

IMPACT ON PUBLIC BUDGETS OF THE KFW PROMOTIONAL PROGRAMMES „ENERGY-EFFICIENT CONSTRUCTION“, „ENERGY-EFFICIENT REFURBISHMENT“ AND „ENERGY-EFFICIENT INFRASTRUCTURE“ IN 2011

Published by
KfW Bankengruppe
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60325 Frankfurt am Main
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Fax +49 69 7431-2944
www.kfw.de

Content editing
STE Research Report
Forschungszentrum Jülich

commissioned by KfW Bankengruppe
abridged translation

Frankfurt am Main, April 2013

Impact on public budgets of the KfW promotional programmes “Energy-efficient construction”, “Energy-efficient refurbishment” and “Energy-efficient infrastructure” in 2011

STE Research Report, Forschungszentrum Jülich,
commissioned by KfW Bankengruppe¹

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1 Background

Measures to reduce energy consumption and decrease CO₂ emissions in the buildings sector have been on the political agenda for years. To support the efforts of both private and public property owners and in pursuit of carbon reduction policy goals, KfW has been promoting investment in energy saving and CO₂ reduction since the beginning of the 1990s. These activities target an important element of the German Federal Government’s autumn 2010 energy concept [BMW, 2010]. The decision to exit nuclear energy has further increased the importance of the building sector’s contribution to energy efficiency and climate protection [BMW, 2011]. It is expected that standards for building efficiency will be raised significantly. In particular, as part of a balanced overall view which considers the burden on those owning or renting property, future revisions of EnEV 2009 (the Germany Energy Conservation Ordinance for Buildings) should gradually develop the standard for new buildings towards the future pan-European “nearly Zero-Energy Building Standard”.

Evaluation of KfW programmes in this area over the funding years 2005 to 2010 showed positive results, not only in terms of investment stimuli, energy savings, CO₂ reduction and impact on employment [Clausnitzer et al., 2010, Clausnitzer et al., 2007, Clausnitzer et al., 2008, Gabriel & Balmert, 2007, Diefenbach et al., 2012], but also in their effectiveness with regard to public finance budgets [Kuckshinrichs et al., 2010b, Kuckshinrichs et al., 2010a, Müller, 2012].

2 Terms of reference and overall approach

The aim of the present study is to provide a brief analysis on the effects which KfW programmes in the areas of energy efficiency and CO₂ reduction had on public finances in the 2011 funding year. The analysis focuses on short-term budgetary effects, i.e. on the effects on budgets during the year in which the measure received support. In doing so it sets out the costs of the programmes and lists the additional revenues gained and reductions in expenditure achieved for each individual type of tax and contributions concerned, and it allocates these to the appropriate administrative authority level

¹ This is a translation of Kuckshinrichs, W., Kronenberg, T. und Hansen, P. (2012), Wirkungen der Förderprogramme „Energieeffizientes Bauen“, „Energieeffizient Sanieren“ und „Energieeffiziente Infrastruktur“ der KfW auf öffentliche Haushalte: Förderjahr 2011, STE Research Report, commissioned by KfW Bankengruppe.

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(federal government, state or municipal) and social insurance funds. The analysis covers the following KfW programmes from the 2011 funding year: “Energy-efficient construction”, “Energy-efficient refurbishment”, “Energy-efficient refurbishment for municipalities”, and “Social investment – energy-related building refurbishment”. In this study, the latter two programmes are combined as “Energy-efficient infrastructure”.

2.1 Modelling approach

Figures for the amount of investment stimulated by these KfW programmes have either been taken from KfW data and existing analyses [Diefenbach et al., 2012] or have been estimated on the basis of individual analyses. In order to represent the full spread of possible investment stimuli, two positions are assumed for this purpose. This spread ranged from “induced investment” – meaning investment that was directly initiated – to “promoted investment” – meaning investment that received some support. The effects on public budgets of the short-term demand thereby generated were calculated using the STEIN model [Kuckshinrichs et al., 2009]. This is an open static input output model (used here without an income multiplier), which was extended to incorporate a module that simulated effects on public budgets. This module captures all the public revenue and expenditure data that is relevant in the context of these KfW programmes and allocates it to the appropriate administrative authority level (federal, state or municipal) and to social insurance funds. The extent of these effects on the public budget is significantly dependent upon the degree to which the additional work that has been generated is satisfied through additional manpower. To cover the range of potential reactions in the labour market, two scenarios were adopted here. In the overtime scenario (OT), the entire volume of work is met from the already employed workers through overtime working; whereas under the additional jobs scenario (AJ,) it is envisaged that additional workers will be hired, thereby avoiding expenditure on unemployment benefits and lightening the load on public finances. For the analysis of expenditure avoided on unemployment, use was made of a new study which determines the overall fiscal cost of unemployment in Germany [Bach & Spitznagel, 2012], produced by the IAB (“Institut für Arbeitsmarkt- und Berufsforschung” – Institute for Employment Research).

2.2 KfW programmes: basic data and data analysis

The KfW programmes examined in this study promote investment in energy-saving and CO₂ reduction measures for new homes, housing refurbishment and buildings which form part of the social and community infrastructure. As in other years, in 2011 the Federal German Government provided KfW with funds to finance low-interest loans and investment grants in this area.

This short analysis is essentially based on KfW data and external assessments on programme costs, lending commitments, effects on jobs and the volume of investment funded in the construction area.³

Table 1 shows the basic data for the 2011 funding year. Programme costs were covered out of a federal special fund (the “Energy and Climate Fund”) and from the budget of the Federal Ministry for Transport, Construction and Urban Development, and are in the following denominated as federal government programme costs. At € 952 million in 2011, these costs are lower than in previous years. Around 100% more federal funding was made available in 2009, when the figure was roughly

³ For individual programmes (Energy-efficient construction and Energy-efficient refurbishment), investment and employment effects were determined using results from the Bremer Energieinstitut (BEI) [Diefenbach et al., 2012, Müller, 2012]. These results relate to investment induced in the construction area through building and refurbishment activity and its subsequent impact on jobs, and are applied here directly.

€ 2,000 million. These funds formed part of the federal government’s economic stimulus package (Konjunkturpaket I) and hence also had a political and economic motivation, in that they aimed to cushion the effects of the economic downturn that followed the financial crisis.

Programme costs comprise the reduction in interest charged and the grants that were provided. The proportion from grants amounted to 2% in 2008, 5% in 2009, 13% in 2010 and 7% in 2011. The federal budget funds also include a handling margin, which KfW receives in return for implementing the programme. The available data does not permit a breakdown into the various programmes.

Table 1: Basic data for 2011 on the following KfW programmes: “Energy-efficient construction”, “Energy-efficient refurbishment” and “Energy-efficient infrastructure”

	Commitment volumes	Investment		Jobs		Programme costs
	€ million	Induced ¹⁾	Promoted ²⁾	Induced ¹⁾	Promoted ²⁾	€ million
Energy-efficient refurbishment	2,847	3,853	3,853	52,000	52,000	Not allocated
<i>Ratio of investment to commitment volumes (rounded)</i>		<i>1.35</i>	<i>1.35</i>			
Energy-efficient construction	3,613	4,890 ³⁾	14,559	66,839 ³⁾	199,000	Not allocated
<i>Ratio of investment to commitment volumes (rounded)</i>		<i>1.35³⁾</i>	<i>4.03</i>			
Energy-efficient infrastructure	119	175	175	2,300	2,300	Not allocated
<i>Ratio of investment to commitment volumes (rounded)</i>		<i>1.47</i>	<i>1.47</i>			
Total: Energy-efficient construction and refurbishment	6,579	8,918¹⁾	18,587	121,139¹⁾	253,300	952

- Data for the “Energy-efficient construction” and “Energy-efficient refurbishment” programmes on commitment volumes, investment promoted and jobs promoted comes from [Diefenbach et al., 2012]
- Data for the “Energy-efficient infrastructure” programme on commitment volumes, investment promoted and jobs promoted comes from KfW (investment and jobs data has been derived from updating the results of [Clausnitzer et al. 2011])
- Data on programme costs comes from KfW
- 1): induced in the sense of having been directly initiated through KfW funds (see below for an explanation);
- 2): promoted through the provision of KfW funds;
- 3): data adjusted by the authors

Source: [Diefenbach et al., 2012, Müller, 2012], own conversion

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The overall stimulus in terms of investment from granting loans and issuing grants derives from the ratio of commitment volumes to programme costs and from the ratio of investment to commitment volumes. The ratio of commitment volumes to programme costs (based on the average of all three programmes) rose from 6.40 in 2010 to 6.91 in 2011, and was thus significantly higher than in 2009.

The ratio of investment to commitment volumes for refurbishment projects in 2011 was 1.35 – somewhat lower than in 2010, but still at the same level as 2009. In the area of new construction, this ratio climbed from 3.91 in 2010 to 4.03 in 2011, and was significantly above the 2009 value. Hence in 2011 more loans and grants were issued (commitment volumes) per euro of programme cost, and more investment per euro of commitment volume was induced than in 2010. Compared to 2009, the overall stimulus achieved was significantly higher.

Induced and promoted investments were differentiated to aid further analysis. A large part of the substantial success these programmes achieved can be traced back to the area of new construction. Because of the lending system structure, investment projects funded in this area cannot be considered entirely as induced investment. The maximum loan in this area is € 50,000 per housing unit; this is therefore capped well below the total investment required for a new building and strictly speaking it must be allocated to increased expenditure for energy-related efficiency. Hence for the ratio of investment to commitment volume in the construction area it is reasonable to adopt (as an approximation) a similar ratio to that for refurbishment projects. However there is no secure empirical data to confirm this. For this reason the presentation also shows the promoted investment option, which takes the upper limit of a potential investment stimulus with a low probability of occurrence. Based on this assumption, investment induced is lower than investment promoted. Taking into account all new construction and refurbishment activity, induced investment amounted to approx. € 8,900 million in 2011, whereas promoted investment for the same year was markedly higher at approx. € 18,600 million (cf. Table 1). In the new construction area, the effect of induced investment on jobs is consequently markedly lower than the impact of promoted investment. Overall, the impact on job numbers (both direct and indirect) of induced investment in construction and refurbishment amounted to approx. 121,000; but based on evaluation results, promoted investment yielded substantially more at 253,000.

3 Budgetary impact of these support programmes

In order to assess the success of these programmes from a macro-economic perspective, it is an essential precondition that the measures were actually initiated by the programme and would not have been enacted by the investors without programme support (cf. also [Schöpe, 2010]). It can be assumed that individual refurbishment measures would have proved profitable for investors even without the support of the CO₂ building refurbishment programme. To what extent these investments would have been undertaken even without financial support is not addressed in this analysis. The possibility that they have generated windfall benefits is therefore no more than speculation; but based on the decisions of a rational investor, it cannot be entirely excluded. However, assuming the investor is an all-knowing “homo oeconomicus” would be setting the bar rather high, and considerations of windfall benefits should be qualified accordingly. The programmes also have another effect: in many cases they create an initial awareness of the subject, and the information and advice provided by KfW serves to reduce investors’ costs in gathering data. Furthermore, it has been seen that although energy-related measures on existing building stock enacted outside KfW funding programmes have exceeded EnEV requirements, they were still significantly worse than those envisaged under the KfW programmes [Diefenbach et al., 2010].

These programmes can relieve the national fiscal burden if they generate increases in government revenues or reductions in government expenditure which exceed the costs of the programme. The increase in revenues and reductions in expenditure for the government arise out of additional

revenue from taxes on sales, taxation of wages and salaries, taxation of company profits, and contributions to the social security system. The savings in government expenditure stem from the reduction in government support payments whenever the programmes lead unemployed people to find employment which is subject to the compulsory payment of social security contributions.

The measures supported by KfW influence the national budget in various ways. During the period of investment there is a short-term effect on demand, as construction activity and the essential preparatory work which precedes it increases the revenues from value added tax, income tax and various other taxes. Other effects emerge over the long term, because savings in energy serve to reduce the annual revenue from taxes on energy supplies. Eventually further effects can arise if employment increases are sustained, property values start to reflect the refurbishment undertaken, or there is a significant impact on knowledge and technical progress.

Table 2 shows the short-term effects of these support programmes on public budgets at an aggregated level for the 2011 funding year. The government receives most revenue from taxation on sales incurred by the investor, taxation on wages, and social security contributions, including the solidarity contribution. For example, taxation on sales induced in 2011 amounted to approx. € 1,690 million and taxation on wages (including the solidarity contribution and the social security contribution) came to approx. € 1,900 million.

Taxation on company profits and property income is the next most important item by some distance. In the overtime scenario, induced investment benefited public budgets in 2011 by a net amount of approx. € 3,000 million. If we substitute promoted investment for induced investment, net benefits are substantially higher at approx. € 7,400 million.

Table 2: Budgetary impact from the investment induced and promoted by these programmes in the 2011 funding year (in € million)

	2011	
	Induced	Promoted
Programme costs	952	
Tax on sales incurred by investors	1,694	3,532
Tax on products, net of product subsidies, incurred by companies	157	330
Other taxes on products, net of other subsidies, incurred by companies	-1	-2
Taxes on wages and social insurance contributions, including solidarity surcharge	1,914	3,995
Taxation on company profits and property income, including solidarity surcharge	237	495
Overtime scenario (OT) (after off-setting programme costs)	3,049	7,398
Expenditure on unemployment avoided	1,271	2,657
Additional Jobs scenario (AJ) (after off-setting programme costs)	4,320	10,055
Source: own calculations	IEK-STE 2012	

The overtime scenario portrays an extreme situation, under which the demand for labour is entirely met by overtime working. Under the additional jobs scenario the expenditure avoided on unemployment costs is of greater significance. This includes costs incurred at the Federal Employment Office, federal and local authorities, as well as in social insurance (health insurance, pension insurance and care insurance schemes). In the case of induced investment these amount to approx. € 1,270 million. Due to the relatively low level of programme costs the net effect in the 2011 funding year is considerable, at around € 4,300 million. Assuming promoted investment, the volume of unemployment costs avoided comes to approx. € 2,660 million, amounting to a net benefit of roughly € 10,000 million. However, a lower level of probability should be assumed for this option.

4 Distribution of anticipated budgetary effects between federal and local authorities and social security

Under German tax law there is a differentiation between federal government taxes, state taxes, municipal taxes and joint taxes (for an overview, see [BMF, 2011]). The latter account for about two thirds of total tax revenues (€ 404 billion out of a total of € 573 billion in 2011 [BMF, 2012]). These revenues are apportioned to the federal government, the states and the municipalities in accordance with a statutory formula. For example, 42.5% of the revenue from taxation on wages and income goes to the federal government, a further 42.5% to the states, and the remaining 15% goes to the municipalities.

Joint taxes (taxes on sales, taxes on wages and income, taxes on corporate bodies and certain taxes on asset yields) are set out in Table 2, and these can therefore be allocated among the regional bodies by using the official allocation formula. Due to limited data availability, taxes on products and production (e.g. taxes on energy products and land taxes) are not modelled individually within the STEIN model, but in an aggregated form. For this reason it is not possible to achieve an exact demarcation between the different regional authorities. To counter this problem, official statistics have been used to calculate what proportion of total revenue from these taxes should be allocated to federal government, states and municipalities. The revenue from taxes on products and production shown in Table 2 has been allocated in accordance with this distribution.

In the additional jobs scenario, the unemployment costs avoided have additional relevance. Use is made here of new data from the IAB [Bach & Spitznagel, 2012]. In their analysis they calculate the total fiscal cost of an unemployed person in 2011 at € 18,900. Of this total figure, 24.7% is attributable to federal government, 7.0% to the regional states and 12% to municipalities. The remaining costs are shared between the Federal Employment Office (31.6%) and other social services (health insurance, pension insurance and care insurance schemes), which bear the balance of 24.7%.

However, these total fiscal costs also include tax revenue losses. If one focuses on the expenditure side, Bach & Spitznagel's analysis [Bach & Spitznagel, 2012] shows that expenditure on social insurance amounts to approx. 21.6% of total fiscal costs per unemployed person, and expenditure on social benefits to approx. 33.9%, i.e. approx. 55.5 %, in total. These expenses are avoided if the demand for additional work is met not from overtime working, but by employing a person who was previously unemployed. On the income side, it is assumed that this makes little difference to the regional authorities and the social insurance institutions, since from an input-output viewpoint it is not significant whether taxes and contributions are paid out of overtime worked or from newly created employment.

There are different levels of expenditure for those in receipt of Level I and Level II unemployment benefit (ALG-I, ALG-II), and in addition different levels of regional authorities are involved in the transfer of funds. For a simplified analysis it is assumed here that, when new employment is created, 51.6% of the expenditure avoided is shared between the social insurance institution (which takes an above-average share of around two-thirds) and the municipalities and the federal government (which take roughly one-sixth each).

Table 3 shows the effects on the budgets of the regional authorities and on the social insurance budget. A conservative approach (using the overtime scenario with induced investment) reveals significant additional revenues for the regional states and for social insurance funds, but less so for the municipalities. After taking account of programme costs, approx. € 350 million of net benefit accrues for the federal government in 2011. Assuming promoted investment, there is a marked improvement in the result for all regional authorities and for social insurance funds, and the federal government also gains a net benefit of approx. € 1,760 million in 2011.

In the additional jobs scenario, the unemployment expenditure avoided in the case of induced investment has a substantial impact. Marked improvements are seen, especially in the social insurance budget (approx. € 2,300 million), but also in the federal government budget (approx. €-560 million) and in the budgets of the municipalities (approx. € 400 million). The states make hardly any gains, due to the system of taxes, contributions and expenditure.

Taking a more optimistic viewpoint (the additional jobs scenario with promoted investment), results in substantial benefits for all the levels of regional authority and for social insurance funds. This shows that in 2011 the federal government profited (by approx. € 2,200 million), as did the regional states (by approx. € 2,270 million), but social insurance funds benefited most of all (by approx. € 4,750 million).

Table 3: Effects on public budgets (regional authorities and social insurance funds) in the 2011 funding year (€ million)

	Federal Government		States		Municipalities		Social Insurance Funds		Total	
Programme costs	952		0		0		0		952	
	Induced	Promoted	Induced	Promoted	Induced	Promoted	Induced	Promoted	Induced	Promoted
Tax on sales	871	1,815	786	1,639	37	78	0	0	1,694	3,532
Tax on products, net of product subsidies	96	201	9	18	53	111	0	0	157	330
Other taxes on products, net of other subsidies	0	-1	0	0	0	-1	0	0	-1	-2
Taxes on wages and social insurance contributions, including solidarity surcharge	221	461	196	408	69	144	1,428	2,982	1,914	3,995
Taxation on company profits and property income, including solidarity surcharge	112	233	99	208	26	54	0	0	237	495
Overtime scenario (OT) (after off-setting programme costs)	347	1,757	1,090	2,272	185	386	1,428	2,982	3,049	7,398
Expenditure on unemployment avoided	212	443	0	0	212	443	847	1,771	1,271	2,657
Additional jobs scenario (AJ) (after off-setting programme costs)	558	2,200	1,090	2,272	397	829	2,275	4,753	4,320	10,055

Rounding errors during addition may lead to minor deviations in the Totals column

Source: own calculations

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5 Conclusion

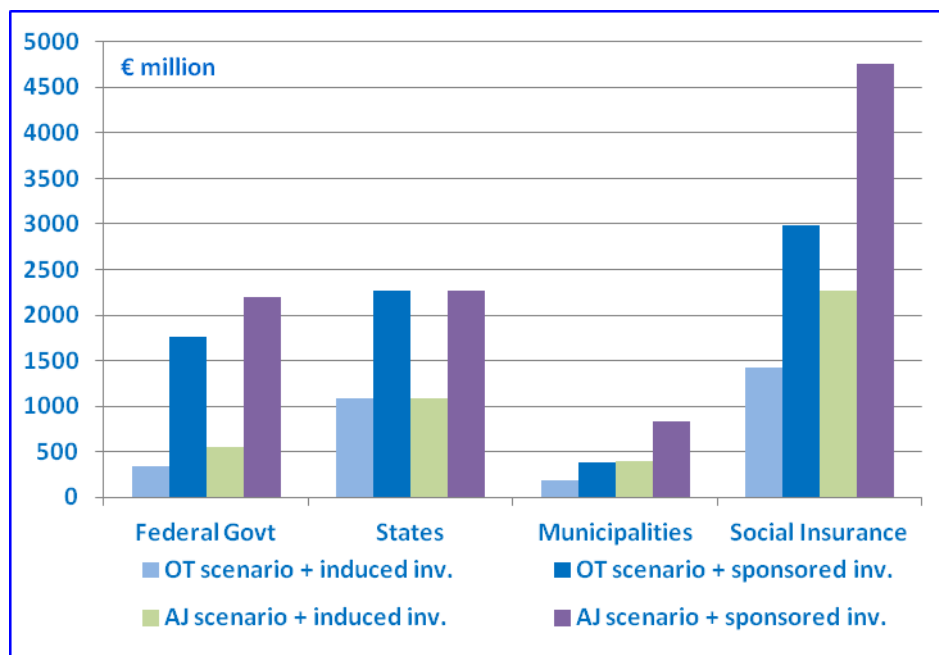
The KfW programmes “Energy-efficient construction” and “Energy-efficient refurbishment” provide low-interest, long-term finance to fund investment in energy-saving and CO₂ reduction measures, both for existing residential building stock and for new construction projects. In 2011 the cost of these programmes (around € 952 million) was borne by the federal budget. These activities are an important component of both the Federal Government’s autumn 2010 energy concept and its June 2011 energy policy concept.

The effect of these programmes on public budgets is of great significance when evaluating their overall performance. These effects arise in the short term, i.e. in the year in which support is provided for the measure, and are the result of programme costs, investments made and the economic activity that follows, which is accompanied by changes in governmental revenue and expenditure. In this context the ratio of commitment volumes to programme costs and the ratio of investment to commitment volumes are of considerable significance. On the basis of data from KfW, relatively high ratios are seen in both cases. Two alternative positions are analysed here, in order to represent the full spread of potential stimuli. This spread ranged from induced investment – meaning investments that were directly initiated – to promoted investment – meaning investments that received some support. In establishing the ratio of induced investment to lending volumes it is reasonable, for the purposes of simplification, to adopt similar ratios to those for refurbishment projects, although there is no secure empirical data to confirm this. For this reason, the various types of investment supported are also presented as supplementary information.

As well as effects in terms of taxation and other contributions, the degree of impact achieved on public budgets also depends on the extent to which the volume of labour required is met by employing additional workers. When assessing the effect on the labour market, two scenarios are considered: “overtime” and “additional jobs”. In each case the effect is so marked that the overall balance for the state is positive. The less that the need for employment induced by these programmes is met out of overtime and the more it is provided through new additional employment arrangements, then the better is the balance of public finances and the greater is the success of the programme, when evaluated from a macro-economic perspective. The “overtime” option offers a very conservative assessment, as it is unrealistic to assume that production activity will have absolutely no effect on the labour market, and so this option represents the lower limit of estimations. The “additional jobs” option operates under the assumption that production needs will be entirely met from additional workers (and hence this represents the upper limit of estimations).

The calculations show the effect of these programmes on public budgets at an aggregated level. A cautious assessment (using the overtime scenario with induced investment) reveals net benefits for public budgets in the 2011 funding year amounting to € 3,000 million (Figure 1). Using the most optimistic but also less probable alternative (the additional jobs scenario with promoted investment), net benefit to public budgets amounts to approx. € 10,000 million in 2011. In both cases, the relatively high ratio of commitment volumes to programme costs and, even more so, the ratio of investment to commitment volumes, are crucial to the overall result. Moreover, the substantial benefit seen in the most optimistic alternative (additional jobs with promoted investment) is also driven by the strong impact on jobs, which was identified in an external assessment [Diefenbach et al. 2012].

Figure 1: Net budgetary benefit to national and regional authorities and social insurance funds



Source: own compilation

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At a disaggregated level, clear benefits are apparent for social insurance funds, the regional states and the federal government, followed by the municipalities. On the one hand the various levels of regional authority share in this via the German tax system through joint taxation (taxes on wages and income, taxes on corporate bodies/ taxes on certain asset yields, taxes on sales), and social insurance funds participate via social insurance contributions and/or lower expenditure on the unemployed; and on the other hand, the federal budget bears the full burden of programme costs. Using a conservative assessment (overtime scenario with induced investment), the 2011 funding year yields a positive balance for the federal government, the regional states and for social insurance funds, but less so for the municipalities. Using the most optimistic calculation (additional jobs scenario with promoted investment), the individual balances for the federal government, the municipalities and especially the social insurance funds come out much better. This results in net benefits for all public budgets in the 2011 funding year, even that of the federal government, which carries all the costs of the programmes. Alongside the revenue released by the KfW programmes for regional authorities and social insurance funds, the unemployment expenditure avoided is particularly significant in this option.

Taken together, the KfW programmes “Energy-efficient construction”, “Energy-efficient refurbishment” and “Energy-efficient infrastructure” can therefore be considered as a financial instrument for residential and climate policy applications which is yielding positive effects, most notably on the budgets of social insurance institutions, but also on the budgets of the federal government, states and municipalities. With the marked effect achieved in the labour market, the budgetary impact for the federal government is positive and led to benefits in 2011 of approx. € 560 million in the case of induced investment and approx. € 2,200 million in the case of promoted investment.

However, in their effect on public budgets these programmes do not hold a unique position, since similar effects could also be outlined for initiatives of a totally different kind with no link to climate protection, provided those initiatives relate to sectors with, for example, a similarly high labour content and low level of import penetration. This programme's special status is based on the fact that the incentives it offers to internalise external effects in the climate area and to promote energy efficiency are accompanied by investment, by an impact on employment, and by public revenue surpluses.

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