The Danish Agreement Scheme and EMS

By Ulla Vestergård Rasmussen & Peter Maagøe Petersen
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Outline

• Legal Framework Related to Energy Efficiency in Industry in Denmark
• The Danish Voluntary Agreement Scheme
• Cornerstones for Success in Industrial Energy Efficiency
  • Technical Approach
  • Management By-In
  • Requirements to EMS
  • Supportive Measures
• An Example
ENERGY POLICY ON EFFICIENCY IN INDUSTRIES

- Policy action are based on national overall energy strategies and plans, including energy saving targets by sector.
- Long term and systematic EE policy (starting early 1990’s, based on "Energy 2000").
- A number of policy measures combined:
  - Tax on energy
  - The "Voluntary Agreement Scheme" (starting 1996)
  - Subside schemes
  - A number of supportive measures
Legal Framework for EE in Industry in Denmark

- European Emission Trading System (ETS)
- Voluntary Agreement Scheme*
- Energy Taxes (a number of measures)
- Energy Efficiency Obligation Scheme (Subsidy Scheme)
- Renewable Energy Subsidy Scheme (requires energy efficiency to be investigated)
- New European Energy Management and Audit Scheme for Industry and Buildings*

*New mandatory European energy audit and energy management scheme to replace Danish voluntary agreement scheme
Legal Framework for EE in Industry in Denmark

- SMEs
- Large Industries

- EU Emission Trading System (ETS)
- Voluntary Agreement Scheme
- Energy Taxes (several measures)
- Energy Efficiency Obligation Scheme
- Renewable Energy Subsidy Scheme
- New Audit Scheme (Industry & Building)
The Danish Voluntary Agreement Scheme

• Introduced in early 1990’ties
• The agreement scheme targets large industrial companies and large SMEs
• Scheme is based on a tax refund if companies implement certified ISO50001
  • A combination of “carrot” and “stick”
• In Denmark, 3 generations of the agreement scheme over 20 years:
  • Traditional energy efficiency approach (mandatory energy audits)
  • Focus on processes and energy management (DS2403 -> ISO50001)
  • New and advanced methodologies (LEAN and heat pumps etc.)
• The scheme is supported by a number of other measures
• Many lessons learned!
Management of Danish Voluntary Agreement Scheme

• The agreement scheme has comprised up to 300 industrial companies
• Resources to run scheme:
  • Managed by small dedicated team at Danish Energy Agency (6-8 persons)
  • A total of 30 consultants certified to carry out energy audits/special investigations
  • An industrial advisory board has been formed for periods
• Frequent adjustments of **bottom-up** requirements based on:
  • Experiences from frequent evaluations and feedback from industries
  • New insights from data, pilot projects, surveys and specialists
• Important to have a vision and to “push” development of the agreement scheme
Results and Lessons Learned

• 1’st generation (1992)
  • Mandatory energy audits in large industries
  • Installation of meters for all significant energy users
  • Technical focus mainly on boilers, insulation, lighting

• 2’nd generation (1998)
  • Energy management system (DS2403)
  • Process focus
  • Special investigations

• 3’rd generation (2003)
  • Production, LEAN etc. included in special investigations
  • New utility and waste heat focus
  • DS2403 -> EN160001 -> ISO50001

Lessons learned:
- Small savings
- Technical approach was wrong
- Many meters hard to use

Lessons learned:
- Large savings
- Management buy-in important
- Operator influence (LEAN)
- New utility structures developed
Energy Management Systems
Cornerstones for Success of Agreement Scheme

- Technical Approach
- Supporting Measures
- Management Buy-in
- Bottom-Up Requirements ISO50001
Technical Approach

Management tends to think that energy costs is about utility systems

Maintenance staff are asked to front energy efficiency activities/EMS

Our experience that most energy usage is bound inside processes and equipment

QA-people and process engineers etc. could also be engaged in EMS
Management Buy-In

- A broad anchoring of energy efficiency necessitates top management to engage.

- Energy efficiency is at its best not about “quick wins” – it is a long term, continued and systematic effort with large savings.

- Clear communication of responsibilities, resources, budgets and timelines are crucial as well as follow-up and evaluations should be carried out.
Buttom-Up Requirements ISO50001

For the Danish Agreement Scheme, the overall requirement to the companies is to implement energy management system according to ISO50001.

The Danish Energy Agency have launched additional requirements:

- Energy mapping should be presented in breakdowns of a certain level of detail (by end-use)
- Energy saving projects are to be identified by saving potential and pay-back periods
- All energy saving investment projects with pay-back less than 4 years must be implemented
- Complex process energy saving analysis must be nominated as “special investigations” and carefully planned
- New investments should be planned following a guideline on “Energy Efficient Design”

*Experience has shown that it is important that the responsible authority sets quality requirements for energy efficiency work performed in the industries*
Supportive Measures

• Grant schemes necessary to support investments – industry often consider energy efficiency investments as risk-related and somehow out of strategic focus.

• Competence scheme for energy consultants and specialists necessary to support industry in more complicated saving areas, by example complicated processes

• Pilot projects to demonstrate new technologies and new ways of working are highly appreciated by industry

• Data and surveys necessary to identify and promote new efforts
An Example
An Autoclave (Packed Food Products)

6 compressors of each 150 kW delivering 8.5 bar compressed air

Compressed air receiver at 8.5 bar

Trays with products in bags with sterile water

Sterilisation of products at 100% humidity and 120° C for 50 min.

8 bar steam

10° C water
An Autoclave (Packed Food Products)

6 compressors of each 150 kW delivering 8.5 bar compressed air

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Trays with products in bags with sterile water

Sterilisation of products at 100% humidity and 120°C for 50 min.

8 bar steam

10°C water

20% of saving potential

80% of saving potential
Management Danish Voluntary Agreement Scheme

- Managed by small dedicated team at Danish Energy Agency
- Frequent adjustments of bottom-up requirements based on:
  - Experiences from frequent evaluations and feedback from industries
  - New insights from data, pilot projects, surveys and specialists
- Important to have a vision and to “push” development of the agreement scheme*

*Henry Ford:

“If we had asked the customers what they would like, they would have asked for a faster horse”
Summary

- ENERGY EFFICIENCY NOT A STRATEGIC FOCUS IN MOST INDUSTRIES
  GREAT POTENTIAL FOR COST-EFFECTIVE ENERGY SAVINGS IN INDUSTRY
- GOVERNMENTAL ACTION NECESSARY
- LONG TERM PERSPECTIVE AND SYSTEMATIC EFFORTS NECESSARY
- INCOLVEMENT OF VARIOUS STAKEHOLDERS IMPORTANT
- EVALUATE AND FOLLOW UP ON A REGULARLY BASIS
- COMBINE A NUMBER OF EE-MEASURES (CARROT AND STICK)
- PROVIDE SECTOR WITH TOOLS, GUIDELINES, DATA, SURVEYS, ETC.
- KEEP RULES AND ADMINISTRATION SIMPLE
For more information:

Danish Energy Agency’s new publication

Energy Policy Toolkit on **Energy Efficiency in Industries**
Experiences from Denmark

[www.ens.dk/lctu](http://www.ens.dk/lctu)

Ulla Vestergaard Rasmussen, Danish Energy Agency
[uvr@ens.dk](mailto:uvr@ens.dk)
Thank you for your attention

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Ulla Vestergaard Rasmussen & Peter Maagøe Petersen
Danish Energy Agency

uvr@ens.dk