



# **Energy Efficiency in industry** **experience from Denmark**

Anders H Kristensen, Chief Policy Adviser  
Ukraine-Denmark Energy Center

*Government cooperation on strategic energy planning between  
Ukraine and Denmark*

# EE incentive in DK industry

- CO2 tax on energy consumption in all sectors introduced in Denmark in 1993
- Between 25 & 100 DKK/ton depending on type of consumption
- Revenue received from industry returned through tax compensations and through subsidies for investment in EE
- Precondition: Industry to enter into an agreement with Danish Energy Agency

**Table 2.1 Resulting CO<sub>2</sub> taxes DKK per ton of CO<sub>2</sub>**

Year	1996	1997	1998	1999	2000
Heavy process no agreement	5	10	15	20	25
Heavy process with agreement	3	3	3	3	3
Light process no agreement	50	60	70	80	90
Light process with agreement	50	50	50	58	68
Space heating	100	100	100	100	100

# About agreements

- Agreement on Energy Audits and introduction of Energy Management Systems
- Obligation to implement EE investments with low pay back times
- Possibility to receive state subsidy amounting to 30% of investment
- Duration 1993 – 2013
- Examples of industries: sugar, malt, steel, aluminium, chemical, medical, paper, bricks and glass
- No. of agreements: ex. 370 (2000), 280 (2008) and 100 (2013)

# Stakeholders involved

Stakeholders	Roles
Danish Energy Agency	Agreements with industries, contact to tax authorities, delegated tasks to accreditation organization and accredited companies
Industries	Agreement with DEA, implements certified ISO 50001
Tax authority	Informed by DEA on industries entitled for subsidy
Accreditation Organization	Monitors the accredited companies, close contact with DEA
Accredited companies	Control of industries implementation of ISO 50001, close contact to DEA
Technical experts	Accompanying accredited companies certifying ISO 50001 etc. at industries
Special experts	Accompanying accreditation organization when accrediting companies

# Timeline / Cost profile

- Natural delay in retransfers:
- Agreements being concluded during the first years
- Feasible EE investments identified as Energy Audits implemented
- Applications for subsidies and project implementation

DKK mill.	1999 1997	1998	1999	2000	2001	2002	2003	2004	2005	Total 1996- 2005
Retransfers minus additional taxes	-205	-15	-25	335	175	250	355	460	570	1900

- Net expense for industry during first years of taxation scheme
- Accumulated retransfers to industry

# Conclusion

- Substantial impact on energy consumption and CO2 emission from industry
  - CO2 reduction of 330.000 tons/year calculated in 2013 based on projects implemented during previous 8 years (2006 – 2013)
  - 8 % reduction of consumption in industry equal to 3,7 PJ/year
- The Danish Industry agreements proved to be a strong tool to promote Energy Efficiency in manufacturing industry
  1. Raising awareness of consumption and cost of energy
  2. Tax on consumption increase feasibility for investment in EE
  3. Revolving tax payment finance subsidy scheme
  4. Subsidy scheme increase feasibility in investment projects further