

# ***Energy efficiency activities in Denmark – with focus on utilities***

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*GreenNet-Incentives*

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# A Danish tradition...

- 35 years of broad political consensus about the importance of energy efficiency
  - Continuity
  - High acceptance
- Far from perfect
  - General focus on supply options, e.g wind power
  - Unbalanced activity for energy efficiency

# Political goals

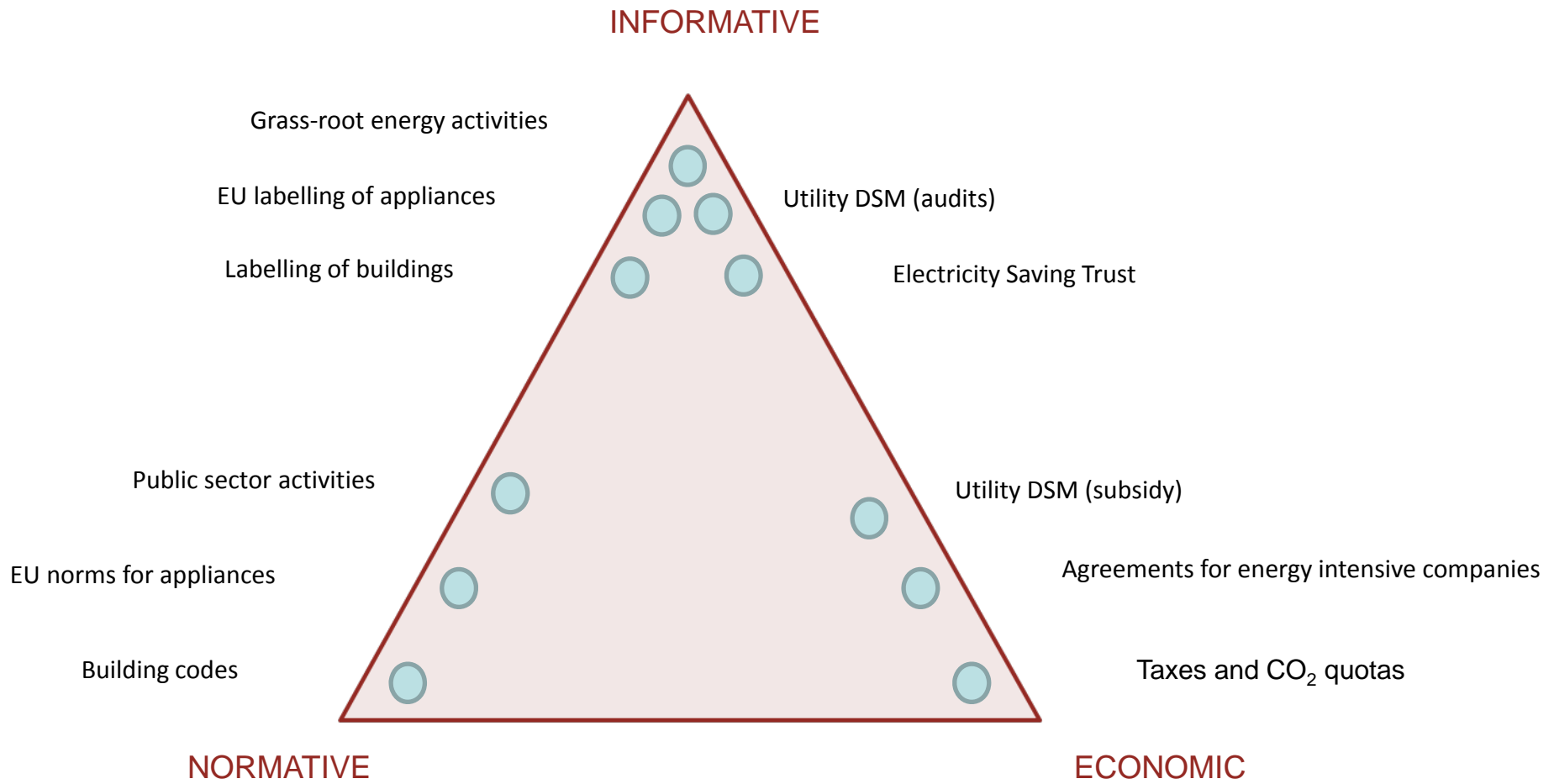
- Final energy (2005-agreement):
  - 1% reduction in final energy (excl. transport)
    - 2013 compared to 2003
- Gross energy (2008-agreement):
  - 2% reduction in gross energy consumption
    - 2011 compared to 2006
  - 4% reduction in gross energy consumption
    - 2020 compared to 2006
- CO<sub>2</sub>
  - 20% reduction 2020 compared to 2005
    - Within ETS
    - Outside ETS
- Renewable energy
  - 20% of gross energy consumption in 2013
  - 30% of final energy consumption in 2020

Fuel	Generation (Wind power, CHP)	Efficiency
		X
	X	X
X	X	X
	X	X

# Several goals

- It is not only CO<sub>2</sub>
  - Security of supply
  - Reducing the use of fossil fuels
  - Long-term technology development
- Several policy goals is a way to obtain balanced solutions

# Many energy efficiency instruments



# Taxes

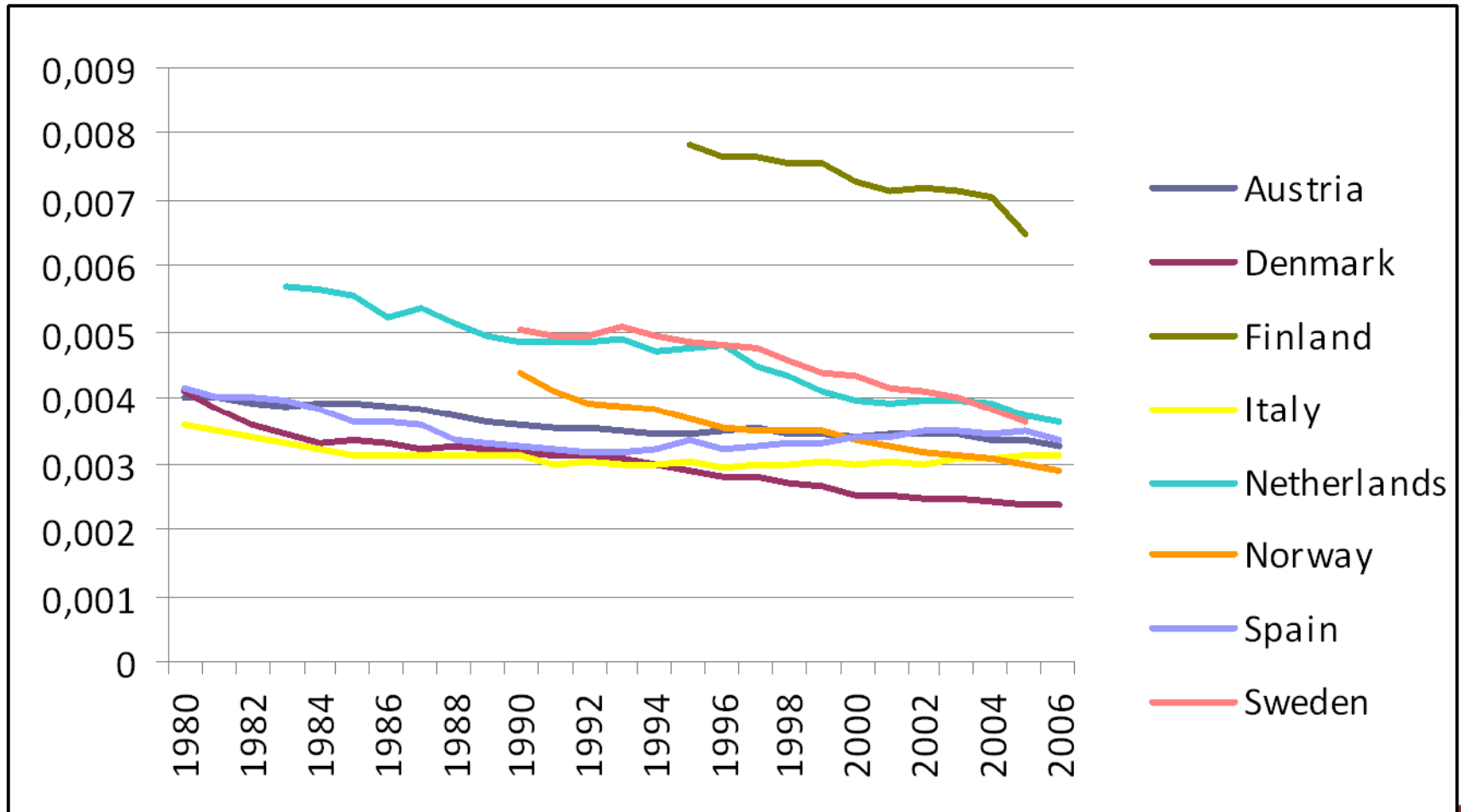
- High energy taxes (> 100%) for households and public sector
- Taxes as well as *Public Service Obligation* for all users
  - PSO (electricity) includes
    - Energy efficiency
    - Subsidy for wind power and CHP

# Evaluation

- Evaluation of all nine energy efficiency activities
  - May – December 2008
  - A step towards a major revision of the energy efficiency activities
  - Ea Energy Analyses is project manager

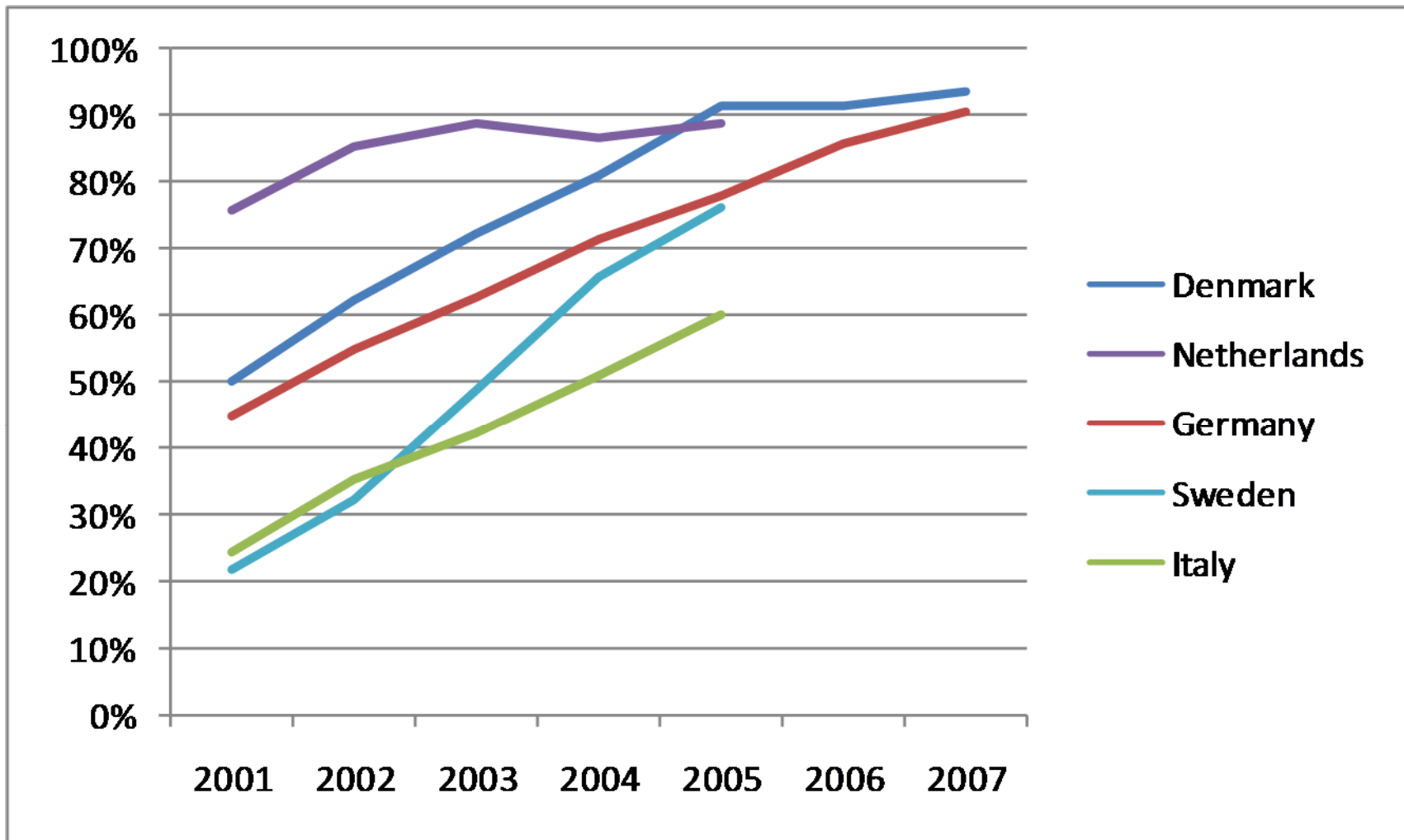
# Final energy consumption

BNP (GJ/€<sub>2000</sub>). Transport excluded. Clima corrected.





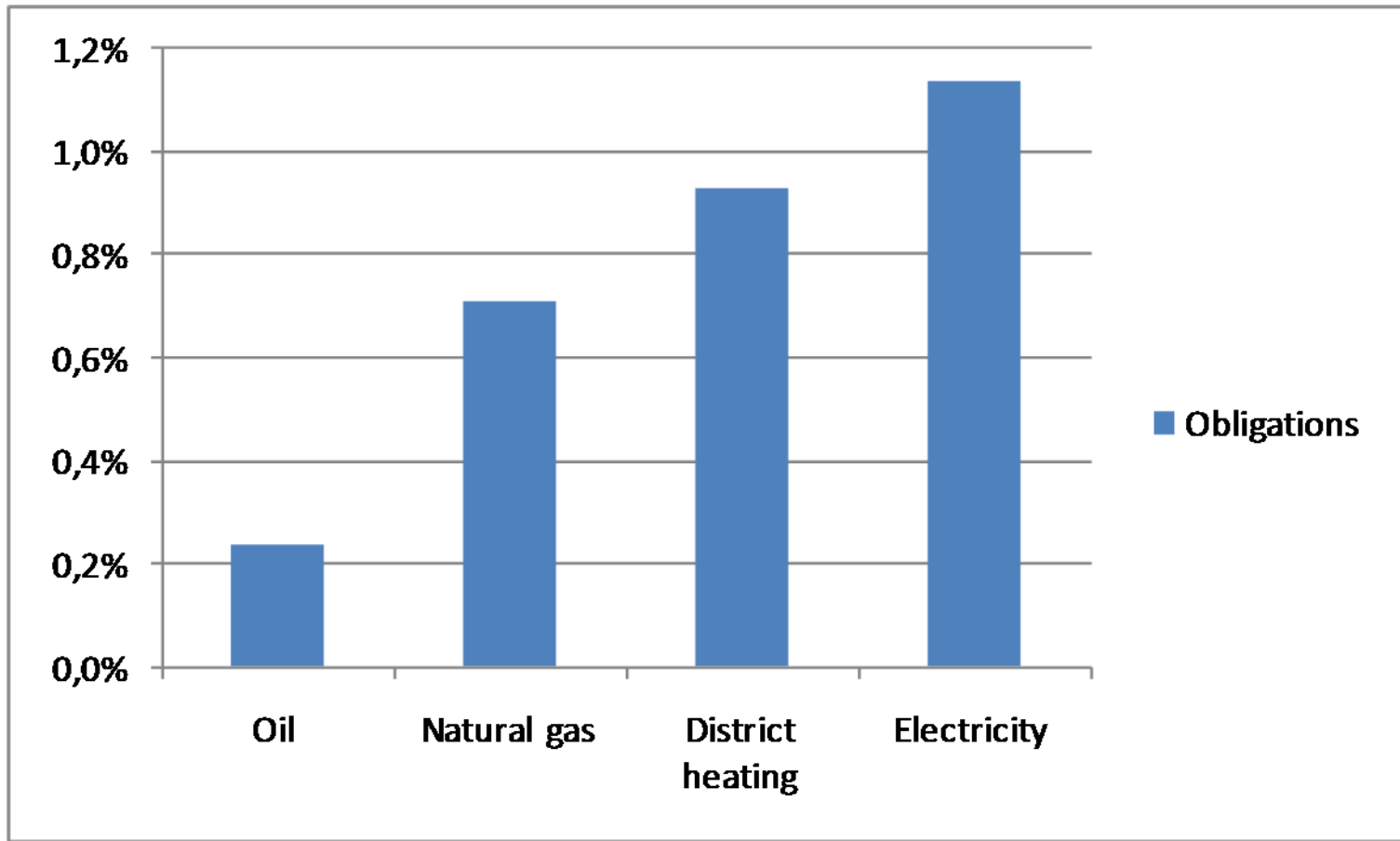
# Market shares for A, A+, A++ Refrigerators, freezers



# DSM / ENERGY UTILITIES

# Obligation

- Electricity, natural gas, district heating
  - Grid companies
- Oil
- From 2006: 2.95 PJ/year
  - First year's saving!
- From 2010: 5.4 PJ/year
- Extended freedom in execution
  - Any energy type (not transport)
  - Any area
  - Any type of interaction (audits, subsidy,...)



	Natural gas	District heating	Oil	Electricity	
Consumption	71	102	63	123	PJ
Obligation	0.5	0.9	0.15	1.4	PJ
	0.7%	0.9%	0.2%	1.1%	

# Understanding “first year’s saving”

- Electricity
  - First year’s savings X Life time X Factor<sub>additionality</sub>
  - Example:
    - First year’s saving: 1.1%
    - Life time = 9 years
    - Factor<sub>additionality</sub> = 0.5
    - Impact after 9 years = 5%
  - No official values for life time and additionality

# 1 kWh = 1 kWh...

- The obligation can be fulfilled in any energy type
  - Electricity
  - Natural gas
  - District heating (typically CHP based)
  - Oil
- Only in conversion projects – e.g. conversion of electricity use for heating to district heating – a factor 2.5 is used

# The involvement rule

- The energy company must be actively involved in the project *before* the investment
- The involvement can take many forms, e.g. audits, information or subsidy
- *It is not a requirement that the project must be additional*
- The administrative procedure is simple
  - Each energy company must maintain its own documentation system
  - Only a few central parameters are reported to the Danish Energy Authority

# Limited trade

- Trade of savings allowed
  - No public price
- Low volume of trade
- High degree of competition
  - Contact to industrial companies
  - Savings at low costs (for utilities)



# Which energy type?

## 2006+2007, TJ

Company	District heating	Natural gas	Oil	Electricity	Total	Within own energy type
District Heating	861	189	143	105	1,299	66%
Natural gas	20	757	325	195	1,297	58%
Oil	-	-	353	-	353	100%
Electricity	195	1,051	248	1,293	2,795	46%
Total	1,076	1,997	1,069	1,593	5,744	

# Which sectors?

## 2006+2007, TJ

Company	Households	Public	Trades and industries	Total
District Heating	741	168	391	1,299
Natural gas	791	66	440	1,297
Oil	309	0	44	353
Electricity	513	246	2,036	2,795
Total	2,354	480	2,911	5,744
	41%	8%	51%	100%

# Examples

Large volume	
Six step evaporator	56 GWh
Use of by-product hydrogen to produce steam	26 GWh
Conversion of new type of town gas	23 GWh
Campaign for using clothesline instead of tumble drier	20 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 optimise air flow	8 GWh

# Examples

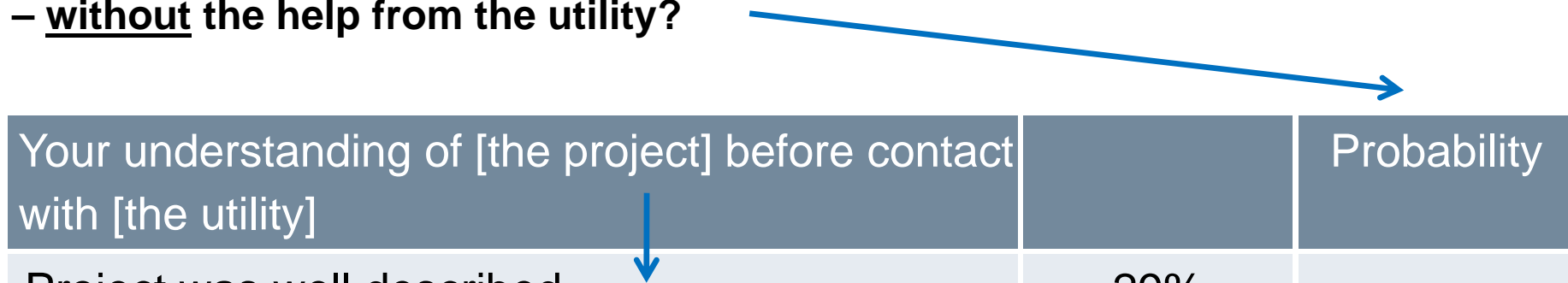
Other examples	
New motors and frequency control on ventilation	855 MWh
Natural cooling for refrigerating	770 MWh
New curtains in greenhouse	685 MWh
Savings in relation to pressurised air	300 MWh
New condensing boiler	142 MWh

# Types

Types	
Boilers, ventilation, heating	59%
Industrial process	25%
Appliances	4%
Lighting	3%
Buildings (isolation, windows)	3%
Pressurised air	2%
Other	4%
Total	100%

# Survey

What is the probability that the project would be realised within the next year – without the help from the utility?



Your understanding of [the project] before contact with [the utility]		Probability
Project was well described	29%	69%
We had a certain understanding of the project	20%	56%
We had a certain understanding of the project but [the utility] has contributed with important information	31%	40%
The project was new to us	19%	44%
Total	100%	52%

(n = 89)

# Survey

**What is the probability that the project would be realised within the next year – without the help from the utility?**

In which way was [the energy company] involved?		Realised without help
Idea	41%	42%
Financing	23%	43%
Economic analysis	56%	45%
Technical analysis	31%	39%
Implementation	11%	52%
Other	24%	69%
Total		47% *

N = 94. Several answers possible

\* 58% if asked about “within 3 years”

# Evaluation

- The nine energy efficiency activities each have their history
- Coordination could be better, e.g. between utilities and the Electricity Saving Trust
- The priority of sectors could be better
  - Households and public sector seem to be over-exposed
  - Industry seem to be under-exposed



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**COMMENTS?**