

The Danish experience with Energy Efficiency Obligations (EEO)

- and its effects on industrial energy efficiency

Mikael Togeby

Ea Energy Analyses

Copenhagen, Denmark



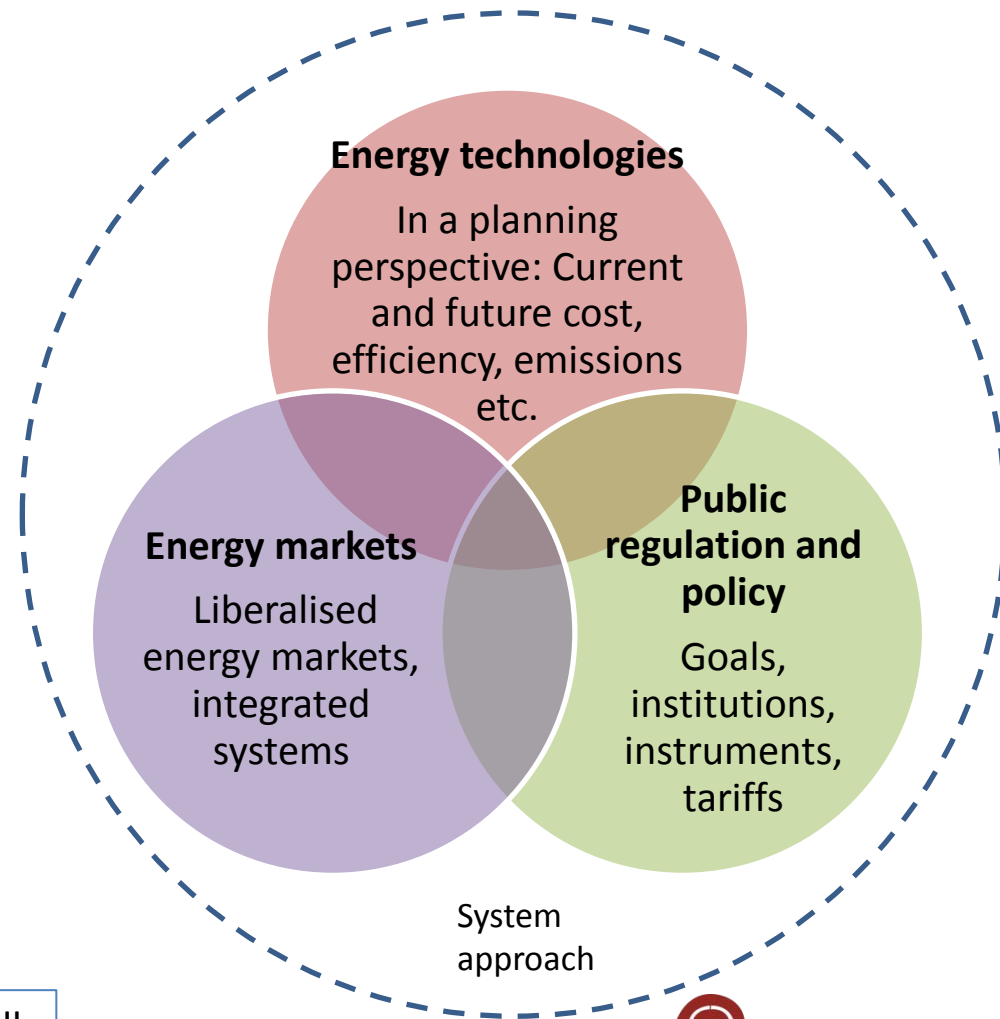
Agenda

- Presentation
- The Danish EEO
- Evaluation
- Personal view

PRESENTATION

Ea Energy Analyses A/S

- Started 2005
 - Four partners with background in the planning department of the Danish Transmission System Operator, Energinet.dk
 - Today 33 employees
- Customers
 - Governments
 - TSOs
 - International organisations
 - Energy companies and associations



Mikael Togeby

- M. Sc. and Ph.D from the Technical University of Denmark
 - Prognosis model for industrial energy consumption
- AKF, Local Governments Research Institute
 - Energy audit in industry: Design and evaluation
- TSO, Elkraft/Energinet.dk
 - DSM planning
- Ea Energy Analyses
 - Evaluation of Danish EEO (x 2)

THE DANISH EEO

EEO in Denmark

- Long history of energy companies (grid companies) working with energy efficiency
 - 1995 to 2006: DSM
 - Electricity
 - From 2000: Natural gas and district heating
 - From 2006: EEO
 - Oil (for heating) also included

2006 change: DSM -> EEO

- Focus on realised project
 - Before: Recommended projects
- Freedom of method:
 - All energy types
 - All areas
 - All types of interaction
 - Before: Only own energy type and area
- Industrial perspective:
 - Before: Was tied to local utility
 - After: Can select between more than 400 utilities
 - Improved the interest from industry a lot



Obligated parties

- 75 electricity distribution companies
 - Distribution only, unbundled from production
- 380 district heating companies
 - In general owned by municipality or by the end-users
- 3 natural gas distribution companies
- 6 oil companies
 - EE obligation is handled in cooperation by branch office

Computation of savings

- Small projects: Deemed savings (catalogue)
- Larger projects: Engineering estimates

Rule of interaction

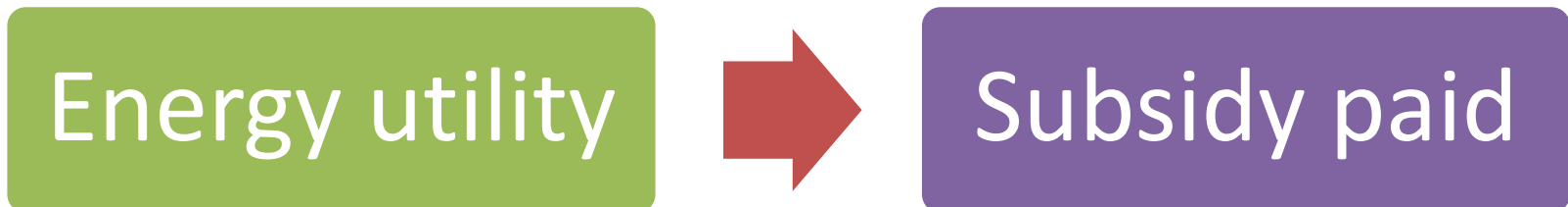
- Interaction with end-user must take place before realisation of project
 - Simple and clear rule
 - Does not guarantee additionality!
 - No rule can guarantee additionality!

Type of interaction

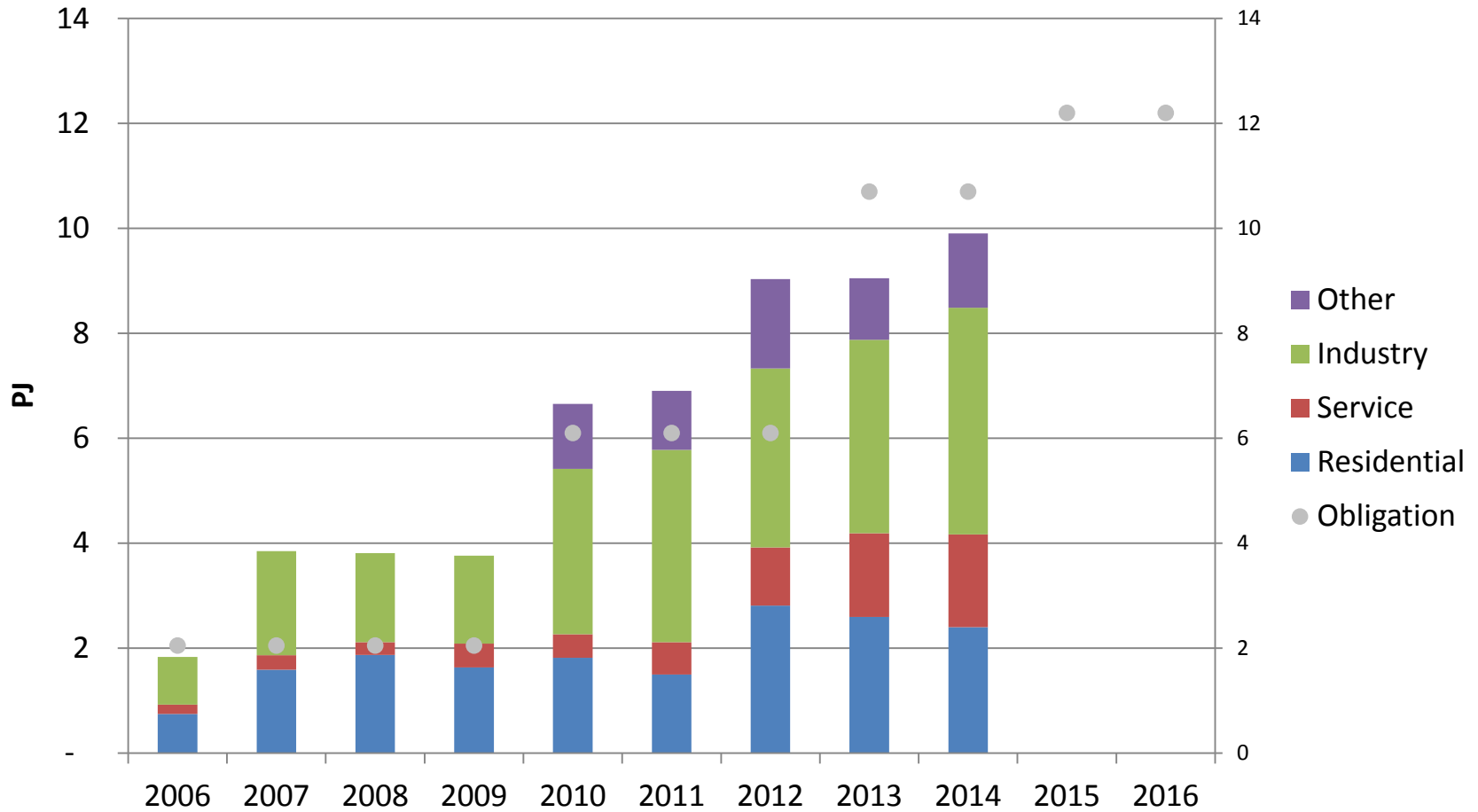
- In 2006:
 - Dominated by technical advise
- Today:
 - Mostly subsidy
 - Plus computation of savings

Third party help allowed

- Installers or engineering companies can help
 - Rule of interaction must be respected

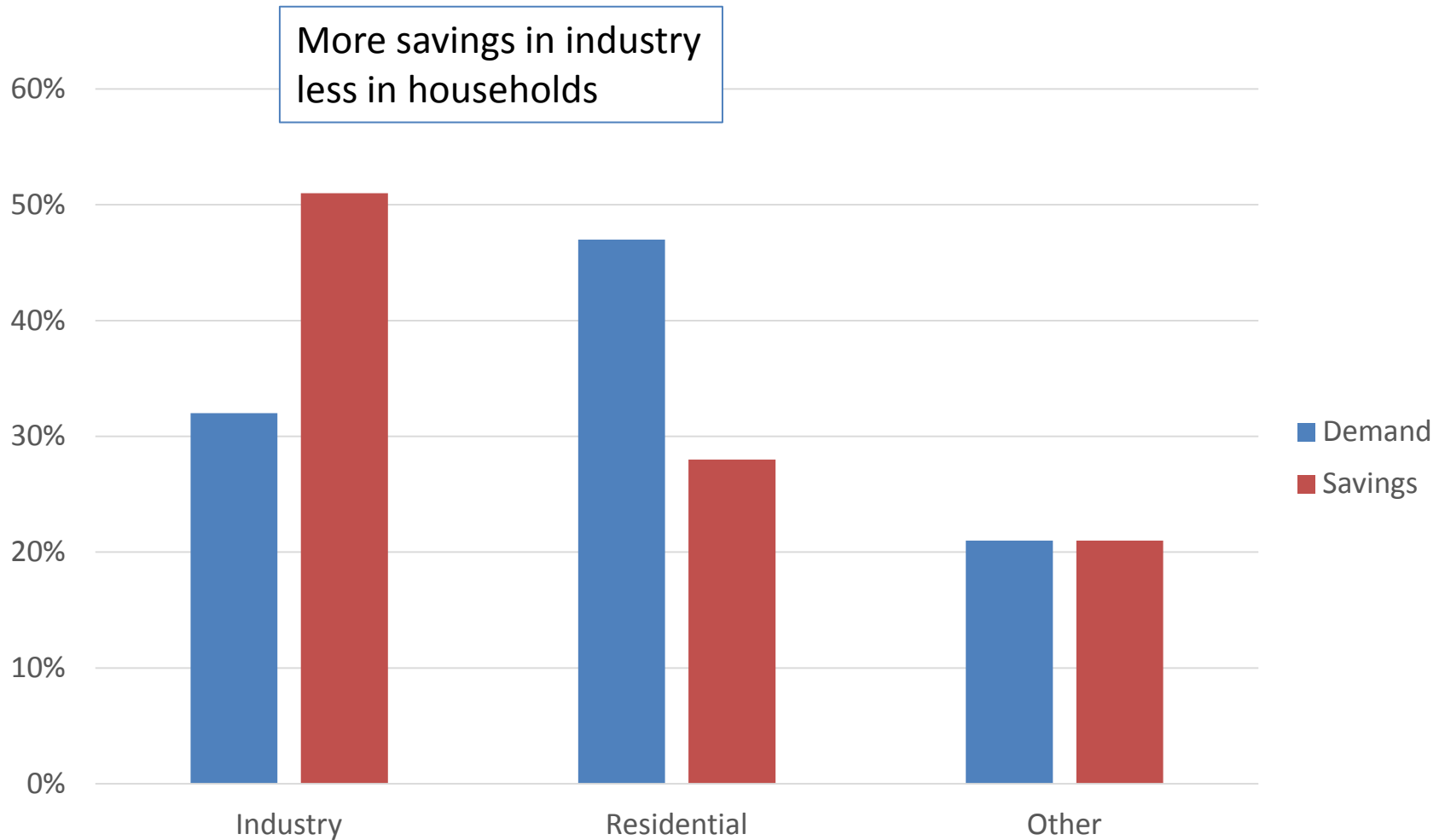


Realised savings



By end of 2014 the companies have realised 106% of the accumulated obligation

Demand and savings



Examples from industry

	First year's saving
Six step evaporator	56 GWh
Use of by-product hydrogen to produce steam	26 GWh
Converting of new type of town gas	23 GWh
Partnership with chemical company	12 GWh
New natural gas steam boilers	11 GWh
Converting oil and electricity for heating to natural gas	10 GWh
Retrofitting boiler with flue gas cooler	9 GWh
Retrofitting kiln to optimize air flow	8 GWh

Many examples with pay-back times of 1-2 years



Summary

- Simple system
 - Little risk for industry
 - No yearly review
- Obligated party is responsible for quality
- Freedom of method
 - Subsidy
 - Technical advice
- Room for third party

EVALUATIONS

Evaluations

- Has been evaluated in 2008, 2012 and 2014
- Total economy positive
 - Very positive for industry
 - Negative for residential
- Additionality
 - ~50% for industry
 - ~20% for residential
- Pay-back times
 - Short for industry
 - Long for residential

Total economy:

Cost and benefit for all:

Cost for utility

Investment cost for company

Benefit for company

Corrected for additionality (free riders)

How to measure additionality?

- Scientifically sound methods have failed!
 - Statistical methods with large sample
 - Data quality!
- Simplified methods give a clear picture
 - Survey with self-reporting
 - Direct question:
 - “What is the probability that you would have realised the project without help from the energy company?”
 - Indirect questions
 - “To what extent did you know about the project before the help from the energy company”
- Consistent results in three evaluations
 - 45-50% for industry

PERSONAL VIEW

Personal view

- The simple system is the basis for success in industry
 - Strict requirements about documentation of savings may not be needed
 - Can introduce risk and challenge the economy
- Results in industry are significant!
- Wrong only to use EEO in relation to industry
 - Other measures can help – where EEO is not effective (e.g. provision of EE information)
- (The Danish version of) EEO is not successful in relation to households or small companies
 - EEO is not a efficient tool for all end-users!

THANK YOU!

EXTRA

EU Energy Efficiency Directive

- EEO is a central part of the directive (article 7)
 - Important element to reach the 20 pct. saving target for 2020
 - Annual target 1,5 pct. of final energy consumption
- 5-6 Member States had EEO before the directive
 - France, Italy, UK, Poland, Denmark...
- 17-18 Member States have EEO as part of their implementation of EED