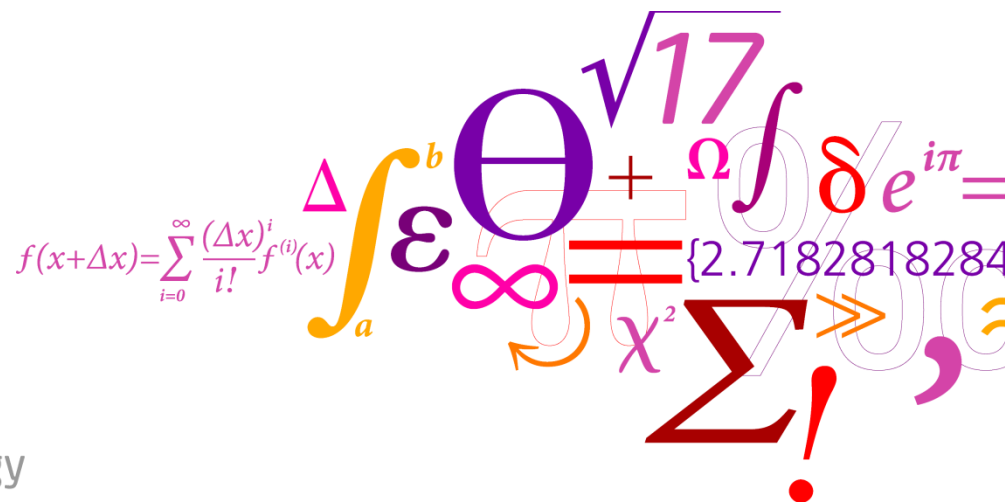


# ***Instrumentation of Scenarios***

## ***- Use of Policy Instruments to achieve our long term goals***

Poul Erik Morthorst  
 Systems Analyses Division  
 Risø DTU

3. June 2009  
 Ceesa Annual Meeting  
 Haraldskjær



# 100% Renewable Scenarios

- ***Biomass scenario.*** Based on 100% RES low demand, mostly biomass.
- ***Wind scenario.*** Based on 100% RES low demand, mostly wind
- ***High demand.*** Based on the 2004 energy demand, both wind and biomass.

# Levels of Analyses

- **International Framework**

- EU targets
- EU Emission trading system

- **National possibilities**

- EU non-ETS
- All the different forms of regulation, tariffs etc.

# EU Energy Policy Framework



- **Binding targets in EU:**

- **20-20-20 i 2020**

- **20% reduction of greenhouse gases by 2020 compared to 1990**

- this target can be raised to 30% subject to binding international climate change agreements

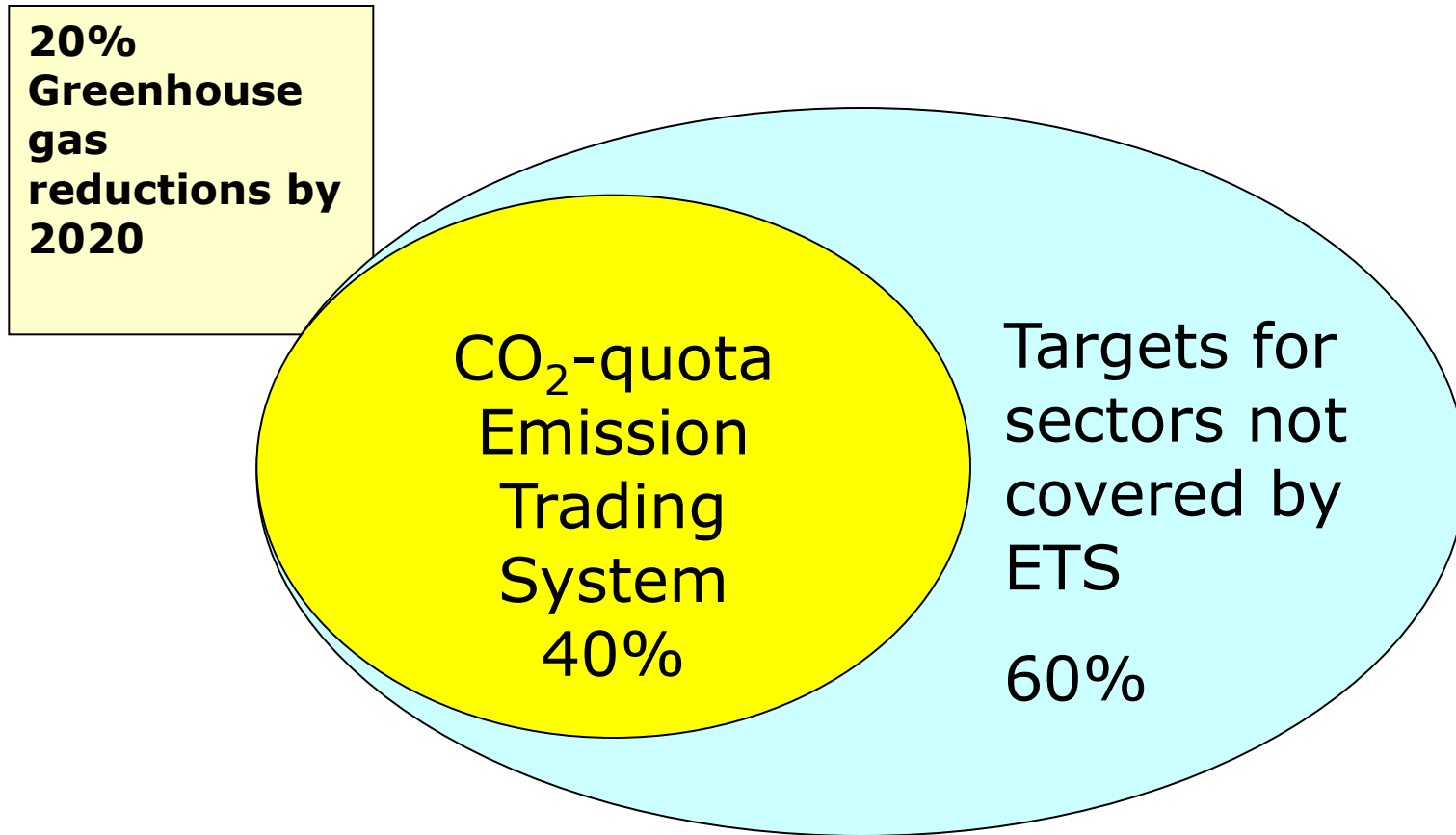
- **20% of final energy consumption in the EU has to be supplied by renewable energy**

- Existing target was 12% in 2010 and non-binding – 7% expects to be achieved

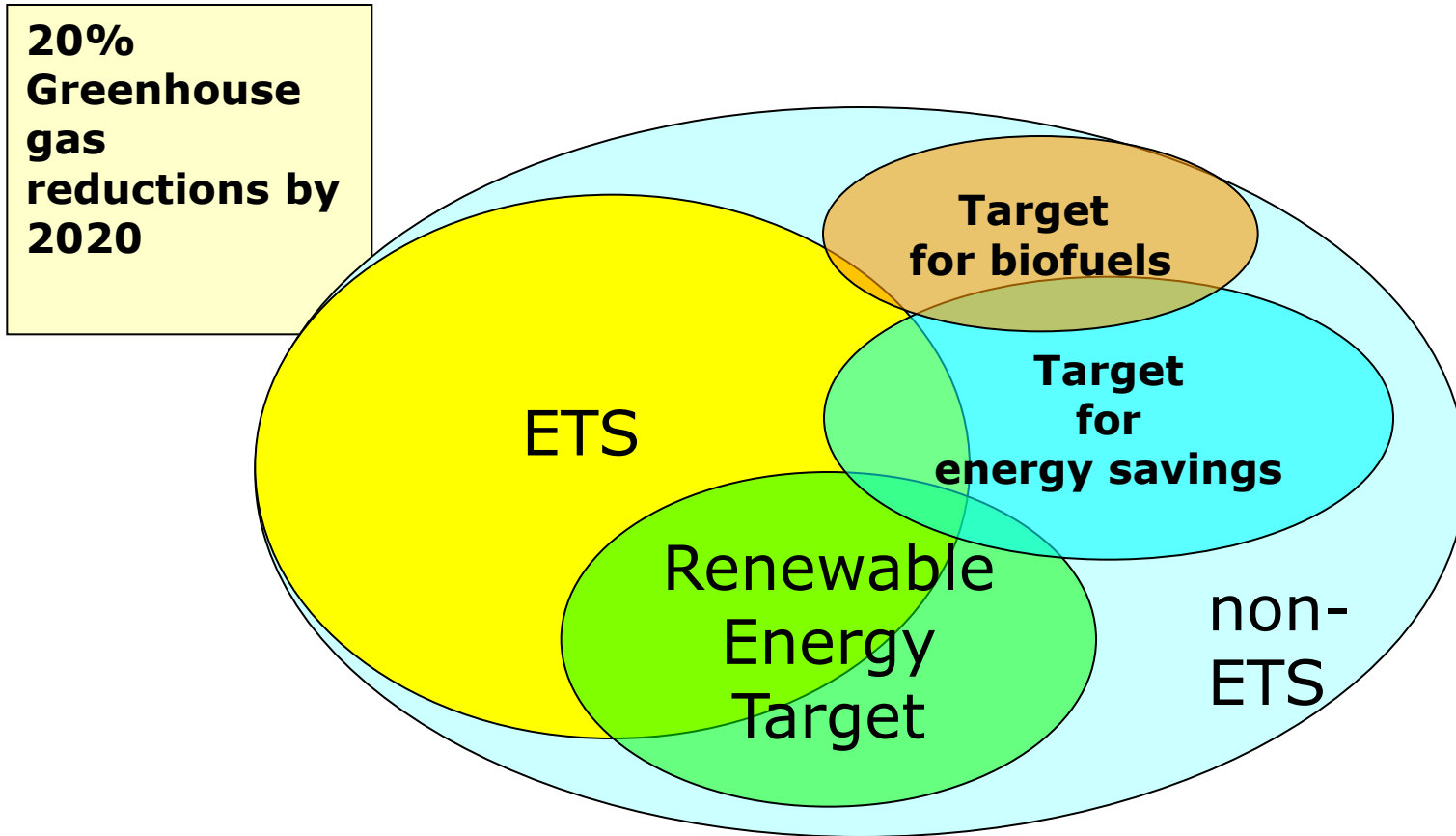
- **20% increase in energy efficiency by 2020 compared to a reference**

- **10% biofuels in transport by 2020**

# ETS and non-ETS



# Targets



# EU CO2 Reduction Policy

## • Non-ETS

–Required reduction of CO2 of	1068 Mio.T
–Allowed use of Credits	783 Mio.T

## • ETS

–Required reduction of CO2 of	2635 Mio.T
–Allowed use of Credits	1017 Mio.T

# Grand Totale

- Approx. 50% of the 20% reduction by 2020 can be achieved by buying credits from outside Europe
- Moreover, the inclusion of Eastern European countries in EU has also introduced a large number of cheap (free) reduction options.
- The total reduction achieved by the EU system in 2020 might be less than "real" 5% achieved in Europe compared to the promised 20%



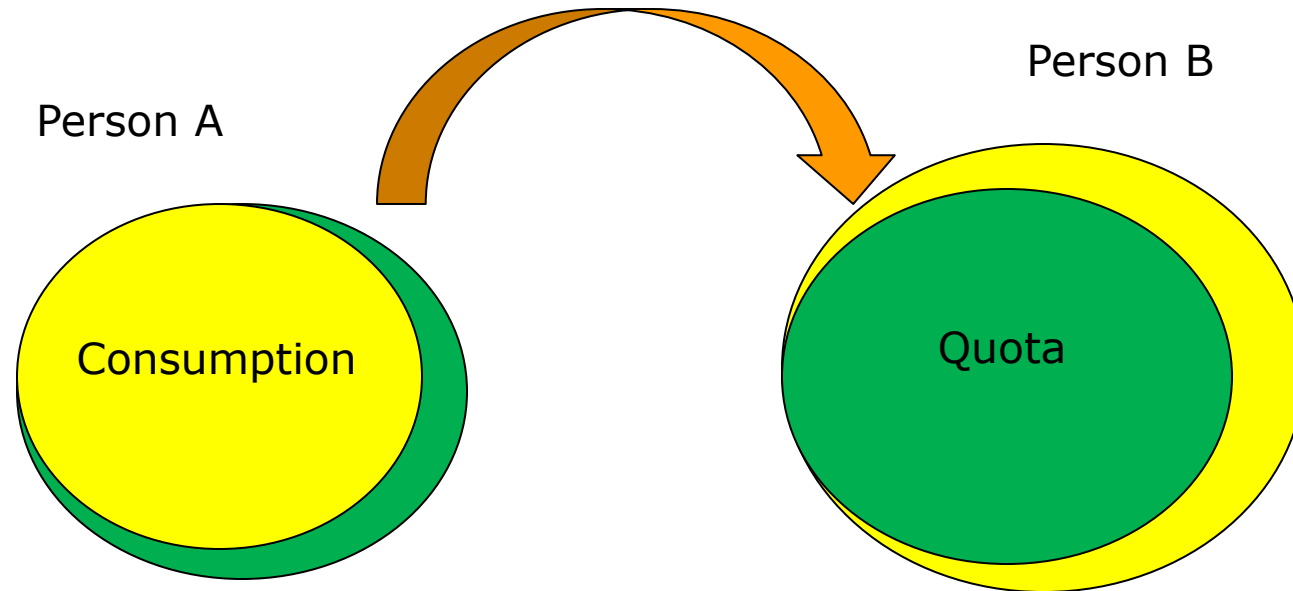
# National Possibilities

- **Demand side Policy Instruments**

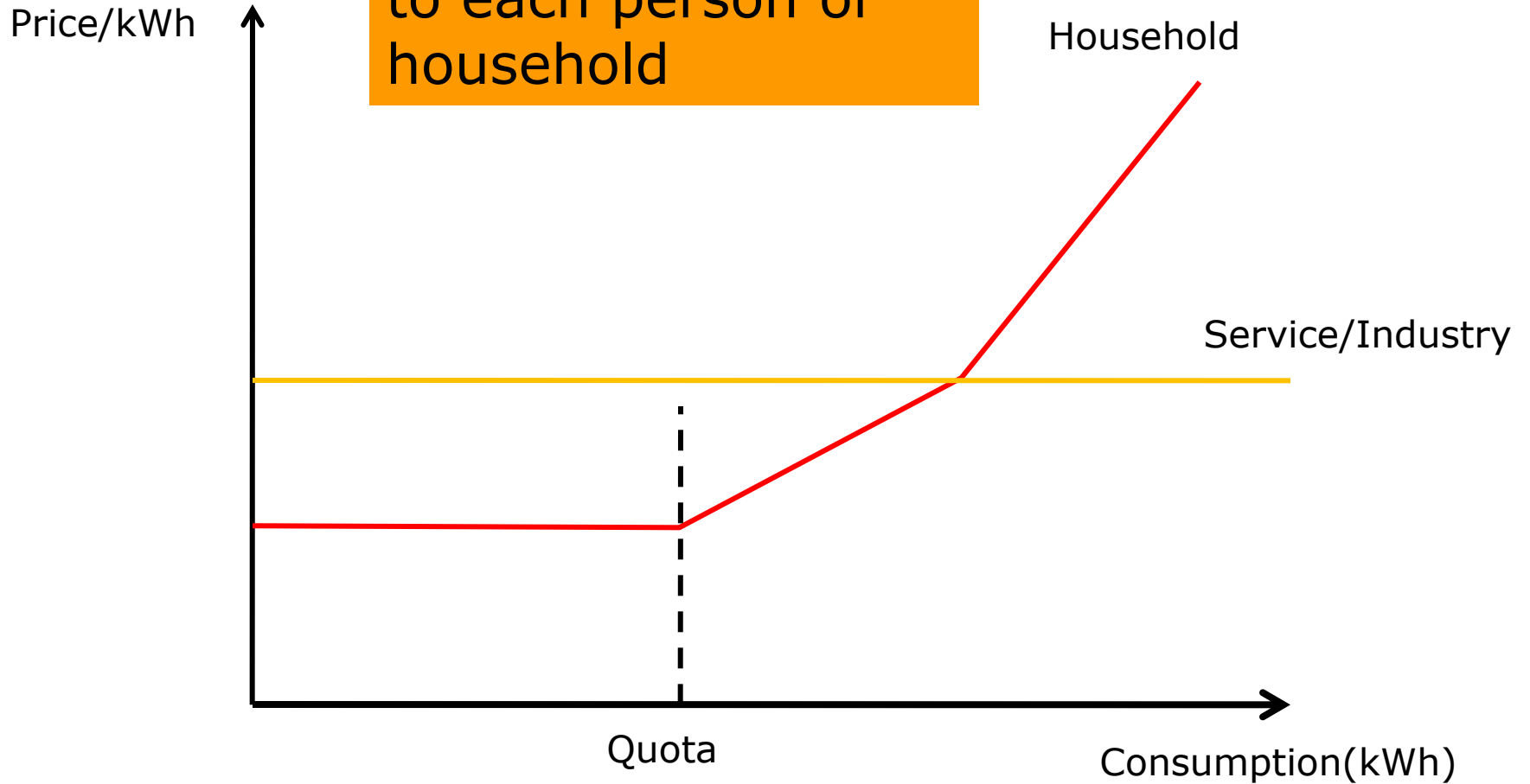
- Households
- Services
- Industry
- Agriculture

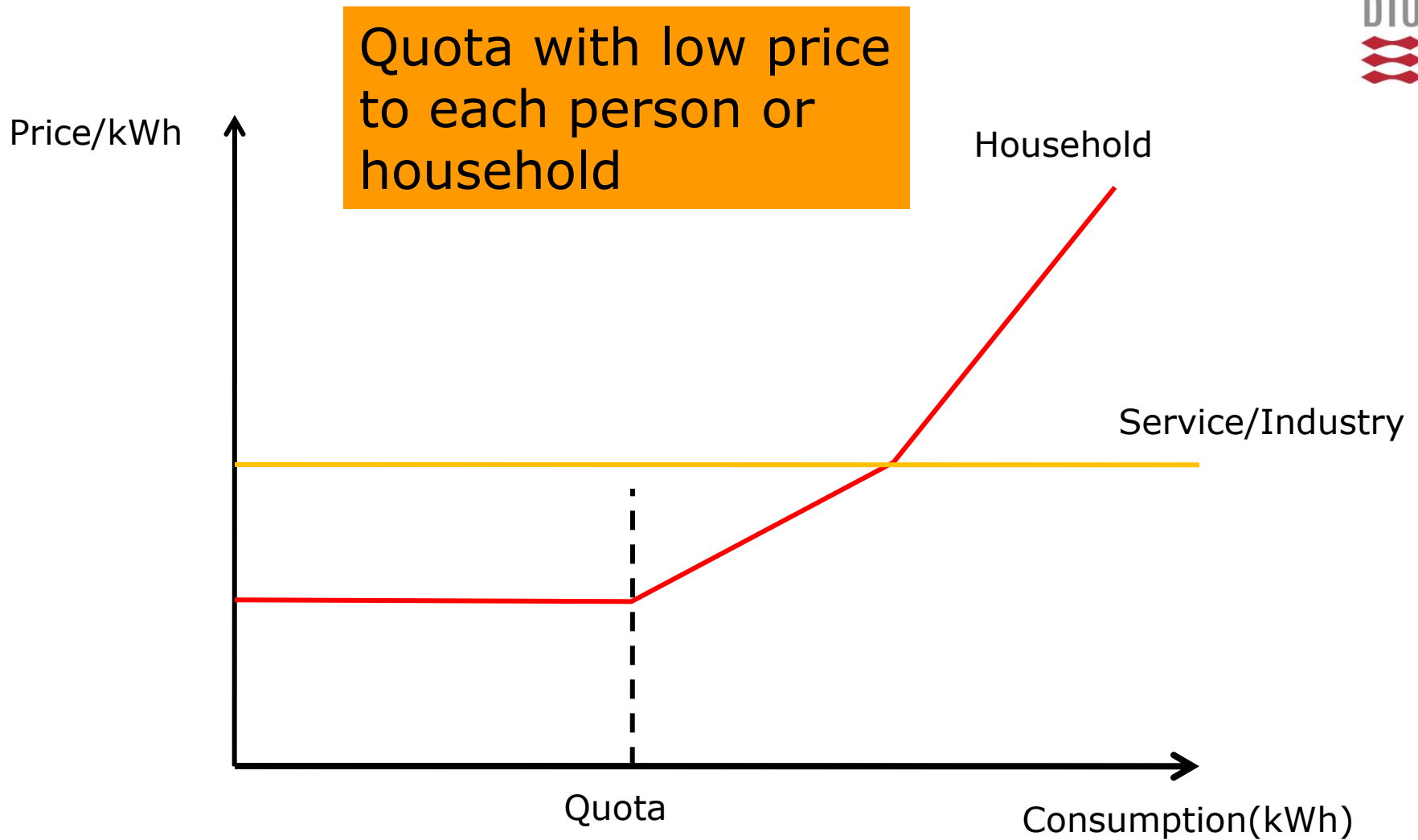
- **Supply side Policy Instruments**

# Personal CO2 Allowances

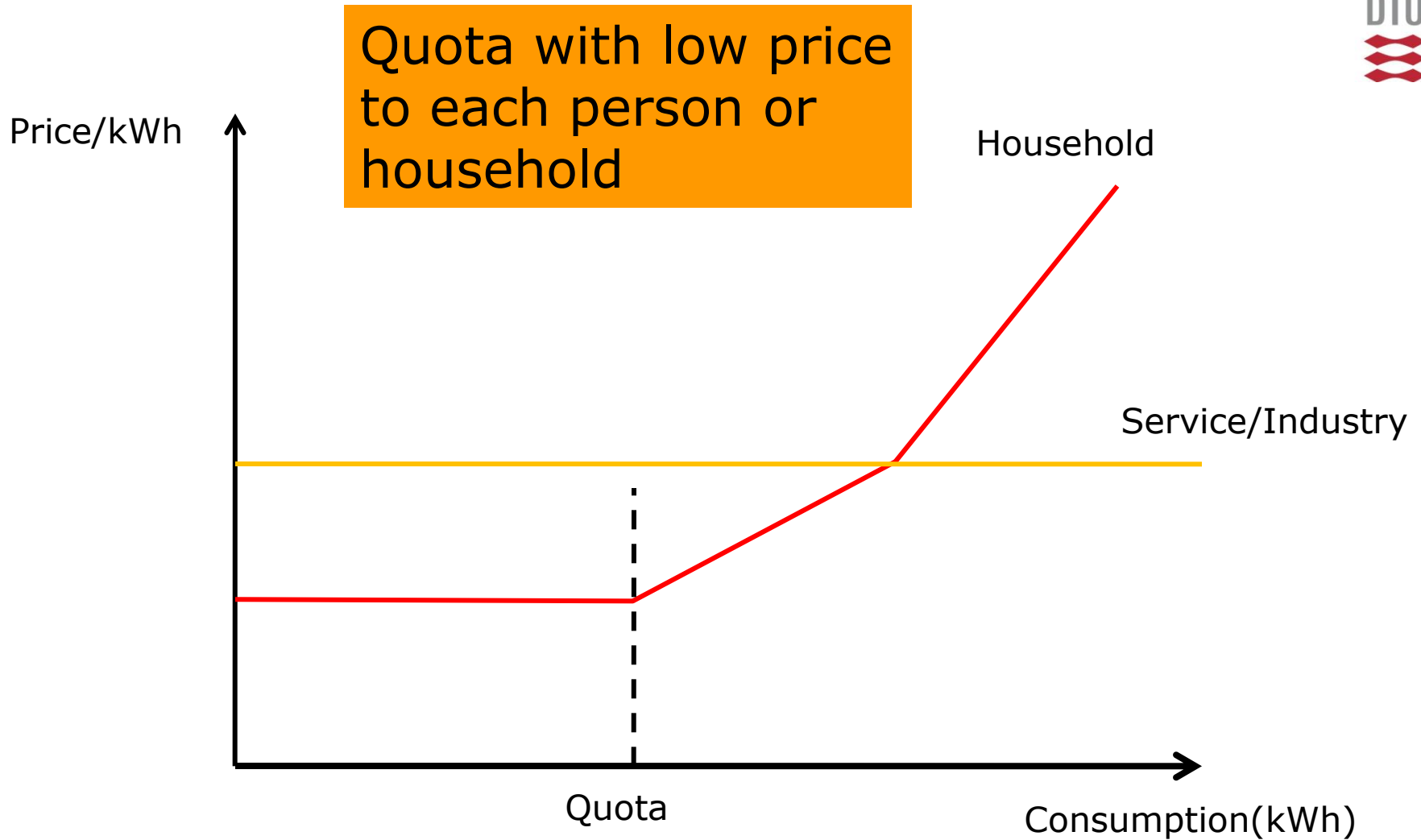


Quota with low price to each person or household



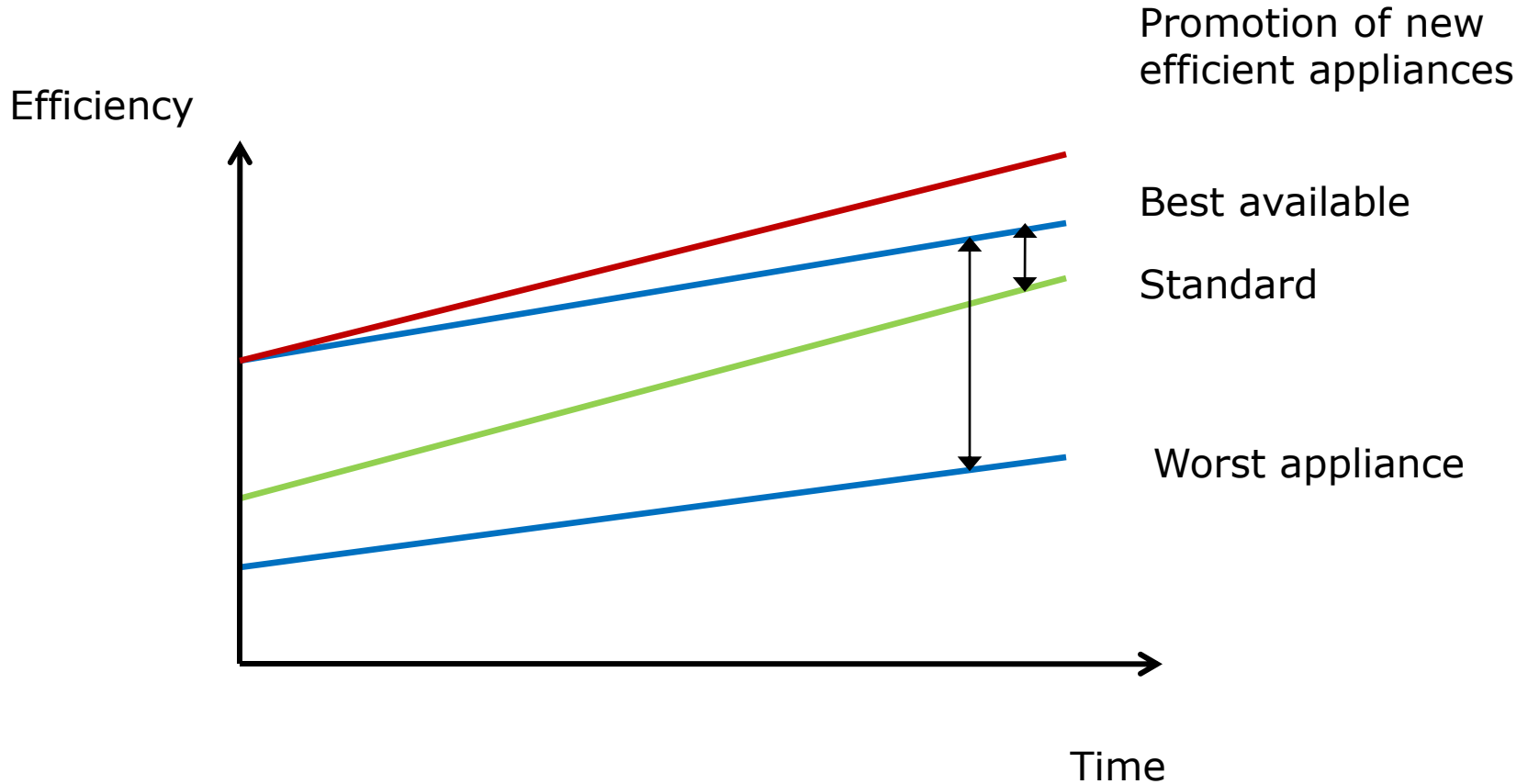


$$\text{Quota} = \text{basicquota} + N * \text{personquota}$$



$$\text{Quota} = \text{basicquota} + N * \text{personquota} + \text{EVquota} + m2 * \text{heatpumpquota}$$

# Standards



# Policy means for energy renovation of the old building sector.

- Energy conservation potential corresponding to approx. 30% of the existing consumption
- SBI report lists a number of negative investor considerations:
  - *No faith in human influence on climate changes*
  - *Too long pay-back times*
  - *Free money are reserved for other purposes*
  - *Better wait until a major renovation is necessary*
  - *Private comfort is disturbed during renovations*
  - *Lack of detailed knowledge concerning economic and comfort advantages of energy renovations*
  - *Major renovations may harm the original architecture.*

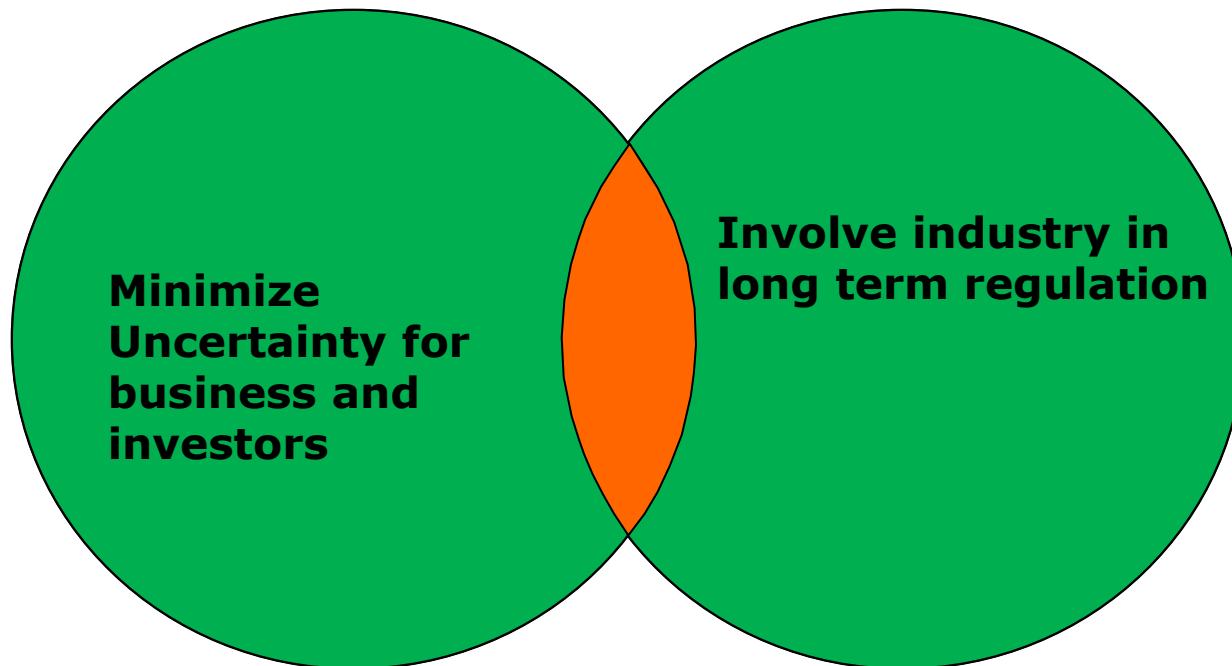
# POLICY MEANS FOR PROMOTION OF ENERGY REDUCTIONS

- *Green building tax graduated in accordance with the energy intensity of the house.*
- *Labelling of energy intensity of all houses as a basis for green building taxes.*
- *Tax reductions and other forms for investment subsidies as support for strong energy renovations and installations of renewable energy sources.*
- *Introduction of a new scheme where old houses that are difficult to put through an efficient total renovation as an alternative are abolished and replaced by a "passive house".*
- *Introduction of Personal Carbon Allowances including heat and electricity for private houses.*



# How to regulate industry until 2050?

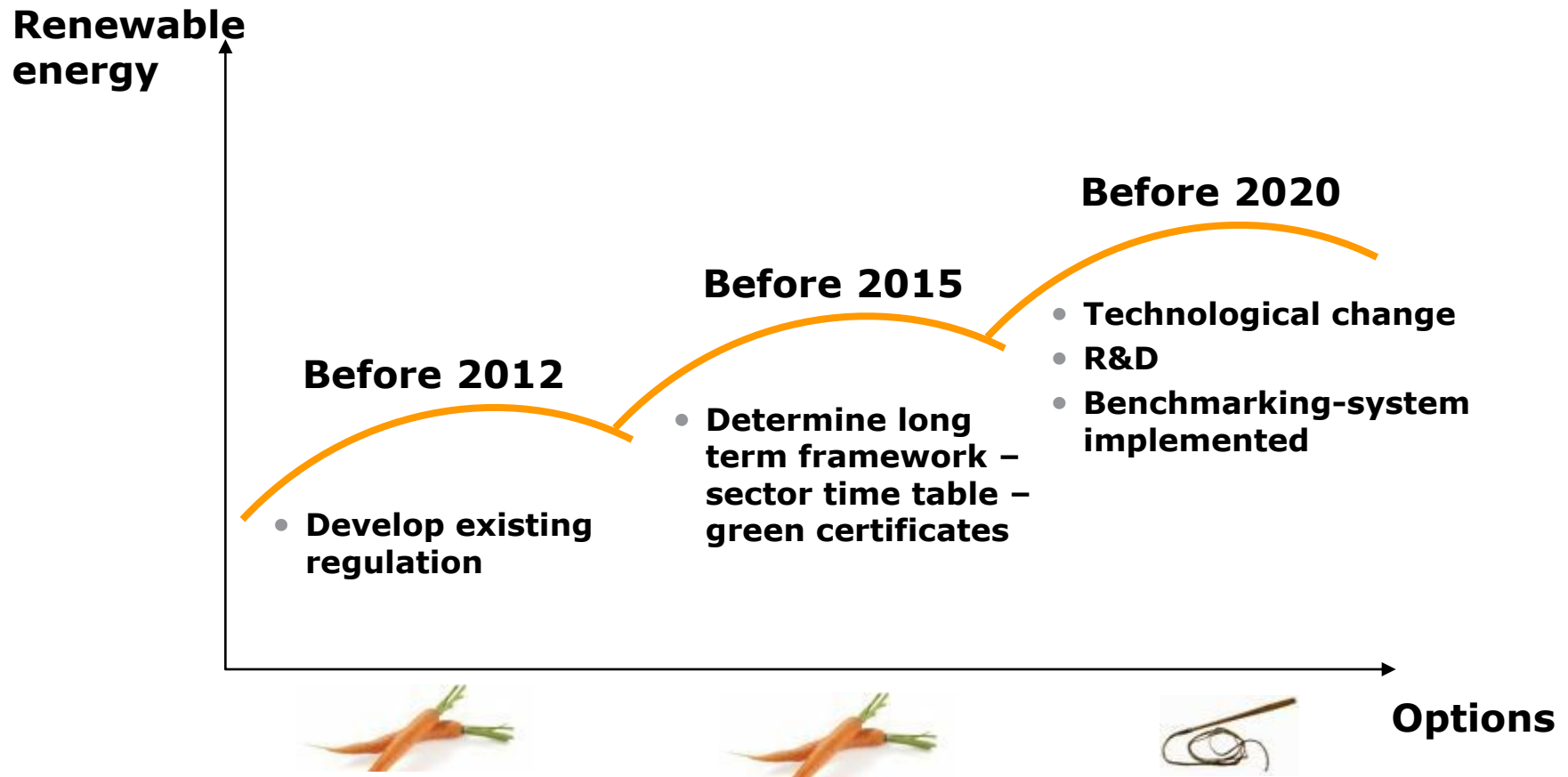
Reliable long term framework to regulate energy consumption by industry



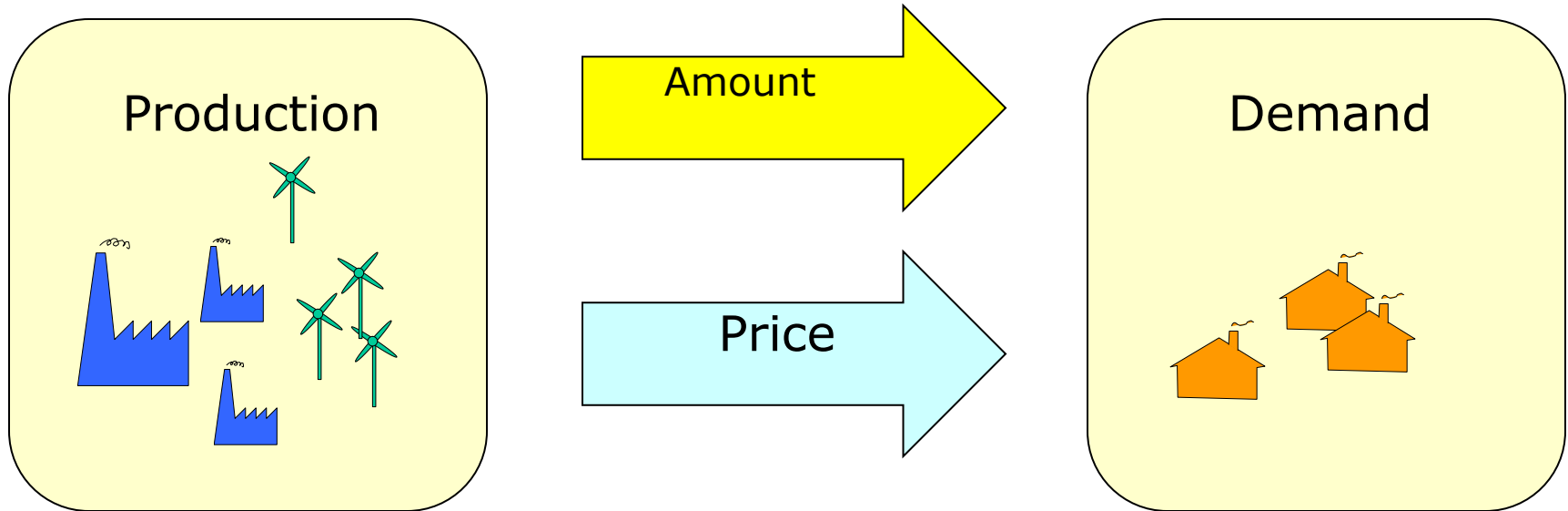
# Industry is Challenging!!

- Specific Challenges in regulating Industry
  - Complex processes
  - To utilize the large existing knowledge
  - To make binding agreements with industry
  - To create green innovation in industry

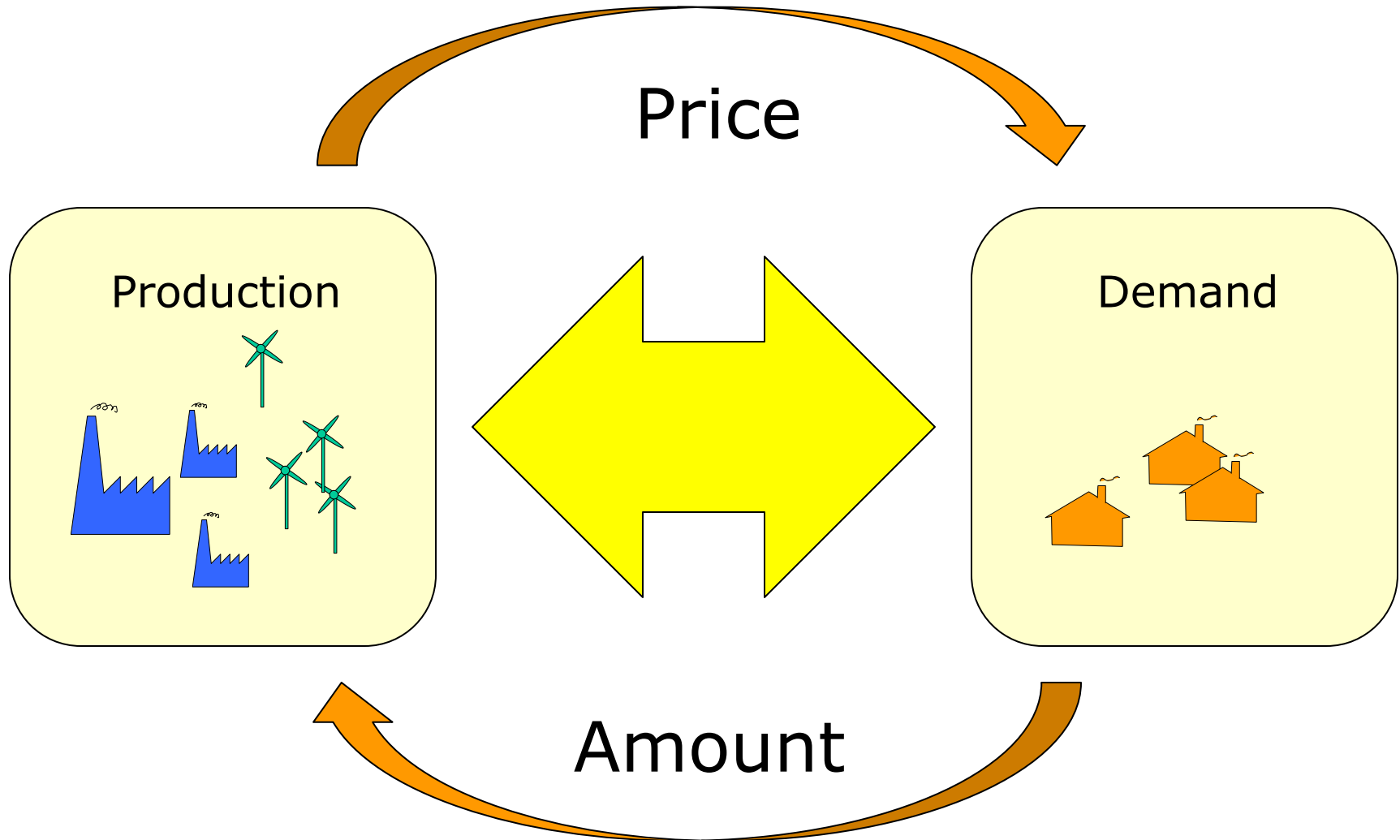
# Use of Policy instruments in Industry– 2012 til 2020



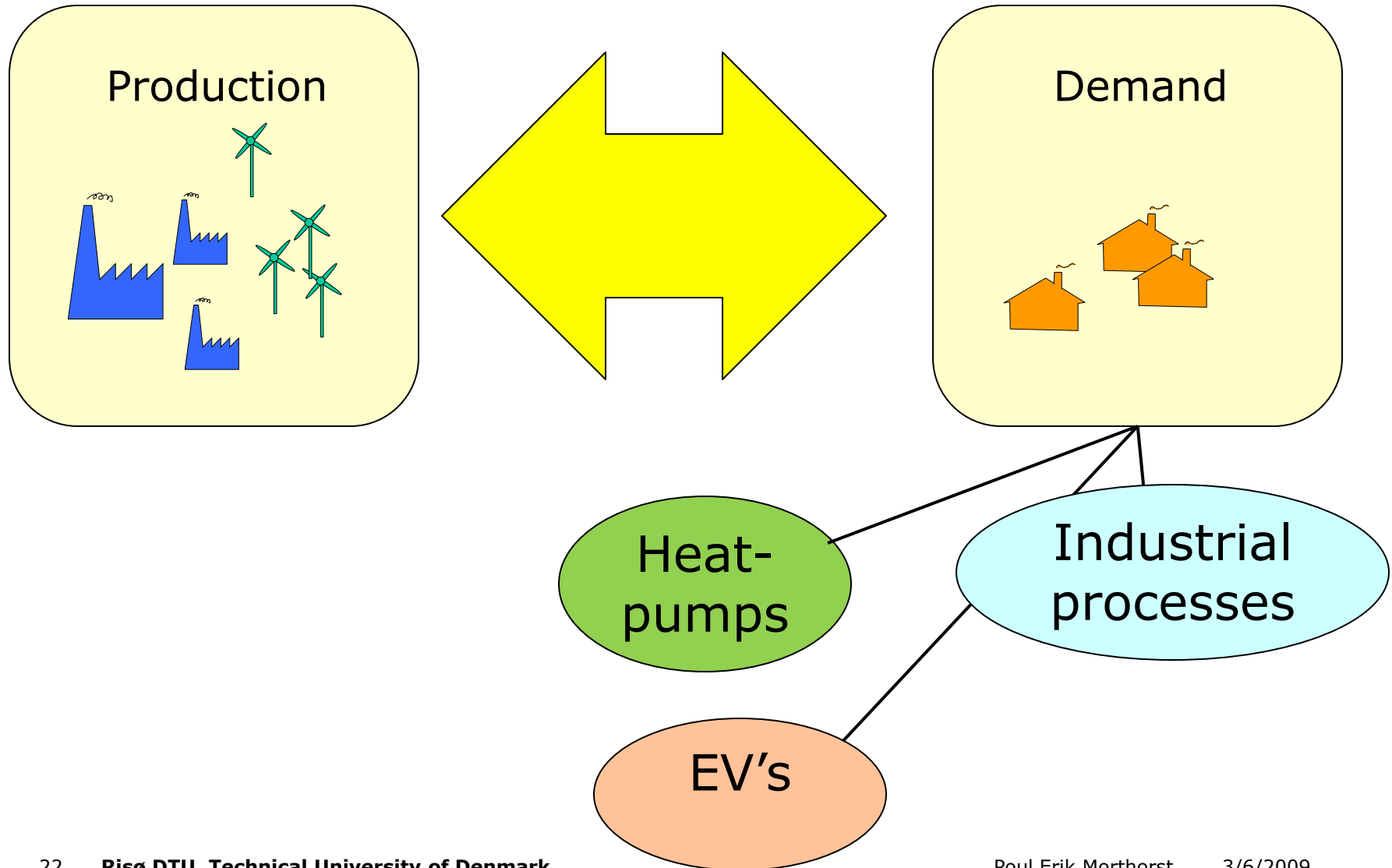
# OneWay Communication



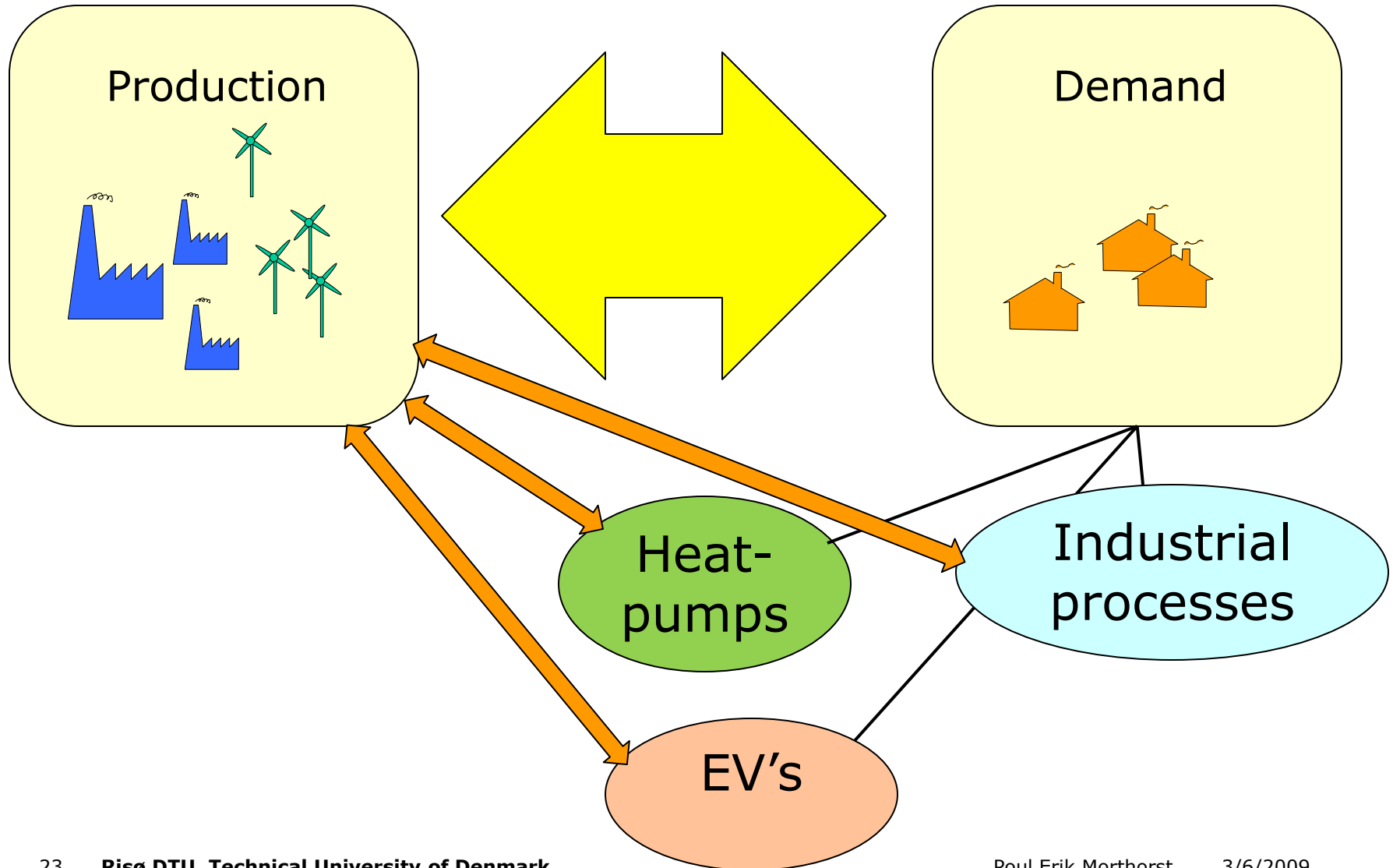
# Communication between demand and production



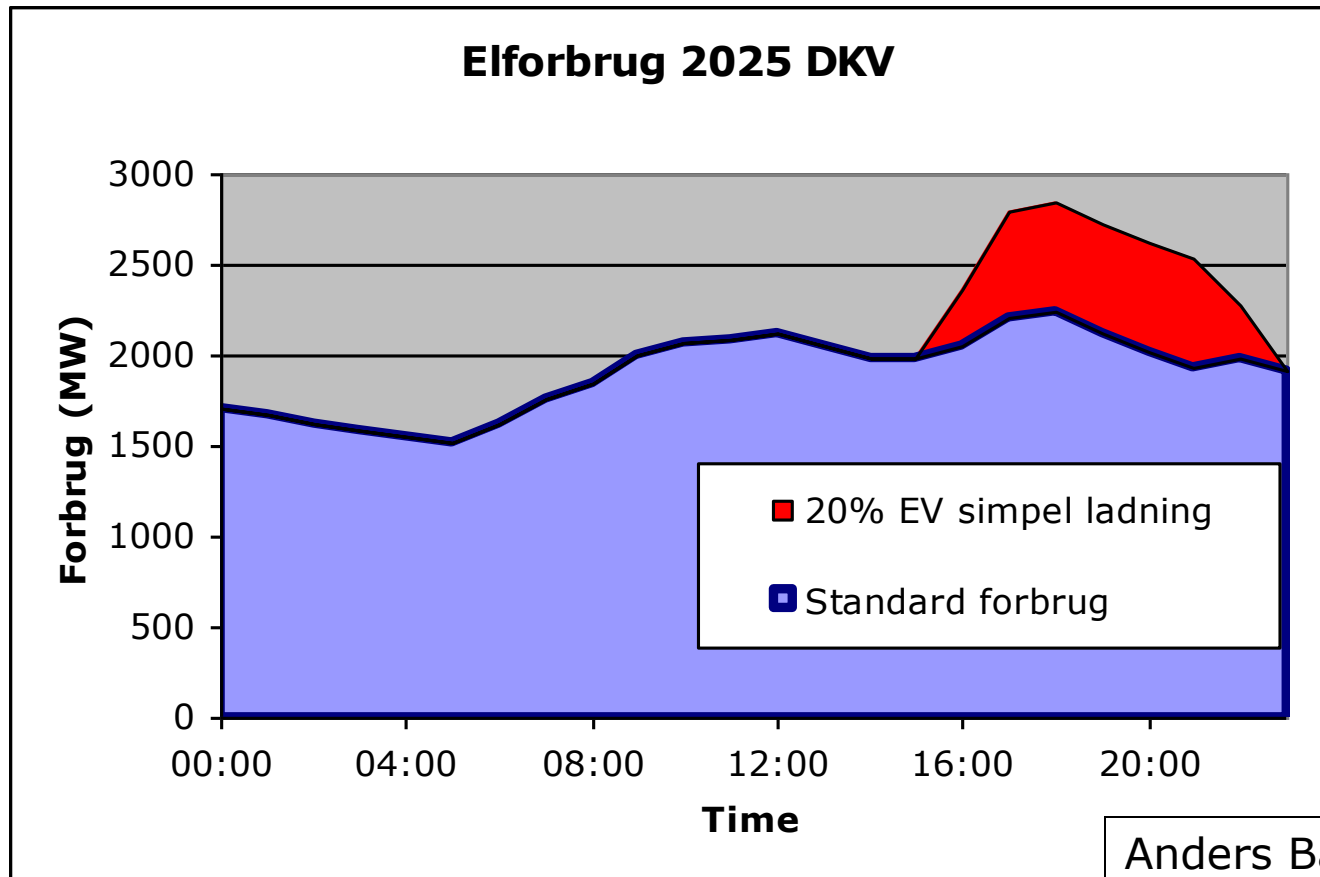
# Communication



# Communication



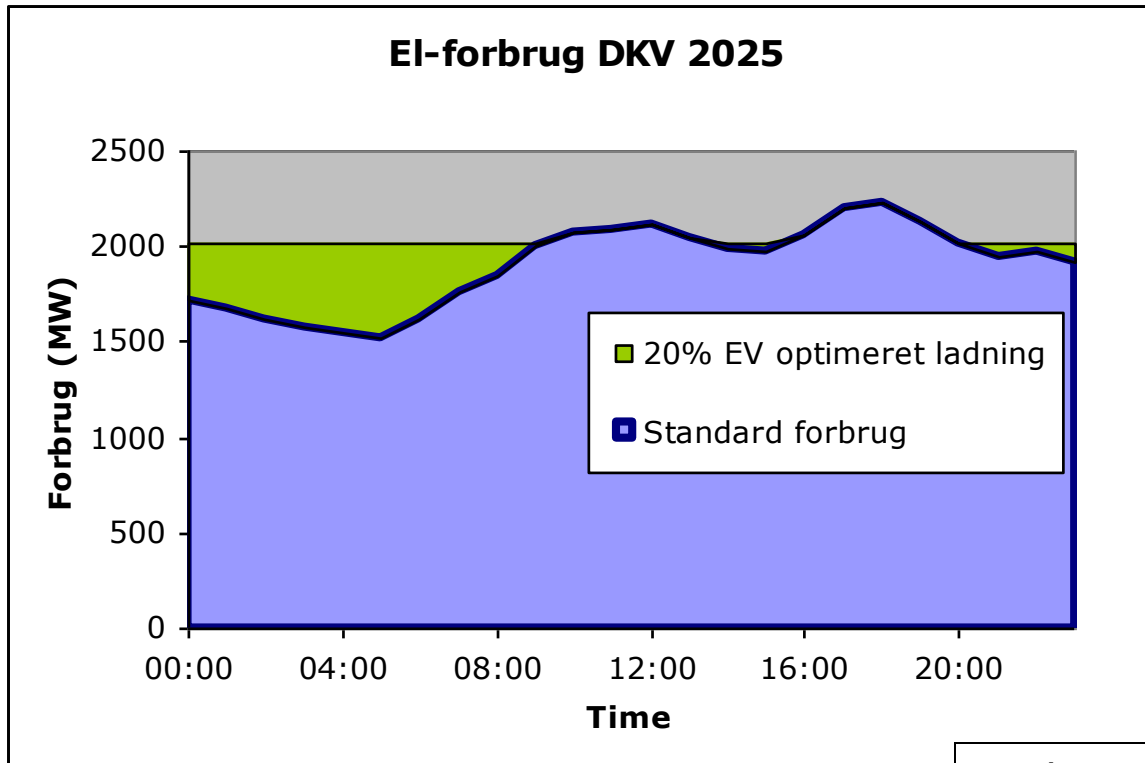
# Simpel Charge of EV's



Anders Baunhøj Hansen,  
Energinet.dk

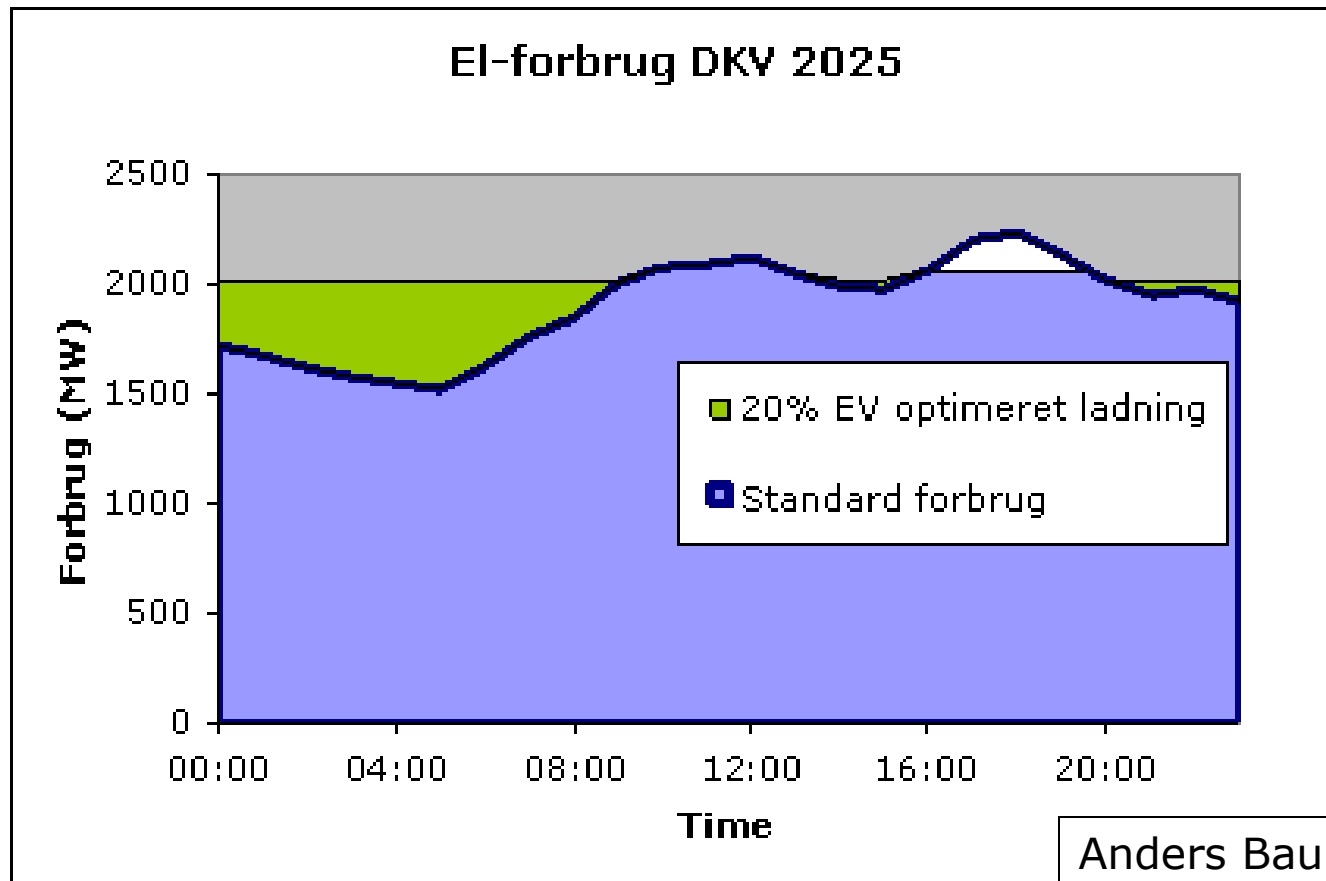


# Cheapest Charge of EV's



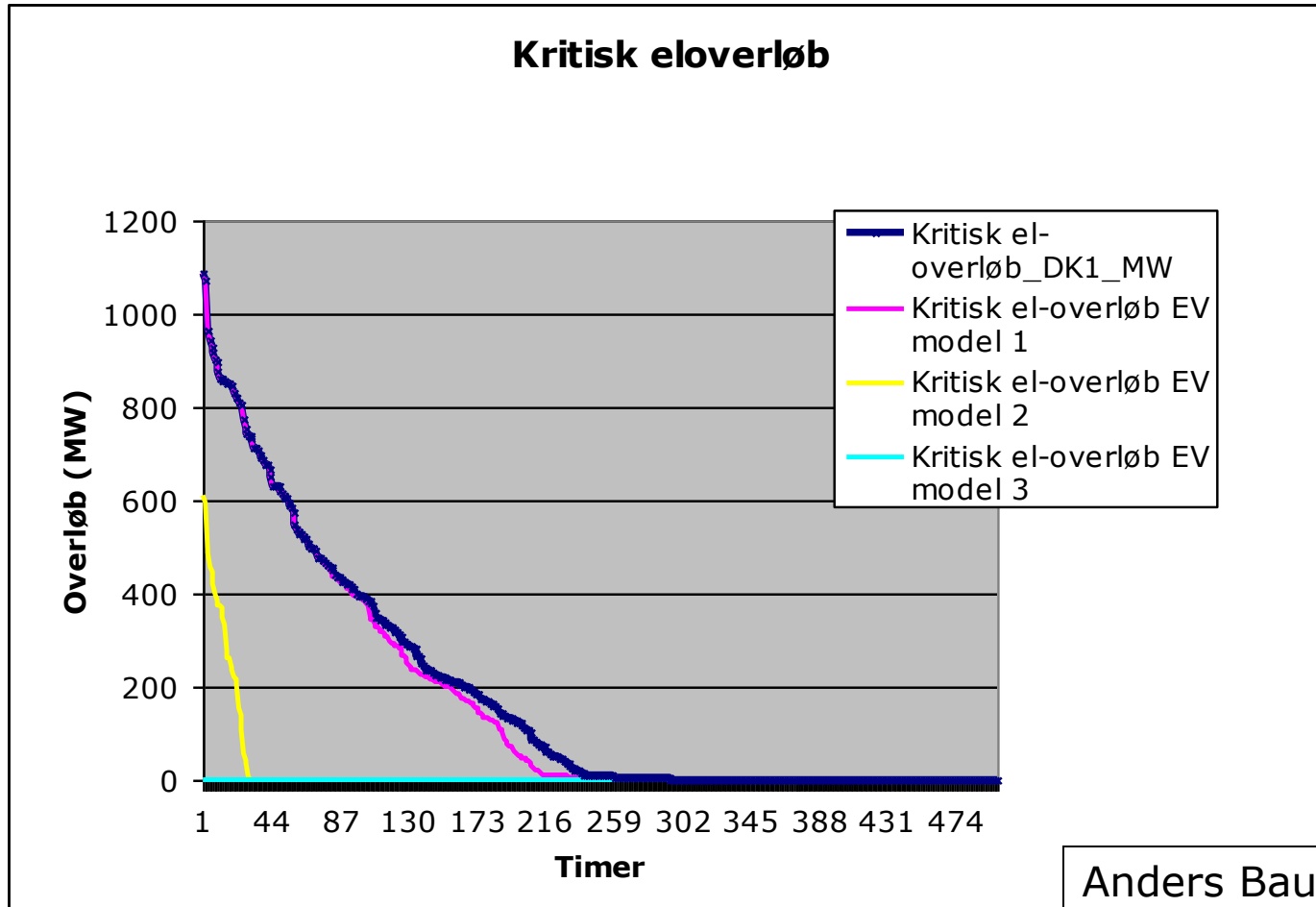
Anders Baunhøj Hansen,  
Energinet.dk

# Optimised charge/discharge of EV's



Anders Baunhøj Hansen,  
Energinet.dk

# Impact on critical excess power production by year 2025



Anders Baunhøj Hansen,  
Energinet.dk

# Conclusion

- A large portefolio of different instruments exists for implementation of our scenarios
  - The EU framework makes it difficult especially in the short run
  - We have to utilize the national opportunities to the full limit
- Overall regulation schemes all have their pros et cons
  - Some of them are more difficult to administrate than others
- Technology and instrumentation should go hand in hand
- A 100% renewable system might require a new market set-up because the existing one cannot cope with the large amounts of variable energy produced