Swedish energy and CO_2 taxes

National design within an EU framework

Conference on *"Green taxation as key for sustainable fiscal reform – the French context and European perspectives"*

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Outline of my presentation

- **Design and development of Swedish taxation of energy**
  - Main elements of our system
  - Cost-effective policy packages 1990 – 2012
    - Addressing distributional effects
    - Energy intensive industry and coordination with EU ETS
    - Major environmental and economic effects
- **Looking ahead**
  - Cost-effective EU tax framework
  - Swedish tax policy design in the future

Swedish energy and CO_2 taxation 1924 – 2012

Basic design and environmental effects

Energy tax and CO_2 tax (1)

- **Excise duty on energy – two components:**
  - Energy tax on fuels and electricity
  - CO_2 tax on fossil fuels
- **Energy tax:**
  - Introduced in: 1924 petrol ; 1951 electricity ; 1957 oils and coal ; 1964 LPG ; 1985 natural gas
- **CO_2 tax:**
  - Introduced in 1991, along with existing energy tax. Part of major general tax reform.
  - CO_2 tax achieves cost effective emission reductions.

Energy tax and CO_2 tax (2)

- **Increased tax levels and fine tuning of tax system to ensure cost-effective taxation**
  - 1991 and onwards ….
  - Focus on gradually increased CO_2 tax
  - Energy tax strictly based on energy content of fossil heating fuels from 2011
  - Design of taxation of bio fuels

Energy tax and CO_2 tax (3)

- **Basic principle: Same level of CO_2 taxation for motor fuels and heating fuels, per ton CO_2**
- **Two levels of CO_2 taxation of heating fuels, per ton CO_2**
  - *high* for households and service (27 € in 1991 ; 114 € in 2012)
  - *low* for sectors subject to international competition and risk of carbon leakage = industry, agriculture and heat production in combined heat and power plants (CHP).
    - *In 1991: 7 €; in 2012 outside EU ETS 34 €, within EU ETS 0 € industry, 8 € for CHP (plans of 0 in 2013).*
    - Energy tax for industry within EU ETS to fulfil EU minimum tax levels.
- **Two levels of energy taxation of heating fuels and electricity**
  - high for households and service
  - low for industry (within and outside EU ETS) and agriculture

Administration and calculation of tax rates

- **Low administrative costs for tax authorities and operators**
  - A CO_2 tax can easily be added to an existing energy tax system.
  - Administrative costs for Swedish Tax Administration is 0.1 % of total revenues for energy and CO_2 taxes.
- **Same taxation points for energy tax and CO_2 tax**
  - Facilitates tax collection and control.
  - Same tax payers and tax collection for both taxes.
- **No need to measure energy content or actual CO_2 emissions from fuels**
  - Average factors (CO_2 emissions and energy content for different fuels) are used by the Government to calculate tax rates.
  - Tax rates in tax law are expressed in commonly used trade units (ton, litre).

Theory put into practice – part of the 2009 package

Taxation of fossil heating fuels in Sweden 2010, 2011 and 2015

Area of use	2010	2011 (decided by Parliament in Dec. 2009)
Households and service	100 % energy tax – not based on energy content (0.1 – 0.8 € cent/kWh) 100 % CO_2 tax	100 % energy tax – based on energy content (0.8 € cent/kWh) 100 % CO_2 tax
Industry outside EU ETS + agriculture	0 energy tax 21 % CO_2 tax 0.8 % rule – further tax reductions	30 % energy tax = 0.25 € cent/kWh 30 % CO_2 tax (60 % in 2015) 0.8 % rule more strict (abolished in 2015)
Installations within EU ETS	*Industry + Heat production in CHP (Combined Heat and Power Plants)*: 0 energy tax 15 % CO_2 tax *Other heat plants*: 100 % energy tax; 94 % CO_2 tax	*Industry* : 30 % energy tax = 0.25 € cent/kWh 0 CO_2 tax *Heat production in CHP*: 30 % energy tax = 0.25 € cent/kWh 7 % CO_2 tax (2012; proposal 0 CO_2 tax in 2013) *Other heat plants*: 100 % energy tax; 94 % CO_2 tax

Energy intensive industry and coordination with EU ETS

Design of economic instruments preventing carbon leakage of Swedish energy intensive industry

- **1991:**
  - Two levels of CO_2 taxation for heating fuels, lower level for all industry
  - Further CO_2 tax reductions possible for energy intensive industry (above EU minima; so called “0,8 %-rule”).
  - CO_2 tax exemption for raw material use in industry.
- **2008 - 2015:**
  - Second period of EU ETS is introduced
  - Major energy intensive industry covered by EU ETS (heating fuels + raw material use)
  - *EU ETS industry*: A further reduced CO_2 tax level is introduced, zero CO_2 tax in 2011.
  - *Non EU ETS industry*: CO_2 tax level is raised, additional raises in 2011 and in 2015. “0,8 %-rule” is faced out, abolished in 2015.

Cost-effective policy packages 1990 – 2012

How to reach emissions reductions?
How to address distributional effects?

Policy packages ….

1990/1991 tax reform

- Reduced and simplified labour taxes (- 6 billion €)
- VAT introduced on energy (+ 1.6 billion €).
- CO_2 tax introduced at a low levels combined with ca 50 % cuts in energy tax rates (+ 0.3 billion €).
- Investment state aid for fossil free electricity production, mainly bio fuel CHP plants. Replaced in 2003 by green electricity certificate system.

No earmarking of revenues!

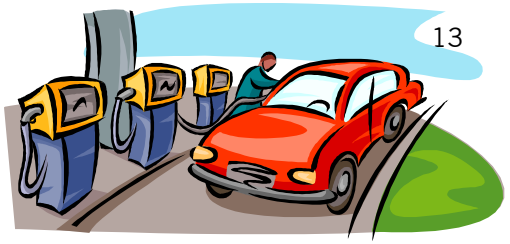
Green tax shift 2001 – 2006

- 1.6 billion € shift; raised environmental taxes, cuts in income taxes (focus on low incomes, e.g. increased basic deduction).

Policy 2007 – 2012

- Environmental tax increases for households and firms; cuts in taxes on labour, in order to increase labour supply and employment.
- 2007 – 2012: Increased environmental taxes + 0.5 billion €; reduced taxes on labour – 8,6 billion €.

Distributional effects, *households*



- **An average SE household pays approx. 200 € CO_2 tax on <u>motor fuels</u> in 2012** (about 1 % of total annual tax paid by the household).
- **<u>Heating fuels</u>: The CO_2 tax has led to the phasing out of fossil heating fuels used by households.**
  - Replaced by district heating and wood pellets burners.
  - Temporary aid for conversion to renewable heating.
  - SE traditionally electrically intensive (basically hydro and nuclear).
- **Green tax reform 2001-2006:** Increased basic tax deductions for low and middle income households.

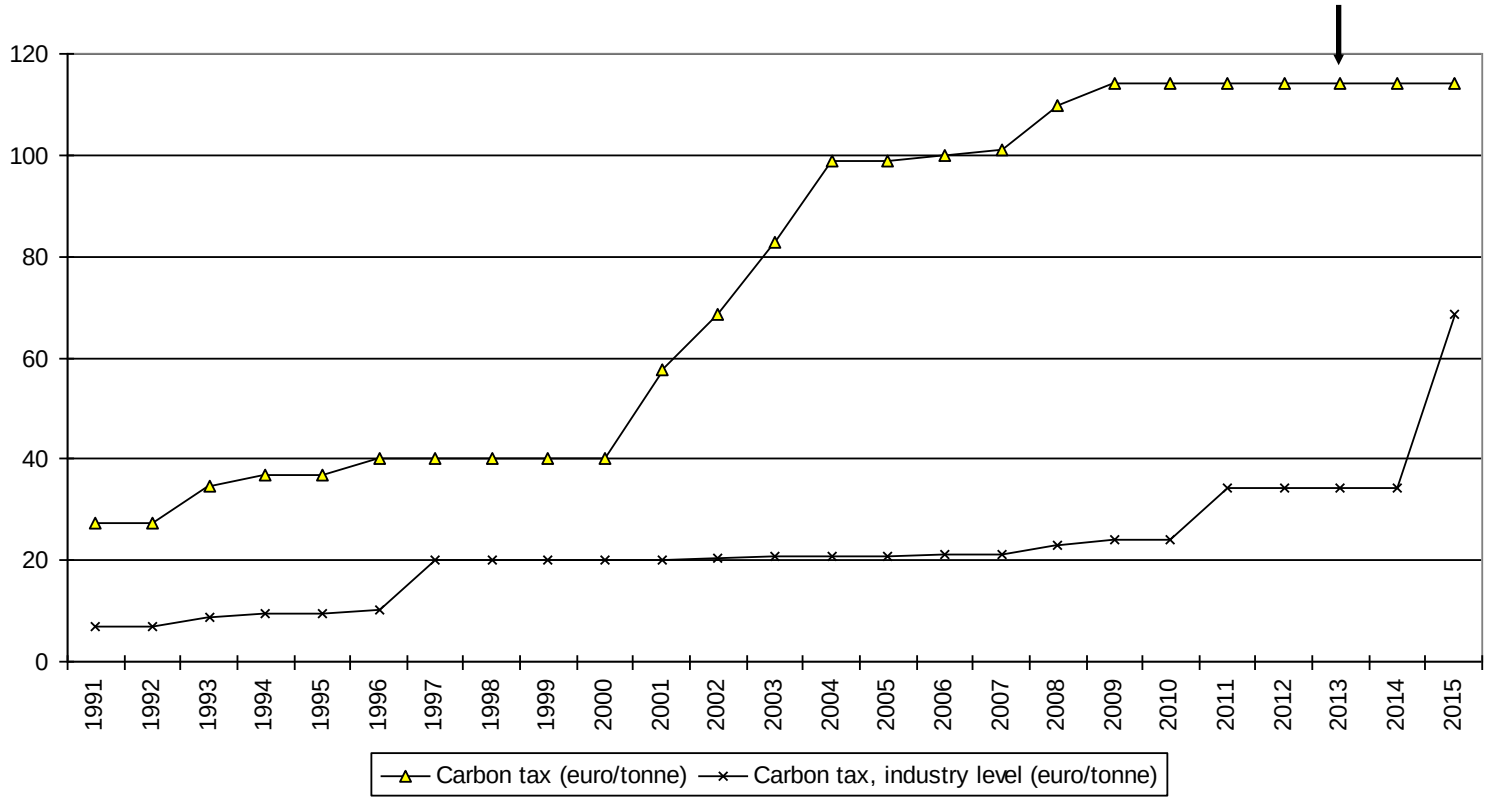
Distributional effects, *business*

- **Industry in EU ETS:** Generally energy intensive.
  - No CO_2 tax from 2011, lower energy tax. Replaced earlier tax reduction schemes.
- **Industry outside EU ETS:** Generally less energy intensive.
  - 30 % CO_2 tax 2013, and 60 % CO_2 tax 2015.
  - In general low costs for energy and high costs for labour and capital.
- Large shares of the SE industry's use of energy consist of **bio fuels (36 %,** mainly paper and pulp) and **electricity (35 %)**.
  - No tax on bio fuels and low energy tax on electricity for industry.
  - Steady decline in specific energy use (amount of energy used per monetary unit of value added).
- **District heating** is a significant provider of **space heating for service sector** (offices, shops etc.): **80 % in 2011.** 68 % of in-put is bio-fuels and waste.

Major environmental and economic effects

Development of the Swedish CO_2 tax
general level and industry level
from 2008 industry outside EU Emissions Trading Scheme (EU ETS)

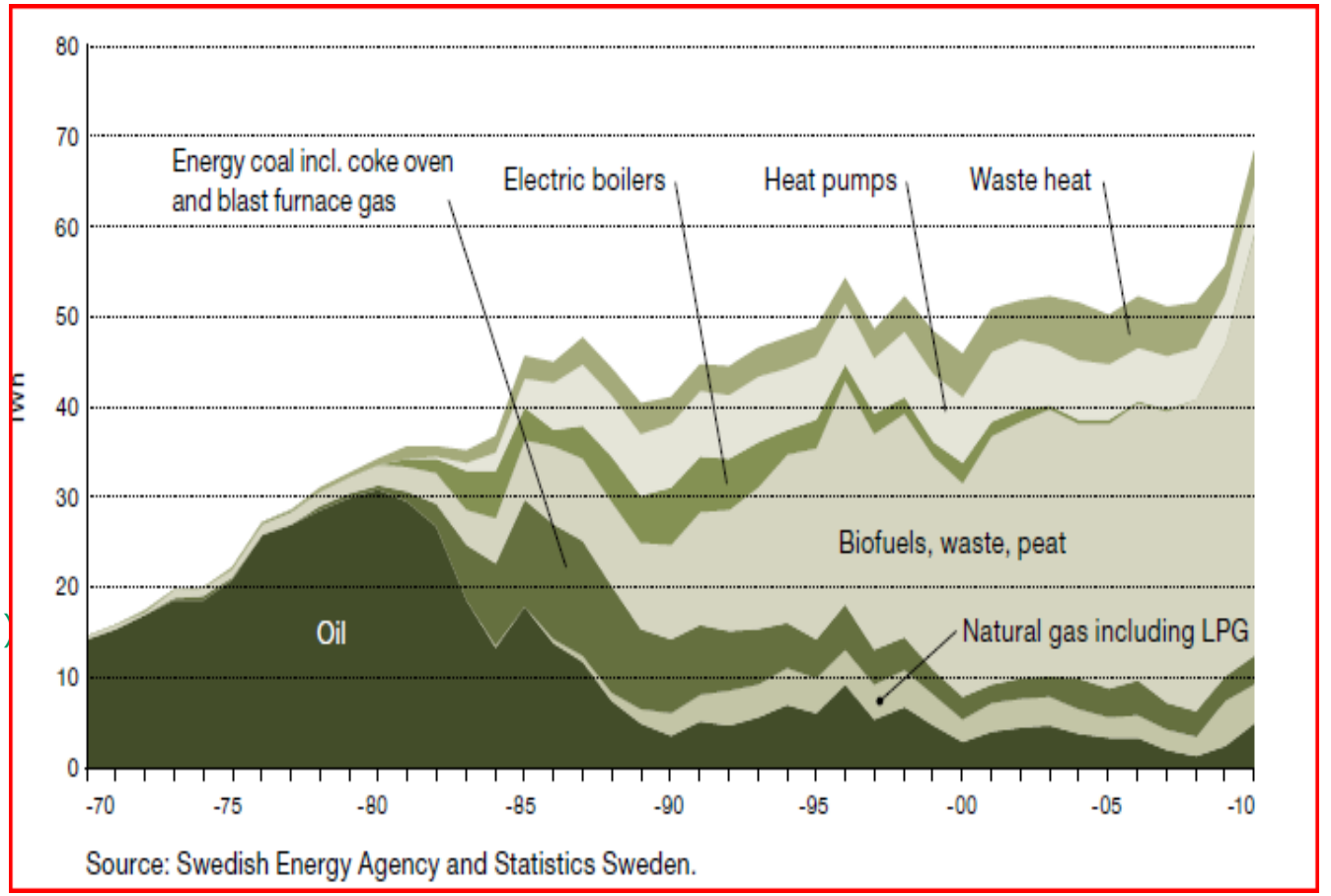
General level for 2012 level in figure



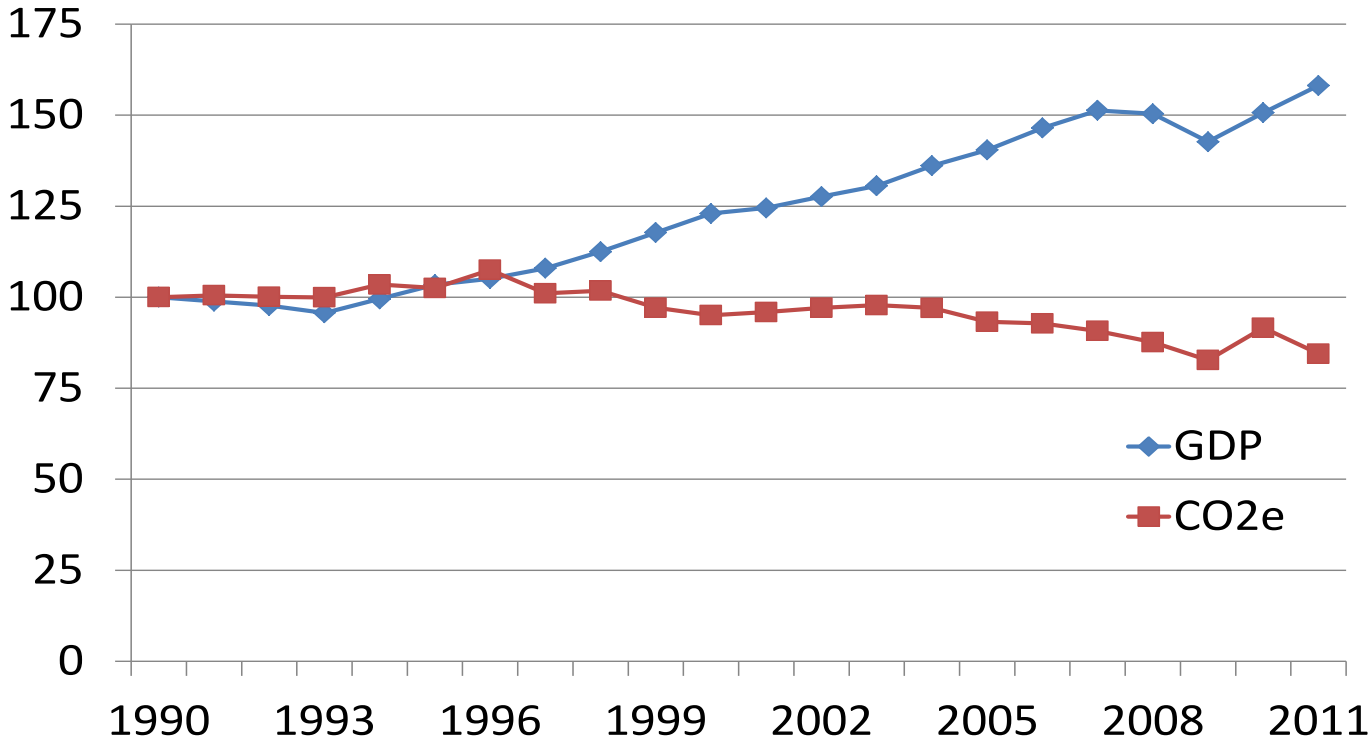
Energy input sources for district heating in Sweden, 1970-2010

District heating in Sweden

- 2010 68 TWh (+ 66 % since 1990).
- 92 % of all flats.
- 60 % delivered by municipality companies.
- In-put bio mass (wood scrap, household waste etc.) 10 % in 1990; 68 % in 2010.



Real GDP growth and CO_2e emissions in Sweden, 1990-2011



1990 – 2011: 16 % reduction of CO_2e emissions + 58 % economic growth

Sources: For CO_2e: Sweden's National Inventory Report 2012, submitted under the UNFCC and the Kyoto Protocol, and for 2011 prelimary figures from the Swedish Environmental Protection Agency. For real GDP: Statistics Sweden.

Lessons learned ……

- A CO_2 tax is easy to administer and it gives results.
- Households and firms are free to choose measures best for them.
- Start at low tax levels and raise gradually.
- Announce tax measures in time, to give time for adjustment.
- CO_2 tax revenues can be used for
  - – aid schemes for limited time periods, to ensure that real options are available for households and firms (investment aid, public transport etc.),
  - – addressing distributional consequences and effects on labour supply,
  - – green tax shift reforms (in SE shift energy – labour ; also possible to consider shift energy – corporate taxation in order to stimulate growth).

Economic instruments in the future .....

Cost-effective EU tax framework

- **EU climate and energy policy targets for 2020**
- **Proposal for a revised Energy Taxation Directive**
  - Taxation based on same metrics as set targets:
    - Coordination - taxation and EU ETS:
      - CO_2 tax outside EU ETS (*climate target*) - proposal 20 € per ton CO_2.
      - Same emission factors for different fossil fuels are used within EU ETS as when calculating the CO_2 tax rates.
    - Energy tax based on energy content (*energy efficiency target* as well as broad tax base for *fiscal reasons*).
    - No CO_2 tax on sustainable bio fuels (*renewable target*).
- **Central steps towards increased cost-effectivess in policy design**
  - Harmonised and coordinated approach – at least energy and CO_2 components used to calculate EU minimum tax levels.
  - CO_2 price floor also in sectors outside EU ETS.

Swedish goals and visions

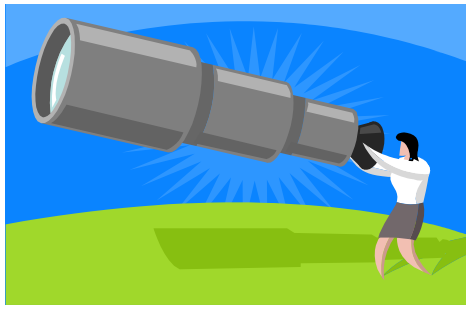
Climate and energy policy goals for *2020*:

- 40 % reduction of greenhouse gas emissions outside EU ETS, compared to 1990
- 50 % renewable energy of total energy use
- 10 % renewable energy in transport sector
- 20 % increased energy efficiency

Priority for *2030*: A vehicle fleet which is independent of fossil fuels.

Vision for *2050*: A sustainable energy supply that makes efficient use of resources and gives rise to zero net emissions of greenhouse gases to the atmosphere.

Swedish energy and CO_2 tax policy design in the future



- **Climate and energy tax package, decided by Parliament in 2009**
  - Energy related taxes and other economic instruments are primary instruments to reach set targets for 2020 (climate, share of renewable energy and energy efficiency)
  - Stepwise changes in 2011, 2013 and 2015
  - Control station in 2015; on-going research work => fine tuning measures.
- **EU ETS sector: No CO_2 tax** *(climate and renewable energy targets)*
- **Non EU ETS sectors: CO_2 tax** *(climate and renewable energy targets)*
  - one price for carbon emissions irrespective of which fuel and where used = same tax level SEK/kg CO_2 for motor fuels and heating fuels (carbon leakage may be addressed)
  - More effective environmental taxation by less reductions of tax level for industry and, if need be, raised general level of CO_2 tax
- **Energy tax for all sectors** *(energy efficiency target; fiscal reasons)*
  - According to energy content
  - Higher energy tax for motor fuels (external traffic costs etc.) than for heating fuels

Conclusions

- **Market based policy instruments and "Polluter Pays Principle" are central.**
- **CO_2 taxation of fossil fuels is the primary instrument for climate policy outside EU ETS**
  - Easy to administer and gives results.
  - Households and firms are free to choose measures best for them.
  - Start at low tax levels and raise gradually. Take steps towards a more uniform price on fossil CO_2.
  - Emission reductions and revenues can be combined with economic growth.

=> Cost-efficient reductions of CO_2 emissions! <=