

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

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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. CO₂, SO₂, NO_x, 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.

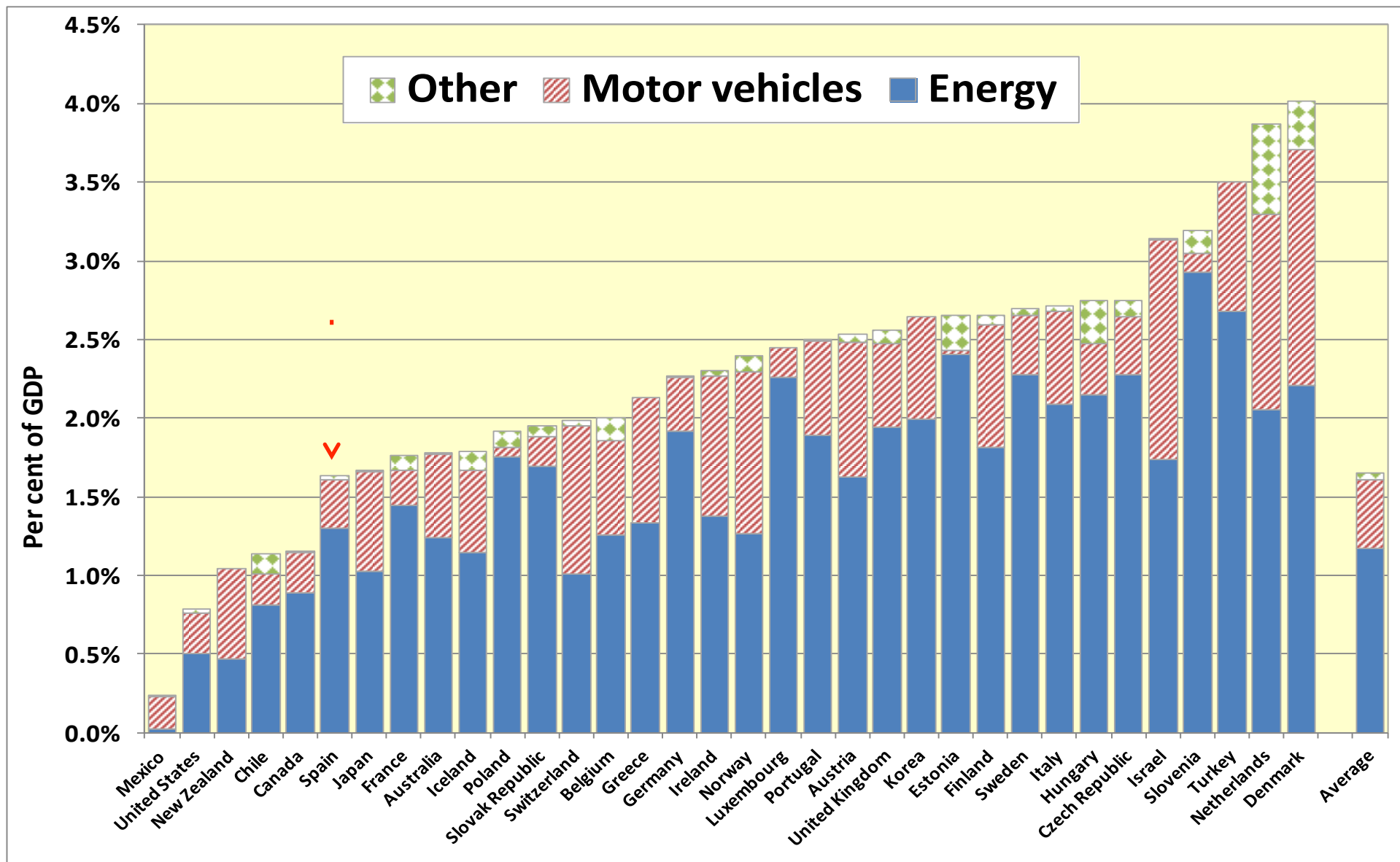
Why use environmental taxes?

- 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.

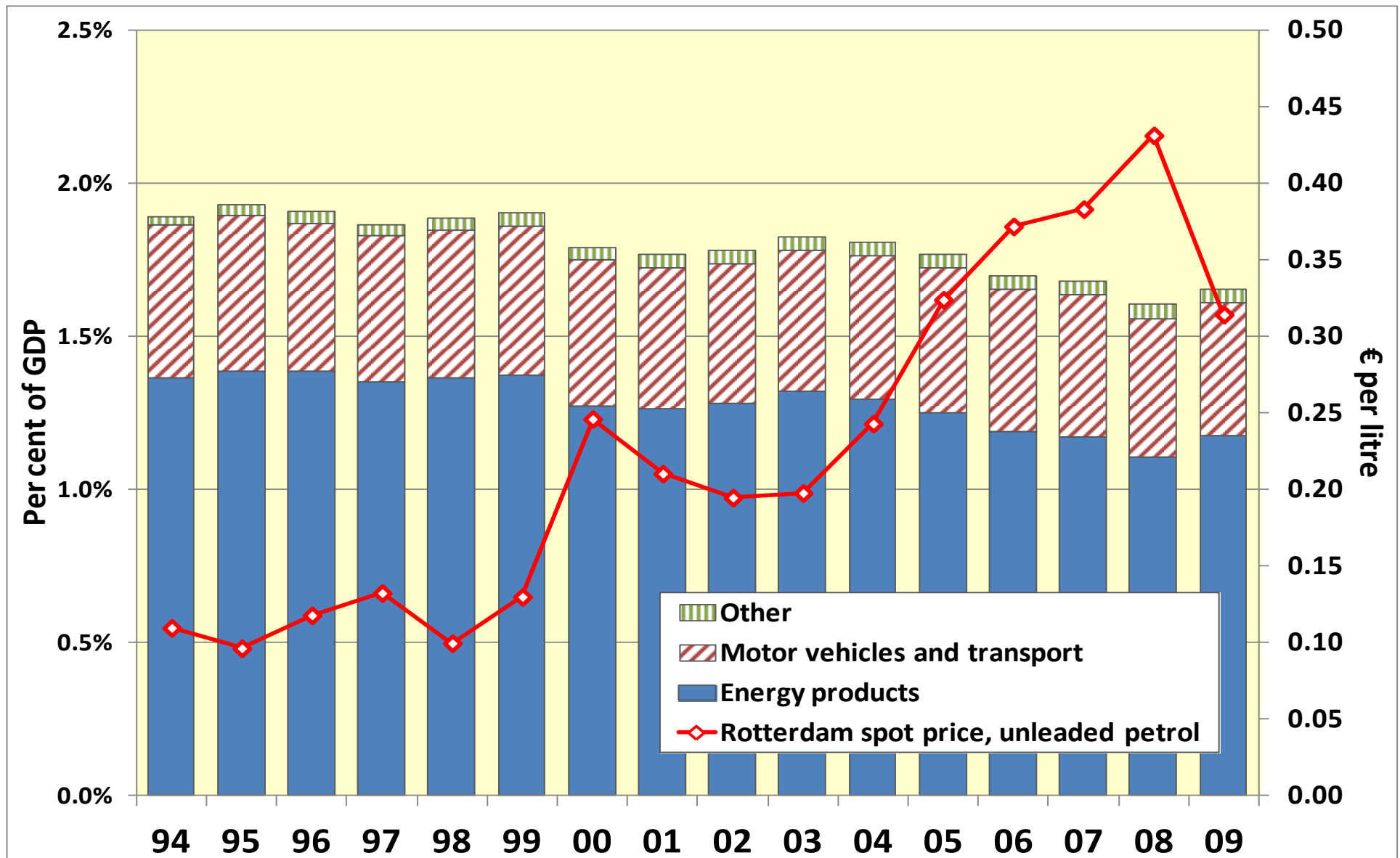
Environmentally related taxes

- 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)



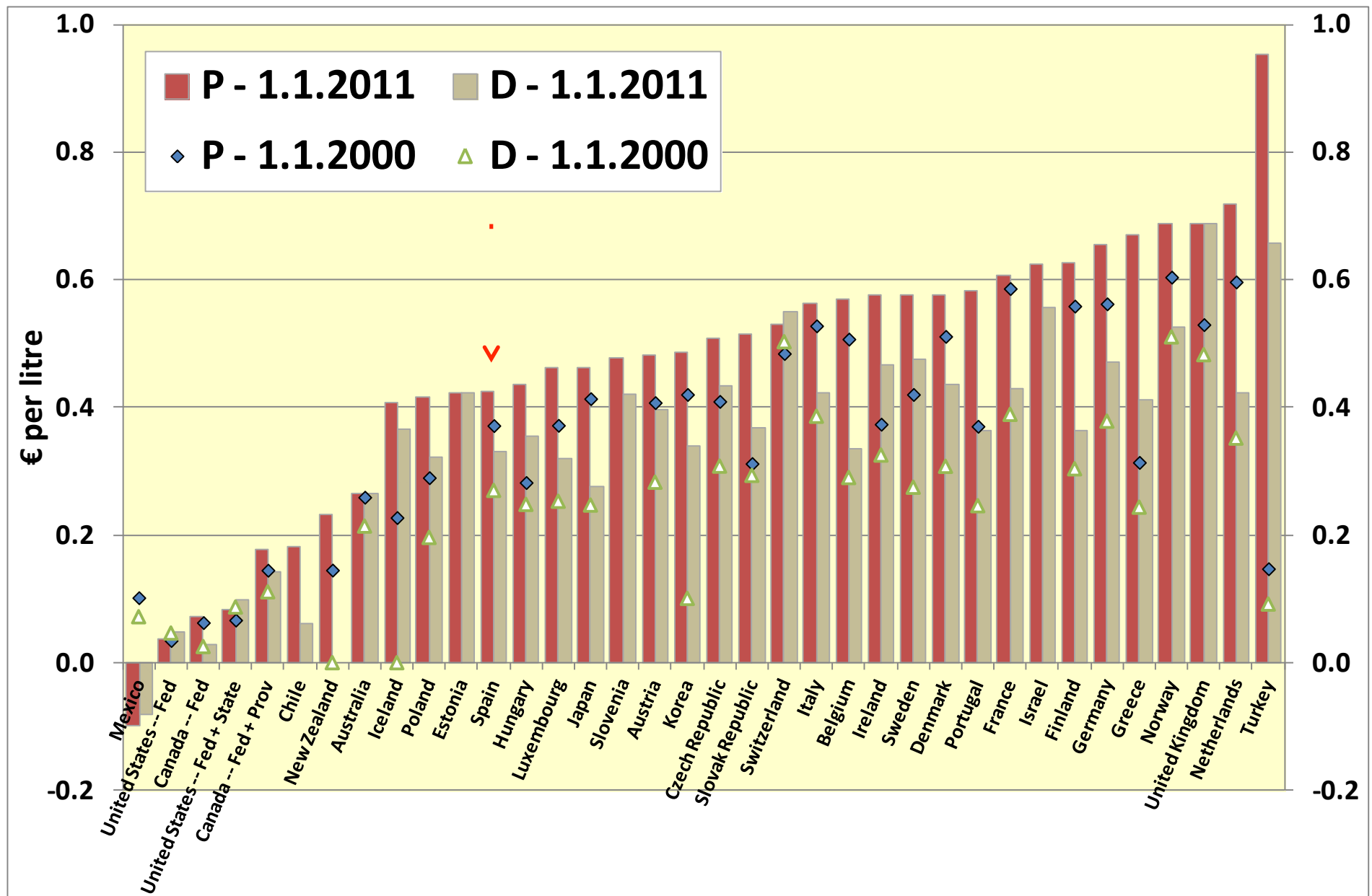
Revenues from environmentally related taxes in per cent of GDP, by tax-base + petrol price



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



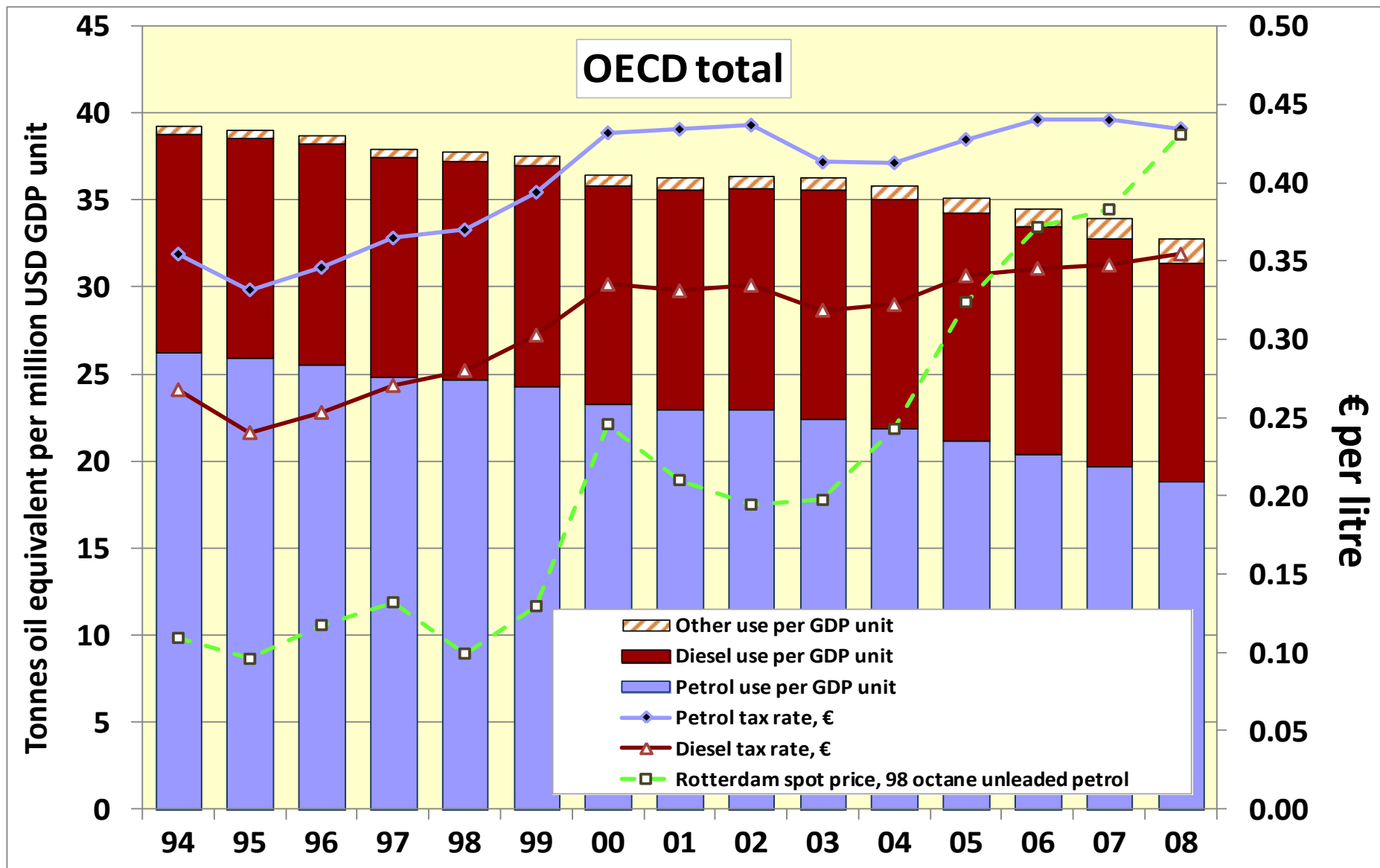
Petrol taxes vs. diesel taxes I

- Because diesel-motors are **more fuel efficient** than petrol-driven motors, diesel-driven vehicles emit less CO₂ 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 CO₂ emissions than one litre petrol.
- And diesel-driven vehicles cause more harmful **emissions of NO_x, particle matter (PM₁₀, PM_{2.5}) 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.

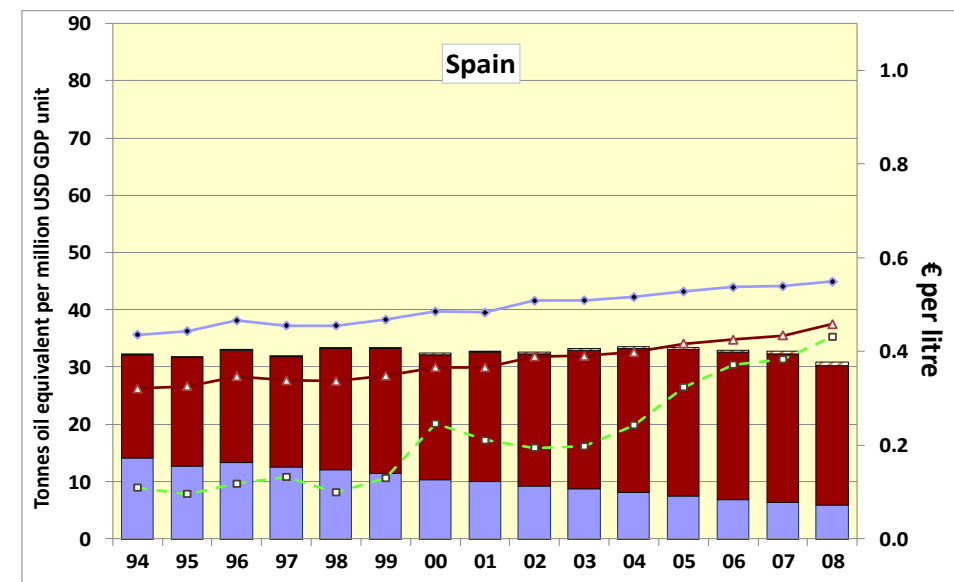
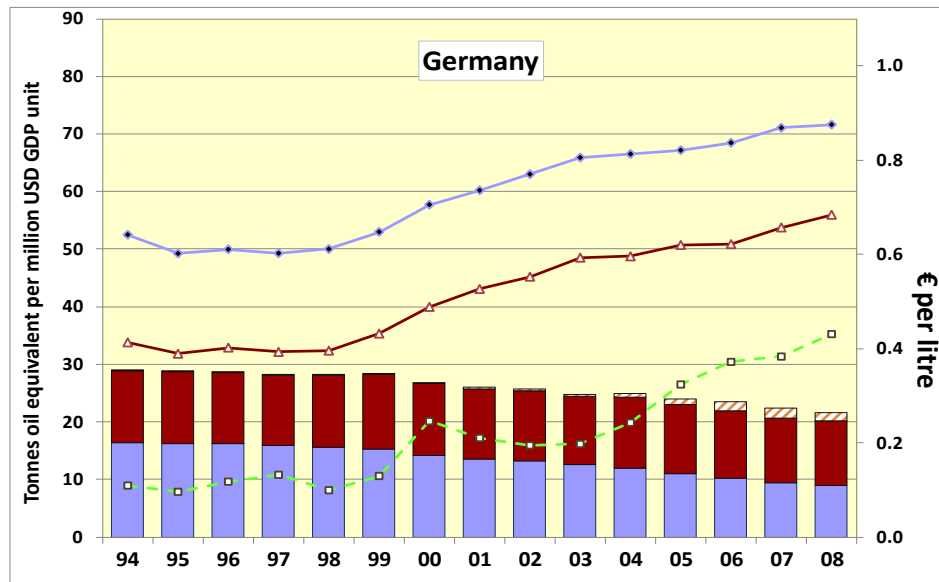
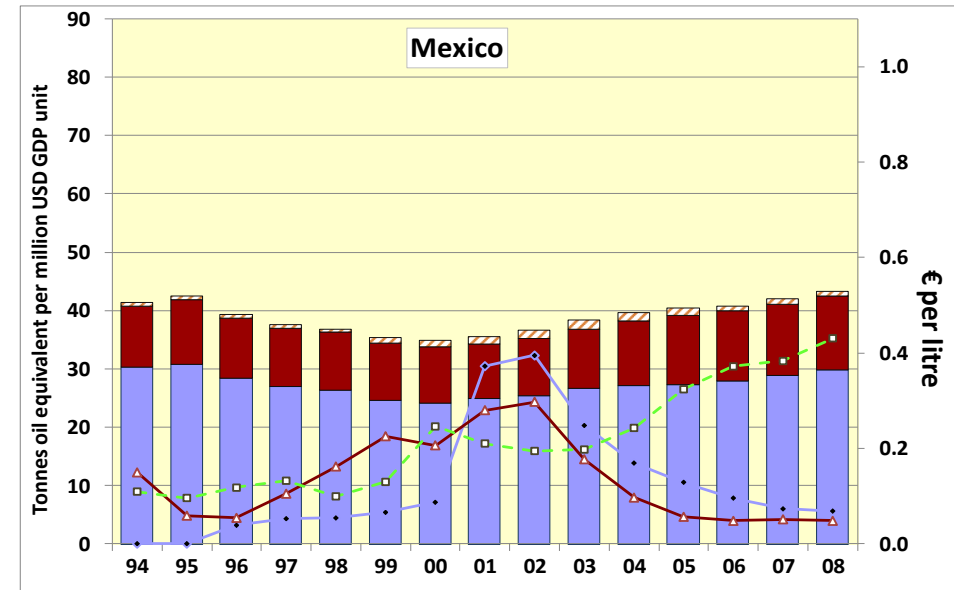
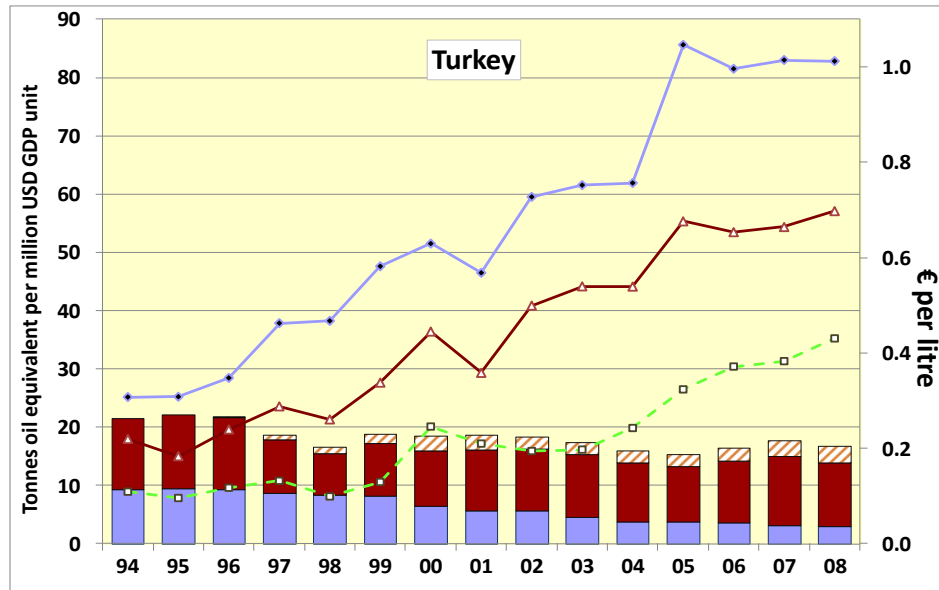
Petrol taxes vs. diesel taxes II

- 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.

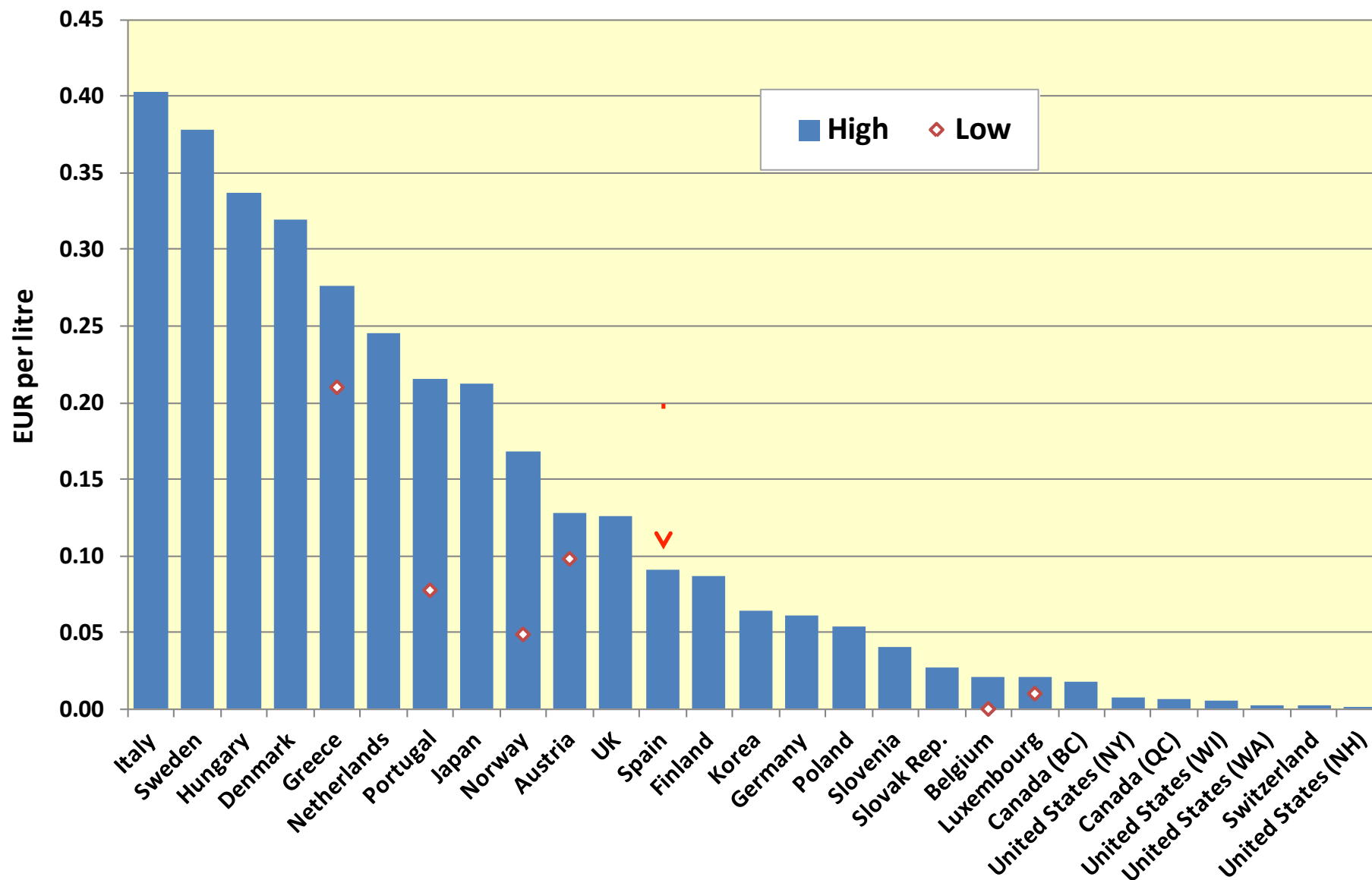
Impacts of prices and taxes on transport sector energy use per unit GDP



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 CO₂ emissions: 20€ per tonne CO₂ 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 CO₂ emissions: 20€ per tonne CO₂ as of 2013.
 - Tax based on energy content: 0.15€ per GJ by 2013.
- This would result in the following overall tax rates:

∴

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 SO₂ 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**.

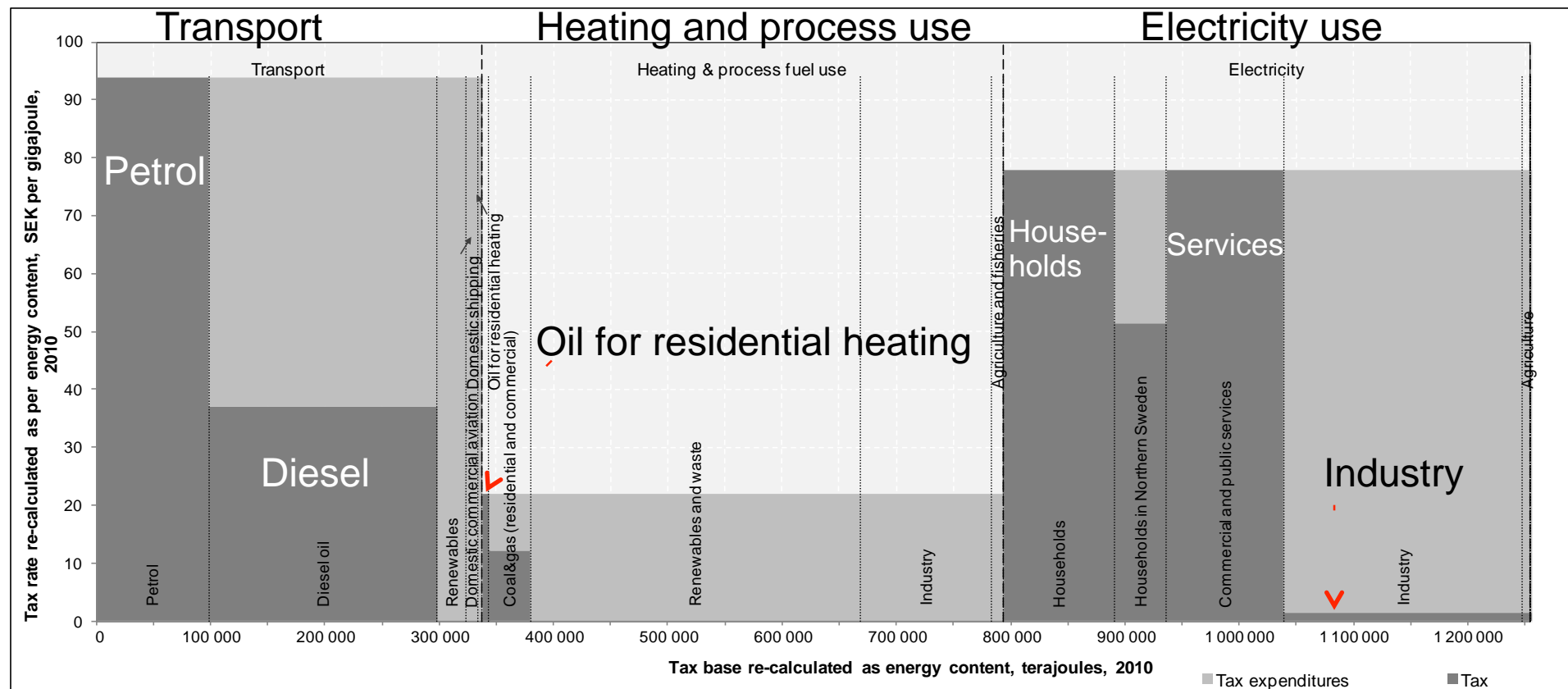
Income distribution concerns

- 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

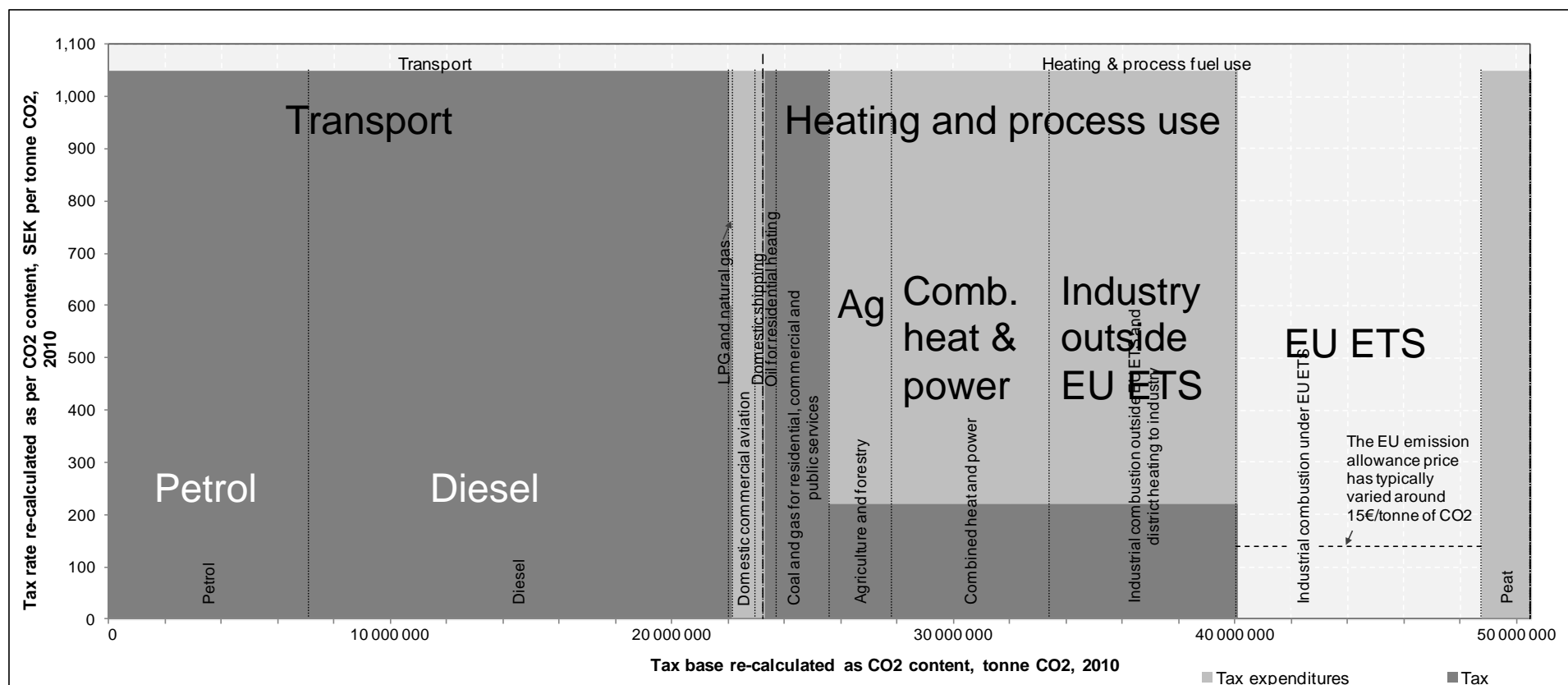
- G20 has mandated *i.a.* OECD to do work on ‘inefficient’ support to fossil fuels that contribute to wasteful consumption.
- New study attempts to quantify relevant “tax expenditures” – *i.e.* tax **revenues forgone** due to exemptions and reduced rates.
- This work is **difficult** – *i.a.* because 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 (1st slide)
 - Fuel taxation by CO₂ emissions (2nd slide)

Sweden – Energy tax expenditures



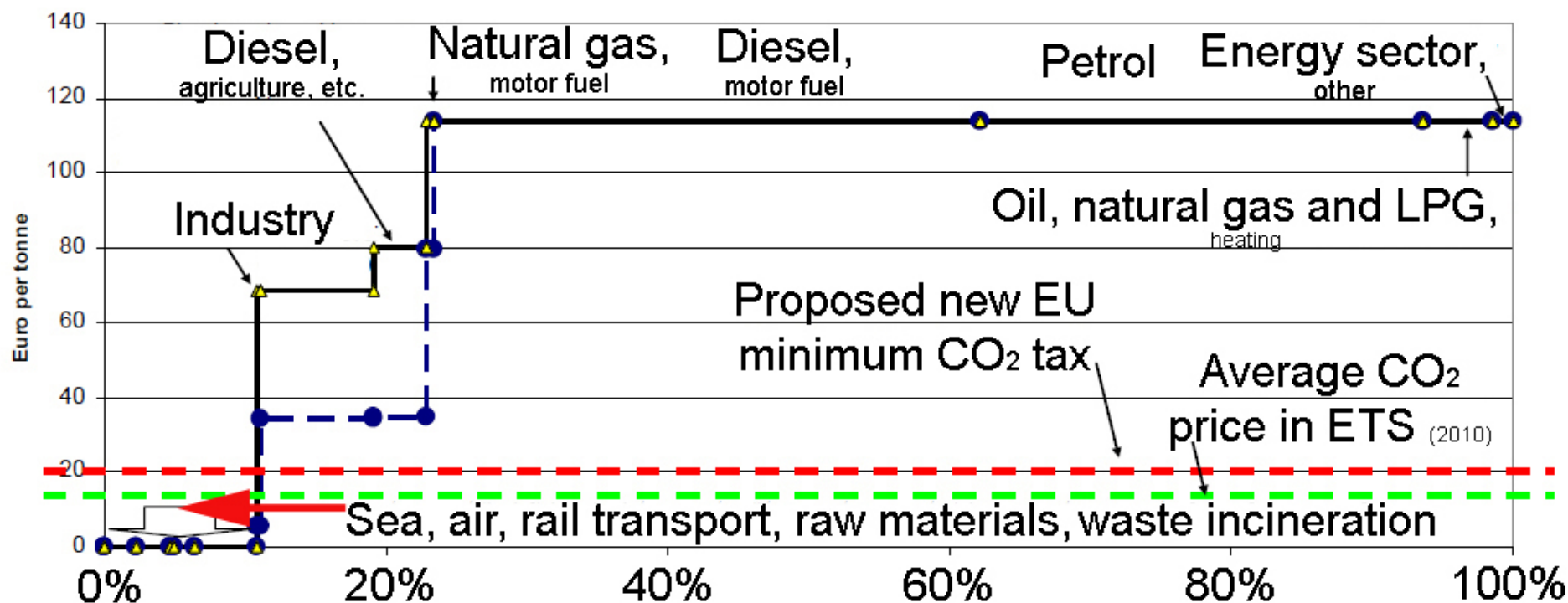
- Illustrates *differing* benchmarks and exemptions.
- Demonstrates scale of reduced rates and exemptions (e.g. lower rate for diesel, exemption for aviation).

Sweden – CO₂ 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 CO₂ tax is levied on industrial consumption subject to EU ETS
 - EU emission allowance price is depicted.

Swedish CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emissions

- While the 'cap' of the EU ETS is fixed, additional instruments will not have any impact on EU-wide CO₂ emissions.
- Reductions in emissions one place will cause higher emissions somewhere else in the sectors covered by the scheme.
- As the EU ETS covers CO₂ 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 CO₂ 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 CO₂ 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 CO₂ cap.
- Replacing a coal- or gas-fired power plant with a wind turbine will necessarily *increase CO₂ emissions* from some other source(s) covered by the trading scheme.
- These CO₂ 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 CO₂ intensity* of a given activity level – or a combination of the two.
- Hence, ‘overall fossil fuel use’ (measured by CO₂ 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. SO₂, NO_x and particulates emissions will, hence, depend on the *relative emission intensities* of the sources that reduce and the sources that increase their CO₂ 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 CO₂ (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
- www.oecd.org/env/taxes
- 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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