Energy efficiency
Involvement om energy utilities

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SWISS Cleantech, StromEffizenz Initiative
Bern, 9 September 2015

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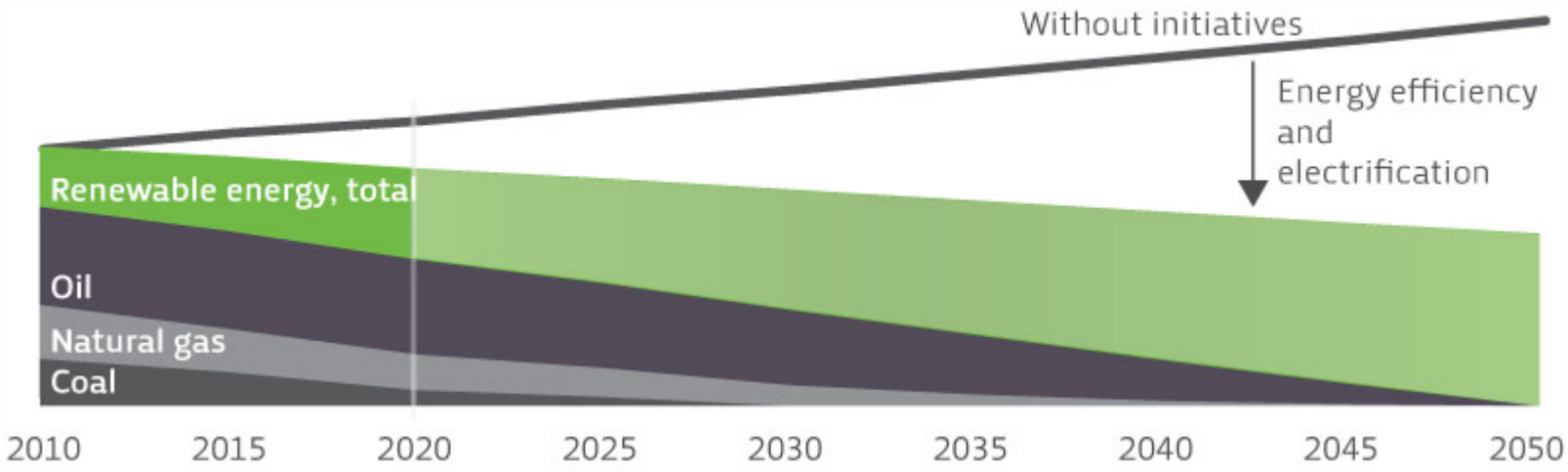
Independent of fossil fuels in 2050



- Strong improvement of energy efficiency in all sector
  - Includes electrification
- Increased use of renewable energy

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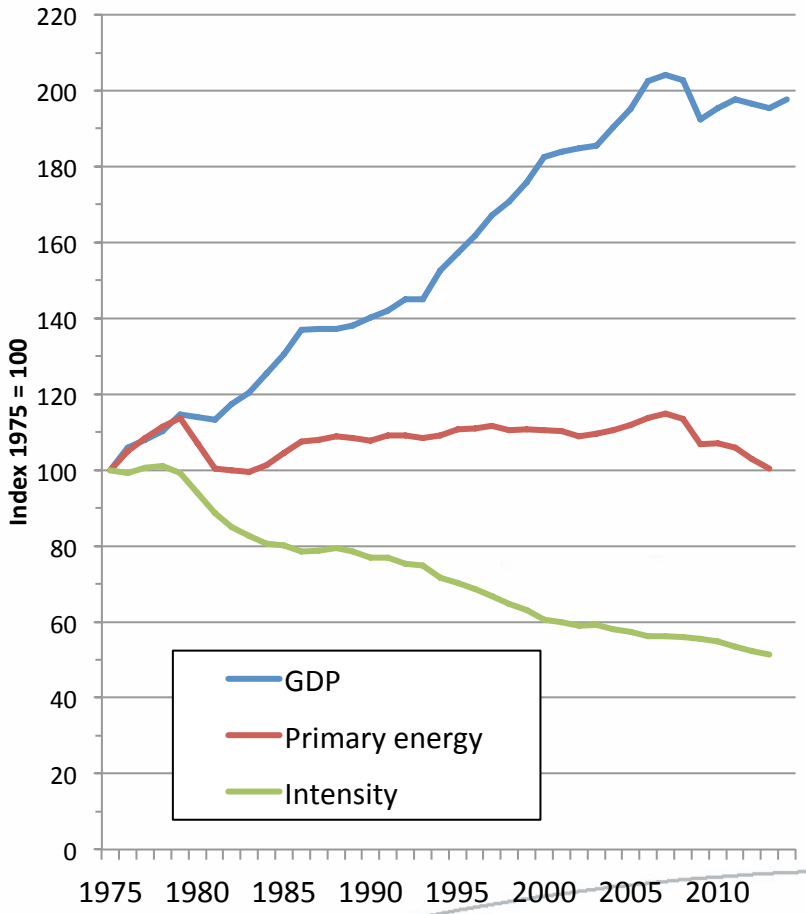
EE in Denmark - overview

- Strong EE improvements
- De-coupling energy consumption and economic growth
- Also under the actual economic crises
- Long-term stable policy framework
- Combination of several policies and measure



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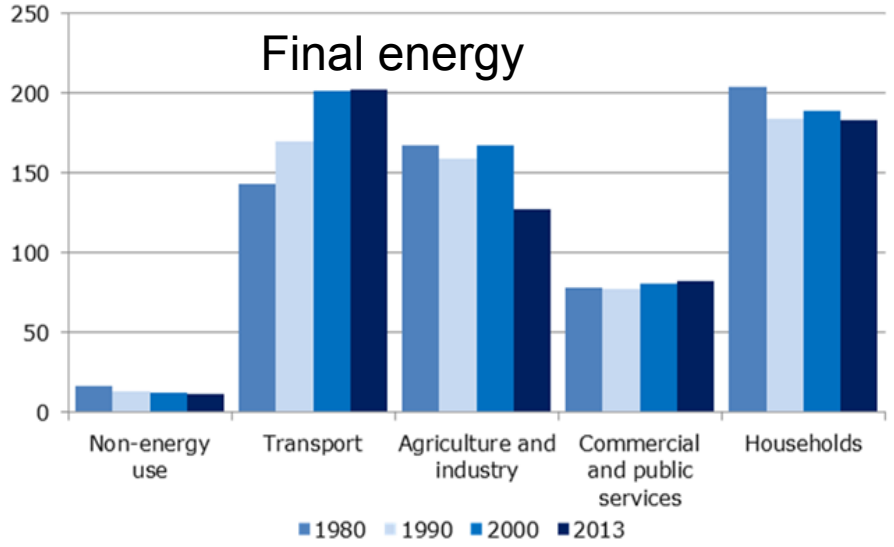
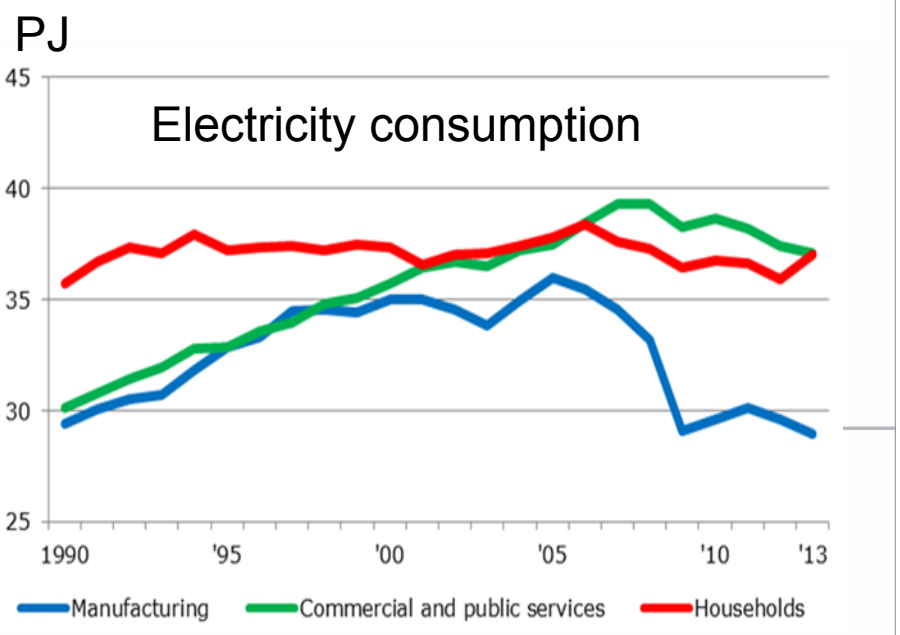
Strong end-use EE improvements

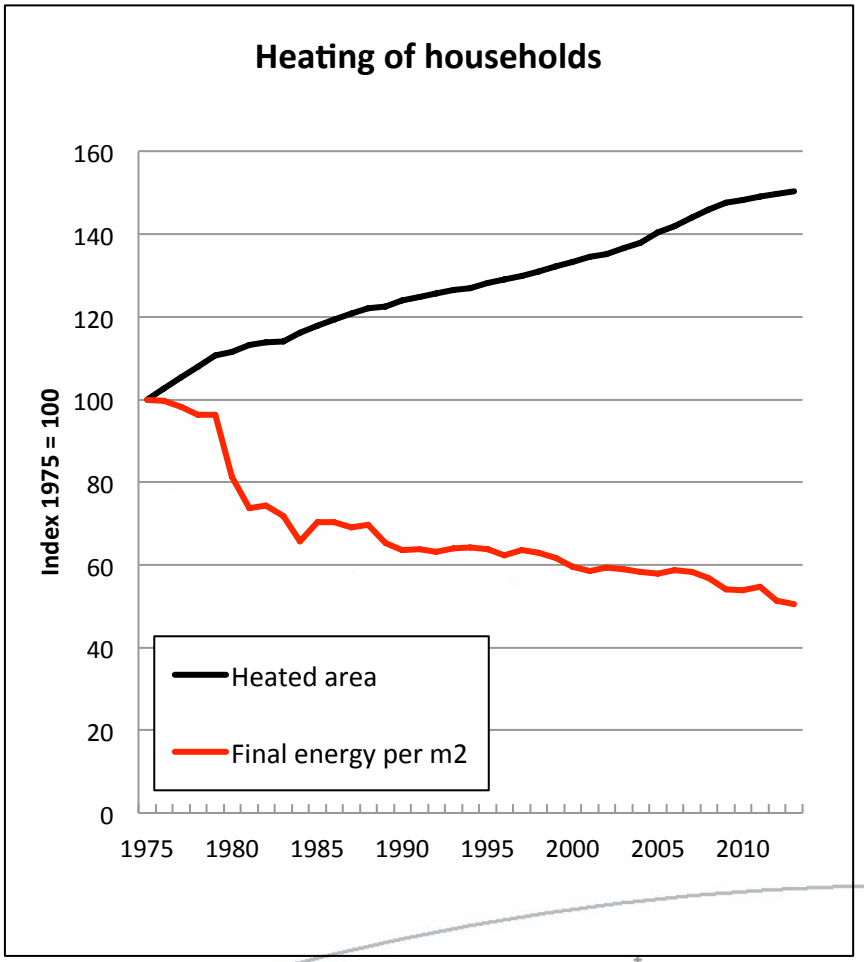
- High economic growth – more energy services
- Stable consumption
  - Not transport
- Combination of measures has delivered
  - Economic incentives- tax on energy, etc.
  - Regulation – building codes etc.
  - Information, awareness, education, etc.





Buildings:
Big saving over the last 35 years

- 45 pct. lower consumption per m^2
  - Very strong improve-ment from 1979 to 1984
- But almost 40% of energy consumption still in buildings
  - Still a big potential
  - In Denmark and global
- Measures are needed



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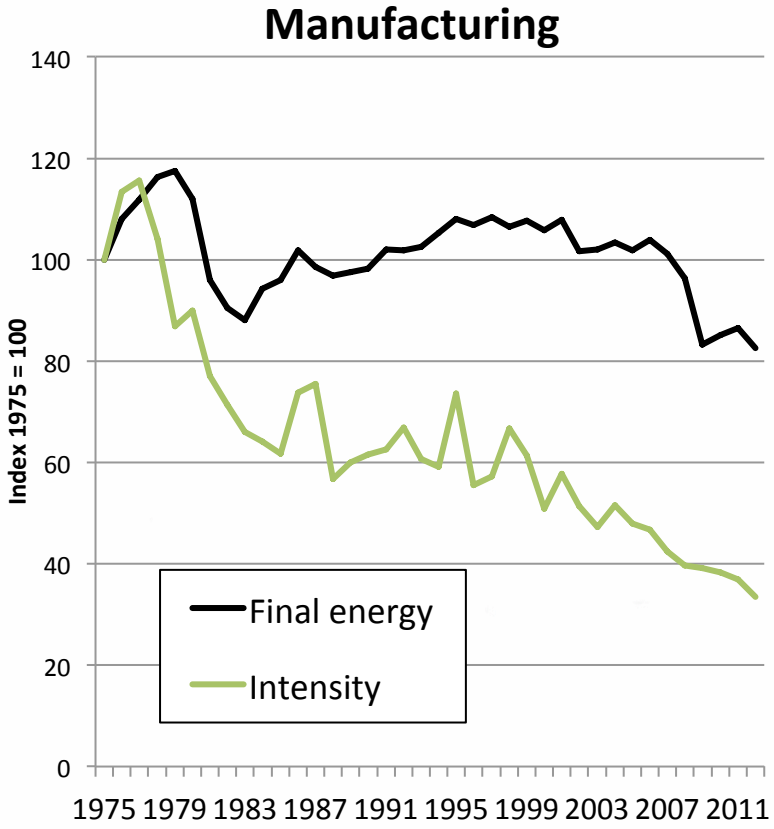
High efficiency improvement in industry

- CO2-packages in 1993 and 1996
  - CO2-tax
  - Voluntary agreements scheme
  - Subsidy scheme
- Involvement of energy utilities since 1993
  - Strong focus on industry



Decrease in intensity:
2000-2013: 3,6 % p.a.

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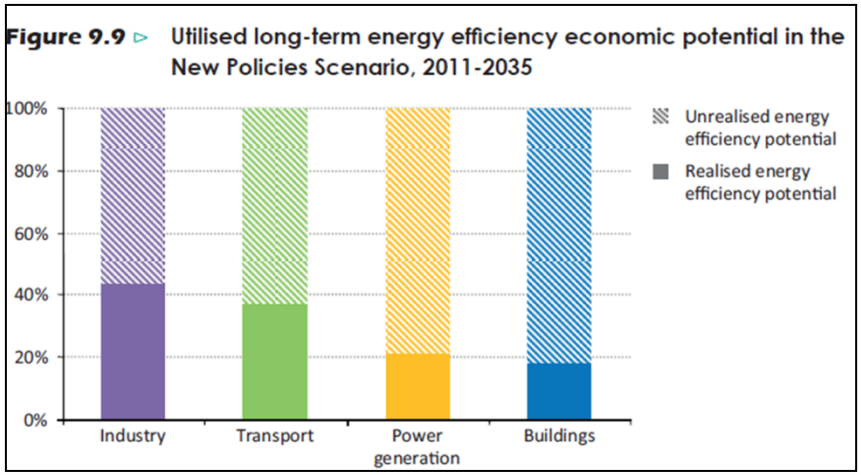
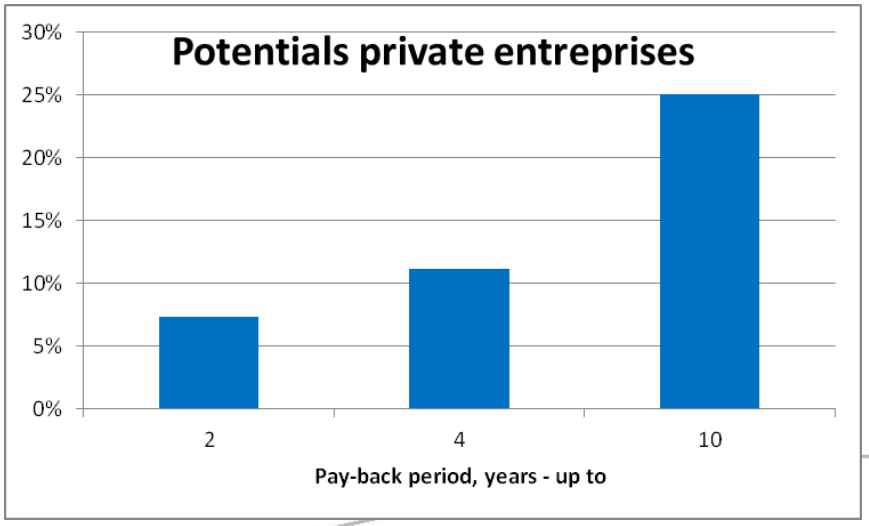
Still cost-effective potentials

- Global
  - IEA studies
- EU
  - Studies published by the Commission
  - 27% EE target for 2030 – 20% reduction compared to 2005
- Denmark
  - New study for industries and commercial sector
  - Big potential in existing buildings





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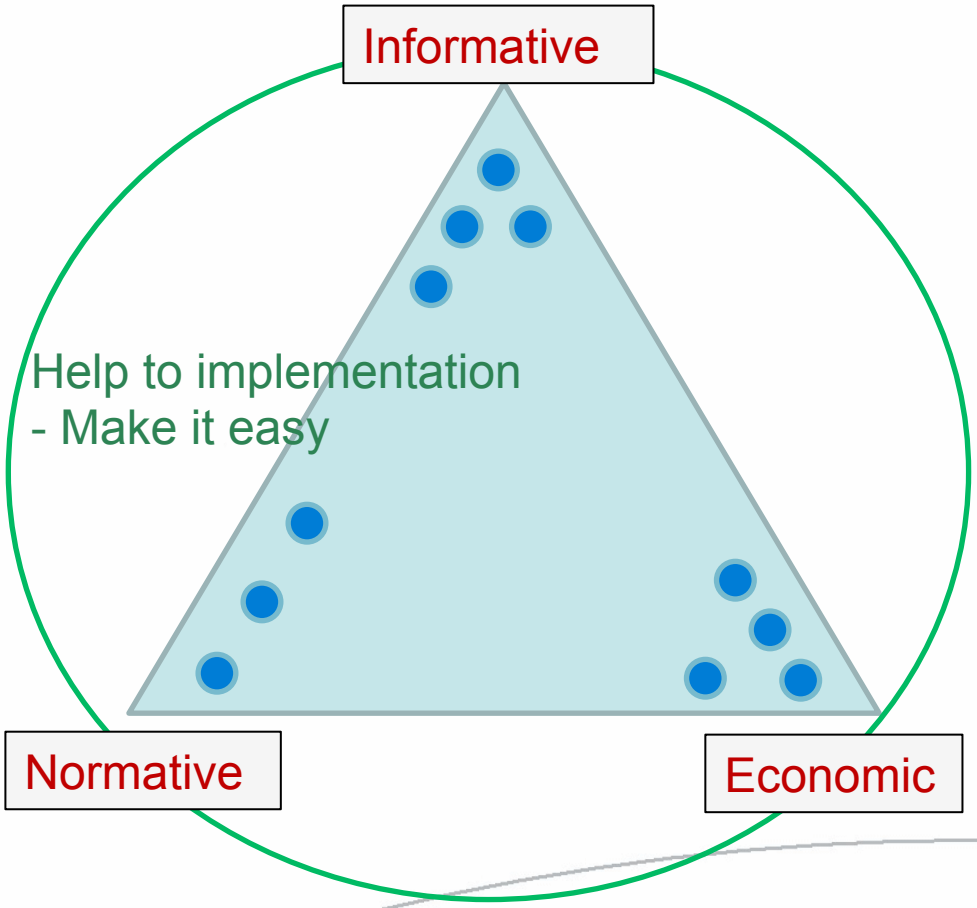
Combinations

- Of measures
  - Strong EU requirements
- Of target groups
  - End-users
  - Producers of products
  - Installers
- Of actors
  - EU, National, Local
  - Installers
  - Energy companies



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Main EE measures in Denmark

- Taxes on energy and CO2
  - Incentives to reduce consumption
- Regulation
  - Standards, norms, etc.
  - Especial buildings and products – and cars, etc.
- Information, campaigns, etc.
  - Both to end-users and to installers, etc
- Help to implement savings
  - Obligations for energy providers, subsidies, etc.
  - Especially existing buildings and private enterprises
- Combinations are important

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Role of energy companies - History

- DSM/IRP requirements introduced in 1995 for the electricity sector
  - For natural gas and district heating in 2000
- Main focus information, consulting, audits
  - Only in relation to the utilities own consumer
  - No saving target
  - Strong focus on industries
  - Competence was established
- Liberalization in 2000 – start of unbundling
  - The IRP concept difficult
  - DSM for distributors

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Introduction of EEO

- EEO part of a 2005 policy agreement on energy savings
- The distribution companies where positive
- A legal basis for setting EE obligations was amended to the supply acts in 2006
  (Electricity, Natural gas, District heating)
- Implemented by a voluntary agreement
  - The oil companies (oil for heating) are also included
- Specific requirement for companies, which not are parts of the agreement

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Why EE obligations?

- Political target to phase out fossil fuel by 2050
  - EE is an important tool to reach the target
- Supporting implementation of EE
  - Savings in existing buildings and industry are complicated
  - Energy companies are close to the consumers and cover all part of a country
- A secure and stable way to finance energy savings activities
  - Difficult to get money over the state budget
- Transformation of the utilities to energy service providers
  - Provides energy services to the costumers in a cheap way

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Incentives for utilities?

- Depend on organization and regulation
  - Integrated companies or unbundling
  - Distributors or retail sales companies
- Can serve their customers
  - Help them to reduce their bill
  - Selling energy services
- Can create income – profits
  - In some US states are profits linked to savings
- Not about competence

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EU Energy Efficiency Directive

- EEO is a very 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
- 4-6 Member States had EEO before the directive
  - France, Italy, UK, DK, Polen,…
- 17-18 Member States have EEO as part of their implementation of EED

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Energy efficiency obligations

Annual saving target

- Focus on realization
- Target has been increased
- Market based
- Help to implementation

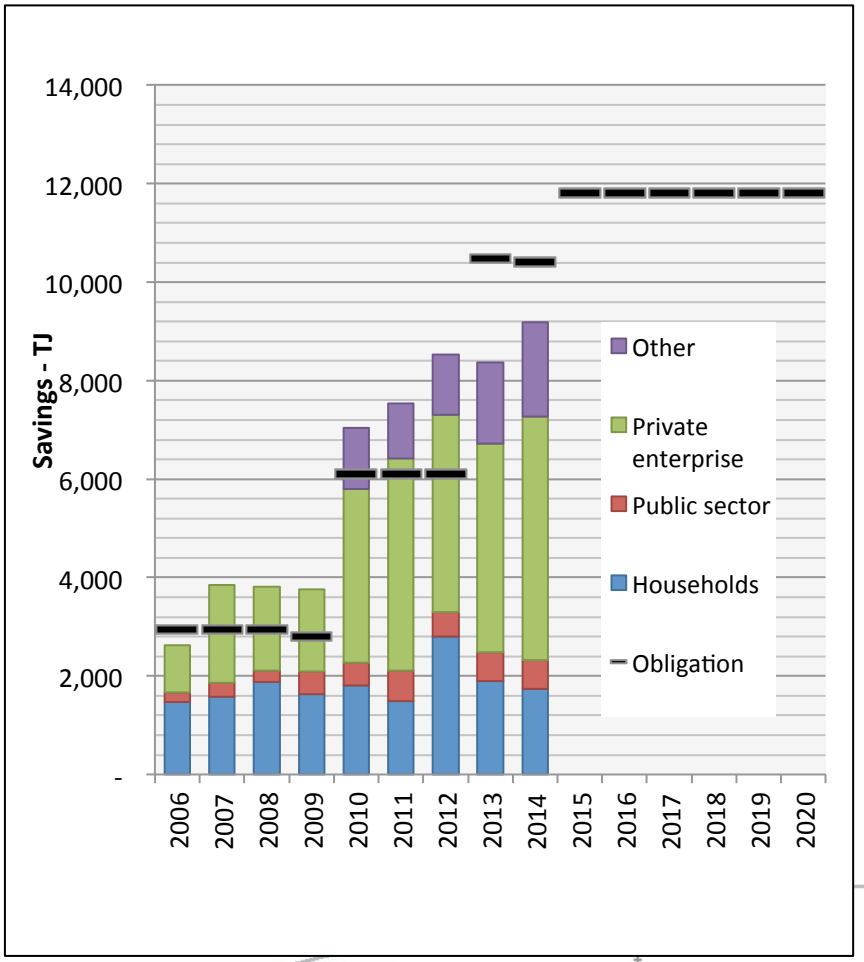
Selling energy services – not only kWh

- Transforming the energy utilities

Financed by the tariffs

- Not from the state budget

Strong cost-effective measure



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Main principles of the EEO scheme

- Obligation is placed on the distribution companies
  - Electricity, Natural Gas, District heating, Oil
  - Approx. 450 companies involved
- Large freedom to deliver savings
  - Focus on cost-efficiency – lowest cost for utilities
  - Freedom to find savings in all sectors and within all types of energy use
- Companies must be direct or indirect involved in the implementation to count the saving
- Involvement includes advice, energy audits, subsidies, etc.
- Agreement between distribution company and consumer must be in place before project implementation

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Savings – Where?

- Final energy consumption in all sectors
  - All end-uses of energy
  - The basis of calculating savings is the net supply of energy to end users – hence small RE equipment (local solar collectors, wind mills etc.) and heat recovery projects can count as an energy saving
  - Some household appliances are not accepted
  - Some measures within transport are included from 2013
- Grid losses (technical) – mostly in district heating
- Efficiency improvement in energy production is in principal not included in the scheme
  - Exception to the rule: Solar thermal is permitted

Target

- Target is set for final energy

	PJ	% of final energy*
2006-2009	2.95	0.7
2010-2012	6.1	1.5
2013-2014	10.7	2.6
2015-2020	12.2	2.9

* Final energy in 2010. Energy used for transport is excluded

- Target is defined at branch level
  - No targets for individual companies
  - No sub-targets for sectors (households etc.)

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Who fulfills the obligation?

- The distribution companies are not allowed to do very much themselves
  - Regulated monopoly companies
- Have to involve external actors
  - Can be another company in the same group
  - But can also be private engineering companies, plumbers, construction companies, etc.
- There can be several links from the distribution company to the end-user

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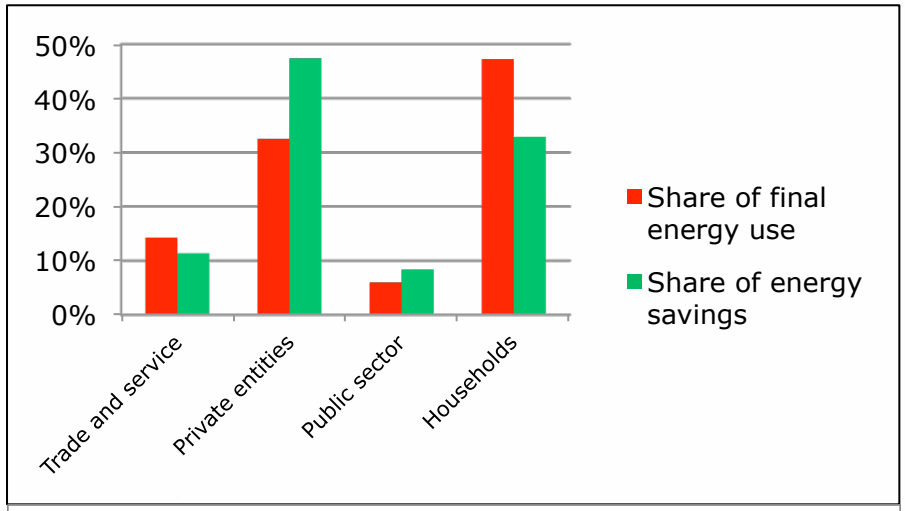
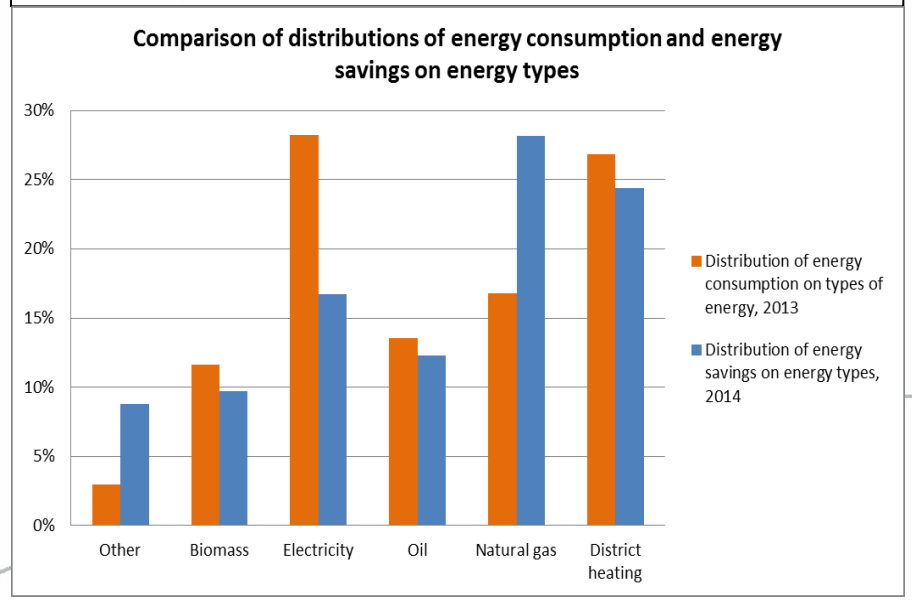
Distribution of savings in 2014

- Between sectors
  - More in private entities
  - More in public sector
  - Less in households
  - SME maybe a problem
- Between fuels
  - More natural gas
  - Less electricity
  - Other fuels – their share





Cost and financing

Utility costs 2013:

Companies	Savings MWh	Total costs Mio. Euro	Cost Cents/kWh
Electricity	960,000	57.9	6.0
Natural gas	538,842	29.1	5.4
District heating	719,060	33.6	4.7
Oil	81,951	3.6	4.4
Total	2,299,853	124.3	5.4

- 5.4 Eurocents per kWh first year savings
- App. 0.5 Eurocent per kWh with an average lifetime on 10 years

Financing:

- Elec. and natural gas companies:
  - A surplus to the regulated price cap
  - Cover their actual costs
- DH: Just a part of their normal cost
  - Non-profit companies
- Oil: Commercial companies – a part of their tariffs

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Experiences

- Efficient and cost effective system
  - 3 independent evaluations
  - All branches have fulfilled there target 2006-2014
  - The utility costs have only increased marginally even though the EE target has increased
  - In general cost-effective
  - Involvement of external actors and energy service providers has been successful
- Have seen some change of utilities to be energy services providers
  - Lower the consumers bill – not (only) price per kWh

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Distributors or retail energy sales companies?

- The Danish solution is based on:
  - A historical background
  - The liberalization of the energy sector in 2000
  - The fact that the distribution companies are known and regulated – no regulation of sales companies
- Advantage of having the obligation on the retail sales companies
  - It is primarily the retail sales companies, which have the relation to the consumers, and they do the actual work
  - If the obligations were moved to the retail sales companies would the cost be part of the market price – better incentive to cost-efficiency

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Obligations/White certificates

- The Danish system is NOT a full white certificates system
  - No independent verification of saving
  - No trading of certificates
- Lower cost for verification and administration
  - Quality assurance is managed by the obligated parties
  - Implementation and verification is handled by the same company
- Not clear whether a market will work well

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Challenges

- Additionality
  - Difficult to measure the additional effects
  - Difficult to ensure additionality
  - Especially in the building sector
- Market and other actors
  - Some actors argue that the energy companies have a advantages
  - Use of companies in the same group
  - Important to ensure transparency
- Keep the rules simple
  - Low cost for administration are important

Conclusion

- Energy efficiency has delivered
- Still a big cost-effective potential
  - Traditional electricity consumption will not increase
  - But new consumptions for transport and heating
- Combination of measures are needed
- EEO is a strong cost-effective measure
  - Utilities can play an important role

- Thank you for your attention
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