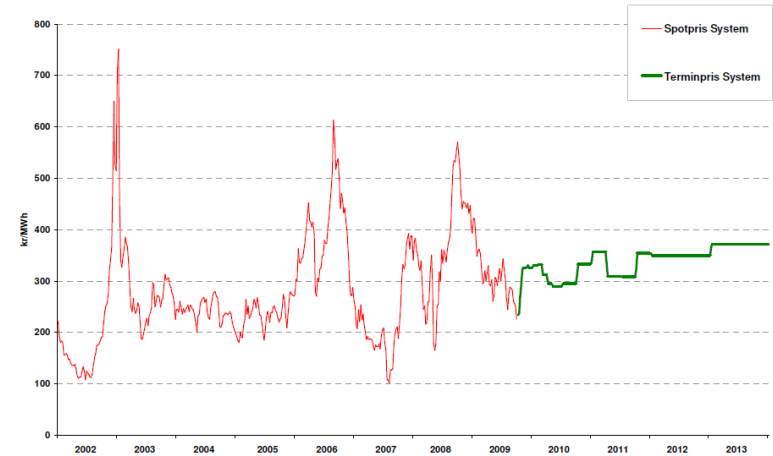


Source: Statistics Norway

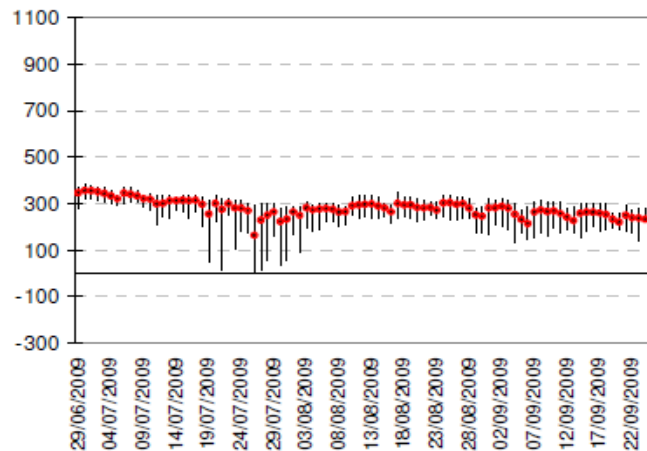


The Nordic wholesale market

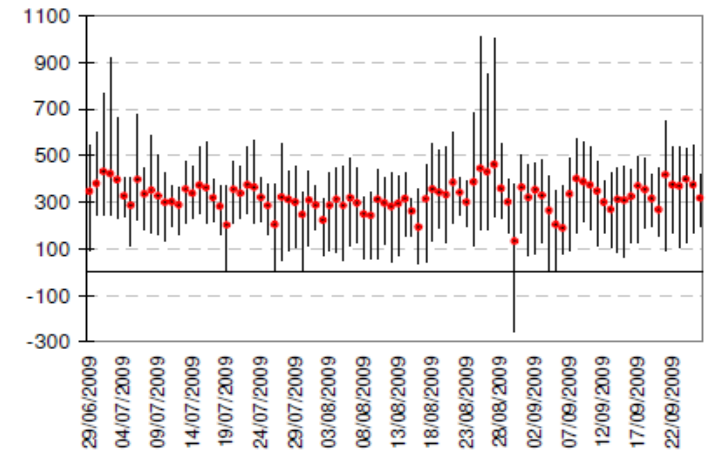
- 56 pct of all financial and 70 pct of all physical trades on Nord Pool.
- Price varies with water reserves and the prices on fundamentals
- Price variation between the prices areas
- Little variation during the day



Norden



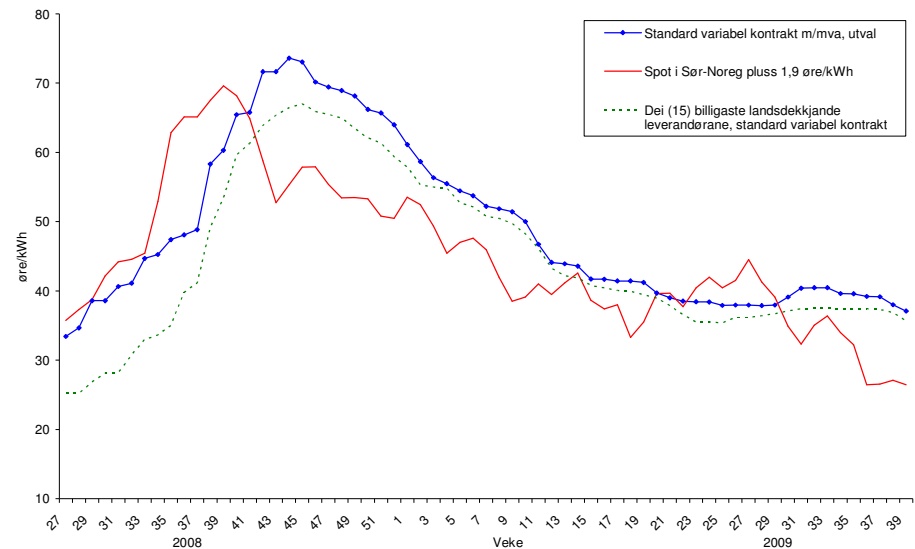
Tyskland





Contracts and margins in the Norwegian retail market 2. Q 2009

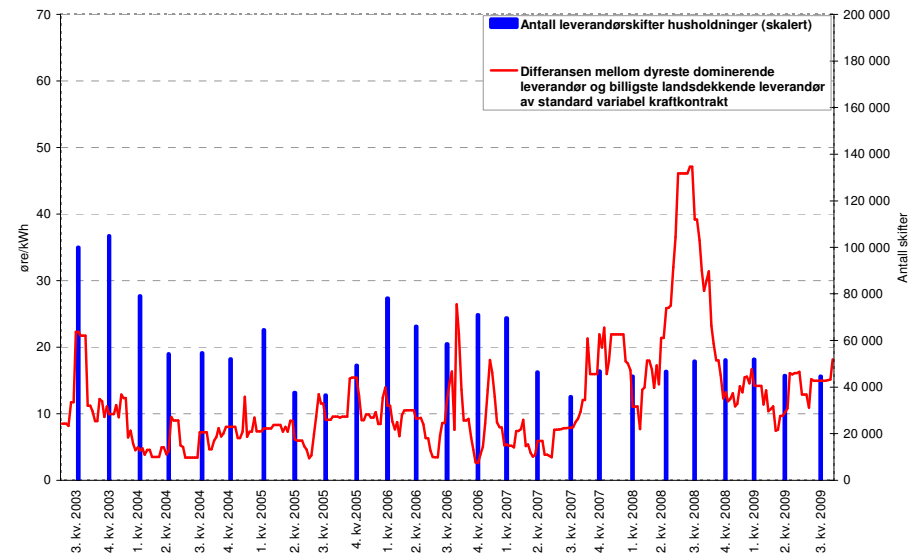
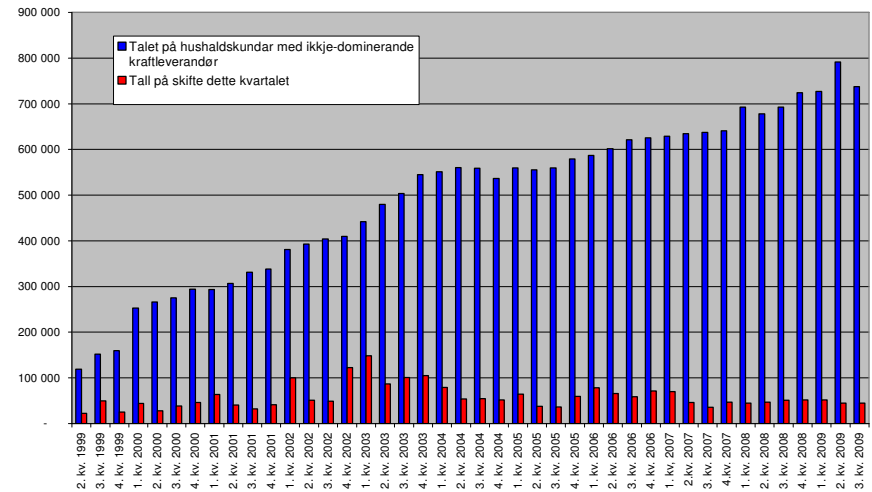
- 73% of business and 48,5% of households on spot contracts.
- Average margin on spot contracts 0,025 Euro cents kWh, approx. 50 Euro per year
- 20% business and 44% of households on variable price contracts,
- Prices for dominating suppliers higher than spot contract.





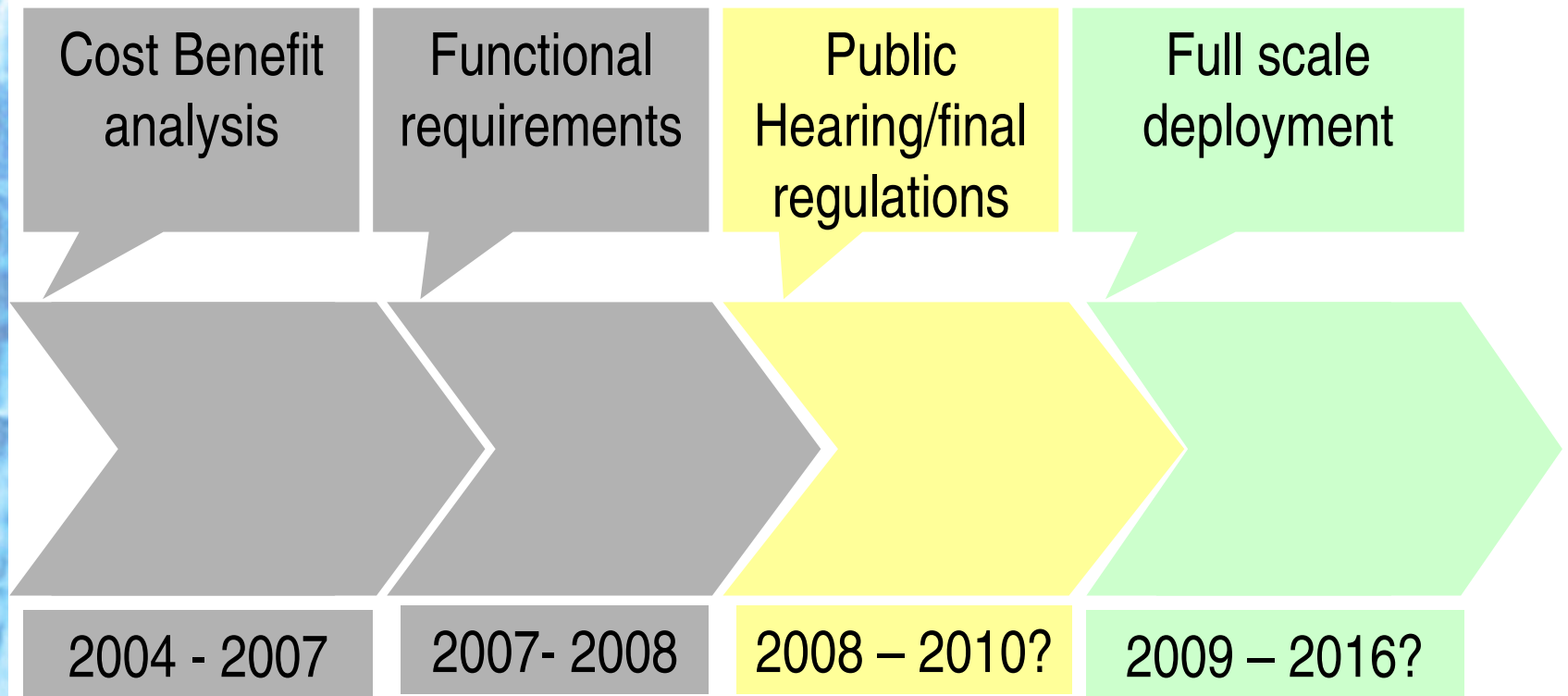
Customer switching

- 2,5 million switches since 1995.
- Price deviations give increase in switching.
- Number of customers not served by dominant supplier is increasing.
- 70% of customers are served by dominant supplier.



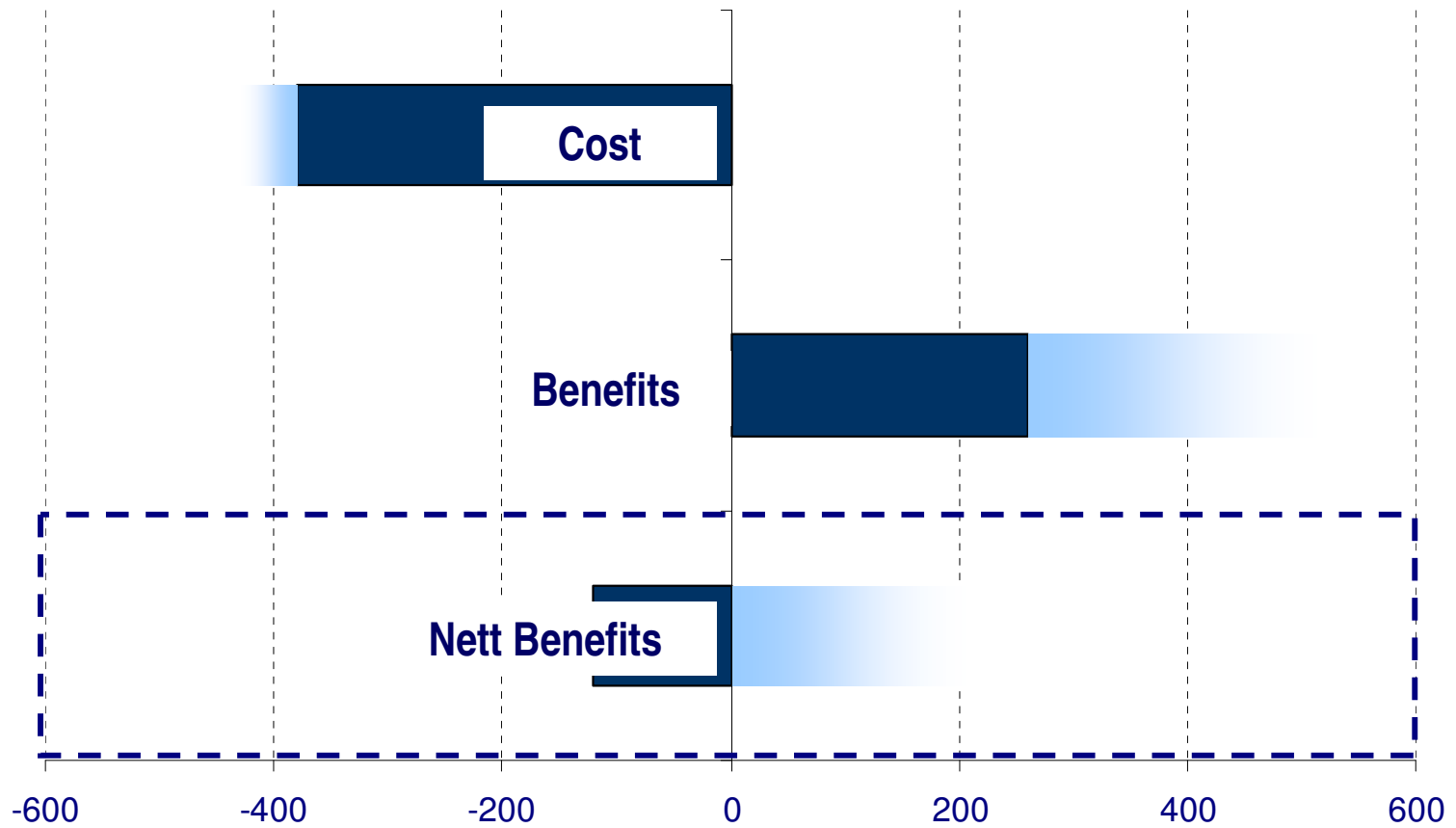


Road map towards full scale deployment of Smart metres in Norway





Not profitable for the distribution company – Cost benefit is positive if uncertain benefits are included



Norwegian Kroner per metering point NOK/Euro = 8

■ Relative certain Benefits/Costs

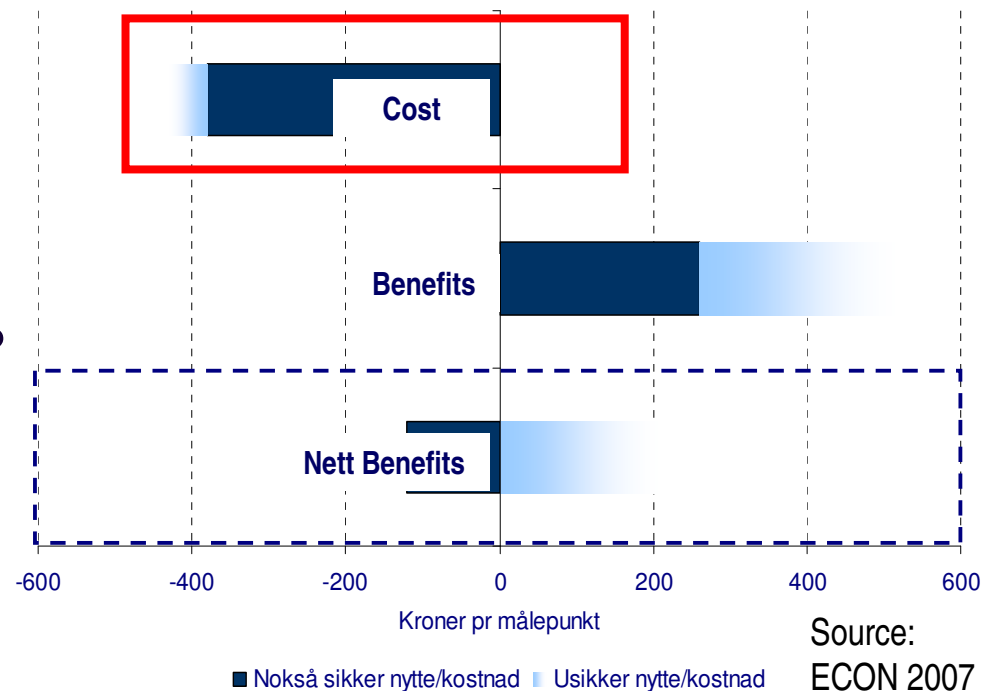
■ Uncertain Benefit/Costs

Source:
ECON 2007



Relatively large investment

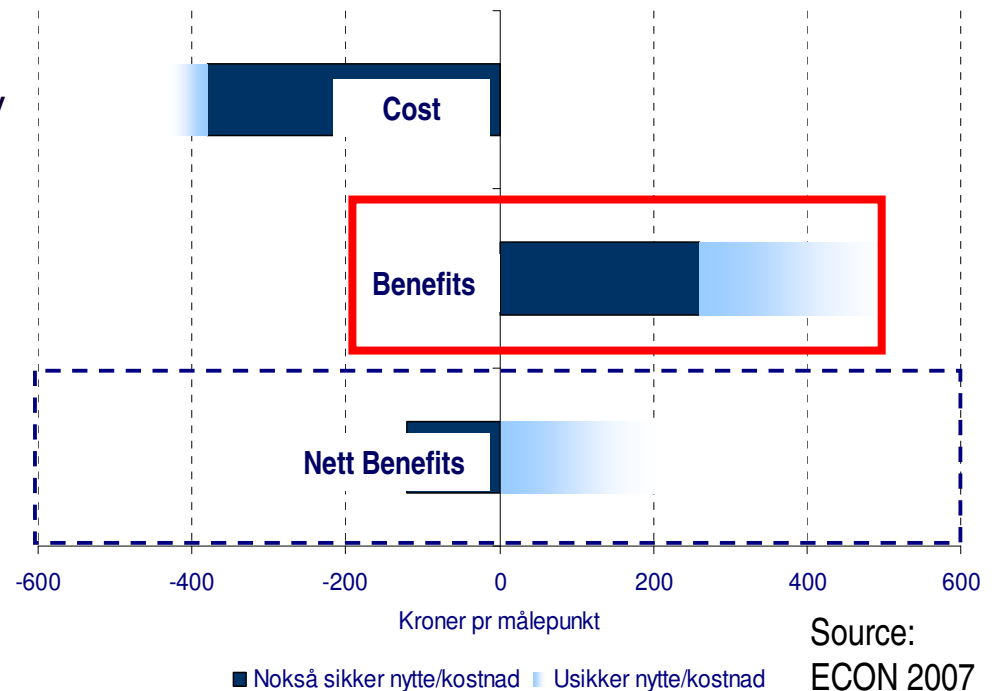
- Should not underestimate the cost
 - Limited upside on investment cost
 - Uncertainty about installation cost
 - Uncertainty about operation cost
- Status quo is not the benchmark
- Size of sunk cost limited?
- Nordic End user marked





Difficult to quantify all benefits

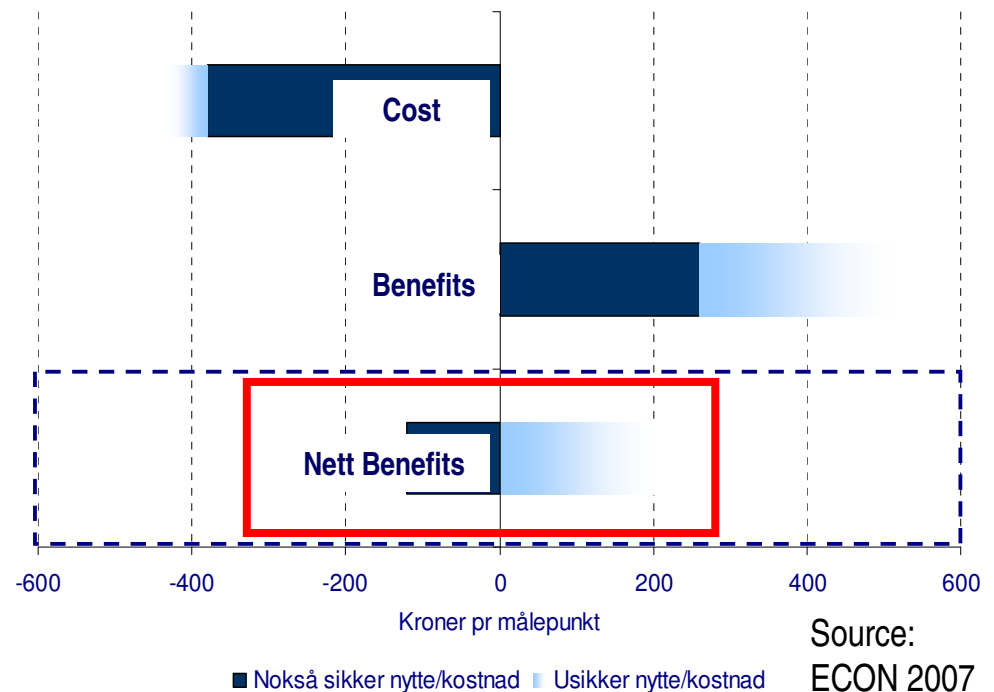
- Not possible to quantify all benefits
 - Distribution companies – metering, operation and surveillance.
 - Supplier - metering, customer management (switching) and product diversification.
 - Customer – metering, product variety and energy efficiency and demand response
 - Third parties – new products
- Benefit of increased demand flexibility?
- Cost saving on metering and switching underestimated?





Question of when – not if!

- Nett benefit probably positive when uncertain benefits are included
- Technological development and international experience suggest that,
- in order to capture all benefits
- a coordinated deployment is recommended





Benefits of demand flexibility?

- Hutt (2009) show that under specific assumption increased demand elasticity can give a 10 pct. reduction in whole sale electricity cost in the PJA marked.
 - Lower prices
 - Less capacity
 - Higher capacity prices?



Regulation of DSOs and smart meters in Norway

- Yardstick regulation based on historic cost
 - The cost of the meters are covered
 - Timing/cost will decide on the profit?
- NVEs has adopted a 2 step approach to smart meters
 1. Sett a timeline for full-scale deployment together with function requirements for smart meters
 2. Regulate the role of the DSO, in order to facilitate a more efficient competition in the retail market



Conclusion

- Benefits of smart meters (in the Norwegian market)
 - Improved operations of DSO
 - More efficient metering, billing and settlement
 - More efficient markets and demand response
- Regulators tool – facilitate competition by providing functional requirements to meters and defining rights and obligation regarding access to data and customers.