



**NATIONAL ECOLOGICAL  
CENTRE OF UKRAINE**

# **COMPARATIVE ANALYSIS OF CARBON TAX AND EMISSIONS TRADING: LESSONS FOR UKRAINE**

*EXECUTIVE SUMMARY*





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## **COMPARATIVE ANALYSIS OF CARBON TAX AND EMISSIONS TRADING: LESSONS FOR UKRAINE (EXECUTIVE SUMMARY)**

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## *Executive summary*

Although GHG emissions of Ukraine dropped considerably after collapse of the Soviet Union (mainly due to production decline) Ukraine is still among top 20 countries in the world with highest CO<sub>2</sub> emissions (United Nations Statistics Division, 2010). Therefore, it is also responsible for climate change and hazardous social and environmental consequences that it will cause. Thus, Ukraine should implement GHG reduction policies to mitigate negative impacts of climate change. Although Ukraine has ratified United Nations Convention on Climate Change in 1996<sup>1</sup> and the Kyoto protocol in 2004<sup>2</sup>, climate change mitigation policy of the country is very weak. In particular, the official position of 20% GHGs emissions reduction (1990 is the baseline) by 2020 does not stimulate to cut but rather envision further growth of GHG emissions since current emissions levels in Ukraine are lower by 45% than 1990 baseline (HEЦУ, 2009).

Utilisation of Joint Implementation mechanism is a beneficial for Ukraine but is not sufficient to reach significant emissions reductions. At the same time, government programmes (e.g. to stimulate energy efficiency) are often underfinanced and ineffective; recently introduced CO<sub>2</sub> emissions tax is too low to stimulate any emissions reductions. In addition, Ukraine has plans to implement domestic emissions trading scheme. In particular, a draft law aiming to establish legislative provisions for emissions trading has passed a first reading in the Parliament. However, it was not submitted to second reading because of critique from civil society and business.

Analysis of carbon tax and emission trading based on international experience revealed the evidence that main factors which should be taken into account for evaluation of policy instruments are design of the instrument (e.g., tax rate, number of sectors covered by ETS, etc.), impact on the competitiveness, administrative costs, availability of institutional and legislative basis.

Comparative analysis of climate policy instruments shows that carbon tax defines the cost of CO<sub>2</sub> emissions on the expense of environmental effectiveness, is more institutionally feasible policy instrument and requires limited administrative expenditures. However, carbon tax is socially and politically unpopular policy. In contrast, ETS could be more environmentally effective and politically acceptable policy instrument. However, implementation and administration of the latter is very complicated and expensive.

## *Environmental effectiveness*

Environmental effectiveness reflects the extent to which the policy achieves desired goals. For example, policies that reach certain objectives better than the other ones are more environmentally effective, which is determined by design, enforceability and acceptability, etc. (IPCC, 2007).

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<sup>1</sup>The Law of Ukraine "On ratification of the UN Framework Convention on Climate Change" від 29.10.1996, № 435/96-ВР.// Відомості Верховної Ради України -1996, № 50, 277 с.

<sup>2</sup>The Law of Ukraine "On ratification of the Kyoto Protocol" від 4.02.2004 № 1430-IV.// Відомості Верховної Ради України. - 2004, № 19, 261 с.

In general, ecotaxes demonstrated to be environmentally effective instruments (EEA, 2006). However, tax rates should be set high enough to be effective and provide adequate stimulus for emission reductions. At the same time, tax rate should not be too high to stop or relocate industries, (Gielen and Moriguchi, 2002).

Emissions trading as a policy instrument is intrinsically more environmentally effective than carbon tax since it guarantees achievement of defined environmental target though on the expense of a volatile price on GHG emissions reductions. However, it is important to keep in mind that environmental effectiveness of emissions trading as well as any policy instrument directly depends on the its design, particularly, coverage of ETS, defined cap, procedure of allowances distribution and linkage to other trading systems.

### *Cost-effectiveness*

Due to the fact that resources are always limited, cost-effectiveness is an important criterion in decision-making. The policy, which attains the goal at the least price, is the most effective one (IPCC, 2007).

Tax on CO<sub>2</sub> emissions is intrinsically cost-effective. In addition, administration and compliance costs which also influence effectiveness are usually lower than similar expenditures for alternative policy options. However, intensive collection of revenues i.e. imposing high tax rates could face local political opposition, which is critical for wide coverage by the tax (Duval, 2008).

In fact, both emissions trading and carbon tax are equal in terms of cost-effectiveness under assumption that competition is perfect and there is no uncertainty. In addition, if permits are totally auctioned emission trading provides “double-dividend” as well as taxes (Duval, 2008). A number of factors could be defined which influence the cost of ETS in every country such as monitoring and enforcement, the design of the emissions trading system and transaction costs.

### *Distributional impact on different social groups*

Distributional impact on different social groups is another important criterion, which reflects how cost and benefits of a particular policy are distributed among households with different income (Field and Field, 2002).

Energy and carbon taxes usually have regressive impact on the society due to tax-induced increase of electricity price. Low-income households will spend a larger share of their income on electricity than richer ones. However, higher electricity prices will stimulate wider implementation of energy efficiency measures in the housing sector and industry. This will lower the burden of increased prices for consumers. Another important issue is distribution of revenues generated by tax. In particular, part of the revenue should be recycled back to low-income households, which will help to reduce negative social effects of carbon tax.

Distributional impacts of ETS are largely defined by the way how allowances are distributed. Permits could be allocated either for free, which is often called “grandfathering” or sold on

actions. These two basic options inevitably affect equity issues. Free allocation creates potential for “windfall profits”. Moreover, if national target is demanding free distribution of quotas to sectors under emission trading scheme would ultimately lay stricter emission reductions for sectors not in the EU ETS and for the national governments i.e. tax payers (EEA, 2006). Auctioning of allowances will help to improve performance of ETS under this criterion.

### *Social and political acceptability*

Only socially and politically acceptable policy instrument could be successfully implemented at the national level. Moreover, if instrument is politically acceptable, it would be much simpler to guarantee allocation of funds required for implementation and enforcement from the state budget and also development of necessary institutional conditions.

One of the main practical disadvantages of carbon tax is simply political unacceptability to new taxes (Parry and Pizer, 2007). Moreover, implementation of carbon tax does not create any constituency. Therefore, targeted groups will lobby successfully to prevent implementation of the tax or in favour of offsetting measures (Duval, 2008).

Wolff (2000) reports that companies give preference to emission trading scheme over taxes if some measures should be implemented. Presently, most emission trading systems allocate allowances for free. In particular, it was crucial for gaining political support for the US SO<sub>2</sub> emissions trading scheme (Ellerman, 2005).

### *Institutional feasibility*

Institutional conditions unavoidably influence environmental policy decisions. The criterion reflects availability of required legislative system and institutional conditions for successful implementation of the instrument.

One of the main advantages of environmental taxes is quite simple administration. First of all, it is easier to monitor quantities of goods than quantities of emissions. Secondly, ecotaxes are administered by state tax collecting institutions, which are more effective in developing countries and economies in transition than environmental regulatory institutions. Swedish experience demonstrated that taxes could be easily administered by existing tax collecting institutions at relatively low costs (1-5% of total revenues) (Blackman and Harrington, 2000).

Emissions Trading System is significantly less institutionally feasible policy option than the carbon tax. First of all, ETS is very complicated mechanism and, therefore, very challenging for implementation especially in transitional countries as it was discussed in the previous chapter (Coria and Sterner, 2008). Moreover, experience of the EU ETS shows the evidence that emission trading requires sophisticated institutional basis. In particular, a number of the EU countries had to establish from one to six new institutions specifically to administer ETS (Duer, 2007).

## Recommendations

Considering strengths and weaknesses of carbon tax and emissions trading, the author believes that it is worth implementing both instruments. Thus, it would be possible to achieve greatest benefits as well as compensate disadvantages of suggested policies. However, it is important to note that the burden for economic entities should not be too heavy. Therefore, it is reasonable to choose the most feasible option to target particular installations. In particular, the largest emitters of GHGs (fuel and energy complex, metallurgy, industry of construction materials, etc.) should be covered by ETS. In addition, it is reasonable to include in the cap only large installations (above 20 MW<sub>th</sub>) within the above mentioned economy sectors. The tax on CO<sub>2</sub> emissions should be implemented over the whole economy. However, exemptions and tax remissions could be introduced for the most vulnerable industries, particularly, installations which are covered by the ETS. Thus, the tax will target mainly economy branches and installations outside the ETS.

Thus, the following recommendations should be followed to implement effective climate policy instruments:

- It is essential to conduct comprehensive research to design technical details of each instrument since the performance of particular policy highly depends upon its design. In addition, prior to implementation of carbon tax and emission trading it is imperative to examine interactions between policy instruments as well as to conduct *ex ante* analysis of the possible direct and indirect impacts on the economic entities and economy as a whole.
- Implementation of effective emissions trading system. Due to the fact that Emission Trading System is very complicated mechanism and Ukraine does not have experience of implementation of similar instruments, it is essential to conduct careful preparation. First of all, it is necessary to undertake a number of preparatory arrangements, particularly, improve National emission inventory (e.g. introduce collection of emissions data from every source); develop appropriate mechanism of National ETS, in particular, define appropriate emissions cap, design allocation rules and administration mechanisms. In addition, it is imperative to develop legislative and institutional basis in a way to distribute executive and controlling functions between different institutions. Once the preparation work is completed, it is reasonable to launch pilot phase of the ETS on the voluntary basis to test the mechanism developed and give the opportunity for national installations to obtain useful experience. The next step is to enforce ETS for all legible installations and ensure that it works properly. Finally, linking National ETS to EU ETS could be considered.
- Implementation of effective carbon tax. Carbon tax as a policy instrument is rather simple in implementation and enforcement because institutional system of Ukraine has experience of collection of environmental taxes. In addition, there is no need for considerable legislative changes and existing tax-collecting institutions would be able to manage carbon tax as well. However, establishment of appropriate tax rate would be the most challenging task, indeed. If it would not be possible to implement high enough tax rate per tonne of CO<sub>2</sub> emissions because of political lobby, there is a positive moment of even low tax rate since installations would get used to the fact that they also have to pay for CO<sub>2</sub> emissions. Thus, the tax will bring positive signals to the market. In case high carbon tax is implemented Ukraine would also have to implement tax reliefs and exemptions for competitiveness concerns. However, it is definitely much better to

introduce relatively high tax rate (with some reliefs for the most vulnerable industries) than very low tax rate for all economic entities. In the last case, hardly any GHG emissions reductions would be achieved. In addition, the state could set up special conditions for industries to be exempt from the tax, for example, installations would be required to reduce energy-intensity to some extent as it is done in a number of EU countries. Moreover, in order to obtain social and political acceptability of the carbon tax it is essential to implement the tax within environmental tax reform in order to maintain the overall tax burden at the same level on the expense of reduction of other taxes.



## References

- Blackman, A., W. Harrington. 2000. The Use of Economic Incentives in Developing Countries: Lessons from International Experience with Industrial Air Pollution.// Journal of Environment and Development. Vol. 9, No. 1.
- Coria, J., T. Sterner. 2008. Tradable Permits in Developing Countries. Evidence from Air Pollution in Santiago. – Washington, 34 p. Mode of access: <http://www.rff.org/RFF/Documents/RFF-DP-08-51.pdf> - Last access: 17 December, 2011.
- Duer, D. 2007. EU European Emission Trading Fact Book. Mode of access: [http://www.inagendo.com/res/doc/inagendo\\_ets\\_fact\\_book.pdf](http://www.inagendo.com/res/doc/inagendo_ets_fact_book.pdf) - Last access: 17 December, 2011.
- Duval, R. A. 2008. Taxonomy of Instruments to Reduce Greenhouse Gas Emissions and Their Interactions.- Paris: OECD Publishing, 42 p.
- EEA. 2006. Using the Market for Cost-effective Environmental Policy: Market-based Instruments in Europe. Luxembourg. – EEA, 44 p.
- Ellerman, A.D., B.K. Buchner. 2007. The European Union Emissions Trading Scheme: Origins, Allocation, and Early Results.// Review of Environmental Economics and Policy 1(1). pp. 66 –87
- Field C., Field M. 2002. Environmental Economics: An Introduction.- USA: McGraw-Hill/Irwin, 510 p.
- IPCC. 2007. Climate Change: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. – Cambridge: Cambridge University Press, 851 p.
- Parry I., W. Pizer. 2007. Emissions Trading versus CO<sub>2</sub> Taxes versus Standards. Mode of access: [http://www.rff.org/RFF/Documents/CPF\\_7\\_IssueBrief\\_5.pdf](http://www.rff.org/RFF/Documents/CPF_7_IssueBrief_5.pdf) - Last access: 17 April, 2012.
- United Nations Statistics Division. 2010. Carbon dioxide emissions. Mode of access: <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crd=> - Last access: 17 December, 2011.
- НЕЦУ. 2009. Щодо підготовки позиції України на міжнародні переговори ООН зі зміни клімату в Бонні 1-12 червня, Режим доступу: <http://climategroup.org.ua/upl/rekNPOVonn.pdf> - Доступне станом на 17 грудня, 2011 року.

## Annex A. Main findings of the comparative analysis of carbon tax and emissions trading

**Table A.1.** Main findings of the comparative analysis of carbon tax and ETS based on the international experience

Criterion	Policy Instrument	
	Tax on CO <sub>2</sub> emissions	Emissions trading system
<b>Environmental effectiveness</b>	<ul style="list-style-type: none"> <li>- depends on the appropriate (1) tax rate (which should stimulate emission reductions but to be not too high to stop or relocate industries), and on the (2) number of entities covered;</li> <li>- should be revised frequently to reach environmental target.</li> </ul>	<ul style="list-style-type: none"> <li>- intrinsic environmental effectiveness: guarantees achievement of determined target; however, overall benefit depends on the (1) coverage and other (2) design aspects.</li> <li>e.g. EU ETS covers about 50% of CO<sub>2</sub> emissions of EU.</li> </ul>
<b>Cost-effectiveness</b>	<ul style="list-style-type: none"> <li>-depends on the coverage and tax rate i.e. revenue generated (e.g. in 1995 carbon tax yielded US \$1.6 billion, which is roughly 1% of Swedish GDP);</li> <li>-administration cost are low (e.g. Swedish carbon tax: roughly 5% of total revenue) (Blackman and Harrington, 2000).</li> </ul>	<ul style="list-style-type: none"> <li>-could bring significant cost savings, however, monitoring and administration costs are considerable;</li> <li>e.g. economic models show from 30% to 90% cost savings. EU ETS will help EU to meet its Kyoto targets for EUR 3–3 ½ billion annually comparing to EUR 7 billion without ETS (EEA, 2006).</li> </ul>
<b>Distributional impact on different social groups</b>	<ul style="list-style-type: none"> <li>- has regressive impact in society, however, could have progressive impact on welfare distribution;</li> <li>- earmarking of revenues generated by the tax.</li> <li>e.g. in Denmark the regressive effect has been mitigated through special compensation to single-parent households and retired people without retirement schemes/pensions.</li> </ul>	<ul style="list-style-type: none"> <li>-depends on the coverage of (1) economic sectors and the (2) way allowances are distributed: free allocation is regressive in general, creates potential for “windfall profits” for companies; auctioning could improve equity issues.</li> </ul>
<b>Social and political acceptability</b>	<ul style="list-style-type: none"> <li>-usually politically unpopular, however, acceptance could be improved if eco-labour tax reform is implemented.</li> </ul>	<ul style="list-style-type: none"> <li>-usually more preferable than taxes; free allocation is crucial for gaining political support; however gradual transition to auctioning is possible.</li> <li>e.g. almost all allowances in the EU ETS are distributed for free (auctioning only 5-10%).</li> </ul>
<b>Institutional feasibility</b>	<ul style="list-style-type: none"> <li>- could be administered by existing tax collecting institutions.</li> </ul>	<ul style="list-style-type: none"> <li>- requires well functioning market and establishment of firms and institutions to maintain the market and ensure compliance (in developing and transitional countries can be problematic).</li> </ul>

## Appendix B. Key factors to consider for analysis of policy options

**Table B.2.** Key factors to consider for analysis of policy options

Criterion	Policy Instrument	
	Tax on CO <sub>2</sub> emissions	Emissions trading system
<b>Environmental effectiveness</b>	<ol style="list-style-type: none"> <li>1. Tax base (sectors and installations covered).</li> <li>2. Tax rate.</li> <li>3. Regular revision and adjustment in order to reach environmental target.</li> <li>4. Influence of other instruments (e.g. energy subsidies).</li> </ol>	<ol style="list-style-type: none"> <li>1. Coverage (sectors and installations covered).</li> <li>2. Quantity of permits allocated i.e. “cap”.</li> <li>3. Distribution of allowances for free/auctioning.</li> <li>4. Linking to EU ETS.</li> </ol>
<b>Cost-effectiveness</b>	<ol style="list-style-type: none"> <li>1. Tax base.</li> <li>2. Tax rate.</li> <li>3. Administrative costs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Coverage.</li> <li>2. Distribution of allowances for free/auctioning.</li> <li>3. Administrative costs.</li> <li>4. Linking to EUETS.</li> </ol>
<b>Distributional impact on different social groups</b>	<ol style="list-style-type: none"> <li>1. Tax burden on poor and reach households.</li> <li>2. Impact of tax on the cost of other goods.</li> <li>3. The way how revenue generated by the tax is used.</li> </ol>	<ol style="list-style-type: none"> <li>1. Distribution of allowances for free/auctioning.</li> <li>2. Impact of ETS on the cost of other goods.</li> <li>3. The way how revenue (in case auctioning) is used.</li> <li>4. Coverage.</li> </ol>
<b>Social and political acceptability</b>	<ol style="list-style-type: none"> <li>1. Tax base.</li> <li>2. Tax rate.</li> <li>3. Impact on competitiveness.</li> <li>4. Impact on low-income social groups.</li> </ol>	<ol style="list-style-type: none"> <li>1. Coverage.</li> <li>2. Distribution of allowances for free/auctioning.</li> <li>3. Impact on competitiveness.</li> <li>4. Linking to EU ETS.</li> </ol>
<b>Institutional feasibility</b>	<ol style="list-style-type: none"> <li>1. Availability of institutions for enforcement and administration.</li> <li>2. Institutional experience.</li> <li>3. Appropriate legislation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Availability of institutions for enforcement and administration.</li> <li>2. Institutional experience.</li> <li>3. Appropriate legislation.</li> <li>4. Well-functioning carbon market.</li> </ol>

## Appendix C. Strengths and weaknesses of carbon tax and ETS

**Table C.3.** Strengths and weakness of carbon tax

Strengths of carbon tax	Weaknesses of carbon tax
<ul style="list-style-type: none"> <li>- determines the price of CO<sub>2</sub> emissions;</li> <li>- appropriate tax rate could lead to significant emissions reductions;</li> <li>- generates revenue for the government;</li> <li>- very low administrative costs;</li> <li>- does not require establishment of new institutions for implementation;</li> <li>- requires minor legislative changes for implementation;</li> <li>- simple enforcement and administration;</li> <li>- could stimulate implementation of energy-efficient technologies.</li> </ul>	<ul style="list-style-type: none"> <li>- does not guarantee achievement of environmental target; low tax rate will not bring emissions reductions;</li> <li>- has regressive effect on the society;</li> <li>- lacks flexibility;</li> <li>- requires frequent revisions and adjustments to reach environmental target;</li> <li>- could face strong political opposition if very high tax rate is suggested but political and social acceptability could be improved if eco-labour tax reform is introduced;</li> <li>- requires strong analytical basis to determine appropriate tax rate and true information from industry.</li> </ul>

**Table B.4.** Strengths and weakness of ETS

Strengths of ETS	Weaknesses of ETS
<ul style="list-style-type: none"> <li>- intrinsic environmental-effectiveness (guarantees achievement of determined target);</li> <li>- equalizes marginal abatement costs through the whole economy (cheaper for the whole economy to get necessary reductions);</li> <li>- more politically acceptable than taxes;</li> <li>- regressive effect on distribution of costs and benefits is not as negative as a result of taxes;</li> <li>- could stimulate implementation of energy-efficient technology;</li> <li>- auctioning could generate revenue for the government.</li> </ul>	<ul style="list-style-type: none"> <li>- volatility of prices on emissions allowances makes investment decisions more complicated;</li> <li>- could not cover all economy sectors and installations;</li> <li>- very high administrative costs;</li> <li>- requires considerable institutional adjustments (probably, establishment of new institutions);</li> <li>- requires considerable legislative changes;</li> <li>- requires well-functioning carbon market;</li> <li>- very complicated enforcement and administration; lack of institutional experience;</li> <li>- risk of over allocation of permits will not lead to emission reductions, which undermines effectiveness of ETS;</li> <li>- the risk of uneven distribution of allowances among economy sectors and particular installations;</li> <li>- linking to EU ETS impose a risk that cheap abatement projects would be quickly drained away (Ukraine will have to cut emissions at a higher cost in case strong emissions target under the post-Kyoto protocol);</li> <li>- stringent cap and/or auctioning could have negative impact on the competitiveness of national entities at the international market (increased prime cost).</li> </ul>

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