Registration and validation in Denmark – the principles and the chosen solutions

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The Association of Danish Energy Companies

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Electricity utilities and target

- Results to date:
- Approx. 150 GWh 1. year savings per year

- New target:
- 389 GWh 1. years savings per year
- Equals 1,18 % of present electricity consumption
- About 120 utilities share the target according their sales
- Utilities not restricted to implement savings in own grid

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The new setting – a market is formed

- Creation of a market inspired by the UK EEC system
- MWh target for all distribution companies (electricity, oil, gas and district heating)
- Freedom to chose measure, technology and end-use
- Only properly documented savings count
  - 1. year savings and all savings are equal

- Effect:
  - Documented realized savings for sale on a free market
  - More actors on market
  - Need of common principles for documentation of savings

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Documentation of savings

Main elements in full documentation:

1. Documentation to verify implementation
2. Documentation to calculate the amount of saved energy

- Additional information needed:
  - Utilities behind saving
  - Operator
  - Means

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1. Documentation to verify implementation

- Registration of customer, where implementation has taken place
- Sales statistics or marked research (including baseline development)

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2. Documentation to calculate the savings

A. Specific measurement/calculation of savings by implementing specific technology/behavior at specific customer

B. Standard value: Average savings by implementing specific technology or behavior based on assumptions

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2A Specific calculation

Activities focusing specifically on the consumption of the individual customer, mainly energy audits

Documentation:

- Identification of customer (name, address, ID etc.)
- Implemented solutions with realized savings
- How savings has been calculated (Use of standard value optional)

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2B Standard Values

- Standard measures, where savings are not specifically calculated for a specific customer.
- Catalog with 195 standard values.
- Easy estimation of savings based on common assumptions
- Helps identify main potentials

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Examples of standard Values

Standard measure	Savings per year
Replace traditional electric stove with induction stove:	33 kWh
Improve roof insulation from 10 cm to 30 cm	20 kWh per M^2
Replace upright freezer with high efficient type	202 kWh

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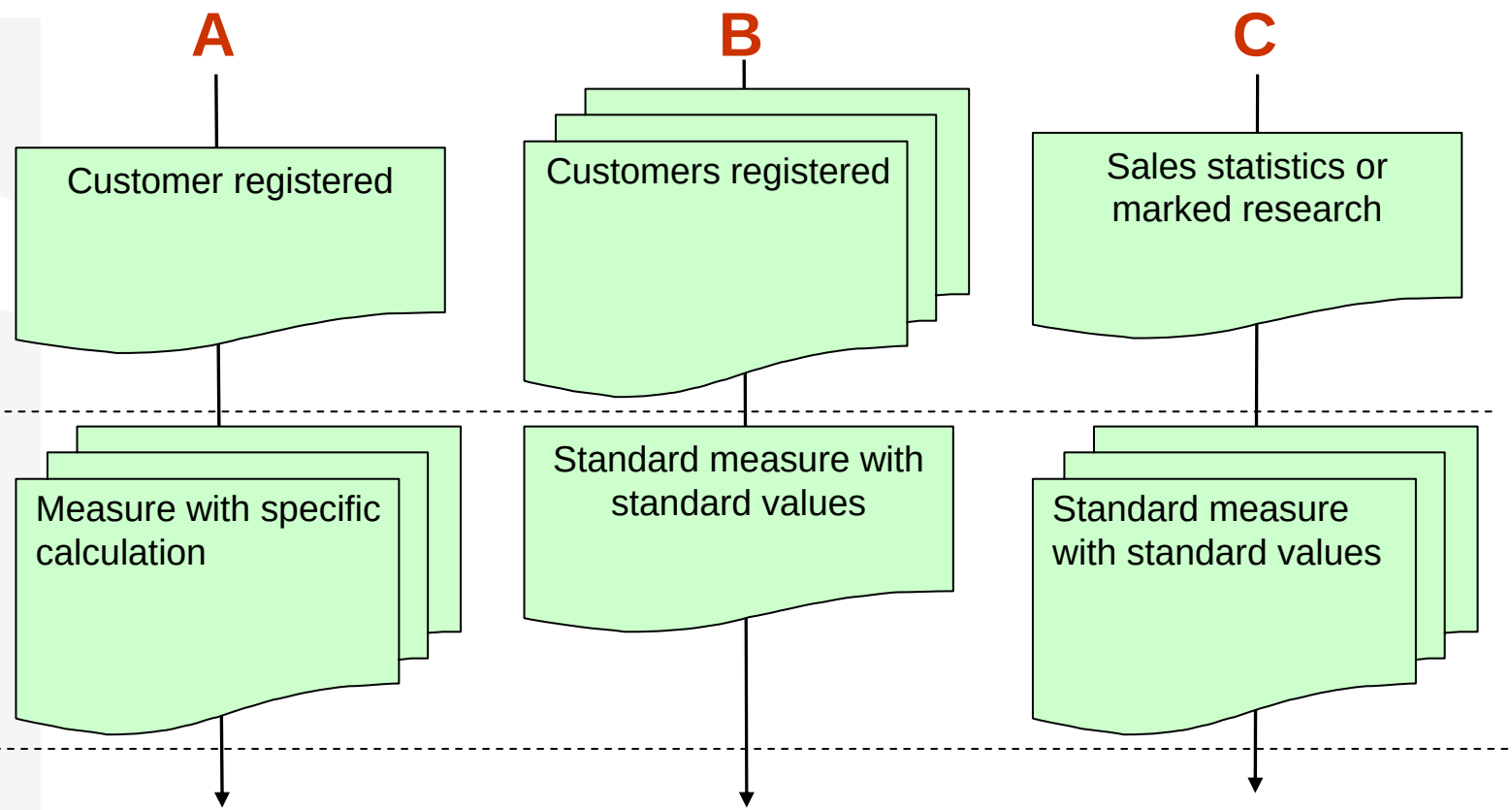
Three cases



1. Documentation to verify implementation

2. Documentation to calculate the amount of saved energy

Type of documentation

Specific calculation
Focus on specific customer

Standard values
Focus on specific technology

Awareness, technological campaigns a.o. Savings only traceable through sales statistics, market research etc.

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Case A: Specific calculation
- Energy audit at a large steel factory

- Name and address and ID of factory
- Description of each saving in audit report
  - Implemented solutions with realized savings
  - How savings has been calculated

Measure	1. Year savings, MWh
Replaced air fan for main furnace	218
Variable speed control for air fan of main furnace	39
Replaced oil preheater	117
Compressed air presure reduction	58
Variable speed control for water pump of station No.1	39
Closed hydraulic circuit for cooling water system No.2	49

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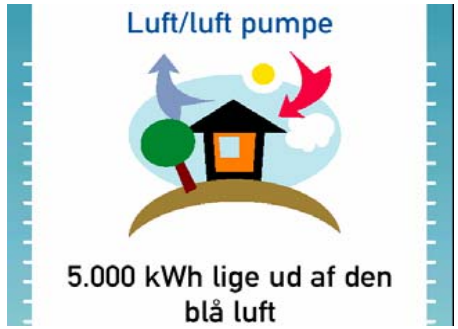
Case B: Standard value - Air to air heat pumps



Documentation:

- What standard measure
- Identification of customers (List of names, addresses, ID´s etc.)

- Utility sells air to air heat pumps
- Customers pay through electricity bill
- Hence customers are registered
- 11,172 MWh saved according standard value
- Savings = number of customers * 11,172 MWh

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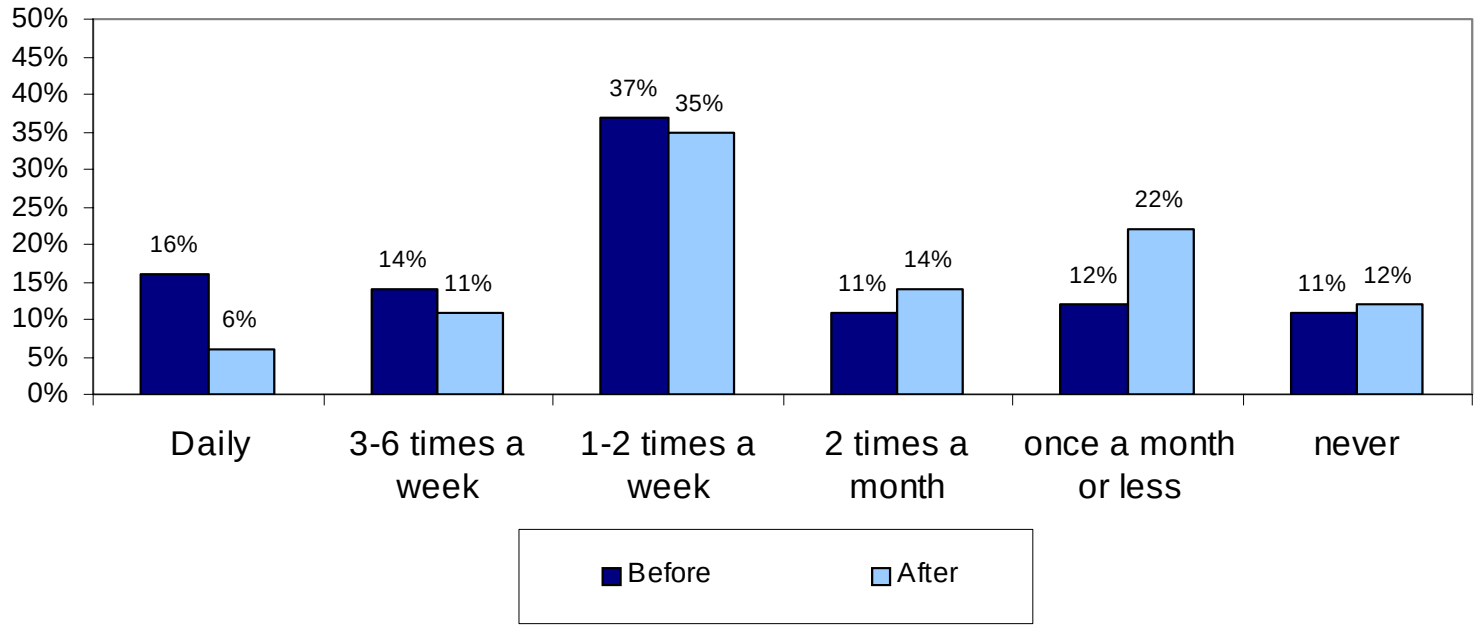
Case C: Awareness campaigns a.o. - Promoting efficient use of dryer

- Description of activity - Standard measures promoted (including behavior change).
- Percent realizing specific measures (results of e.g. market research) or sales statistics including baseline development.



- Average results: 42 dryings saved per customer per year
- Savings: Customers in target group * 42 * 2,75 kWh

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Double counting, free riders and quality control

- At intervals, independent auditors shall verify the documentation procedures, including the spot checking or the utilities can implement quality control system ensuring the validity
- The Danish Energy Authority performs spot checking down to end-use level to check for double counting
- A body is established to deal with dispute on ownership between to market players

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Questions?

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Account 2004

Activities, where energy savings are evaluated	Costs	1.Year savings	Income	Benefit/cost ratio
	Tkr.	MWh	Tkr.	BCR*
Energy audits (industrial and commercial sectors)	69.983	104.923	431.437	6.2
Energirådgivning boliger (primært elvarmekunder)	4.803	14.957	44.772	9.3
Campaigns	6.810	34.589	151.164	26.2
Total	**81.596**	**154.469**	**627.373**	**7,7**
Benchmarked activities with individual evaluation criteria			**Main unit**	
Telefonrådgivning	13.108	121.367	Samtaler	
Rådgivning i demolokaler og udstillinger	9.085	33.038	Rådgivninger	
Udlån af apperatur	1.515	10.563	Udlån med rådgivning	
Temaarrangementer	5.879	20013	Deltagere	
Skoleundervisning	7.641	34132	Elever	
Informative elregninger	2.065	1.573.310	Regninger	
Total	**39.293**			
Generel awareness activities	**55.245**			
Account 2004	**176.134**			

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Background

- The grid companies have more than 10 year experience in promoting energy efficiency
- The grid companies are among the most cost effective regarding energy saving in Denmark
  - 40 DKR/tCO2 in 2003
- The grid companies has delivered many savings – 0,5% of the yearly electricity consumption
- The consumers get their money back more than 5 times
- In 2004 the 1. year savings were 154 GWh.

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