



# The Benefits of a Carbon Tax – Swedish experiences and a focus on developing countries

*Domestic Resource Mobilization and Tax Base Protection*  
UN Workshop on Practical Issues in  
Protecting the Tax Base of Developing Countries  
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# Why is a Carbon Tax Important Now?

## Tax Base Protection for Developing Countries

- Huge challenges
- Increased revenues are essential
- Domestic Resource Mobilization

## The Paris Climate Agreement

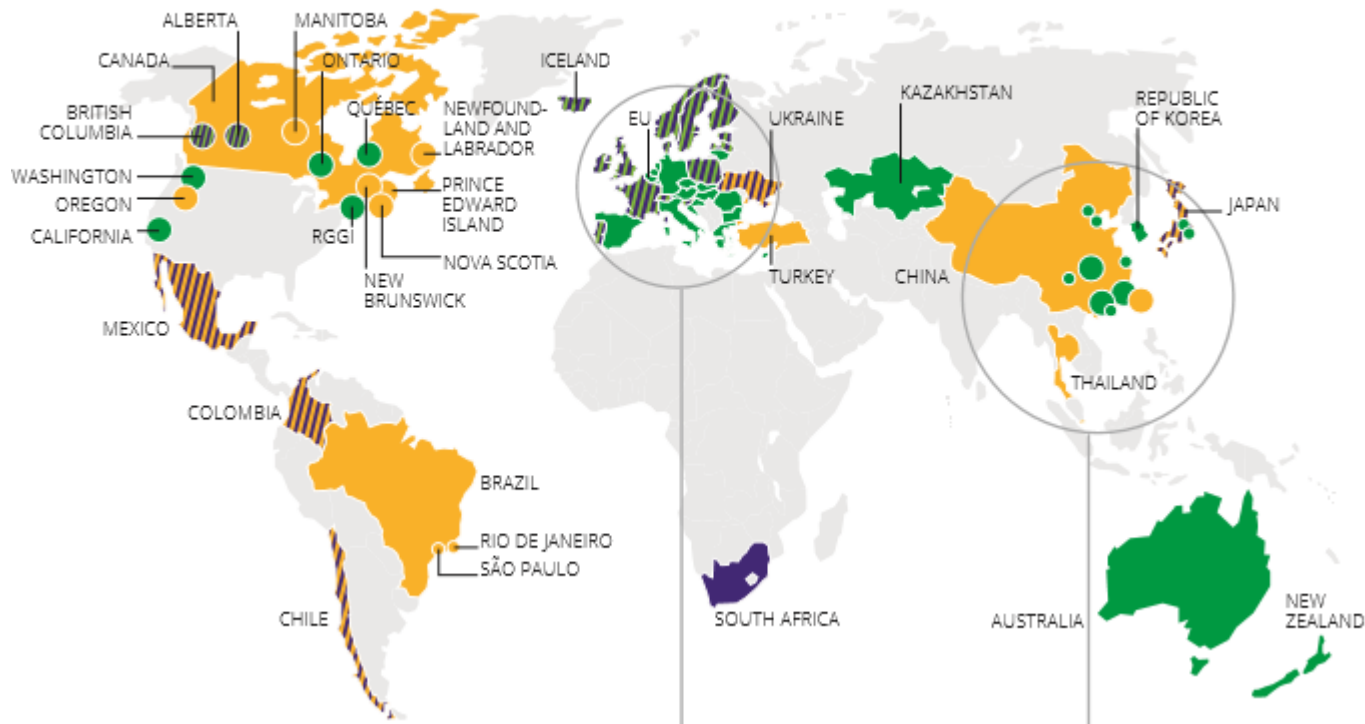
- Cost-effective tools are needed to deliver .... by all countries
- Put a price on carbon – strong signal to households and firms
- A carbon tax has low administrative costs vs emission trading



# Global Outlook

- How can a carbon tax help **deliver on the Paris Agreement** and **raise revenues**?
- **More and more jurisdictions** across the globe are introducing a **carbon tax**
  - Sweden has had a carbon tax since 1991.
  - What lessons can be learned?
  - What is of particular importance to developing countries?
- **The Road Forward .....**

**FIGURE 1 | Summary map of regional, national and subnational carbon pricing initiatives implemented, scheduled for implementation and under consideration (ETS and carbon tax)**



- ETS implemented or scheduled for implementation
- Carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled
- ▨ Carbon tax implemented or scheduled, ETS under consideration

Source: “World Bank; Ecofys. 2017. Carbon Pricing Watch 2017. Washington, DC: World Bank.



# Global Outlook

## *Why a carbon tax can work well in developing countries ....*

- **Low administrative costs**
  - is easy to administer, can be added to existing fuel tax system
  - no need to measure actual emissions
  - sets a price on fossil carbon according to Polluters Pay Principle – national conditions determine choices made by households and firms
- **Taxation points can be chosen up-stream – few tax payers**
- **Start with low tax rates; step-by-step approach**
- **Revenues can be used to**
  - enable options to fossil fuel use (e.g. public transport, substitutes to fossil heating, such as district heating or cooling systems using household waste as a resource)
  - address distributional consequences (e.g. poor households)



## Easy to Administer

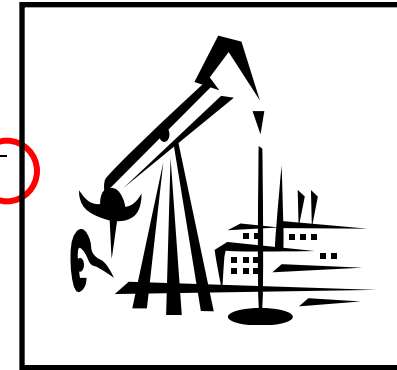
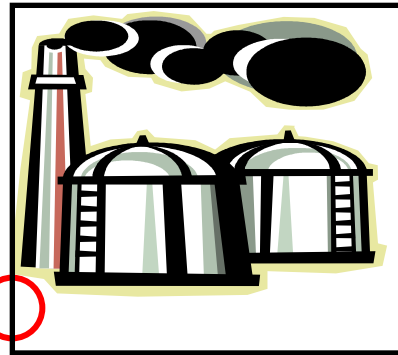
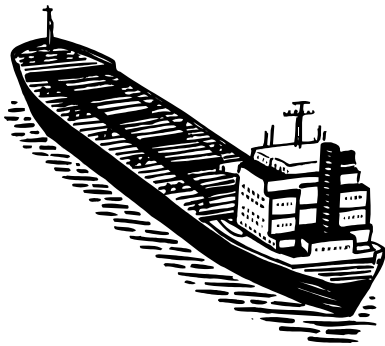
- In tax law, carbon tax rates expressed in normal trade units (**weight or volume**)
- Legislators use average **CO<sub>2</sub> emission factors** for different fuels to calculate tax rates
  - Internationally acknowledged emission factors
  - No need to measure at point of emissions to air
- Most countries already apply some kind of duties on fuels. A carbon tax can be paid by the same **tax payers** (e.g. distributors or large consumers, Sweden: pop. 10 million people, 300 tax payers for energy taxes)
- **Low administrative costs** for tax authorities and business
  - Administrative costs for Swedish Tax Administration is 0.1 % of total revenues for energy and carbon taxes
- **Tax points up-stream** facilitate tax collection and controls

# Taxation Points for Taxes on Fossil Fuels

## *Extreme up-stream alternative<sup>1</sup>*

**General principle:** Fuels taxed at the time of production (incl. extraction) or importation.

○ = Taxation point. Tax payer would typically be a coal mine owner, an oil driller or importer of oil or other fuels.



### Pros and cons:

- + Could facilitate tax control
- + Less number of tax payers, easier tax administration
- Negative liquidity effects on business, due to that tax is to be paid before fuels are sold
- Difficult to differentiate tax between refined oil products
- Difficult to differentiate tax between areas of use

<sup>1</sup> For discussion; would not be possible in Sweden due to general EU provisions



### Carbon Tax

- 1988-1989 Committee of inquiry
- 1989 Committee Report
- 1990 Governmental Bill and Parliament Decision
- 1991 Carbon Tax introduced

# An Example

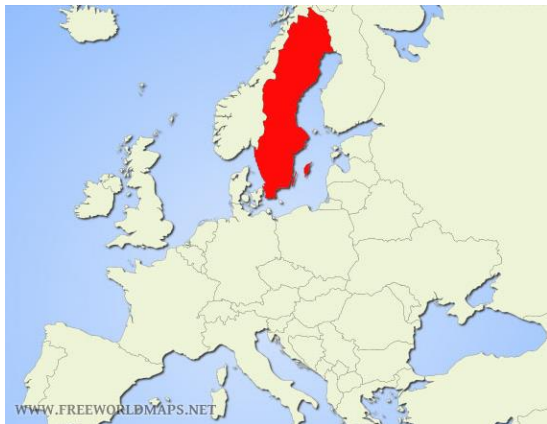
## Sweden's 26 years of carbon tax

### New national climate targets decided by Parliament in 2017

- *By 2045* no net emissions of greenhouse gases.
- *By 2030* emissions from domestic transports (excl. aviation) reduced by 70 % compared to 2010







## Basic Facts on Sweden

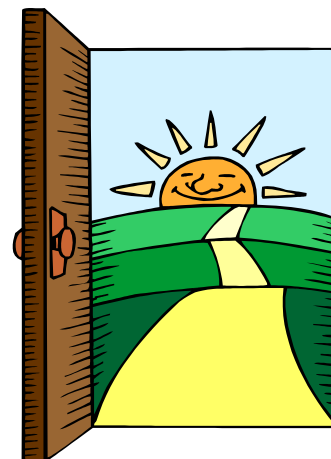
- 10 million people; size of California
- 50 % of land is covered by forests and 10 % by lakes
- Major natural resources: forests, iron ore (90 % of EU's resources) and hydro power
- Export-oriented country, open approach to trade; major exports machinery & vehicles, steel, paper & wood, electronics, telecommunications
- Energy consumption: 33 % electricity, 30 % fossil fuels, 37 % biofuels and heat produced from biofuels and household waste
- Steel and metal industry = 20 % of industry's total energy consumption
- Electricity production: 47 % hydro, 34 % nuclear, 10 % wind, 9 % combined heat and power plants (in-put basically non-fossil)



# Reasons for Taxing Energy in Sweden

## Increased focus on environmental taxes

- **Until 1980's:** Primarily fiscal purposes
  - generally low tax levels
- **1990's and onwards:** Environmental issues given high priority by Government and citizens
  - increased focus on environmental taxes
  - increased tax levels, step-by-step
  - focus on increased carbon tax share of taxation of energy (“carbon tax heavy”)
- **Now:**
  - Energy tax: fiscal and energy efficiency
  - Carbon tax: climate



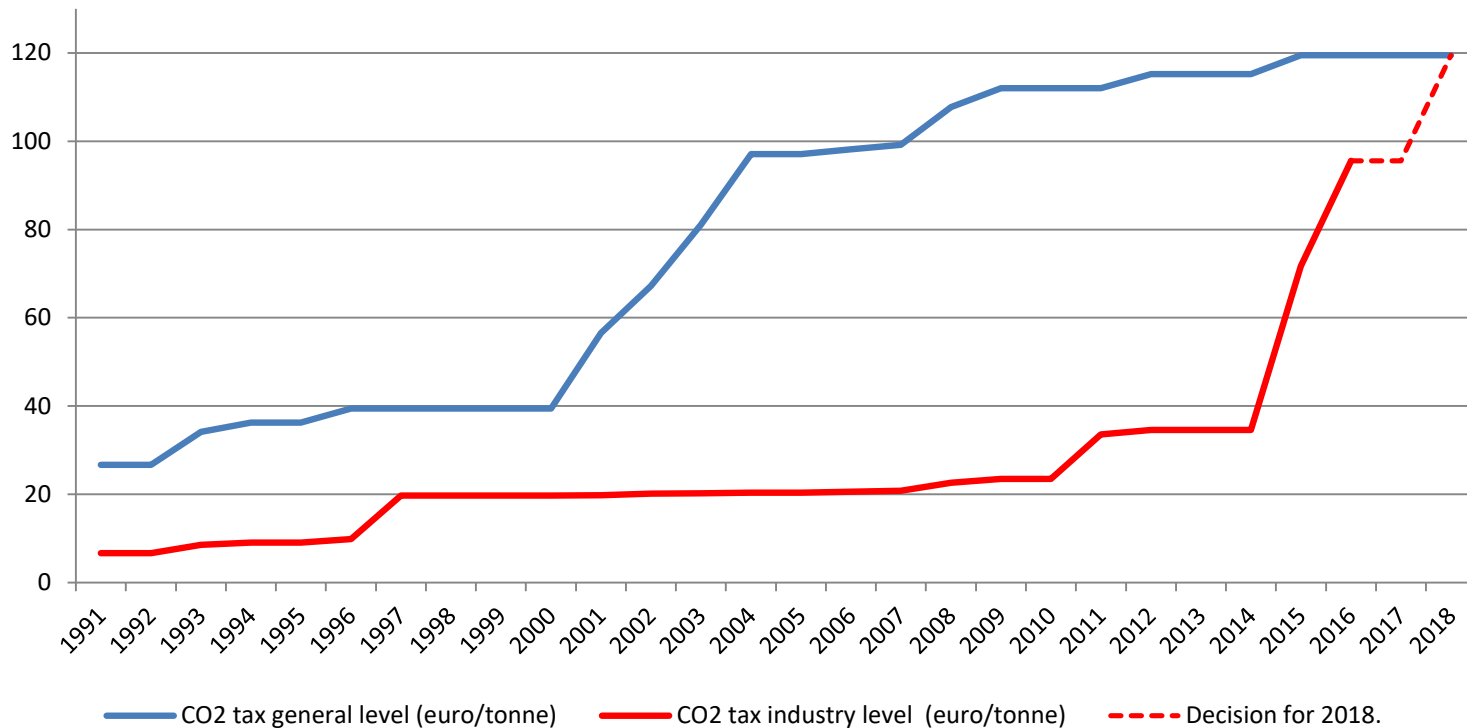
# Swedish Carbon Pricing

- **Carbon tax on motor fuels and heating fuels**
  - Based on fossil carbon content of fuels.
  - *29 \$ in 1991; 132 \$ in 2017; 135 \$ in 2018.*
  - Introduced along with existing energy tax. Part of major general tax reform.
  - Two levels of carbon tax, per tonne fossil carbon, lower level for industry will be abolished in 2018. Non-heating purposes in industry is not taxed.
- **EU Emission Trading Scheme (EU ETS) since 2005**
  - Emissions of fossil CO<sub>2</sub> and other greenhouse gases.
  - Large part of heavy industry.
- **No carbon tax on industry covered by EU ETS**
- **90 % of Swedish fossil carbon emissions** are covered by carbon tax or EU ETS

# Development of the Swedish Carbon Tax

## *General level and industry level*

**Carbon tax levels**  
€ per tonne

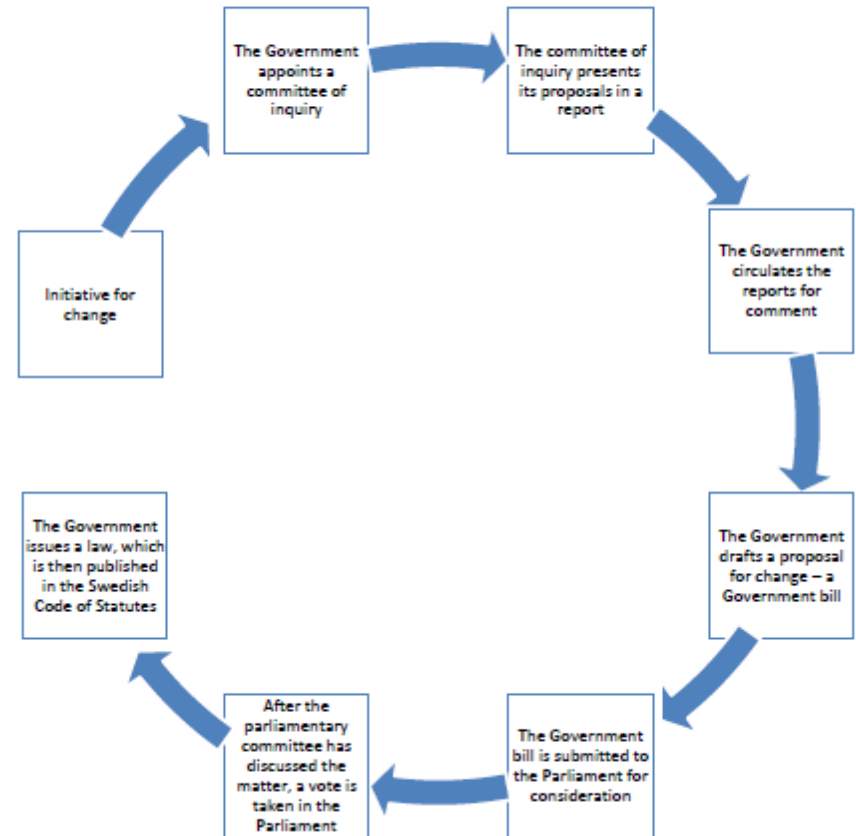


**NOTE:** from 2008 industry outside EU Emissions Trading Scheme (EU ETS)

# How Environmental Tax Laws are Decided in Sweden

- **All political parties in broad consensus on basic structure**
- **Involve stake holders**
  - Committee of inquiry, incl. business representatives and various experts
  - Public consultation of proposals
- **Close cooperation within Government Offices**
  - Main responsibility: Ministry of Finance
  - Close cooperation with Ministries of Environment, Agriculture, Transport and Industry

The process leading to a new law

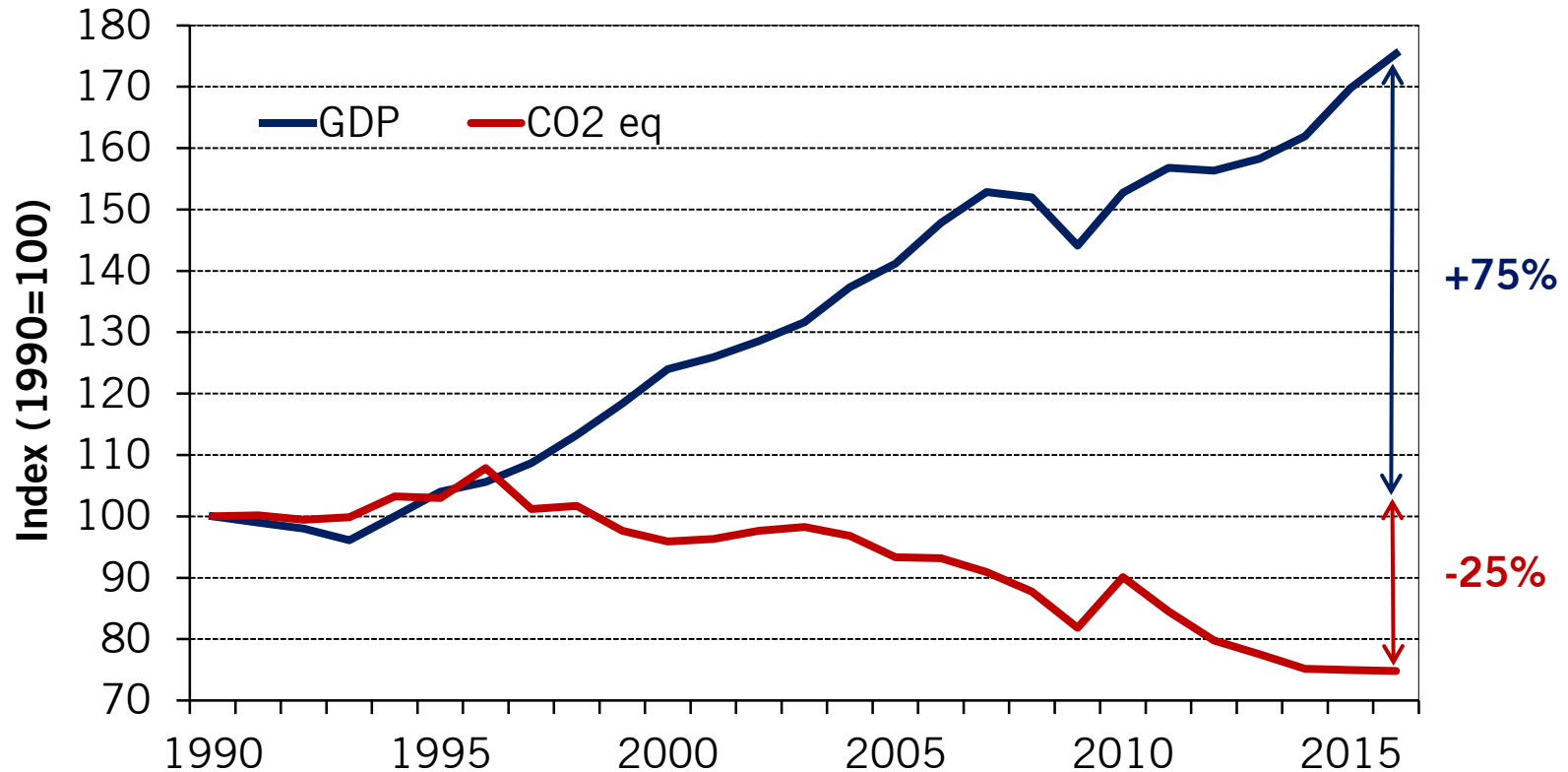


# Examples - 2017 and 2018 Swedish National Budget Bills

- **Continued focus on environmental taxes** (which in themselves are the key drivers to change behavior and reach targets)
- **Examples of environmental national expenditures**
  - New investments in climate measures, fossil free transports and renewable energy, e.g.
    - “Climate step initiative” – local climate investments, such as biogas and electric car charging stations
    - Urban investments in local public transports
    - Climate adaptation measures
    - Railroad maintenance
    - Premium to buy cars with low emissions
    - Buying and cancelling EU ETS emission allowances
    - Grants for emission reduction projects in industry
    - Grants for investments in solar energy
- **No earmarking of revenues**



# Real GDP and Domestic CO<sub>2</sub>eq Emissions<sup>1</sup> in Sweden, 1990–2016



<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>eq emissions. Preliminary data for 2016.

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

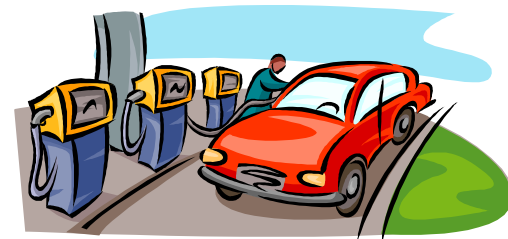


# Distributional Effects

## *Households*



- **Heating fuels:** Fossil heating fuels has been phased out.
  - Fossil heating fuel use has since 1990 dropped by 85 % and now represents 2 % of Sweden's total greenhouse gas emissions.
  - Replaced by district heating (in-put basically household waste and wood scrap; 92 % of all flats), wood pellets burners and heat pumps
  - Temporary aid schemes for conversion to renewable heating
- **Motor fuels:**
  - Major challenge remains for a fossil free transport sector
  - 95 % of current carbon tax revenues from motor fuels
  - Reduction obligation scheme for fuel distributors; taking biofuel share into account when setting carbon tax rates for petrol and diesel
- **General welfare state**
  - Social transfers
  - Increased basic income tax reductions for low and middle income households.







# Distributional Effects

## *Business*



- **Industry within EU Emission Trading Scheme (ETS):** Generally energy intensive.
  - No carbon tax from 2011, lower energy tax.
  - Proposal to reintroduce carbon tax for heat production in combined heat and power plants covered by the EU ETS on January 1, 2018 at a rate of 11 % of the general level.
- **Industry outside EU ETS:** Generally less energy intensive.
  - Step-wise increase to general carbon tax level 2011–2018; lower energy tax.
  - In general low costs for energy and high costs for labor and capital.
- Large shares of the Swedish 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** provides 80 % of **space heating for service sector** (e.g, offices, shops).

# 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; Broad political consensus
- Ensure that feasible options are available (bio fuels, district heating, public transport, housing insulation etc.)
- “Polluter Pays” = “Money Talks”
- 26 years of carbon taxation show good environmental effects = pollution from fossil fuels is not essential to economic success.

*..... the carbon tax is generally accepted.*

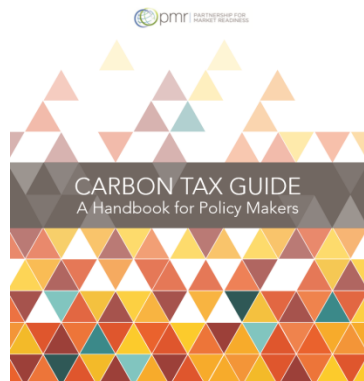




# The Road Forward .....

## .... yes, a carbon tax is a good idea!

- reduced emissions can be combined with long-term economic development and prosperity
- low administrative costs; emission trading schemes more complicated and costly
  - leave the choice of measures to households and firms; no Governmental intervention is needed to pick a winner, no applications and evaluations of individual projects are necessary
- raises revenues, which can be used to make options available
  - fine-tune policy design – what works in one country may not work well in another
  - carbon tax is the engine – additional measures are lubricants that make the engine go faster
- step-by-step approach gives time for households and firms to adapt – consider limited tax exemptions or reductions for certain areas to achieve over-all good results in economy
- discuss with stake holders and academia; cooperate within Government offices
- Sweden and others can share experiences, but exact design needs to take account of national conditions



# How to Make it Happen .....

- **We know how to price carbon by a carbon tax**
  - Economic theory is solid
  - More and more countries can share experiences. See e.g. “Partnership for Market Readiness. 2017. *Carbon Tax Guide : A Handbook for Policy Makers*. World Bank, Washington, DC.  
<https://openknowledge.worldbank.org/handle/10986/26300>
  - Ongoing discussions in COP conferences, UN Tax Committee, World Bank, IMF Carbon Pricing Leadership Coalition (CPLC), IMF, World Bank etc. etc.
- **Political courage** .... not easy but necessary .... and revenues are raised
- **Cooperation between Governments, academia and stakeholders**
  - research on policy experience, economical effects on society
  - step-by-step solutions, time limited aid programmes, technical research etc
  - hands-on, practical solutions

**Thank you for your attention!**  
**Questions?**





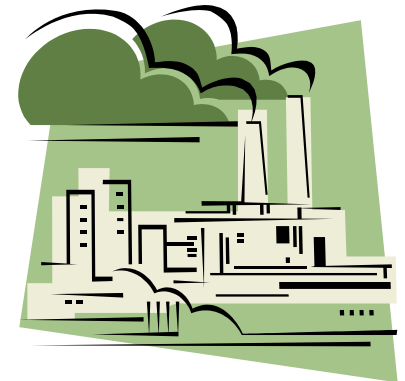
## Questions to discuss ....

- What are the most alarming effects of climate change in your country? Deforestation? Draughts? Flooding? Air pollution? What measures are you already applying or considering – share your experiences!
- Pros and cons of earmarking environmental tax revenues?
- Interaction of a carbon tax with other climate policies such as feed-in tariffs and investment aid for low-carbon projects as well as with other policies, such as fossil fuel subsidies?
- What kind of outside technical support would be most valuable? How to provide the most beneficial hands-on?
- Could discussions in the UN Tax Committee be a road forward? Handbooks?



# Annex

some additional information about the  
Swedish carbon tax



# Overview of Swedish Environmentally Related Taxes

	Revenues Billion € (\$)¹ 2017
<b>A. Energy tax</b>	<b>4.79 (5.38)</b>
- electricity	2.39 (2.68)
- petrol	1.21 (1.36)
- other fossil fuels than petrol	1.20 (1.34)
<b>B. Carbon tax</b>	<b>2.40 (2.69)</b>
- petrol	0.81 (0.91)
- other fossil fuels than petrol	1.59 (1.78)
<b>C. Other environmentally related taxes</b>	<b>0.17 (0.19)</b>
- tax on sulphur	0.001 (0.001)
- tax on pesticides	0.01 (0.01)
- landfill tax	0.03 (0.03)
- tax on natural gravel	0.02 (0.02)
- tax on chemicals	0.12 (0.13)
<b>D. Vehicle related taxes</b>	<b>1.83 (2.05)</b>
- tax on motor vehicles	1.44 (1.62)
- road user charges	0.10 (0.11)
- tax on congestion	0.29 (0.32)
<b>Total (A+B+C+D)</b>	<b>9.19 (10.32)</b>

¹ Prognosis.

Exchange rates 1 € = 9.593 SEK; 1 \$= 8.54 SEK is used throughout this presentation



# Swedish Energy and Carbon Tax Revenues

## A brief overview

	Revenues Billion € (\$)¹ 2017
<b>A. Energy tax</b>	<b>4.79 (5.38)</b>
- <i>electricity</i>	2.39 (2.68)
- <i>petrol</i>	1.21 (1.36)
- <i>other fossil fuels than petrol</i>	1.20 (1.34)
<b>B. Carbon tax</b>	<b>2.40 (2.69)</b>
- <i>petrol</i>	0.81 (0.91)
- <i>other fossil fuels than petrol</i>	1.59 (1.78)
<b>Total (A+B)</b>	<b>7.19 (8.07)</b>

¹ Prognosis.

Exchange rates 1 € = 9.593 SEK; 1 \$= 8.54 SEK

- Energy and Carbon Taxes – share of GDP in 2017: **1.5 %**
- Energy and Carbon Taxes – share of total national tax revenues in 2017: **3.4 %**

# Development of the Swedish Carbon Tax

- **Two levels of carbon tax, per tonne fossil carbon**
  - *High* for motor fuels and heating fuels in households and service: 26 € (29 \$) in 1991; 118 € (132 \$) in 2017
  - *Low* for heating fuels in industry: 6 € (7 \$) in 1991; in 2016 outside EU ETS 94 € (106 \$), no carbon tax within EU ETS industry)
  - Lower tax level has been the prerequisite for the high level. Major emission reductions in sectors where high tax level has been levied.
- **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.



# Green Taxes 1991 and Onwards ....

## 1990/1991 tax reform

- Reduced and simplified labour taxes (- 6 billion \$)
- Value Added Tax on energy (+ 1.8 billion \$)
- Carbon tax introduced at a low levels combined with approx. 50% cuts in energy tax rates (+ 0.4 billion \$)
- Certain investment state aid measures

***In Sweden no earmarking of revenues .... but it may be a solution in other national contexts.***

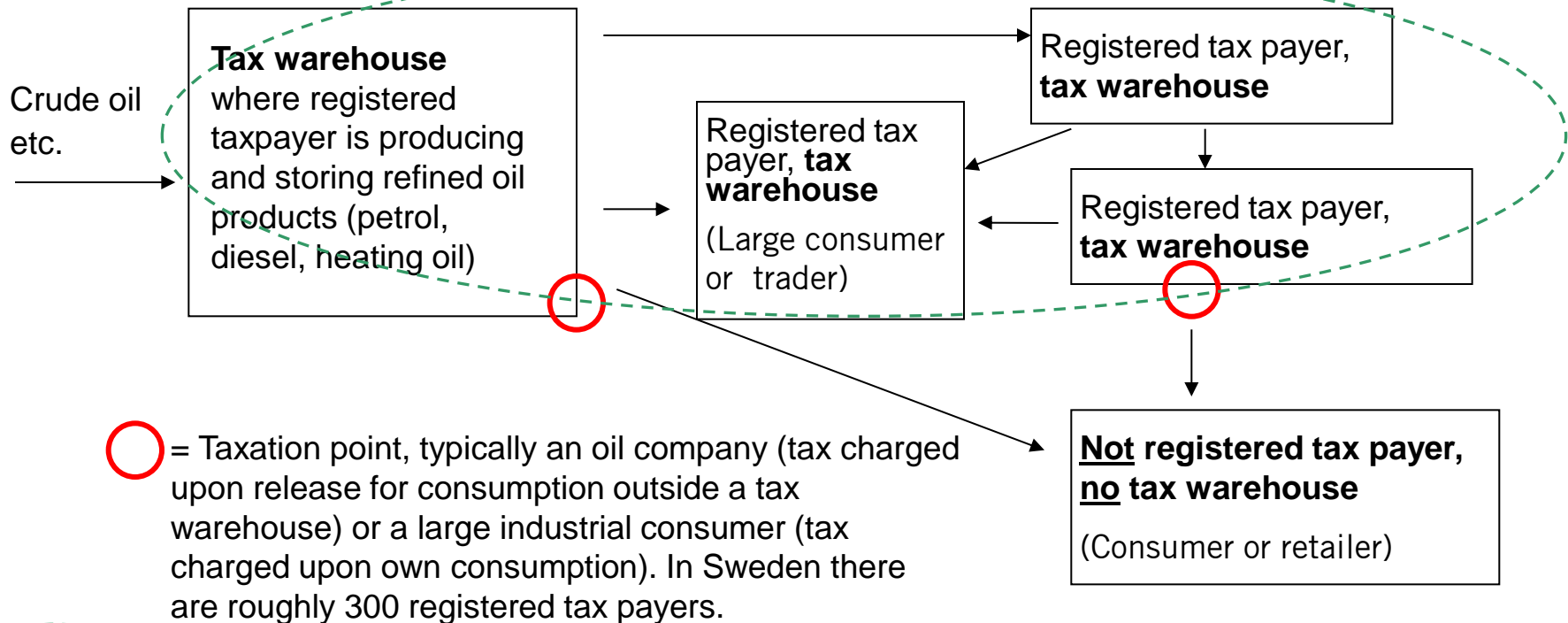
## Since 1991

- 2001-2006 Green tax shift
  - raised environmental taxes, cuts in income taxes focusing on low incomes
- 2007-2013 Increased environmental taxes significant cuts in labour taxes
- 2014 and onwards, for example
  - phasing out carbon tax reductions
  - new taxes on chemicals in electronic products and air travels
  - increased taxes on pesticides and natural gravel as well as energy tax on transport fuels
  - reform of vehicle taxation
  - public inquiries about e.g. road distance tax, waste incineration tax)

# Taxation Points for Taxes on Fuels in Sweden (mandatory EU rules)

**General principle:** Fuels shall be taxed at the time of production (incl. extraction) or import.

**Major exception:** Tax suspension regime



○ = Tax suspension regime (products can be handled without tax being charged), enables taxation closer to consumption.



# Calculations in Tax Declaration

*Example (petrol, 2016 Swedish tax rates)*

	Page 1: Quantities, liters	Page 2: Tax calculations, SEK		
		Energy tax	Carbon tax	Total tax
	A	$B=A*3.72$	$C=A*2.59$	$D=B+C$
Deliveries to non tax payers	500 000	1 860 000	1 295 000	3 155 000
Own consumption	10 000	37 200	25 900	63 100
Deductions (tax exempted areas)				
- export	-5 000	-18 600	-12 950	-31 550
- non-fuel use	-15 000	-55 800	-38 850	-94 650
<b>Tax to pay</b>		<b>1 822 800</b>	<b>1 269 100</b>	<b>3 091 900</b>



# Who Face the Tax Burden?

## *Example petrol – Swedish context*

- **Tax payer: Oil distribution company A**
  - Tax is paid when petrol leaves A's tax warehouse
- **Gas station receives petrol after tax is paid**
- **Households and firms buy taxed petrol**
- **Swedish petrol retail price of ~13.20 SEK(1,38 €/1.55 \$)/liter consists of (2016):**
  - Gross margin (11 %)
  - Product cost (23 %)
  - Taxes: Carbon, energy and value added taxes (66 %)
- **Who face the tax burden?**
  - 3 million owners of petrol driven cars (*via higher petrol prices*)
  - oil production and distribution companies (*via lower profit or lower wages*)
  - owners of petrol stations (*via lower profit or lower wages*)