

***Economic
evaluation of the
“Climate Action
Programme 2020”***
Abbreviated version of
the final report

On behalf of the Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety

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Summary

The PwC study presents the results of the evaluation the economic impacts of the German Government's "Climate Action Programme 2020"

The study at hand examined the economic costs and benefits associated with the "Climate Action Programme 2020". For this purpose system-analytical, distributional and macroeconomic effects of the action programme were analyzed in a compatible way over the lifetime of the considered action. A comparison between one scenario with and one scenario without the implementation of the action programme was core of the different analyses.

For quantification a simulation model was established which displays all single actions as well as the interlinking between the certain sectors electricity, transport and heat (extension of the PwC Model "Energiewende Outlook, EwO"). Amongst others, the Input-Output Model GEMIO developed by PwC was used for the analyses of macroeconomic impacts.

Macroeconomic impacts

The examination of the macroeconomic impacts indicates the following essential results:

- **In total almost 2.0 million man-years of new employment** (corresponds to almost 430.000 additional employments in 2020) **between 2015 and 2020** as well as an additional **growth in the gross domestic product (GDP) of around 1% in total** (+30 bn EUR) **in 2020** can be created in Germany. In the process, positive effects are balanced out (net values) by an additional demand for certain goods (as construction works) and negative effects by a decrease in demand for other certain goods (as energy).
- In comparison to the reference scenario, **economically falling expenses for fuel imports by more than 3.5 bn EUR in 2020** are demonstrated.
- Thereby driving forces are declining expenses for mineral oil of around 3.3 bn EUR as well as further cost savings in hard coal imports of about 175 million EUR. Moreover fundamental additional expenditures for natural gas can be expected, however reduced expenditures of around 13 million EUR arise in 2020.

Beyond the year 2020, it can be assumed that further positive impulses will affect the economy due to additional investments in the economy or rather the consumption related reallocation of the energy cost savings within the different sectors as well as through the diffusion of innovations within climate protection. This way the financial discharge of the national budget could accelerate onwards and also positive effects on growth and employment may have a greater impact.¹

Economic costs and benefits of the individual actions

Out of the total amount of 107 individual policy measures 79 were assessed regarding their cost effect with direct or indirect use of resources as part of a precise bottom-up-approach within the EwO Model. In this process cost estimates by the public sector were used as well. Around 67% of the quantified individual policy measures result in negative specific reduction costs regarding greenhouse gas reduction. This means that for the single policy measure net savings are the result while considering the avoided costs due to the investments.

With 62% these steps therefore cause the majority of the anticipated greenhouse gas reductions by 2020. This result is to be considered with a conservative point of view: No damage costs due to greenhouse gas emissions and other impacts of the use of fossil energy have been taken into account.

With regard to the economic cost/benefit approach the following key messages arise: ⁱⁱ

- While implementing the policy measures of the programme remarkable additional and exceeding the standard technology investments are associated with a reduction in greenhouse gas emissions. These so called **gross costs account for about 123 bn EUR in prices of the year 2015 over the whole life cycle of the action programme**. On top of this **administrative costs of close to 2 bn EUR** need to be added. The investments will be supported by governmental and non-governmental transfers of around 24 bn EUR.
- At the same time investments made within the initial phase lead to savings over a longer period. More precisely, the investments related to the action programme (incidental costs of 100% by 2020) will result in **savings associated with energy and other costs of about 274 bn EUR** over the life cycle, with around 15% of it already achieved by 2020 (about 42 bn EUR).
- Hence the net view shows that **the avoided energy costs exceed the required investments to implement the action programme by around 149 bn EUR**.

Distributional effects

The distributional effects of financial discharges and burdens vary between different end consumer groups considering the total life cycle of the policy measures. Thereby the following core results arise:

- **The majority of energy cost savings account for private households and they also master financially the largest portion of implementing the action programme**. This way they have to bear the gross costs of a total of 56 bn EUR, whereas they save around 82 bn EUR energy costs by implementing the action programme. It results in a sum of negative net costs of about (-)26 bn EUR and under consideration of incurred “programme costs II” to a net relief of around 25 bn EUR for private households.
- For the **state a similar result can be seen directly**: towards energy costs savings of around 55 bn EUR only 15 bn EUR gross and “programme costs I” have to be spend. In sum the net costs account for (-)40 bn EUR and under consideration of payable “programme costs II” **the direct net discharge accounts for around 26 bn EUR**. Moreover the **state budget will be indirectly disburdened additionally by around 73 bn EUR in the period from 2015 to 2020**. These savings are the result of additional tax revenues and avoided transfer payments respectively and as well of additional road toll revenues.
- Within **the sectors industry, trade, services, transport and the agricultural sector net discharges are just as evident** in sum of around 84 bn EUR since the avoided energy and other costs of around 143 bn EUR exceed the gross costs along with parts of the “programme costs II” for implementation of around 59 bn EUR in sum.
- Thus apart from the energy sector, for all other sectors avoided energy costs exceed the gross costs (incl. “programme costs I”) in net present values. The **energy sector has to face a net burden of around 10 bn EUR** (so-called net costs as a difference of gross costs and avoided energy costs). The reason for this is that the energy industry is benefitting less than other sectors from a decreasing energy demand and in particular more expensive primary energy sources as gas have to be spend because of the security stand-by arrangements for lignite power plants. The gross costs originate in the energy industry, but the majority of these costs should be financed by the end consumer via transfers of grid

charges (for security stand-by arrangement) and the CHP surcharge (surcharge on combined heat and power generation systems).

Impact on reducing greenhouse gases of the action programme

For the economic evaluation of the action programme the impact on reducing greenhouse gases of individual policy measures were estimated as a basis. To obtain an ideally high consistency with previous studies the quantification of actions were aligned to the quantification studies of the NAPE (National Action Plan for Energy Efficiency) and the action programmeⁱⁱⁱ. Moreover further individual policy measures were evaluated to achieve a high coverage of the programme's total action package.

As a result 60 individual policy measures were assessed regarding their specific and overall impact on reducing CO₂ equivalents (impact of net reduction excluding possible overlaps). Hence it was determined that the **implementation of the quantified action programme has a potential of reducing greenhouse gases of 56.6 to 61.2 millions of tons of CO₂ equivalent in 2020.**

ⁱ A quantification of these effects was not part of this examination.

ⁱⁱ All monetary values are net present values to the year 2015 and refer to the overall life time of the action programme. For investments over the whole life time, investments taken until 2020 are considered a life time of more than a year. Programme costs I are purely administrative programme costs (administrative expenses by the government for implementing programs). Programme costs II are financial resources to remove investment barriers (for example financial levies or investment subsidies). Gross costs are additional costs of implementing an action without offsetting the energy cost savings (sum of the spread between investments compared to investments in standard technologies). Avoided energy costs and other costs are beneficial savings effects without further consideration of avoided environmental costs (external effects), meaning without a monetary assessment like savings in greenhouse gas emissions.

ⁱⁱⁱ Fraunhofer ISI; Fraunhofer IFAM; Prognos; Ifeu; HfWU (2014): Ausarbeitung von Instrumenten zur Realisierung von Endenergieeinsparungen in Deutschland auf Grundlage einer Kosten-/Nutzen-Analyse. Wissenschaftliche Unterstützung bei der Erarbeitung des Nationalen Aktionsplans Energieeffizienz (NAPE). Projekt BfEE 01/2014 – Zusammenfassung, November 2014 sowie Öko-Institut (2014): Wissenschaftliche Analysen zu klimapolitischen Fragestellungen - Quantifizierung der Maßnahmen für das Aktionsprogramm Klimaschutz 2020. Dezember 2014, Berlin.