

# Some insights from international experiences with carbon and energy taxes

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# Introduction to IEEP study

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## Aim of study:

- Inform preparations to review carbon and energy taxes in Switzerland
  - Overview of experiences with carbon and energy taxes in selected OECD countries
  - Insights and lessons learnt on key issues including design of taxes, environmental effectiveness, economic and social impacts
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- Carried out by IEEP between **January – May 2013**
  - Based on **review of literature and consultation with experts**

# Countries examined in the study

## Existing carbon or energy taxes

- **Australia** - 'Carbon Pricing Mechanism' (CPM) introduced in 2012
- **British Columbia in Canada** – CO<sub>2</sub> tax introduced in 2008
- **Denmark** – CO<sub>2</sub> tax introduced in 1992
- **Finland** – CO<sub>2</sub> tax introduced in 1990
- **Germany** – ETR in 1999 by increasing existing energy taxes & new electricity tax
- **Ireland** – CO<sub>2</sub> tax introduced in 2009
- **Netherlands** – ETR introduced with adoption of regulatory energy tax in 1996
- **Norway** - CO<sub>2</sub> tax introduced in 1991
- **Sweden** – CO<sub>2</sub> tax introduced in 1991
- **United Kingdom** – Climate Change Levy introduced in 2001

## Plans to introduce carbon taxes

- **Czech Republic** – proposal for a carbon tax put forward in April 2012
- **France** – Failed proposal for carbon tax in 2009
- **Italy** – Proposal for a carbon tax part of General Tax Reform approved in April 2012
- **Japan** - New "Tax for Climate Change Mitigation" introduced in October 2012
- **United Kingdom** - Carbon Price Floor from April 2013
- **United States** – Draft Bill to tax CO<sub>2</sub> emissions proposed in February 2013

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# Insights on designing carbon and energy taxes from international experiences

# Objectives and rational

- Combination of **environmental, economic, financial and social** considerations:
  - Part of wider tax shifting programmes to **stimulate employment** (e.g. FI, DK, SE, DE)
  - **Climate and/or energy concerns** (e.g. AU, BC, NO, NL, UK)
  - **Raise revenues** (e.g. IE)
- Objectives can also **change over time** (e.g. SE, DK, FI)

One primary objective drives process while multiple objectives influence final design and implementation

# Tax base

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- Some focus on **narrow set of energy carriers and users** (e.g. [AU](#)), while others adopt a much **wider approach** (e.g. [BC](#))
- In some cases, tax base **gradually expanded over time** to cover a wider number of energy products/users (e.g. [DK](#), [IE](#), [NL](#), [NO](#))
- **CO<sub>2</sub> emissions covered vary substantially** ranging from around 32% in [FI](#) to above 70% in [BC](#) and [NO](#)

**Start with as wide a tax base as possible** (politically and technically) and schedule **gradual expansions** over time to increase coverage of GHG emissions

# Tax rates in context

- **Explicit vs. implicit tax on carbon** imposed on energy products
- Overall **incentives** on energy demand, fuel use, fuel switching affected by the **relative tax burdens** of which CO<sub>2</sub> tax is one (often small) component

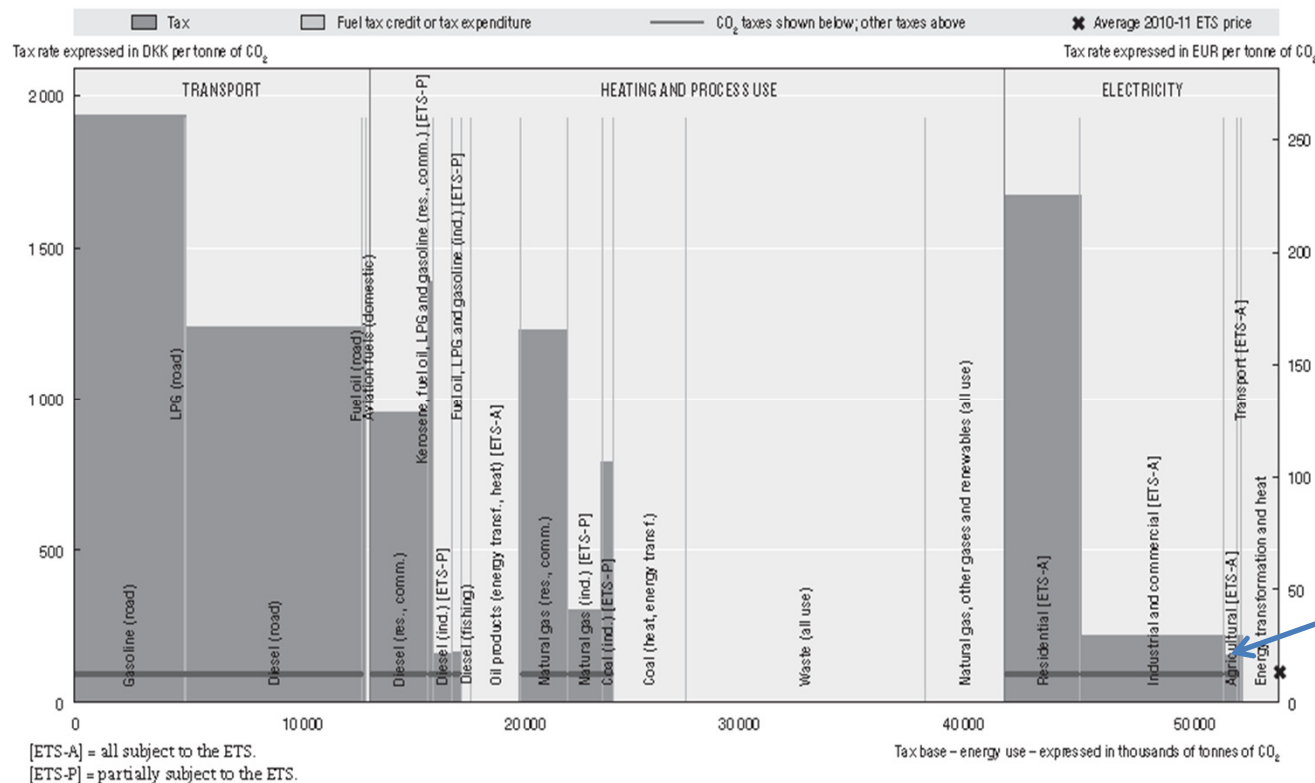


Figure 1: Taxation of energy in DK on carbon emission basis (OECD 2013)

CO<sub>2</sub> tax

# Tax rates applied

Country/ region	Explicit CO <sub>2</sub> tax rate where applied (in EUR per tonne CO <sub>2</sub> )
AU	AUD 23 (EUR 18.6)/t CO <sub>2</sub> on 1/7/2012
BC	CAD 30 (EUR 23.3)/t CO <sub>2</sub> on 1/7/2012
DK	EUR 21.3/t CO <sub>2</sub> in 2012
FI	EUR 60/t CO <sub>2</sub> (transport fuels), EUR 30/t CO <sub>2</sub> (fuels for heating) from 1/1/2012
DE	No carbon tax
IE	EUR 20/t CO <sub>2</sub> (petrol, auto-diesel, kerosene, marked gas oil, LPG, fuel oil, natural gas) in 2012; EUR10/t CO <sub>2</sub> (solid fuels) from 05/2013
NL	No carbon tax
NO	Range from NOK 101 (EUR13.7)/t CO <sub>2</sub> (heavy fuel oil), to NOK 225 (EUR 30.5)/t CO <sub>2</sub> (natural gas, light heating oil) and NOK 384 (EUR 52.1)/t CO <sub>2</sub> (petrol) in 2012
SE	SEK 1080 (EUR 118)/t CO <sub>2</sub> in 2012
UK	CCL equivalent to EUR 12.0/t CO <sub>2</sub> (natural gas), EUR 8.8/t CO <sub>2</sub> (petroleum), EUR 6.4/t CO <sub>2</sub> (coal)
CH	SFR 36 (EUR 30)/ t CO <sub>2</sub> in 2013
EU ETS rate	Between EUR 6 and 10/t CO <sub>2</sub> eq. in 2012



# Variations in tax rates

- Tax rates applied tend to **vary significantly across fuel types and fuel uses**. This applies to energy taxes overall and also often to CO<sub>2</sub> tax (exception is CO<sub>2</sub> tax in **BC**)
- Tax rates applied have also **changed over time**:
  - Some have increased in line with a **(pre)set schedule** (e.g. **BC, AU, IE**)
  - Some have increased following **regular reviews** (e.g. **NO**)
  - Some have been **indexed to inflation** (e.g. **NL, SE, DK, UK**)

**Gradual, transparent increases to tax rates over time (indexation and rate escalator) with greater reflection of CO<sub>2</sub> emissions in price**

# Exemptions

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- **Exemptions and/or tax reductions** introduced for various reasons and used to varying degrees
- **Applied to certain groups and sectors** in particular **energy-intensive** industry (e.g. [NL](#), [DE](#)), sectors covered by **EU ETS**, **transport fuels** (e.g. [AU](#), [NO](#)), electricity from RES (e.g. [UK](#), [NL](#))
- Exemptions **evolve over time** sometimes towards more restrictive systems (e.g. [SE](#)) or more exemptions (e.g. [BC](#))
- Exemptions sometimes **conditional on voluntary agreements** (e.g. [UK](#), [DK](#), [NL](#), [DE](#))

# Good design practice for exemptions

Need to design provisions carefully:

- **Well-targeted** (i.e. focused on most exposed sectors such as energy-intensive and/or trade-exposed sectors)
- Develop **criteria** for granting exemptions carefully together with tax authorities so that they are practical
- Use **partial tax reductions** rather than full exemptions to keep incentives positive
- Limit exemptions for **EU ETS installations** given current low ETS prices and include a review clause for when prices increase
- **Link exemptions to conditionalities** which reflect underlying objectives and require provision of information

# Revenue use

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- Revenues **used to reduce other taxes as part of wider tax-shifting programme** (e.g. [FI](#), [DK](#), [SE](#)).
- **Revenue neutrality ambition with recycling of revenues** through different mechanisms (e.g. [AU](#), [BC](#), [DE](#), [NL](#), [UK](#))
- **Revenue raising purposes** (e.g. [IE](#) to support fiscal consolidation)

Use **mix of approaches** depending on needs of country.  
Develop **recycling mechanisms** to ensure effective incentives and encourage due dynamics in sector

# Monitoring and review mechanisms

Important to have **monitoring systems** to review progress every three-five years

- Design to take into account external factors (e.g. world oil prices) or use a performance indicator (e.g. CH)
- Assess developments and revise the system where needed

Use **windows of opportunity** linked to reporting mechanisms (e.g. environmental satellite accounts, reporting on environmentally harmful subsidies) to revise carbon and energy taxes to reflect priorities of the day

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# Insights on impacts and effectiveness of carbon and energy taxes from international experiences

# Environmental impacts

- Reduction in **CO<sub>2</sub> emissions, fossil fuel use and energy intensity**

- In **DK** total CO<sub>2</sub> emissions decreased by 24 per cent between 1990 and 2001.
- In **SE** average 2008-11 emissions were 12.6 per cent lower than 1990 levels.
- In **BC** consumption of petroleum fuels fell relative to levels in the rest of Canada (as did the province's GHG emissions).
- In **NO** energy intensity reduced by 7.2 per cent from 1990-1999 and contributed to a reduction of CO<sub>2</sub> emissions by 11 per cent.

- Difficult to distinguish contribution of carbon and energy taxes from **wider policy mix**

- **Reductions not sufficient to meet overall GHG targets and to achieve full decoupling** (due in part to exemptions)

# Economic impacts

- Impacts on **GDP** generally positive, but can be negative and vary over time. Depends on design, timescale, and use of revenues

- In **FI** ETR estimated to lead to an average increase in GDP of around 0.5 per cent in 2012 as taxes fall almost exclusively on imports of energy products
- In **SE** ETR estimated to lead to increase in GDP of around 0.5 per cent. Benefit took many years to materialise and there were some short-term economic losses
- In **UK** GDP was 0.06 per cent higher than without the CCL in 2010

- Also **wider economic and welfare benefits** such as innovation

- **BC** attracted green investment and green technologies at higher levels than elsewhere in Canada



## Economic impacts ctd.

- Generally positive impact on overall **employment**. Depends on whether and how revenues are recycled and wider ETR
  - In **DE** ETR with recycling had positive employment effects of between 0.15 to 0.75 per cent
  - In **DK and SE** ETR shown to contribute to growth in employment by up to 0.5 per cent
- **Competitiveness impacts** have been a key concern across all countries examined.
  - **Concerns have not materialised to date** - reflects relatively low price effects and extensive use of exemptions and compensation mechanisms.
  - **Might be a risk in the future** with more ambitious ETR

Sectoral concerns should be seen in context of wider national transformation and benefits.

# Social impacts

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- Strongly depend on use of revenues
- Can lead to **higher fuel prices** (e.g. [SE](#)) which can also manifest in higher CPI (e.g. [SE](#), [NL](#)). Upward pressure may be compensated so there is no net impact on CPI (e.g. [DK](#))
- **Distributional impacts vary:**
  - Elements of regressivity in some countries e.g. [DK](#), [FI](#), [DE](#), [IE](#)
  - Distributional impacts can **change over time** with increasing tax rates e.g. [BC](#)
  - Regressive impacts can be addressed through **specific recycling mechanisms and use of revenues** e.g. [NL](#)

# Future potential for ETR

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- **Plans to introduce or revise carbon and energy taxes** in a number of OECD countries (e.g. [Czech Republic](#), [France](#), [Italy](#), [Japan](#), [UK](#)), emerging and developing countries (e.g. [China](#), [South Africa](#))
- Despite progress, **efforts today fall short of what is needed** to meet long-term climate change objectives. Efforts need to be **ramped up and key issues reflected** in the design and implementation of future carbon and energy taxes
- **Progress on carbon and energy taxes in Switzerland** will be watched with interest abroad and has the potential to encourage action beyond its borders

**Thank you for your attention**

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# Further reading

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- **Evaluation of environmental tax reforms: International experiences** (2013). A report for the State Secretariat for Economic Affairs (SECO) and the Federal Finance Administration (FFA) of Switzerland. [http://www.efv.admin.ch/e/dokumentation/finanzpolitik\\_grundlagen/els.php](http://www.efv.admin.ch/e/dokumentation/finanzpolitik_grundlagen/els.php)
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