

# POLICY *brief*

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## The Impact of Climate and Energy Policies on the Public Budget of EU Member States<sup>1</sup>

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### Highlights

- In the current context, where public budgets are overstretched due to the economic crisis, there is a pressing need to understand the fiscal implications of climate policies. Policies intended to achieve decarbonization will impact both sides of a country's budget via changes in the tax levels and composition of taxes on the one hand, as well as transfer payments and direct investments on the other.
- Back-of-the-envelope calculations – comparing net public revenues in 2020 for a Baseline and an Enhanced Policy scenario – show that the additional revenues from carbon pricing and the reduction in revenues from excise taxes on fossil fuels clearly dominate other direct and indirect effects of policies on public budgets such as the additional expenditures dedicated to RD&D targeting low-carbon technologies.
- The aggregated net budget impact of all direct and indirect effects of new climate policies implemented in the Enhanced Policy Scenario on public budgets in 2020 for the EU-27 as a whole – given our simplifying assumptions – amounts to additional net public revenues of about €12.6bn (0.09% in terms of the EU-27 GDP) under medium-level abatement costs. This makes a non-negligible impact which is nevertheless much lower than the impact on public accounts from changes in main macroeconomic variables over time.
- Differences among Member States mainly depend on the additional revenues they will obtain from carbon pricing, which are driven by three main factors: the carbon intensity of the economy, which is positively correlated with the absolute value of the net budget impact of new policies; the share of non-ETS GHG emissions, which is positively correlated with the net budget impact; and the reduction in GHG emissions resulting from new policies, which is negatively correlated with this impact.
- Countries most significantly affected, both positively and negatively, are among the “new” Member States in the EU-27. In contrast, the impact of new climate policies on large EU-15 economies would be generally positive and typically in line with average EU values. Therefore, authorities from the EU-15 may consider the option of sharing the economic burden of the transition to a low-carbon economy among EU countries, taking into account their economic strength.



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<sup>1</sup> Topic 4 of the EU's FP7 funded project THINK. The project report is available at: <http://think.eui.eu>.

## Background

The transition to a low-carbon energy system will impact both sides of a country's budget, i.e. revenues (via e.g. changes in the composition of taxes or tax levels) and expenditures (via transfer payments or direct investments). In the current context, where public budgets are overstretched due to the economic crisis, there is a pressing need to understand the implications of climate policies on the fiscal situation. Climate policies increasing public revenues could help to reduce state debt, while policies significantly increasing public expenses could be difficult to implement.

To combat climate change and reduce energy import dependence, the European Council in 2007 agreed on "20-20-20" climate and energy targets to be met in the mid-term. The climate and energy package supporting the achievement of these targets came into law in 2009 (see Box 1). Our policy brief summarizes the main findings of a quantitative study we made to investigate the impact of the EU 2020 climate objectives on the fiscal balance of Member States in the year 2020.

### Climate policies induce both direct and indirect effects

Assessing the impact of new energy and climate policy instruments on public budgets is a key issue both for analytical and policy purposes. Such new policies will directly impact public budgets by generating new revenue and new expenditure flows; governments might obtain additional revenues from carbon pricing and face an increase in expenditures associated with direct public support to RD&D targeting low-carbon technologies (assuming that feed-in tariffs or green certificates are expenses borne by private agents and therefore not affecting the state budget).

In addition to the direct effects, most climate policy instruments will also affect other decisions of individual economic agents on the use of resources, and the economy at large. Those indirect effects are harder to predict. They include changes in state revenues and expenses caused by the impact of climate policy on economic output (both its level and sectoral composition), prices and inflation, production and consumption, unemployment, or interest rates. Particularly relevant for the present purposes appear to be impact coming from the changes in GDP as well as the changes in state revenues from excise taxes on fossil fuels. Figure 1 summarizes all direct and indirect effects of climate policy on public budgets considered in our analysis.

### Box 1: Climate and energy policy package

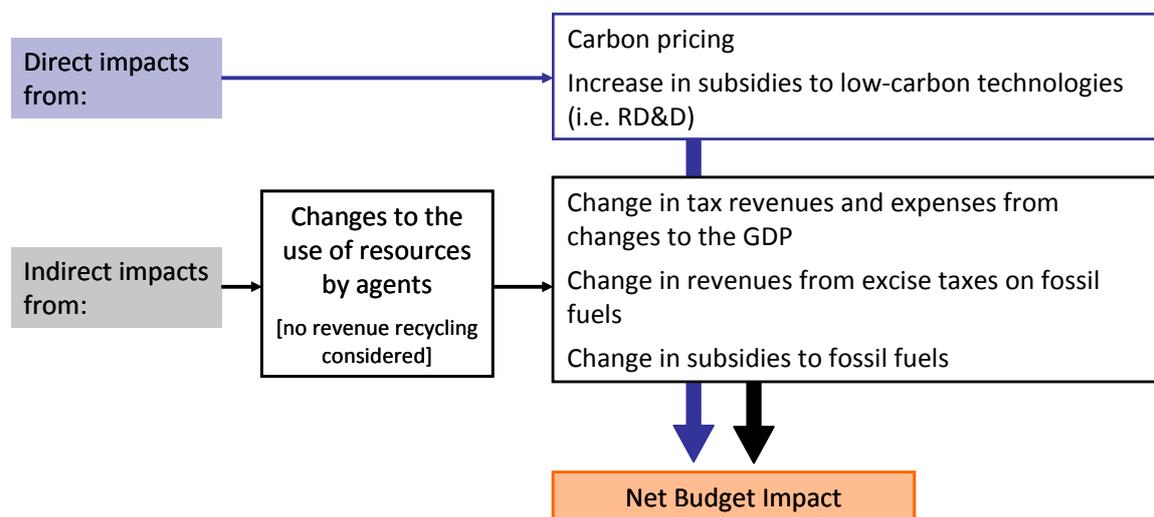
The so called 20-20-20 targets, on which the European Council agreed in 2007 include a// a reduction of EU greenhouse gas (GHG) emissions by at least 20% with respect to 1990 levels; b// meeting a minimum of 20% of EU energy consumption using renewable resources (RES); and c// the reduction of EU primary energy use by at least 20% compared to projected levels. The respective policy package came into law in 2009. It includes both a strengthening of policy tools already available and the implementation of new instruments, standing mainly on three pillars: 1// a revision and strengthening of the emissions trading system (ETS; Directive 2009/29/EC); 2// an Effort Sharing Agreement governing GHG emissions from sectors not covered by the EU ETS (Decision 406/2009/EC); and 3// binding national targets for renewable energy which collectively will raise the average RES share across the EU to 20% by 2020 with a sub-target of a 10% share in the transport sector (Directive 2009/28/EC).

Hence, whereas there are mandatory targets in place for RES and GHG emissions, the 20% target of a decrease in primary energy use is not yet legally binding. The climate and energy package does not address energy efficiency and energy savings explicitly, even though creating some indirect pressure to reduce energy consumption. However, in December 2010, the European Parliament voted in favor of a binding energy saving target of at least 20% by 2020.

Making use of publicly available data on the future equilibrium of the energy sector of EU Member States, we have determined through back-of-the-envelope calculations the difference between net revenues in 2020 in two situations: a Baseline scenario (mainly including a strengthening of ETS and energy efficiency regulations), and a more ambitious Enhanced Policy scenario (considering additional carbon taxation in non-ETS sectors, further support to RES deployment, and additional energy efficiency regulations).<sup>2</sup> Computations make use of a number of simplifying assumptions that are necessary to quantify the respective impacts in a tractable way without using too complex simulation models (see Box 2).

<sup>2</sup> These scenarios are reported in EC (2009, "EU Energy Trends to 2030"). Parameters characterizing the energy sectors of all 27 EU Member States in 2020 have been computed by a consortium led by the National Technical University of Athens (E3MLab) using the PRIMES and GEM-E3 models.

**Figure 1:** Major direct and indirect impacts of climate policy on public budgets



Among direct effects considered, additional revenues from carbon pricing clearly dominate the additional expenditures dedicated to RD&D targeting low-carbon technologies. Net public revenues in the year 2020 directly generated by climate policies applied in the Baseline scenario range between €52 and 123bn for the EU-27 as a whole depending on the carbon abatement cost level considered. Net incremental public reve-

nues directly stemming from the application of new policies in an Enhanced Policy scenario range from a maximum of €71bn (0.55% in terms of the EU-27 GDP) in the case of high abatement costs, to a negative value of -€10bn (-0.06% of GDP) if abatement costs are low. Reaching a given objective in terms of emission reductions requires the application of higher carbon prices the higher carbon abatement costs are. This would result

**Box 2: Underlying assumptions**

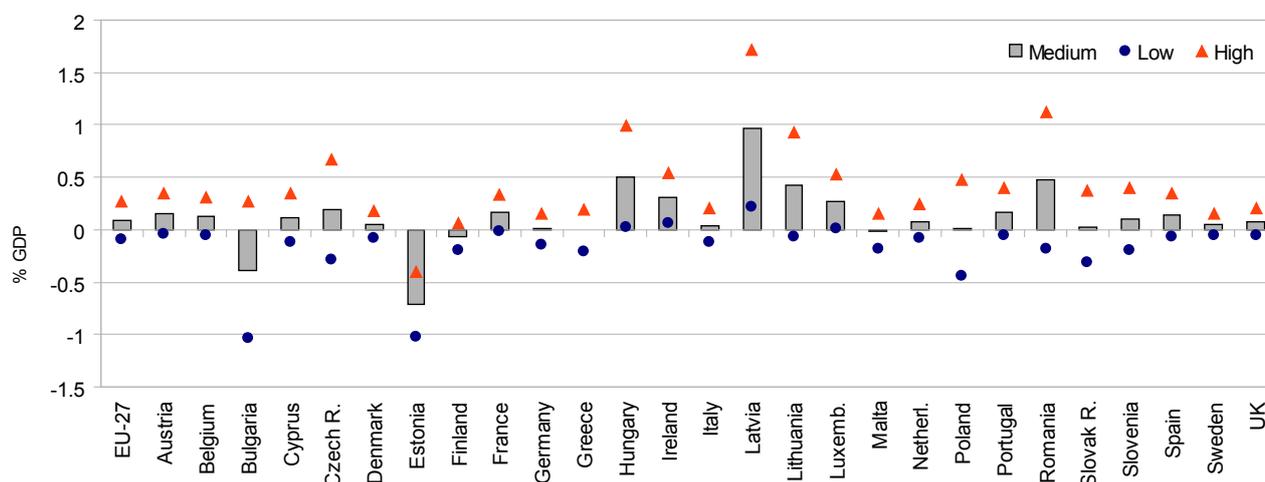
The social cost of replacing high-carbon products with low-carbon ones is assumed to be equal to the costs incurred by industries when abating carbon. Based on this assumption, we estimate the isolated impact that the shift to low-C products will have on national GDPs.

We do not consider changes made to public policies other than climate policy ones. Hence, any recycling of state revenues or the sourcing of state expenses resulting from climate policies are not taken into account; in

the same vein welfare (or distributional) effects are not treated.

Given the uncertainty about future levels of carbon abatement cost, we consider three different possible futures corresponding to three different abatement cost levels. Based on information in the literature and making use of simplifying assumptions, we have derived the level of carbon prices to be applied in each future and in our two respective policy scenarios:

	Baseline scenario	Enhanced policy scenario
Low abatement cost [interval between zero and 45€/tCO <sub>2</sub> differing among MS]	ETS auction price of €25/t CO <sub>2</sub> No carbon tax for non-ETS sectors	Uniform price of €10/t CO <sub>2</sub> [weighted average of prices published in EC (2009) for ETS (€16.5/t CO <sub>2</sub> ) and non-ETS sectors (€5.3/t CO <sub>2</sub> )]
Medium abatement cost [15...60€/tCO <sub>2</sub> ]	ETS auction price of €40/t CO <sub>2</sub> No carbon tax for non-ETS sectors	Uniform price (weighted average of prices in ETS and non-ETS sectors) of €25/t CO <sub>2</sub>
High abatement cost [30...75€/tCO <sub>2</sub> ]	ETS auction price of €55/t CO <sub>2</sub> No carbon tax for non-ETS sector	Uniform price (weighted average of prices in ETS and non-ETS sectors) of €40/t CO <sub>2</sub>

**Figure 2:** “Net Budget Impact” of new policies on state revenues

Source: Own calculation assuming three levels of carbon abatement costs (high - medium - low)

in higher revenues from carbon taxes and from the auctioning of ETS allowances, and therefore a more positive change in the net public budget given a level of innovation subsidies.

Within the indirect effects of the policies applied in the Enhanced Policy scenario, the most relevant ones are the decrease in excise tax revenues from fossil fuels and the decrease in tax revenues related to the impact of these policies on GDP. Changes in state revenues associated with changes in GDP probably are the main factor driving differences among countries. The overall net indirect impact of new policies ranges from a decrease in net public revenues in the EU-27 equivalent to 0.03% of the EU GDP (for low carbon abatement costs) to a decrease equivalent to 0.23% of the EU GDP (for high abatement costs).

Given the assumptions made, all considered direct and indirect effects of new climate policies amount to a net increase in the public revenues of the EU-27 in 2020 of about €12.6bn (0.09% of the EU-27 GDP) for medium abatement costs. This makes a non-negligible impact which is nevertheless much lower than the impact of changes in main macroeconomic variables over time. The main factors contributing to the overall impact are the additional revenues from carbon pricing, the decrease in revenues from excise taxes on fossil fuels and that of revenues from general taxes caused by the impact of the new policies on GDP. Differences among countries are mainly related to differences in carbon pricing revenues, which are driven by three

main factors: 1-the carbon intensity of the economy, which is positively correlated with the absolute value of the net budget impact of new policies; 2-the share of non-ETS GHG emissions, which is positively correlated with the net budget impact; 3-and the reduction in GHG emissions resulting from the new policies, which is negatively correlated with this impact.<sup>3</sup>

### Is there any need to support the EU climate policy implementation through cross-country burden sharing?

The impact of new climate policies on state budgets varies widely across countries (see Figure 2). Countries most significantly affected, both positively and negatively, are among the “new” Member States. Notably Bulgaria and Estonia are the two countries that, given our assumptions, could experience a decrease in net public revenues larger than 0.5% of their GDP in some of the scenarios considered. Both are countries with a small and highly carbon-intensive economy and a low GDP-per-capita. Thus, implementing ambitious climate policies in these countries may require external support. “New” Mem-

<sup>3</sup> Computed values have to be regarded with due reason; the absolute level of the budget impact of new climate policies in the Enhanced Policy scenario is quite sensitive to assumptions made within this analysis. However, our analysis allowed us to determine the order of magnitude of the main effects of new climate policies on public budgets. Besides, relative differences among countries (in the impact of new policies on their net public revenues) seem to be robust.

ber States whose public accounts may be most positively affected by the implementation of new climate policy measures in any scenario are Hungary, Latvia, Lithuania, and Romania. If abatement costs are high, these countries could experience an increase in their net state revenues representing more than 1% of their GDP. The economies of these countries are also carbon-intensive and their GDP-per-capita is low. Thus, extra state revenues should be employed to their own country benefits instead of supporting the “losers” in the decarbonization process.

In contrast, the impact of new climate policy instruments on large economies from the EU-15 is expected to be relatively small, generally positive, and typically in line with average EU values. Taking into account their economic strength, state

authorities may consider the option of sharing the economic burden that the transition to a low-carbon economy may represent for those countries most negatively affected.

Finally, the new climate policies have to be financed in a context of substantial budget adjustments necessary to correct large short-term deficits and to avoid an explosion of debt in the long-term. Therefore public finance variables like the fragility of state budgets, the level of fiscal pressure and the expected growth of economies may affect the implementation of climate policies. The higher the financial fragility of a country, the more difficult the implementation of expensive climate policies may be, while stronger expected growth rates could provide more room for the latter.