



DANISH ENERGY AUTHORITY

**GREEN TAXES IN TRADE AND INDUSTRY
- DANISH EXPERIENCES**



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THE DANISH TARGETS FOR REDUCTION OF THE CO₂ EMISSION

2005	The national target is a reduction of the CO ₂ emission by 20% compared to the 1988 emission level.
2008-12	Fulfilment of the Kyoto obligation, which require Denmark to reduce the emission of greenhouse gasses (CO ₂ , NO ₂ , CH ₄ , HFCs, PFCs and SF ₆) by 21% compared to the 1990 emission level.

THE DANISH HISTORY OF GREEN TAXES ON ENERGY IN TRADE AND INDUSTRY:

1992	Introduction of a CO ₂ -tax
1996	Introduction of the Green Tax Package including an additional CO ₂ tax, a new SO ₂ tax and new energy taxes on space heating
1998	Introduction of the Whitsun Package including an additional energy tax on space heating

INTRODUCTION

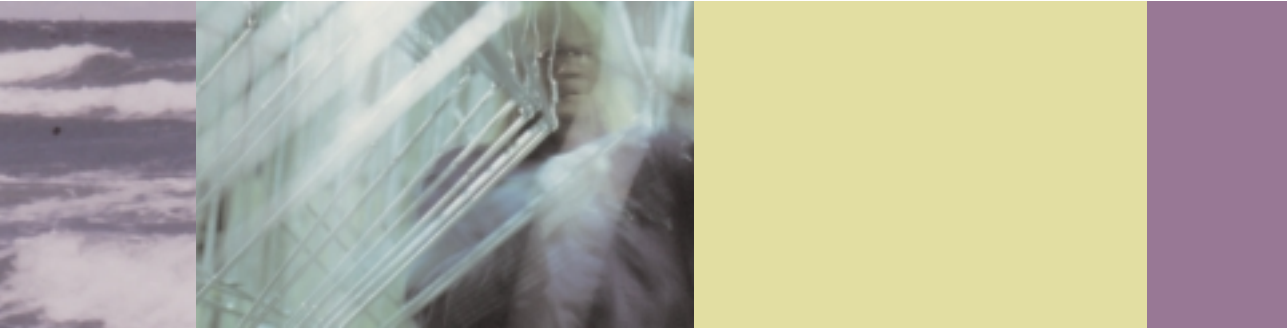
In Denmark, as in many countries, we strive to protect the environment and combat climatic changes. Lowering the emission of greenhouse gases is essential in this quest. Our short-term goal is to reduce CO₂ emissions in 2005 by 20 per cent of the 1988 emission level.

Green taxes are instrumental in achieving the national goals for CO₂ emissions. They are cost effective compared to other methods such as administrative instruments and, to some extent, also to subsidies for environmentally friendly projects. Moreover, green taxes generate revenue that can be used to reduce environmental pollution or regulate other social imperfections.

Taxes on energy consumption have been used for many years in Denmark. In the late 1970s, energy taxes were introduced to reduce energy consumption in households. In the 1990s, CO₂, SO₂ and energy taxes were introduced to all sectors including trade and industry. The green taxes were a part of a larger tax reorganization. Revenue from the green taxes was used to lower taxes on labour and income. This was called the Green Tax Package.

An evaluation in 1999 showed that the Green Tax Package has contributed significantly to the attainment of the expected targets for CO₂ emissions. It also concluded that the additional taxes on trade and industry had no noticeable consequences for the economy or competitiveness of the companies as a whole. This is mainly due to the redirection of revenue to trade and industry and tax rebates for energy-intensive companies.





THE GREEN TAX PACKAGE: BALANCING CONFLICTING OBJECTIVES

When the Green Tax Package was levied on Danish trade and industry in 1996, it was to accomplish two conflicting objectives. On the one hand, the taxes had to be high enough to have an effect on emissions; on the other hand, the tax burden could not be so large as to affect the competitiveness of the companies.

A balance of these conflicting objectives was reached by:

- Redirecting the additional tax revenue from the Green Tax Package directly to trade and industry
- Increasing the tax rates gradually, thus giving companies time to improve energy efficiency, switch to fuels with lower emissions, etc.
- Applying differential tax rates depending on the use of energy, thus lowering rates for energy-intensive production.

The redirection of additional tax revenue resulted in:

- Reduction of taxation of labour
- Subsidies to energy efficient measures
- Special subsidies for small companies.

The taxation of labour was reduced partly through a reduction in employers' labour market contributions and partly through a reduction in employer payment of supplementary labour market pension.

These reductions were being introduced gradually as the taxes were rising. Subsidies were granted to encourage measures that promote energy efficiency including investments in energy efficient projects, industrial combined heating and power plants, energy audits, development, information and demonstration projects, etc.

They were used as temporary means and brought to an end on 1 January 2002.

Special subsidies for small companies are primarily used to compensate for administrative expenses.

The development of tax revenue and redirection is shown in the table. The tax revenue includes both the additional tax revenue from the Green Tax Package (1996) and the increased tax on space heating introduced with the Whitsun Package (1998).



TAX REVENUE, EURO MILLION

	1996	1997	1998	1999	2000 ^{OLD}	2000 ^{NEW}
Tax revenue:						
Additional CO ₂ tax	69	140	224	263	283	277
SO ₂ tax	25	27	28	40	42	42
Total	94	167	252	303	325	319
Redirection:						
Tax on labour	-25	-74	-153	-184	-297	-261
Funds for self-employed	-24	-28	-34	-34	-40	-40
Investment subsidies	-27	-46	-60	-77	-31	-62
Administration costs	-4	-4	-4	-4	-4	-4
Total	-80	-152	-251	-299	-372	-36
Total tax increase	14	15	1	4	-47	-48

As seen in the table, the redirection of tax revenue fully compensates the tax increase. As the employment rate in industry and trade is rising faster than expected in 1996, the accumulated difference between tax revenue and redirection is rising. Initiatives will be taken to neutralise the difference.

In 1999 an evaluation of the green tax burden minus the redirection in different sectors showed that the industry was undercompensated regarding redirection of tax revenue. 2000^{old} shows the expected tax increase if no corrective actions had been implemented. 2000^{new} shows the actual tax increase after a number of adjustments in favour of the industry.



ENERGY TAXES

Energy tax is only paid for energy consumption used for ordinary space heating including hot water. There are no energy taxes on space heating based on bio fuels and renewable energy.

The tax was introduced gradually from 1996 in two phases. First from 1996 to 1998 in which the level was about 5.5 euro per GJ. In 1998 it was agreed to increase the energy tax further (the Whitsun package) to about 6.8 euro per GJ in 2002.

SO₂ TAX

The SO₂ tax is the same for all kinds of energy use. Calculations of the tax are either based on SO₂ emitted or on content of sulphur in the fuel. Fuels with a sulphur content below 0.05% are exempt from the tax.

The tax was introduced gradually from 1996 to 2000. Today, it is euro 1.34 per kilo of SO₂ emitted or euro 2.68 per kilo of sulphur in the fuel.

THE TOTAL OF GREEN TAXES FOR VARIOUS ENERGY SOURCES FOR DIFFERENT ENERGY USE IN 2000

Energy source	Unit	Sulphur content	Heavy process no agreement	Light process no agreement	Space heating
Electricity	euro/MWh		5	14	87
Natural gas	euro/1000 m ³	0	7	27	244
Gas oil	euro/m ³	0.1	10	34	269
Fuel oil	euro/t	0.5	21	49	315
Coal	euro/t	0.6	22	43	221

EFFECTS ON THE ENVIRONMENT

The Green Tax Package has had considerable positive effects on the environment. It has encouraged Danish companies to improve energy efficiency, desulphurise flue gas, reduce energy consumption and to switch to fuels containing less CO₂ and SO₂.

In a 1999 evaluation of the Green Tax Package, the Danish government estimated a reduction of CO₂ emission in 2005 of 3.8 percent, corresponding to 2.3 million tons. Half of this was due to the taxes themselves, the rest to the subsidy and agreement system.

A calculation of the environmental effects shows that the Green Tax Package will hit its expected CO₂ reductions in 2005.

The next goal for CO₂ reduction is to fulfil Denmark's Kyoto obligations. The initiatives to be taken in trade and industry will be developed by the Danish Energy Authority in close cooperation with interested parties such as the Confederation of Danish Industries and the Danish Organisation for Trade and Commerce.

ESTIMATE OF REDUCTION IN CO₂ EMISSION IN 2005

	Per cent	Million of tons
Taxes	2.0	1.2
Subsidies	1.2	0.7
Agreements	0.6	0.4
Total	3.8	2.3



EFFECTS ON THE ECONOMY

Green taxes resulted in increased energy costs for trade and industry of approximately 0.2 per cent of the GNP in 2000. Since approximately the same amount was redirected, trade and industry as a whole have felt no noticeable consequences.

The economic effects of the green taxes are tracked by a number of different indicators. Model calculations show that total production in the private sector is influenced only to a lesser degree, and the taxes have had no significant influence on employment, private consumption and the balance of payments.

Although the effect on total production remains largely unchanged, the Green Tax Package does of course affect individual fields, industries and companies differently, depending on energy and labour-intensity, etc. Thus, there can be changes in production and employment for individual companies as a result of the Green Tax Package.

ECONOMIC EFFECTS

	1996	1998	2000	2003	2005
Employment, 1000 persons	-0.3	-0.3	0.9	1.6	2.6
GVA in fixed prices in private trade and industries, per cent	-0.05	-0.02	0.04	0.02	0.12
Private consumption in amount, per cent	-0.03	0.00	0.05	-0.04	0.00
Balance of payment, per cent of GNP	0.04	0.02	-0.01	0.04	0.01
National balance, per cent of GNP	-0.02	-0.02	-0.04	-0.04	-0.04

+ indicates a gain, - indicates a loss



EFFECTS ON COMPETITIVENESS

A company's ability to maintain or expand their market share is affected by numerous factors, including green taxes. However, experience has shown that green taxes influence business costs less than other factors such as fluctuations in wages, interest or inflation.

In general, the total effects on the economy of the companies are modest. This is primarily because the additional tax revenue is redirected so that the total costs of trade and industry remain constant and tax rebates are offered to energy-intensive companies.

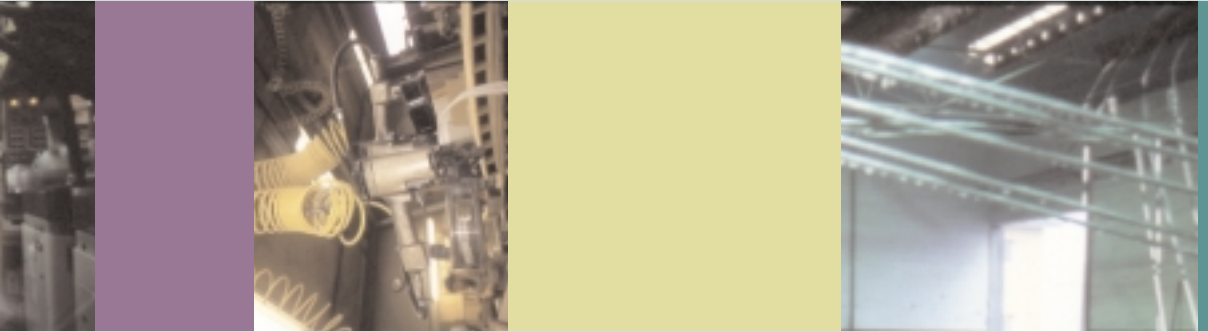
However, the tax burden in various sectors can differ significantly as energy consumption is not evenly distributed. Similarly, there are significant differences in distribution of the reduction of labour market contribution. Therefore, companies that typically gain from the Green Tax Package are energy-extensive with a large number of employees.

TAX INCREASE (IN EURO MILLION) DUE TO THE GREEN TAX PACKAGE AND THE WHITSUN PACKAGE

	1996	1998	2000 ^{OLD}	2000 ^{NEW}
Agriculture	-10	-15	0	0
Industry	20	40	40	15
Trade and service	10	-20	-80	-60

- indicates a gain, + indicates a loss

In 1999 an evaluation of the green tax burden minus the redirection in different sectors showed that the industry was undercompensated regarding redirection of tax revenue. 2000^{OLD} shows the expected tax increase if no corrective actions had been implemented. 2000^{NEW} shows the actual tax increase after a number of adjustments i favour of the industry.



ADMINISTRATIVE EFFECTS

Because the green tax system takes competitiveness into account, it is somewhat complicated. Therefore, the system results in higher company and public administrative costs than other tax systems.

PUBLIC SECTOR

Public administrative duties are primarily carried out by Central Customs and Tax Administration and the Danish Energy Authority. An evaluation in 1999 estimated that the public sector spent euro 6,7 million annually on administrative costs the first years after introduction of the Green Tax Package. Since then, the costs have been lower.

PRIVATE SECTOR

In the private sector, the administrative burdens caused by the Green Tax Package vary according to both the size of the company and on whether the company has heavy processes, receives subsidies or has an agreement about energy efficiency.

The administrative costs for categorising energy consumption are estimated to be 1 to 2 per cent of the tax itself.

The administrative costs for companies applying for subsidies for energy savings were limited to an average of 3 to 9 per cent of the amount of subsidies. This corresponds to 1 to 3 per cent of the investment, since subsidies were given for up to 30 per cent of investment costs.

The administrative costs for entering an agreement are estimated to average 5 to 12 per cent of the expected yearly rebate on the CO₂ tax when it is in full effect. This was for companies entering an agreement the first years after introduction of the agreement system. Since, several initiatives to reduce administration costs have been implemented.

For companies as a whole the average annual administrative burden in the period 1996 to 2005 is estimated to be euro 3.1-9.1 million.

This is one of three publications published by the Danish Energy Authority. They describe the Danish policy instruments to reduce energy consumption and CO₂ emissions in Danish companies:

- Green Taxes in Trade and Industry – Danish Experiences
- Voluntary Agreements on Energy Efficiency – Danish Experiences
- Energy Management in Industry– Danish Experiences

The Danish Energy Authority has also published the report *Green Taxes for Trade and Industry – description and evaluation*, June 2000.

All publications can be downloaded from www.ens.dk.

They are also available from the Danish Energy Information Centre at +45 70 21 80 10 or energioplysningen@ens.dk



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