

# Framework of the energy taxation: the situation in OECD countries

Presentation at the seminar

**JORNADA SOBRE LA FISCALIDAD AMBIENTAL  
EN LA ENERGÍA Y SU APLICACIÓN EN ESPAÑA**

Hosted by the Institute for Fiscal Studies

**Madrid, 31 May 2011**

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# An 'effective' tax system

According to “economic textbooks”, one should **seek to**:

- Apply taxes that capture any ‘economic rents’ (*e.g. oil, gold*).
- Apply taxes that internalise negative externalities – e.g. negative **environmental** externalities (*e.g. CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, PM, heavy metals*).
- Other taxes should be as broad-based as possible, with tax rates set as low as possible – within the limits set by the need for fiscal sustainability.
  - Consumption taxes / value added taxes
  - Income taxes for firms and individuals
- Avoid exemptions and tax rate reductions.
- Avoid earmarking of the revenues for specific purposes.
- Remove / reduce environmentally harmful subsidies.

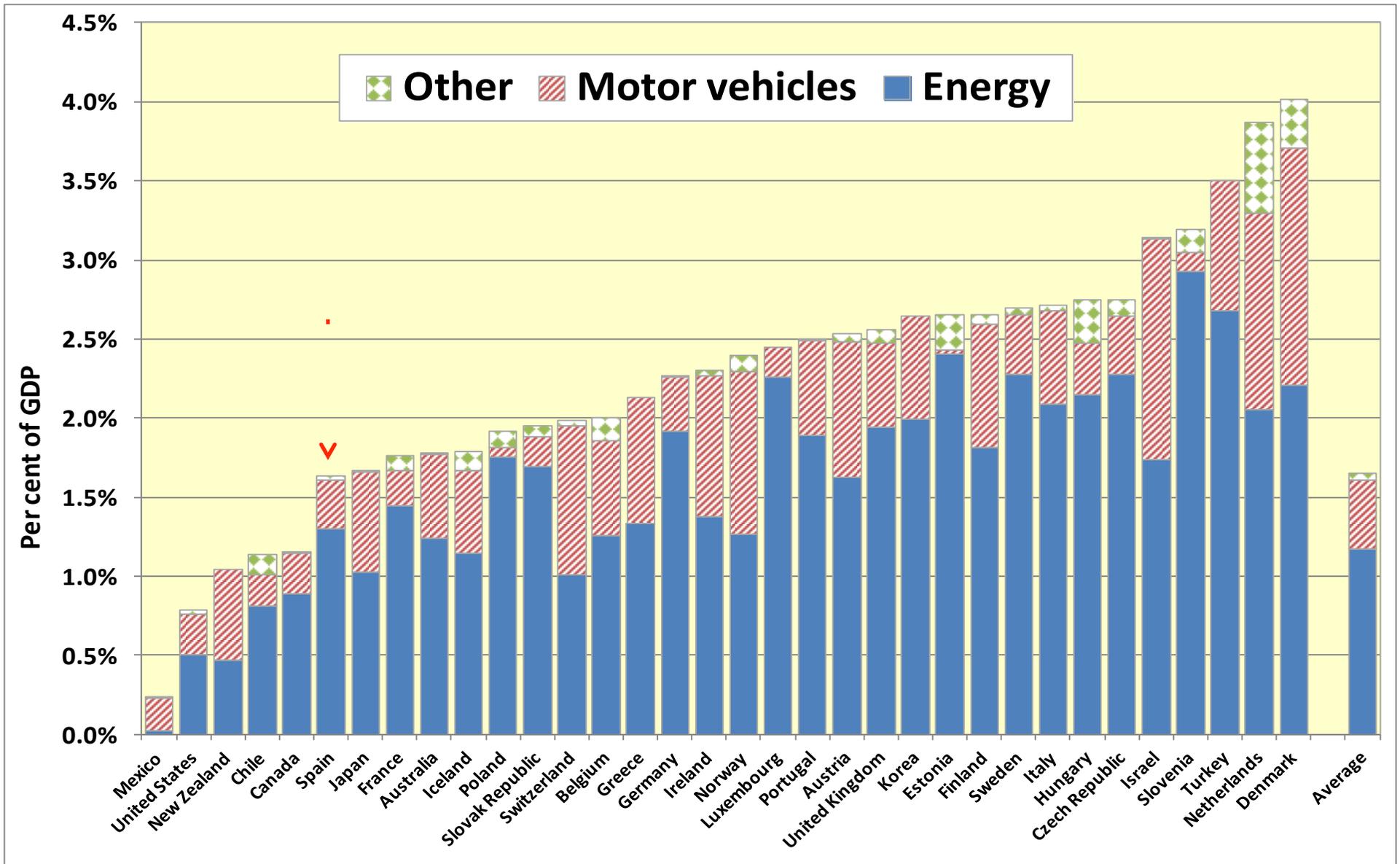
# Why use environmental taxes?

- They provide economic incentives to **change** environmentally harmful **behaviour**.
- They equalise marginal costs of compliance => **least cost** instruments (*Static efficiency*).
- They provide incentives for **continued technological development** (*Dynamic efficiency*).
- They **raise revenues** that can be recycled, be used to reduce distorting taxes (e.g. on labour) or be used to strengthen public finances.

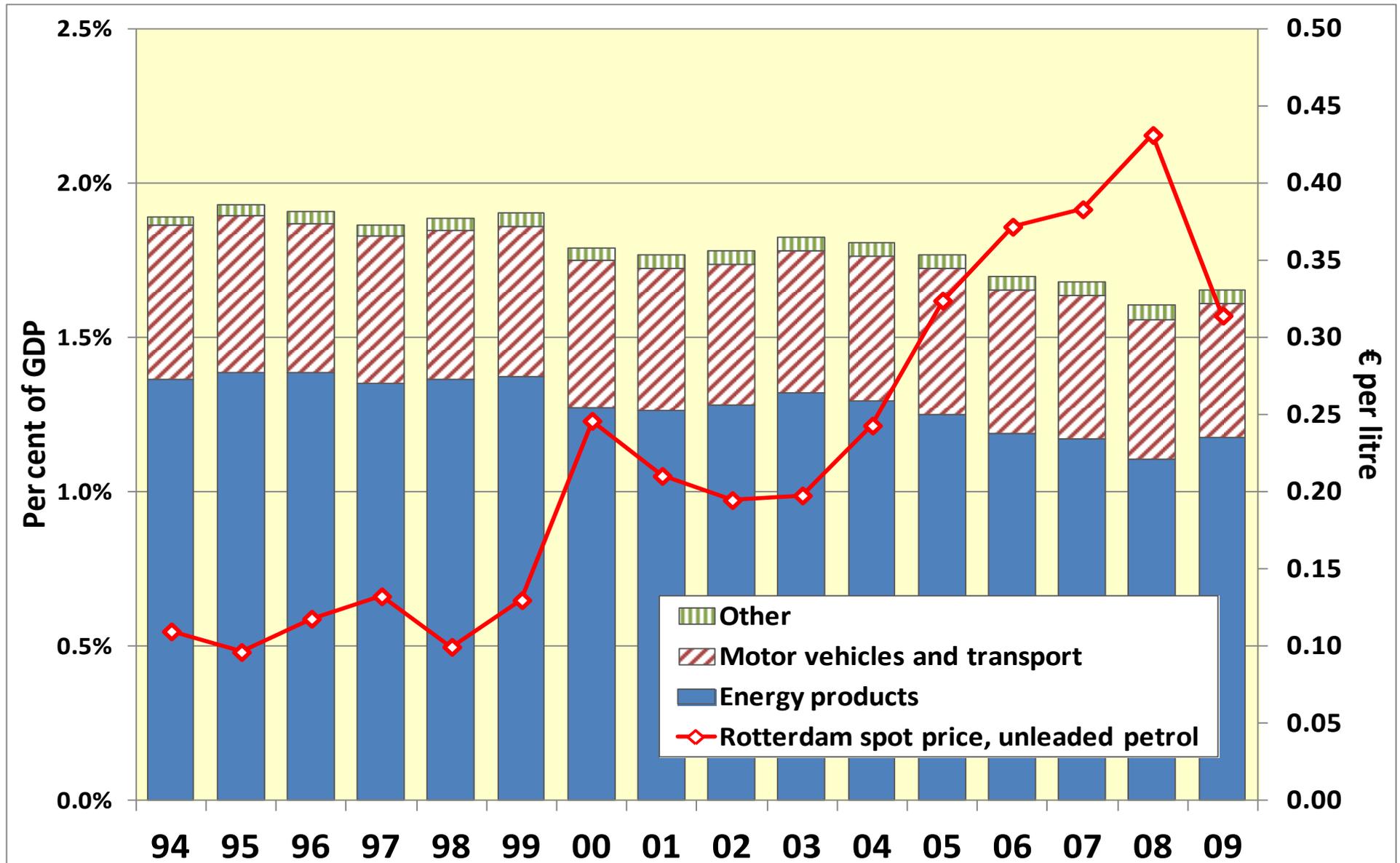
# Environmentally related taxes

- OECD defines environmentally related *taxes* as any compulsory, *unrequited* payment to general government levied on tax-bases deemed to be of particular environmental relevance (*e.g.*, energy use, motor vehicles, measures emissions, hazardous chemicals).
- “Unrequited”: benefits provided by government to taxpayers are not normally in proportion to payments.

# Revenues from environmentally related taxes in per cent of GDP – by tax-base (2009)



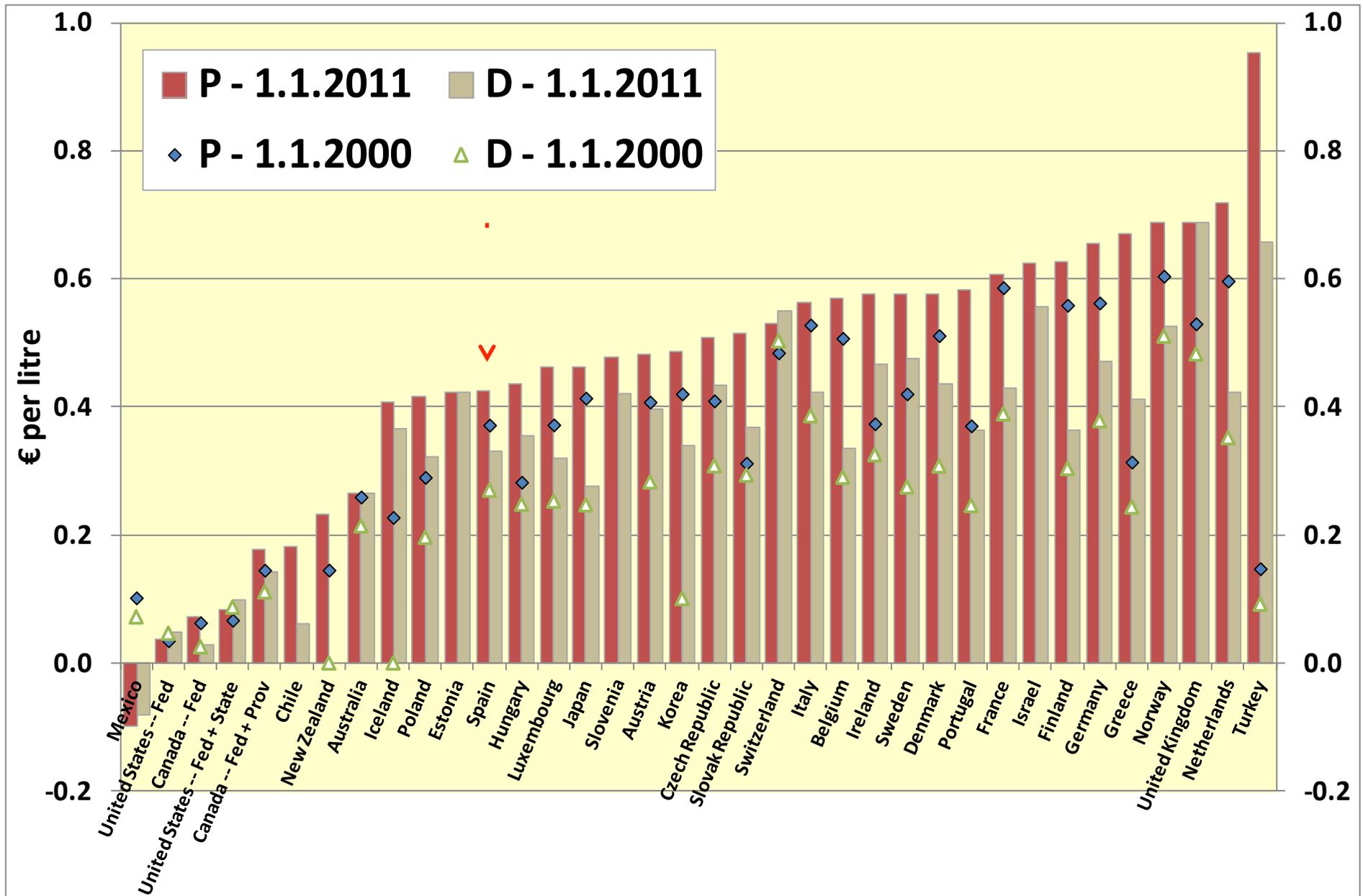
# Revenues from environmentally related taxes in per cent of GDP, by tax-base + petrol price



# Why have revenues decreased in per cent of GDP in recent years?

- This is closely linked to the increase in world crude oil prices since year 2000.
- This price increase has contributed to people substituting away from motor fuel use, towards other goods and services.
- In short: **Prices work!**
- As motor fuels often are (much) more taxed than other goods and services, revenues from environmentally related taxes decreased in per cent of GDP.
- The high motor fuel prices have also made it difficult for countries to increase *nominal* tax rates in line with inflation.
- The *real* tax rate on petrol decreased 8% from 2000 to 2010.
- But, (almost) without any doubt: higher energy taxes will lead to increased revenues (both in absolute and relative terms)!

# Nominal tax rates on petrol and diesel



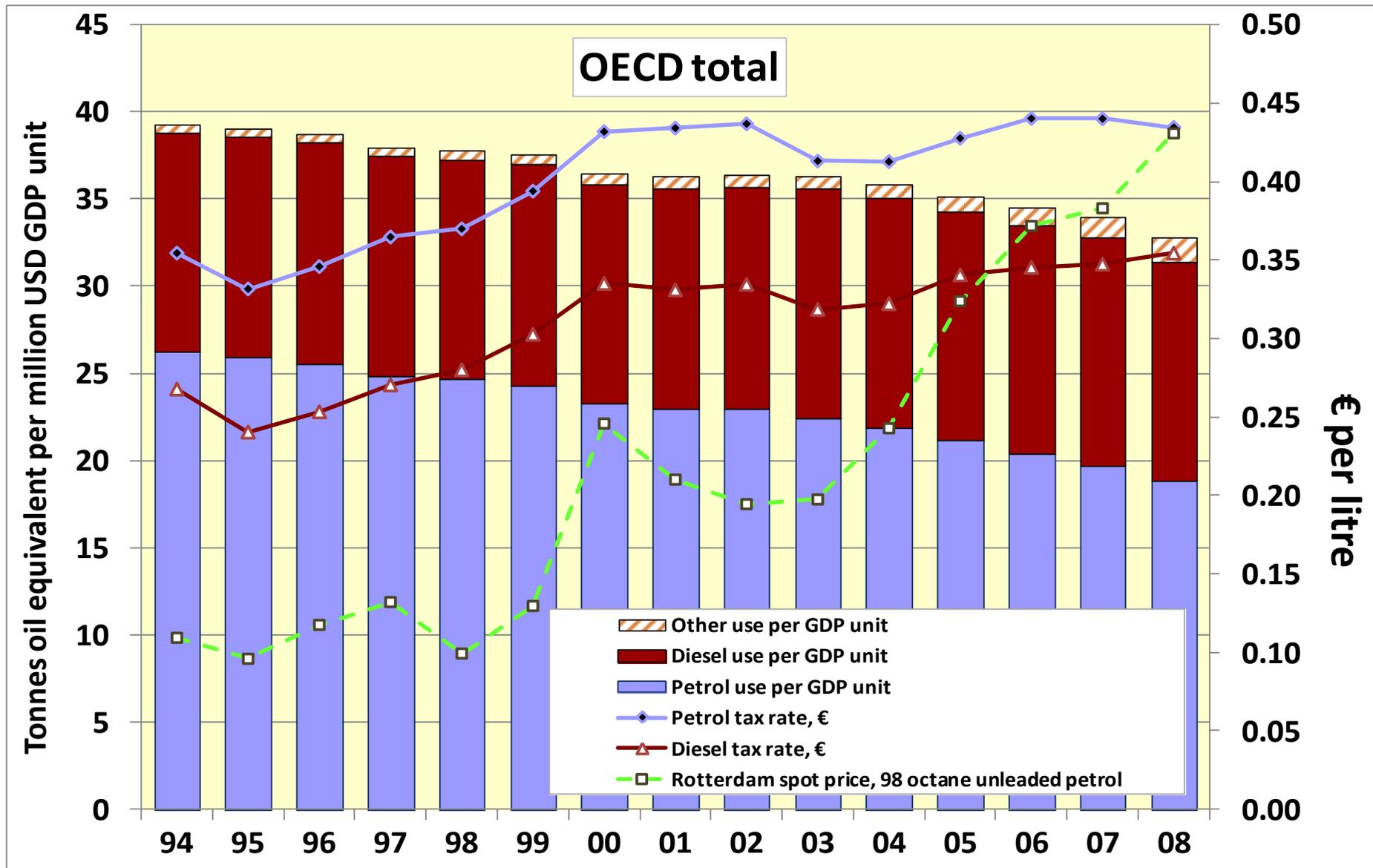
# Petrol taxes vs. diesel taxes I

- Because diesel-motors are **more fuel efficient** than petrol-driven motors, diesel-driven vehicles emit less CO<sub>2</sub> per km driven than what petrol-driven vehicles does.
- However, this is **not** a valid argument for setting tax rates on diesel lower than tax rates on petrol – because the **drivers benefit directly** from this fuel efficiency advantage (the benefits are **fully internalised**).
- One litre diesel causes more CO<sub>2</sub> emissions than one litre petrol.
- And diesel-driven vehicles cause more harmful **emissions of NO<sub>x</sub>, particle matter (PM<sub>10</sub>, PM<sub>2.5</sub>) and noise** than petrol-driven ones.
- Petrol-driven vehicles cause somewhat larger **VOC** emissions.
- None of these impacts are internalised – the drivers do not take these impacts into account in their decisions.
- All in all, **from an environmental perspective**, tax rates per litre diesel ought to be higher than tax rates per litre petrol – not lower.

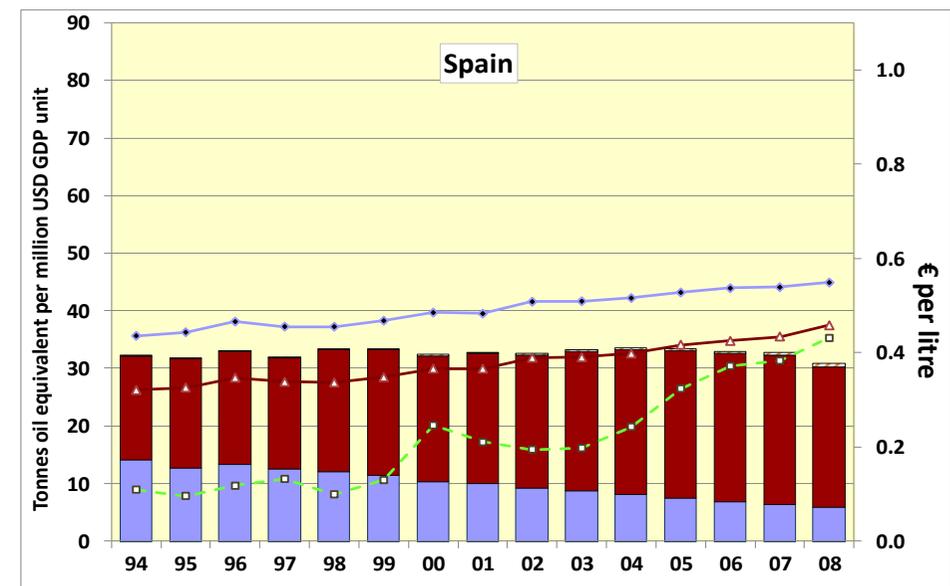
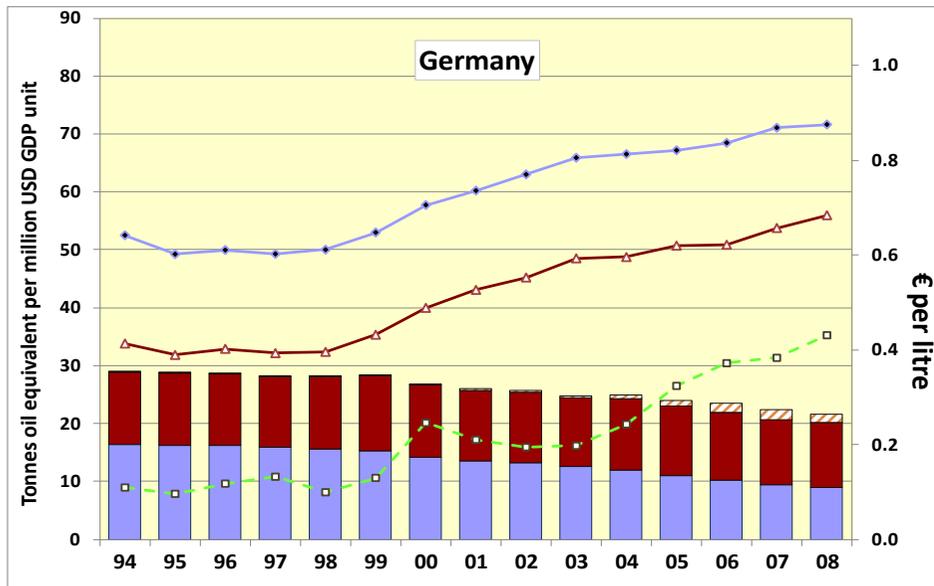
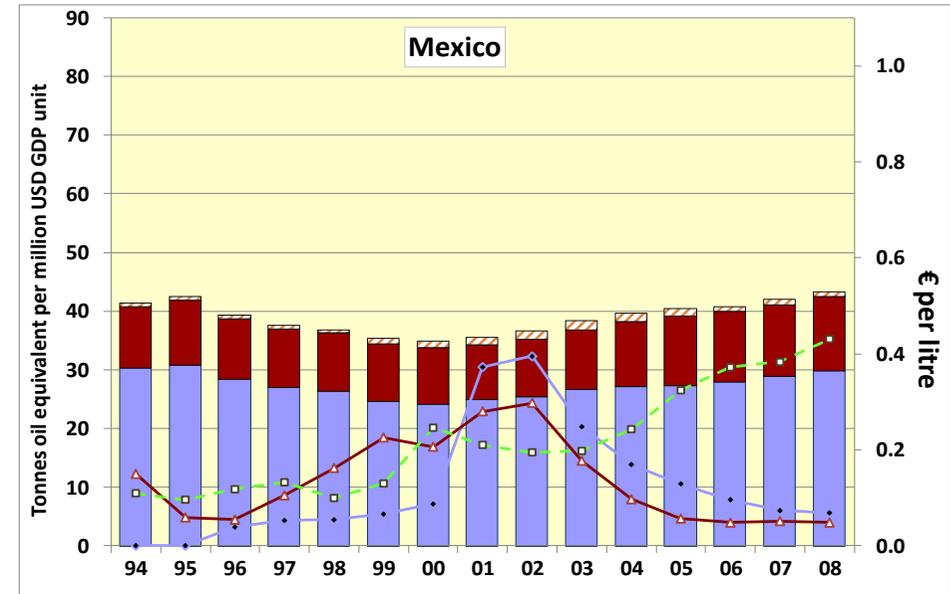
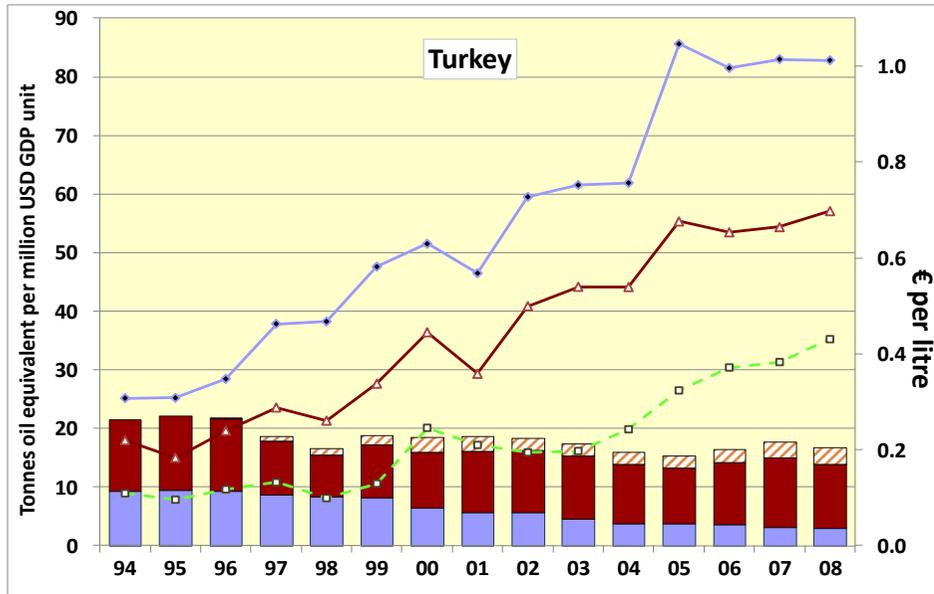
# Petrol taxes vs. diesel taxes II

- Taxing motor vehicle fuels can be a simple way of taxing the rich without (much) taxing the poor:
  - Many poor people in Spain will not own a car at all.
- Any negative, indirect impact on poor people via increased costs for public transport can be offset by using a part of the revenues to subsidise public transport.
- And motor fuel taxes can be relatively simple to collect.
- Such taxes will have very minor impacts on industrial sectoral competitiveness.

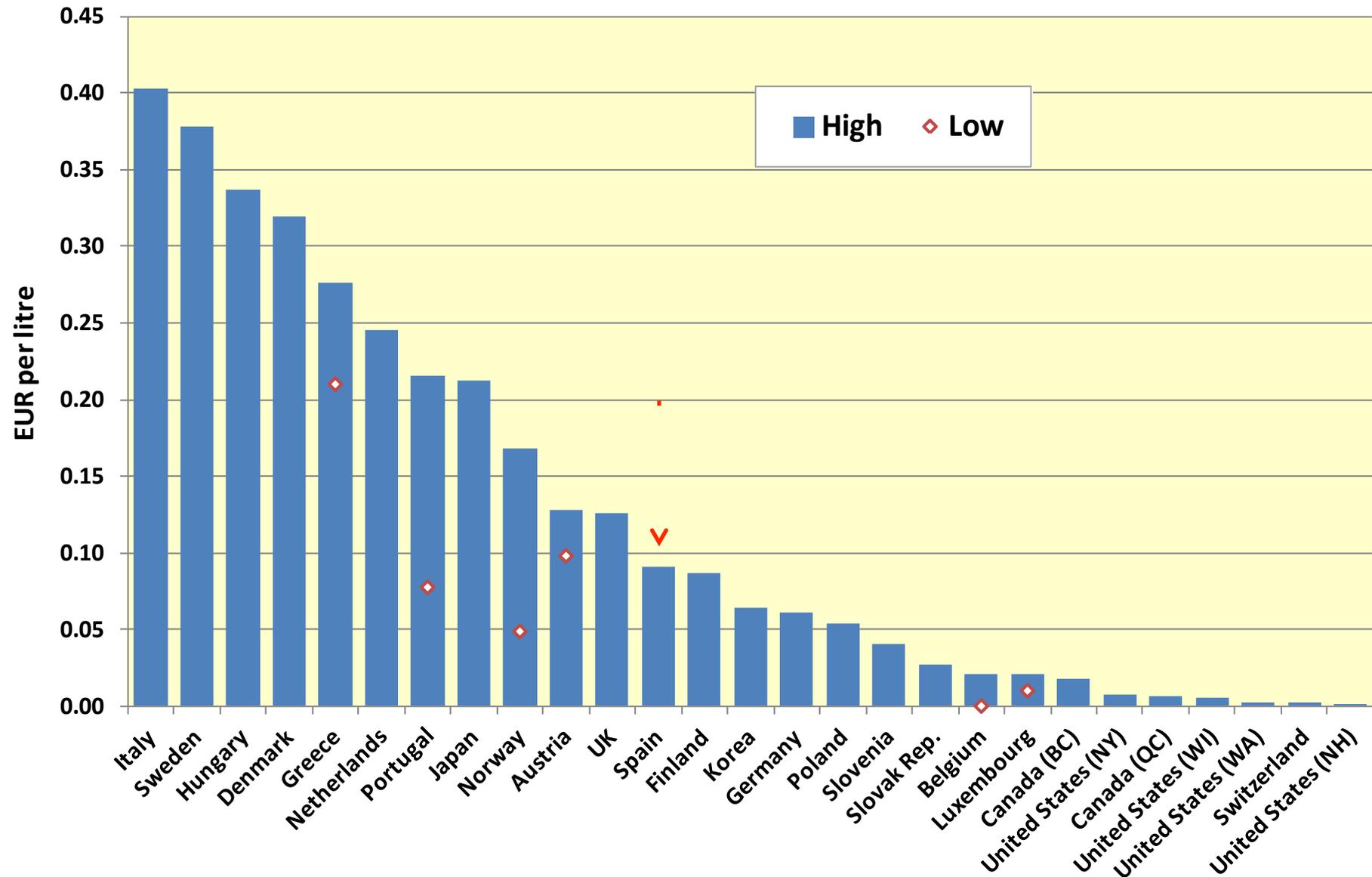
# Impacts of prices and taxes on transport sector energy use per unit GDP



# Impacts of prices and taxes on transport sector energy use per unit GDP



# Tax rates on light fuel oil



# Proposal from the EU Commission: Motor fuels

- **COM(2011)169** proposes new minimum tax rates introduced in stages until 2018
  - Tax based on CO<sub>2</sub> emissions: 20€ per tonne CO<sub>2</sub> as of 2013
  - Tax based on energy content: gradual increase to 9.6€ per GJ by 2018
- This would result in the following overall tax rates:

Energy product	Current EU	Spain	1/1/13	1/1/15	1/1/18
Petrol (€ per 1000 litres)	359	425	359	359	359
Diesel (€ per 1000 litres)	330	331	356	378	408
Kerosene (€ per 1000 litres)	330	316	350	370	384
LPG (€ per 1000 Kg)	125	57	125	311	500
Natural gas (€ per GJ)	2.6	1.2	2.6	6.6	10.7

=> Spain would need to increase its some tax rates significantly.

# Proposal from the EU Commission: Heating fuel

- Proposed new minimum rates – in *one step*:
  - Tax based on CO<sub>2</sub> emissions: 20€ per tonne CO<sub>2</sub> as of 2013.
  - Tax based on energy content: 0.15€ per GJ by 2013.
- This would result in the following overall tax rates:

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Energy product	Current EU	Spain	1/1/2013
Gas oil (€ per 1000 litres)	21	85	60
Kerosene (€ per 1000 litres)	0	79	55.2
Heavy Fuel Oil (€ per 1000 litres)	15	15	67.5
LPG (€ per 1000 Kg)	0	0	65.0
Natural gas (€ per GJ)	0	0	1.27
Coal (€ per GJ)	0.15	0.15	2.0
Electricity (€ per MWh)	0.5	0.5 - 1.0	0.5

=> *Some* Spanish tax rates would have to increase *quite a lot*.

# Exemptions, refunds, etc. |

- While “economic textbooks” would suggest that all sources contributing equally to a given externality ought to be facing a similar tax rate, in reality there are a large number of exemptions, refund mechanisms, special (lower) tax rates, ceilings on tax payments, etc., in energy-related taxes in OECD countries at present.
- One can distinguish three main motivations for this:
  - Some sources **contributes less** to a given problem than others (e.g. firms that install equipment abating SO<sub>2</sub> emissions);
  - Concern about the **competitiveness** of certain industrial sectors (e.g. due to a fear of “**carbon leakage**”)
  - Concern about **low-income households** being negatively affected by a reform.

# Competitiveness concerns

- By seeking to protect the environment, environmentally related taxes are by definition **intended to affect production decisions** and have a disproportionate impact on large polluters.
- The most effective method to minimise potential “**carbon leakage**” is to **co-ordinate environmental policies** across countries.
- Another possibility is to provide some **lead-in time** for affected firms to undertake mitigation measures – **cf. Swedish example later**.
- Where revenues from environmentally related taxes are recycled to the affected firms, the **marginal abatement incentive** is generally **maintained**.
- However, the **polluter pays principle** is violated via such a mechanism – the price to consumers of pollution-intensive products is not increased.
- Rate reductions and exemptions **shift some of the abatement burden to others** – or result in an **inferior environmental outcome**.

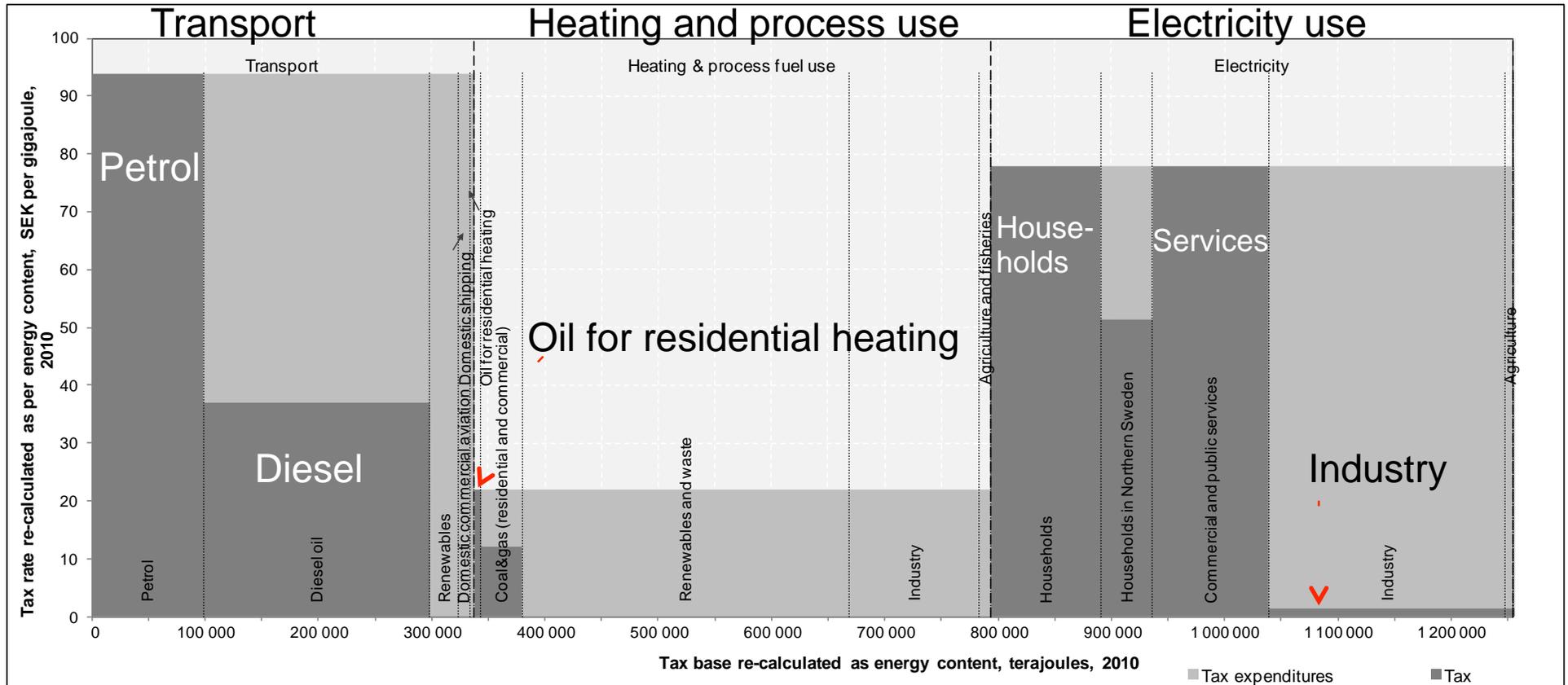
# Income distribution concerns

- Increased taxes on energy used for **heating** and **cooking** can have significant impacts on low-income households.
- Governments should not ignore such impacts.
- Attempting to make taxes both address the environmental issue and address any potential adverse distributional concerns risks, however, *undermining the ability of the tax to do either*.
- Policy makers should be concerned not necessarily with the distributional impacts of specific policies and taxes, but with the *redistributive aspects of overall governmental policy*.
- Distributive impacts could be better addressed through broader means, such as lowering personal income taxes, supplementing low-income supports or providing *cash payments* to the most affected low-income citizens.

# Tax expenditures related to fossil fuels

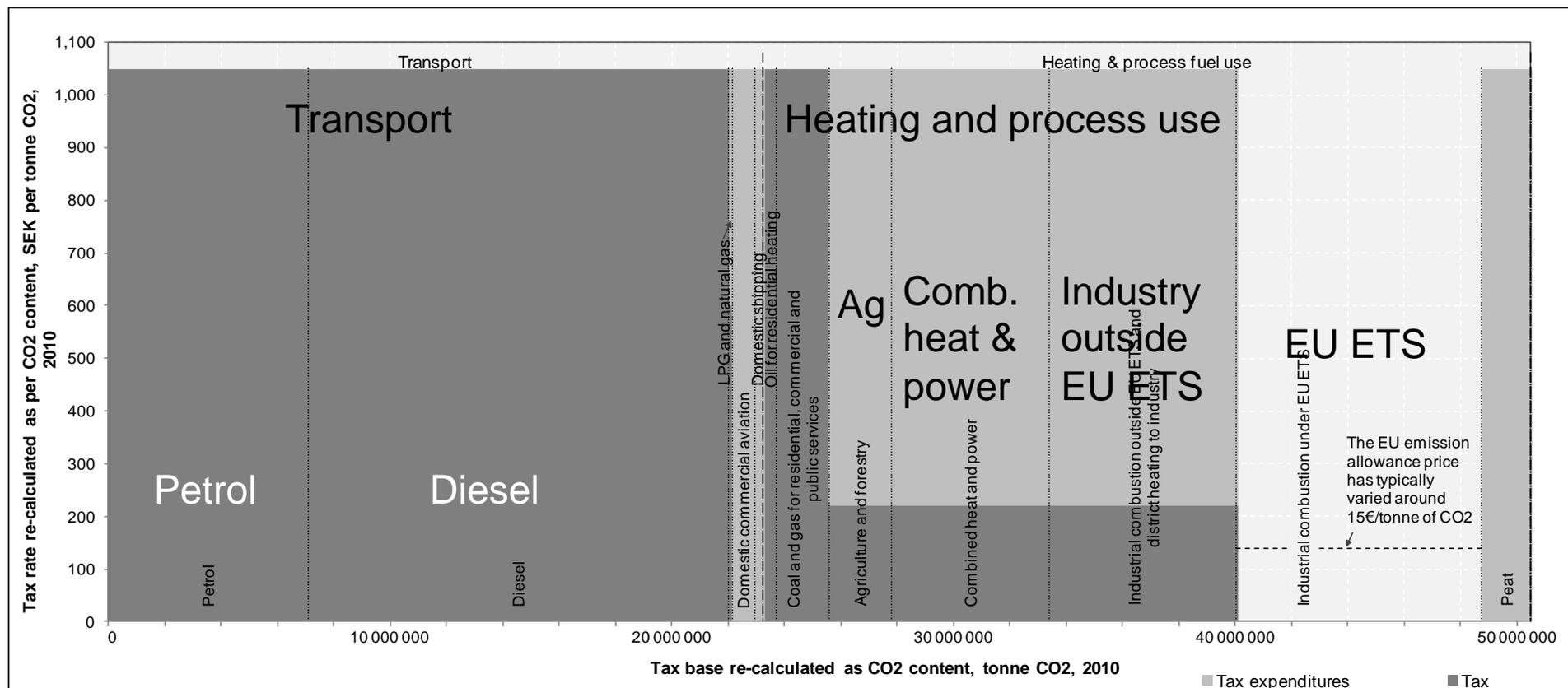
- G20 has mandated *i.a.* OECD to do work on ‘inefficient’ support to fossil fuels that contribute to wasteful consumption.
- New study attempts to quantify relevant “tax expenditures” – *i.e.* tax **revenues forgone** due to exemptions and reduced rates.
- This work is **difficult** – *i.a.* because it is not obvious which is the right “benchmark” in each case.
- A country that **partly** exempts a sector from a generally **high** tax rate could be found to have **larger tax expenditures** than a country that **fully** exempts the same sector from a **lower** rate.
- **Example: Sweden**, based on official expenditure estimates.
  - Fuel taxation by energy content (1<sup>st</sup> slide)
  - Fuel taxation by CO<sub>2</sub> emissions (2<sup>nd</sup> slide)

# Sweden – Energy tax expenditures



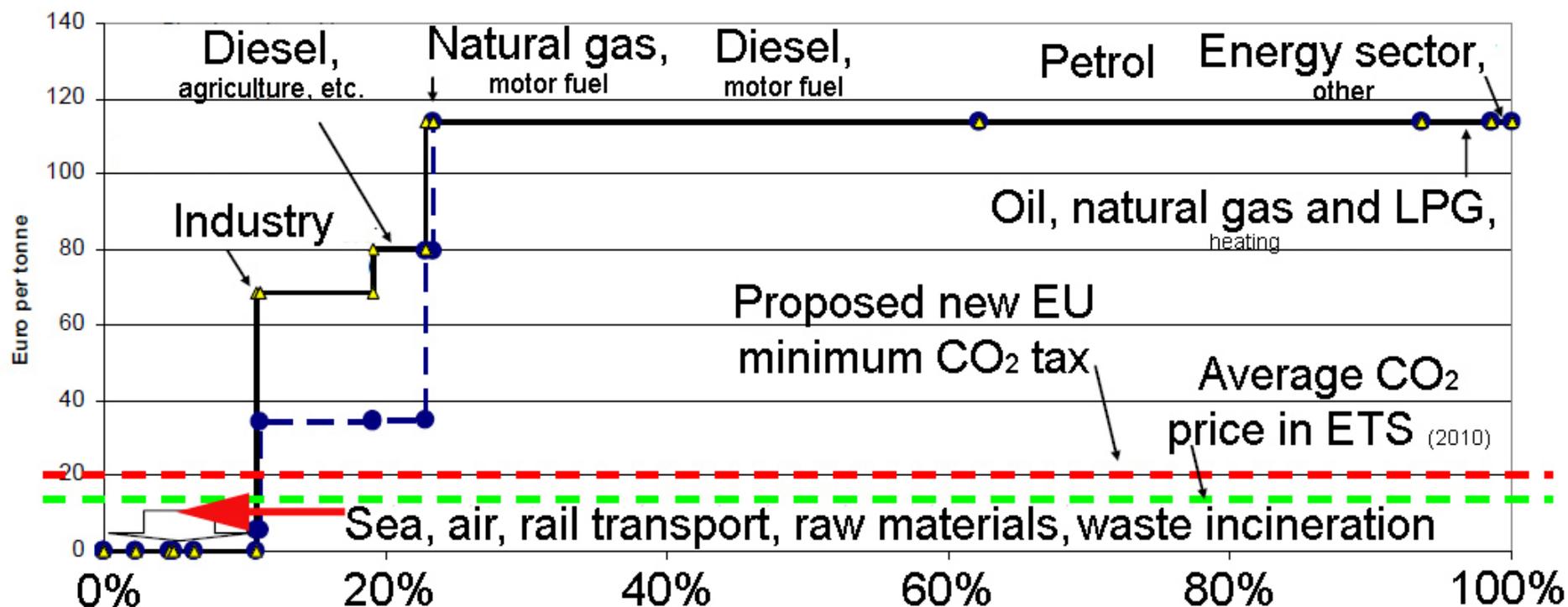
- Illustrates *differing* benchmarks and exemptions.
- Demonstrates scale of reduced rates and exemptions (e.g. lower rate for diesel, exemption for aviation).

# Sweden – CO<sub>2</sub> tax expenditures



- Exemptions and reduced rates for transport use are more limited
- Generally, heating and process use is taxed at a lower rate
- Interaction with ETS:
  - No CO<sub>2</sub> tax is levied on industrial consumption subject to EU ETS
  - EU emission allowance price is depicted.

# Swedish CO<sub>2</sub> tax rates, 2011 and 2015



- Tax rates for industry will be raised significantly from 2011 to 2015.
- By providing ‘early warning’, they have allowed time for necessary investments, etc. – and *opposition to the reform has been modest.*

# Impacts of applying instruments next to the ETS

- Swedish CO<sub>2</sub> taxes exempt sectors covered by the EU ETS.
- However, they and other countries apply many other policy instruments that overlap the EU ETS.
- A recent OECD study has looked at impacts of such overlaps:
- In the short term – while the ‘cap’ of the EU ETS is fixed
  - Impacts on CO<sub>2</sub> emissions
  - Impacts on energy security
  - Impacts on emissions of other air pollutants
  - Impacts on economic efficiency
- In the long term – on the setting of future ‘caps’.

# Impacts on CO<sub>2</sub> emissions

- While the 'cap' of the EU ETS is fixed, additional instruments will not have any impact on EU-wide CO<sub>2</sub> emissions.
- Reductions in emissions one place will cause higher emissions somewhere else in the sectors covered by the scheme.
- As the EU ETS covers CO<sub>2</sub> emissions stemming from electricity generation, this affects a long range of additional instruments:
  - instruments that address electricity use  
(e.g., taxes on electricity use and measures to increase the energy-efficiency of electrical appliances)
  - Instruments that address CO<sub>2</sub> emissions caused by electricity generation  
(e.g., subsidies for renewable energy sources, feed-in tariffs for renewables, and standards for the renewables content in electricity generation).
- It also affects any other policy instrument that aims to reduce CO<sub>2</sub> emissions in the industrial sectors covered by the scheme.

# Impacts on energy security

- As long as the EU ETS ‘cap’ remains unchanged, additional instruments will *not have much impacts on EU-wide energy security* – due to interactions with the CO<sub>2</sub> cap.
- Replacing a coal- or gas-fired power plant with a wind turbine will necessarily *increase CO<sub>2</sub> emissions* from some other source(s) covered by the trading scheme.
- These CO<sub>2</sub> emission-increases can only stem from *increased use of fossil fuels* among these ‘other’ sources.
- This could either be due to an increase in ‘*activity levels*’, or an increase in the *average CO<sub>2</sub> intensity* of a given activity level – or a combination of the two.
- Hence, ‘overall fossil fuel use’ (measured by CO<sub>2</sub> emissions) in the EU ETS region as a whole would not be affected.
- But the ‘average security’ of different fossil fuels could vary.

## Impacts on emissions of other air pollutants

- With a given ‘cap’ of the EU ETS, it *should not be assumed* that additional instruments would cause *significant ‘co-benefits’* related to reduced emissions of other air pollutants.
- The additional instruments would cause increased use of fossil fuels ‘elsewhere’ among the sources covered by the trading system.
- The net impact on e.g. SO<sub>2</sub>, NO<sub>x</sub> and particulates emissions will, hence, depend on the *relative emission intensities* of the sources that reduce and the sources that increase their CO<sub>2</sub> emissions.

# Impacts on economic efficiency

- In spite of the arguments presented so far, there *are* economic efficiency arguments for applying additional instruments on top of the EU ETS – *if* they *cost-effectively* address relevant market failures, such as
  - information barriers,
  - market power in relevant markets,
  - split incentives between landlords and tenants, etc.
- *Energy-labelling* can reduce information barriers, stricter *building codes* can address split incentives between landlords and tenants, active *competition policy* and various regulations can limit market power, etc.
- There *are* also valid arguments for providing *support for R&D* – as inventors will not capture all the benefits of their inventions.
- This could be of particular relevance in relation to climate change, due to the very large welfare consequences of any major breakthrough technologies – fear of *ex post* ‘capture’.

## Impacts on future ‘caps’

- No-one knows exactly what will determine the setting of ‘caps’ in the future, but it will be done through a *‘political process’*, where current and expected future *allowance prices* likely will play some role – possibly a major role.
- To the extent that (expected) allowance prices will matter, additional instruments that *in fact reduce these prices* could contribute to a stricter-than-otherwise future ‘cap’ being set.
- It is, however, important to keep in mind that *not all* potential additional instruments would tend to reduce expected carbon prices – only *truly ‘cost-effective’* instruments would do so.
- And it is important to distinguish between cost-effective *measures* (e.g., turning off the light in empty rooms) and cost-effective *policy instruments* (e.g., a publicity campaign meant to encourage people to turn off the light in empty rooms).

# Conclusions regarding overlapping instruments

- The EU ETS is an *environmentally effective* and *economically efficient* instrument to address emissions of CO<sub>2</sub> (which should be extended to cover other greenhouse gases).
- With a ‘cap’ in place, *further emission reductions* are, however, *unlikely* to be obtained by applying additional policy instruments to the same emissions from the *same sources*.
- If an additional instrument *in practice* contributes to *reducing the costs of complying* with the cap, it *could*, contribute to a stricter future ‘cap’ being set – to the extent that such considerations are taken into account when future ‘caps’ are set.
- Policy makers in EU countries should consider carefully *the actual contributions* of the other policy instruments they apply to address emissions from sources already covered by the EU ETS ‘cap’.
- Some of them might *increase the total cost* of reaching a given outcome, without making future reductions in the ‘cap’ more likely.

# Further information

- [www.oecd.org/env/policies/database](http://www.oecd.org/env/policies/database)
- [www.oecd.org/env/taxes](http://www.oecd.org/env/taxes)
- [www.oecd.org/env/policies](http://www.oecd.org/env/policies)

- **Spanish case study of tax incentives:**

[www.oecd.org/officialdocuments/displaydocumentpdf?cote=com/env/epoc/ctpa/cfa\(2008\)38/final](http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=com/env/epoc/ctpa/cfa(2008)38/final)

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