



# Carbon Taxation

## *Swedish Experiences and Challenges Ahead*

November 2016

# Overview of Swedish Environmentally Related Taxes

	Revenues Billion € <sup>1</sup> (2016)
<b>A. Energy tax</b>	<b>4,80</b>
- electricity	2,29
- petrol	1,26
- other fossil fuels than petrol	1,25
<b>B. CO<sub>2</sub> tax</b>	<b>2,44</b>
- petrol	0,87
- other fossil fuels than petrol	1,57
<b>C. Other environmentally related taxes</b>	<b>0,04</b>
- tax on sulphur	0,001
- tax on pesticides	0,01
- landfill tax	0,01
- tax on natural gravel	0,02
<b>D. Vehicle related taxes</b>	<b>1,84</b>
- tax on motor vehicles	1,50
- road user charges	0,08
- tax on congestion	0,26
<b>Total (A+B+C+D)</b>	<b>9,12</b>

<sup>1</sup> Prognosis.

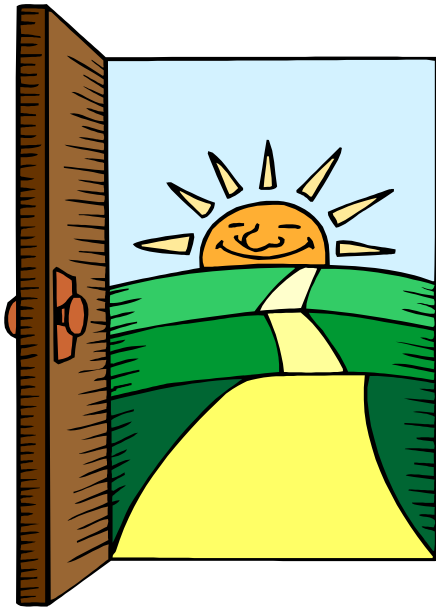
Exchange rate 1 € = 9,3754 SEK is used throughout this presentation  
(Official rate per 1 October 2015, 2015/C324/06)

# Swedish Carbon Pricing

- **CO<sub>2</sub> tax on motor fuels and heating fuels since 1991**
  - Based on fossil carbon content of fuels
  - Introduced along with existing energy tax. Part of major general tax reform.
- **EU Emission Trading Scheme (EU ETS) since 2005**
  - Emissions of fossil CO<sub>2</sub> and other greenhouse gases
  - Large part of heavy industry, heat and power installations
- **No CO<sub>2</sub> tax on industry covered by EU ETS**

# Development of the Swedish CO<sub>2</sub> tax

- **Two levels of CO<sub>2</sub> tax, per ton CO<sub>2</sub>**
  - *High* for motor fuels and heating fuels in households and service
  - *Low* for heating fuels in industry
- **Towards one single price on carbon**
  - Step-by step raising the lower level for industry outside EU ETS; lower level fully abolished in 2018.
  - Heavy industry mainly within EU ETS – another economic instrument which puts a price on carbon



# Swedish Energy and CO<sub>2</sub> Taxation 1924 – 2016

## *Basic Design and Development*

*Raising revenues, driving fossil fuel  
consumption down while enabling growth  
and avoiding carbon leakage ....*



# Swedish Energy and CO<sub>2</sub> taxation

## 1924 – 2016, *Basic Design and Development (I)*

- **Excise duties on energy – two components:**
  - Energy tax on fuels and electricity.
  - CO<sub>2</sub> tax on fossil fuels.
- **Energy tax:**
  - Introduced in: 1924 petrol ; 1937 diesel; 1951 electricity ; 1957 heating oil and coal ; 1964 LPG ; 1985 natural gas ; 2013 low bio blends and 2015 certain high bio blends in motor fuels.
- **CO<sub>2</sub> tax:**
  - Based on fossil carbon content of fuels.
  - Introduced in 1991, along with existing energy tax. Part of major general tax reform.
  - CO<sub>2</sub> tax achieves cost effective emission reductions.

# Swedish Energy and CO<sub>2</sub> Taxation

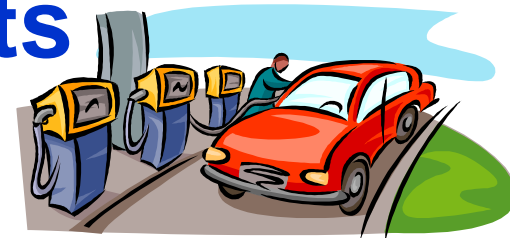
## 1924 – 2016, Basic Design and Development (II)

- **CO<sub>2</sub> tax:** Same level of for fossil motor and heating fuels, per ton fossil CO<sub>2</sub>.
- **Two levels of CO<sub>2</sub> tax for heating fuels, per ton CO<sub>2</sub>**
  - *high* for households and service (27 € in 1991; 119 € in 2016)
  - *low* for sectors at risk of carbon leakage = industry, agriculture and heat production in combined heat and power plants.
    - *In 1991: 7 €; in 2016 outside EU ETS 96 €, within EU ETS industry and CHP 0 €.*
    - The alternative would have been an overall much lower tax level for all operators, resulting in significantly lower environmental results.
    - Border Tax Adjustments have never been an alternative considered in Sweden.
- **Energy tax:** Two tax levels for heating fuels and electricity
  - high for households and service.
  - low for industry (within and outside EU ETS) and agriculture.



# Distributional effects

## *households*



- **An average SE household pays approx. 450 € total energy tax and CO<sub>2</sub> tax on motor fuels in 2015** (about 2 % of total annual tax paid by the household).
- **Heating fuels: The CO<sub>2</sub> 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 is traditionally electricity intensive (basically hydro and nuclear).
- **Green tax reform 2001-2006**
  - Increased basic tax deductions for low and middle income households.







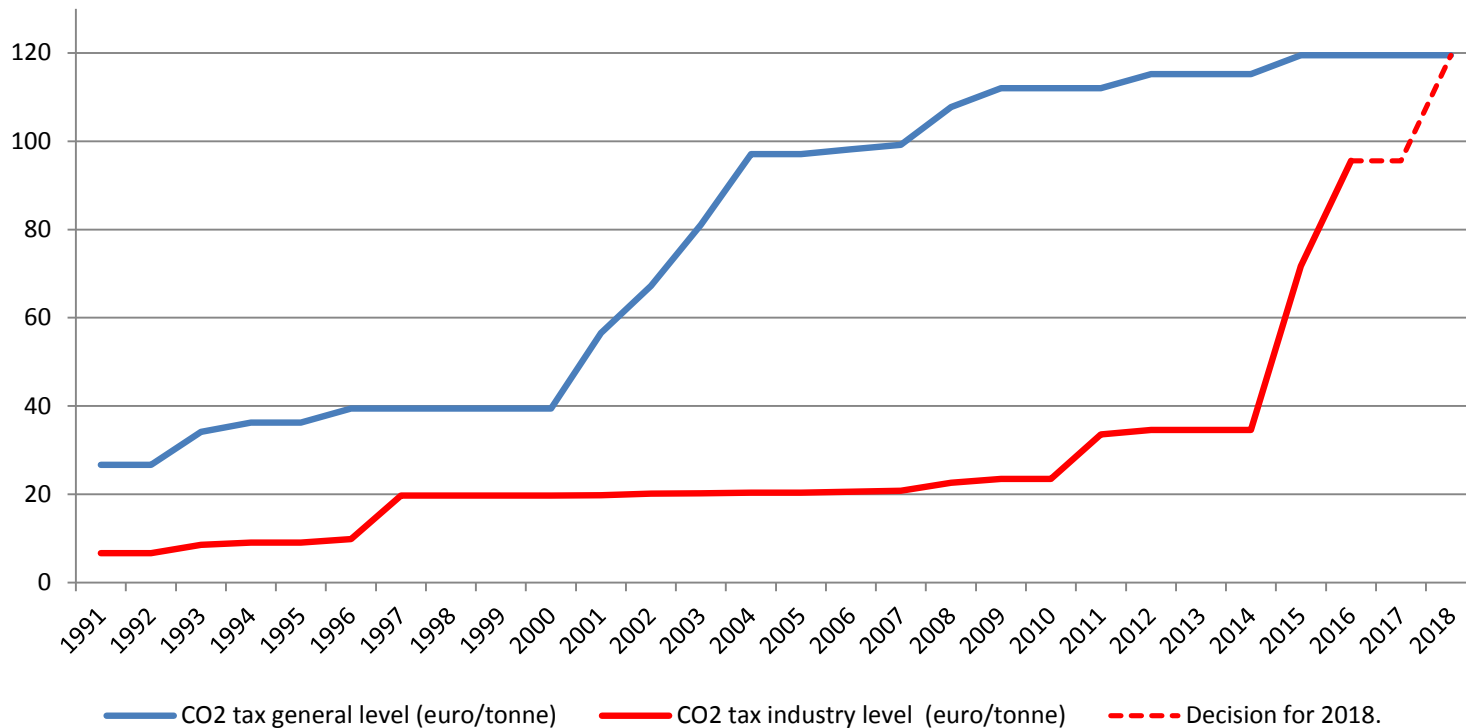
# Distributional effects *business*



- **Industry within EU ETS:** Generally energy intensive.
  - No CO<sub>2</sub> tax from 2011, lower energy tax. (Replaced earlier tax reduction schemes.)
- **Industry outside EU ETS:** Generally less energy intensive.
  - CO<sub>2</sub> tax 30 % 2013, 60 % 2015, 80 % 2016 and 100 % 2018.
  - 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** (32 %) in 2014.
  - No tax on solid bio fuels and residues ; 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 2014.** 74 % of in-put is bio fuels and waste.

# Development of the Swedish CO<sub>2</sub> tax *general level and industry level*

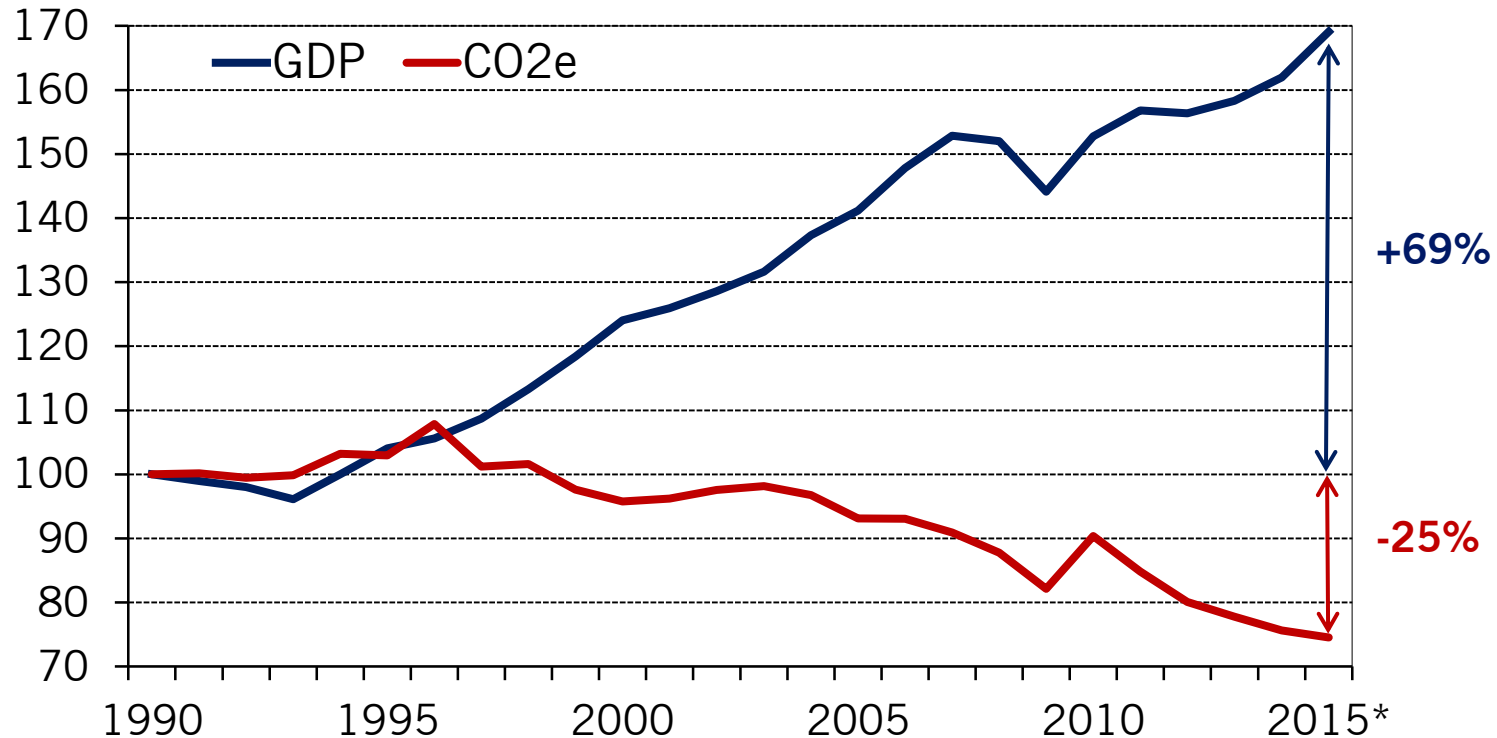
CO<sub>2</sub> tax levels  
€ per tonne



**NOTE:** from 2008 industry outside EU Emissions Trading Scheme (EU ETS)

# Real GDP and domestic CO<sub>2</sub>e emissions<sup>1</sup> in Sweden, 1990–2015

Index (1990=100)



<sup>1</sup> In accordance with Sweden's National Inventory Report, submitted under the UNFCCC and the Kyoto Protocol. CO<sub>2</sub> = approx. 80 % of total CO<sub>2</sub>e emissions. Preliminary data for 2015.

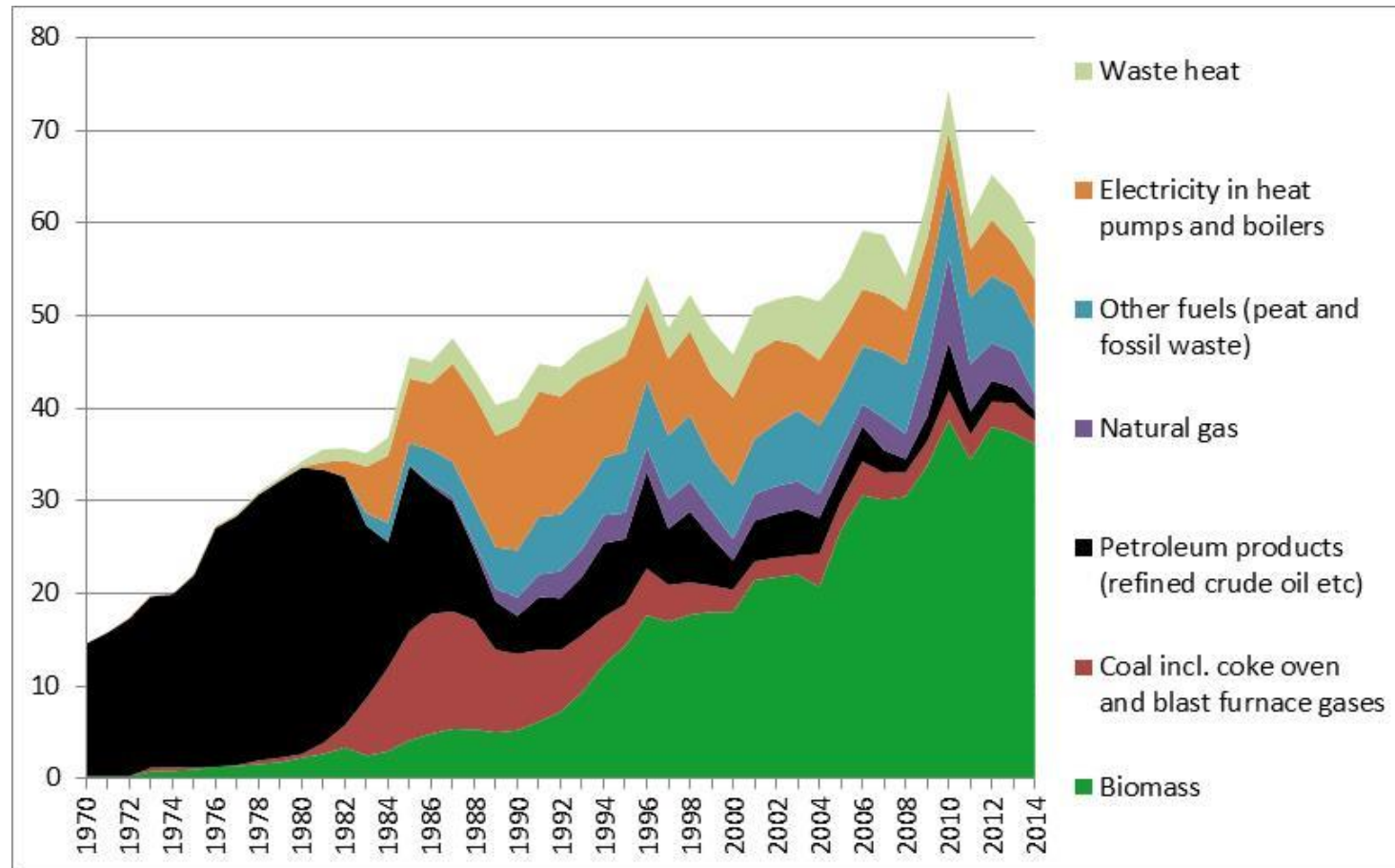
**Sources:** Swedish Environmental Protection Agency, Statistics Sweden

# Energy input sources for district heating in Sweden, 1970-2014

## District heating in Sweden

- 2014 58 TWh (+42 % since 1990); district cooling 1 TWh.
- 91 % of all flats.
- **In-put biomass (in household waste, wood scrap etc.) 10 % in 1990; 66 % in 2014.**

Source: Swedish Environmental Protection Agency, own calculations



# What does the public think?

- **What make households and firms adapt?**

*Swedes do not love to pay tax, but .....*

- General environmental concerns, both from households and firms
- Start at low tax levels, raise gradually
- Ensure that feasible options are available (bio fuels, district heating, public transport, housing isolation etc.)
- “Polluter Pays” = “Money Talks”
- 25 years of CO<sub>2</sub> taxation show good environmental effects = Pollution from fossil fuels is not essential to economic success.

*..... the CO<sub>2</sub> tax is generally accepted.*





# Swedish Experiences of CO<sub>2</sub> taxation, *conclusions*

- **CO<sub>2</sub> taxation ....**
  - has since 1991 been the key driver behind Sweden's success in cutting emissions and maintaining economic growth
  - is easy to administer and gives results
  - is a cost-effective measure to reach emission reductions
- **Long term priority in broad political consensus ....**
  - involve stakeholders in discussions and analysis
  - step-by step approach; alternatives available



# The road forward .....

- **.... in Sweden**
  - Continued emphasis on CO<sub>2</sub> taxation and other market based instruments
  - “Polluter Pays Principle”
  - Sweden aims to be one of the world’s first fossil-free welfare nations. The main challenge ahead is a fossil-free vehicle fleet.
- **.... global action on carbon pricing**
  - We know how to price carbon by a CO<sub>2</sub> tax. Sweden is one good example; reduced emissions can be combined with long-term economic development and prosperity.
  - By leading the way we hope to make more countries follow suit. Let us all work to make that happen!

# Sources

**Slide 2:** *Ministry of Finance*

**Slide 8:** *Statistics Sweden and own calculations*

**Slide 9:** Industry's use of energy: *Swedish Energy Agency, Statistics Sweden*. Space heating in service sector: *Statistics Sweden (Energistatistik för lokaler 2014)*

**Slide 10:** *Ministry of Finance*

**Slide 11:** *Swedish Environmental Protection Agency, Statistics Sweden*

**Slide 12:** *Swedish Environmental Protection Agency and own calculations*

## Further information

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