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Social impacts of renewable energy in Germany – size, history and alleviation

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Overview

1 INTRODUCTION

The support of renewable energy in electricity generation has been subject to much debate. Tariffs or premiums for renewable electricity generation have turned out as the instrument of choice in 23 EU member states and in more than 100 countries globally. But the financing of RE as well as the resulting burden sharing of additional costs from RE based surcharges differ tremendously by country.

Germany has taken early action in the support of renewables. Additional costs from guaranteed prices meanwhile amount to 18.7 billion Euro (2014) and have nearly doubled since 2010 (see below). This amount is paid by end-consumers of electricity, by means of the so-called EEG (German abbreviation of the renewable-energy-law) surcharge. In 2015 this surcharge amounted to 6.170 ct/kWh and the surcharge for 2016 has been announced in October 2015 to be 6.354 ct/kWh (ÜNB 2015). The level of the surcharge is influenced by several factors. Final demand of energy intensive industry is exempt or on a lower surcharge, not to distort international competitiveness. This mechanism, however, increases the burden on those consumers, which are not exempt. Total additional costs are also determined by the difference between the fixed tariff for renewables and the prices they can fetch on the electricity market. Generally low prices at the electricity exchange, which are partly induced by the high share of renewable, lead to a large difference increasing the total surcharge.

Like other electricity taxes or surcharges, the RE surcharge is regressive, too. For some household higher electricity prices are more than a mere nuisance; the increase in expenditures for electricity decreases the budget for other purposes by a noticeable amount. In addition, low income households often own less efficient appliances, and have fewer possibilities to react to rising electricity prices. These effects have been discussed in the literature for Germany (cf. Bardt, Niehues, Techert 2012a & b;. Neuhoff et al. 2012; Neuhoff et al. 2013a; Bardt, Niehues 2013; Grösche, Schröder 2013; Lehr, Drosdowski 2013; Frondel, Sommer 2014; Heindl et al. 2014; Heindl 2014; Lehr, Drosdowski 2015). International studies also confirm regressive effect of duties or levies on electricity prices (EEA 2012; Flues, Thomas 2015; Heindl, Löschel 2015). The regressive distribution effects of the EEG surcharge is generally considered relatively low (Grösche, Schröder 2013). Especially for households with very low income is the financial burden of the levy noticeable. With an annual electricity consumption of a household of 3,500 kWh the monthly impact of the EEG surcharge including VAT payable in 2015 amounts to 21 Euro.

The paper brings together several strands of results based on research from the research project “ImpRES – Impact of Renewable Energy Sources in Germany”, supported by the

Federal Ministry for Economic Affairs and Energy in Germany[1]. The paper explains the development of additional costs in RE electricity generation, which are part of the annual monitoring process and report Breitschopf et al. different years. It shows the distribution effects of the additional costs, with a particular focus on low income households and it reflects alternative financing mechanisms and their respective distribution effects.

2 ADDITIONAL COSTS OF RE ELECTRICITY GENERATION FROM DIFFERENT PERSPECTIVES

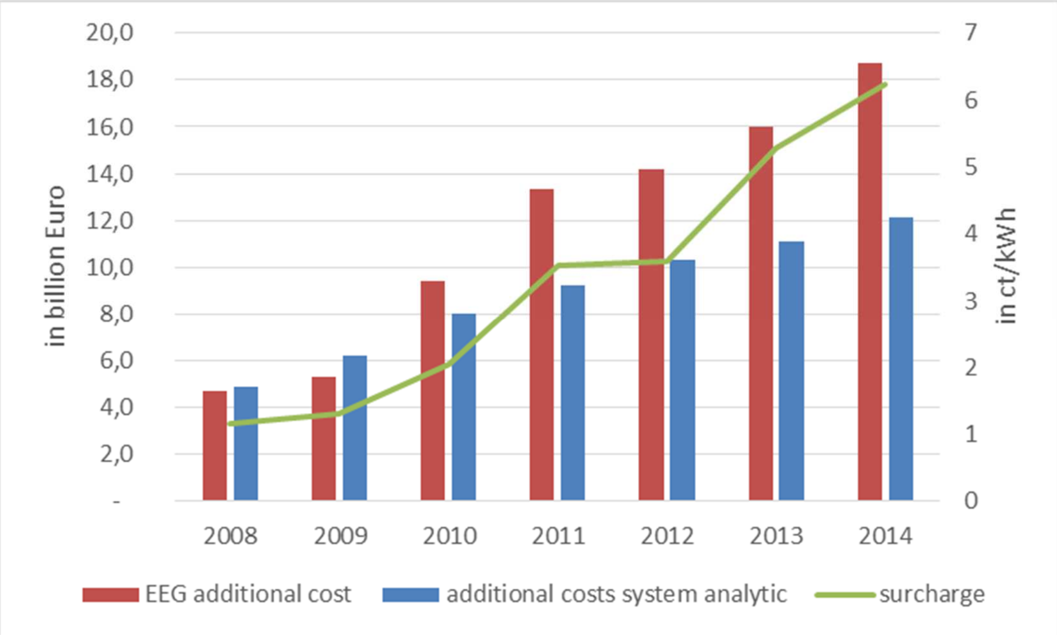
The system analytic view abstracts from the detailed burden sharing process and compares electricity generation costs for a fully fossil fuel and nuclear based system with a system that contain increasing shares of renewable energy. If additional costs are calculated from a system comparison, the results allow statements about the net economic costs of energy from renewable sources, compared to conventional energy. Obviously, additional costs can in principle be positive or negative.

The direct system analytical differential costs of electricity amounted to Euro 12.1 billion higher than in the previous year, 2014. The result depends on a number of factors. First, the cost of new capacities installed in 2014 play a role. A total 18.8 billion euros in Germany were invested in the expansion of renewable energy, with a focus on electricity generation technologies. 85.1% of total investment go to electricity generating technologies.

The second important factor lies in the electricity generation costs of fossil fuel based systems. Since the marginal costs for these technologies are determined by fuel costs, an important role is played by prices of imported coal, oil and gas. Coal prices are falling slightly since 2011; from 2013 to 2014, they fell by 8%. Oil prices fell by 9% and gas prices by 15%. Coal and gas prices are the main driver of falling fossil generation costs. The additional costs therefore grew faster than the addition in capacities installed. Figure 1 gives an overview of the development of the additional costs, calculated according to different approaches and the surcharge paid by the non-privileged consumers. The EEG defines additional costs from renewables as follows: Electricity from renewable sources is fed into the grid and paid for with the respective feed-in tariff, which depends on the characteristics of the respective RE technology (age, system support, geographical location, technology etc.). The transmission grid operator pays the feed-in tariff and sells the RE electricity at the market. If the feed-in from renewables is high, say a clear, hot and windy day, the excess electricity in the electricity market drives the prices attainable for an additional kWh down. The so-called merit order effect leads to very low prices at the market, because most renewables have zero marginal costs.

[1] The contents of the paper are the sole responsibility of its authors and do not necessarily reflect the views of the German Ministry.

Figure 1: Additional costs from RES, determined with a system analytic approach, determined according to EEG (both left axis) and surcharge (right axis)



The figure shows how the additional costs calculated in two different ways differ. Until 2010, the TSOs were supposed to sell fed-in electricity from renewable sources as a band and were reimbursed for processing the fluctuating input from renewables. System analytically determined costs were higher than the costs taken as a base for the surcharge. After the obligation of TSOs to directly market the RE electricity, EEG-costs surpassed system analytical costs. Since the former are the base for the EEG-surcharge, they provide the base for the analysis of the burden on different household types that they create.

3 DISTRIBUTIONAL EFFECTS OF THE EEG-SURCHARGE

The distributional effects of the EEG surcharge on households are analyzed with a simulation model and projected to the future. In the simulation model, behavioral equations reflect consumer demand for goods, as electricity, for instance. Fuel prices, generation costs and surcharges lead to electricity prices, which enter the behavioral equations and have an impact on demand. With rising electricity prices, the consumer can counteract only by declining consumption. For the future, the question is to what extent distribution effects will continue when the EEG surcharge rises. The analysis of burdens by groups of households (based on current expenditure related to higher EEG payments) was carried out with the DEMOS module in the macroeconometric model PANTA RHEI. PANTA RHEI is a model developed for the environmental economic analysis in Germany. Besides an extensive economic modeling modules of energy consumption and air pollution, transportation and housing are part of the system. All model parts are consistently linked. The energy consumption of households and businesses is estimated econometrically in the framework of the energy balances for Germany. The model is solved fully interdependent, that is, that the effects of a measure are recorded on all model variables at the same time and no effects are lost"[2].

Distribution effects of the EEG surcharge are calculated for 35 groups of households (7 kinds of social status differentiated according main earners (HEB) combined with 5 household sizes). Feedback from the economic model leads to shifts between the household groups: higher employment takes households out of the unemployed group, etc. Distributional effects are identified by comparing current expenditure for electricity to income or consumption. Electricity expenditures are modelled taking the different variable which explain energy consumption into consideration. Considering the disposable income, household specific price development payments of households and the development of electricity prices for households empirical correlations are estimated on the basis of the current outputs are updated. The independent variables are updated with model results from PANTA RHEI so that all components of disposable income and increasing prices are determined consistently.

Table 1: Share of expenditure for electricity in household expenditure by household type (in %).

Social status	**2008**	**2012**	**2013**	**2015**
Self-employed	2.5	2.7	2.8	2.8
Civil servant	2.0	2.4	2.5	2.5
White-collar	2.3	2.6	2.7	2.7
Blue-collar	2.8	3.1	3.1	3.2
Unemployed	4.1	4.2	4.4	4.5
Pensioner	2.7	3.1	3.2	3.2
Other	3.0	3.0	3.2	3.2
Household size				
One	2.7	3.0	3.1	3.1
Two	2.5	2.8	2.9	2.9
Three	2.6	2.9	3.0	3.0
Four	2.5	2.8	2.9	2.9
Five and more	2.7	3.0	3.1	3.2

Source: EVS-Sonderauswertung, own calculation

The model is used to analyse different paths for the development of the EEG surcharge. A lower scenario depicts a decrease of the EEG surcharge by 0.3 ct/kWh from 6.2 ct/kWh (2014) to 5.9 ct/kWh in the following year (2015). Household spending rises (except pensioners and Other Non-working households for 2013-2015) over time. Household electricity

[2] Comprehensive model descriptions can be found in Frohn et al. (2003) and Distelkamp et al. (2004). DEMOS (Drosdowski & Wolter 2008) is applied for socio-economic reporting (Drosdowski & Wolter 2012) and has been widely used for the determination of distribution-effects of an eco-tax (Blobel et al. 2011).

consumption is projected without without price respondent adjustments of electricity consumption. The results are shown in Table 1. The first column gives the statistical data, all other columns are simulation results, but the scenario maps the real development in 2014 and 2015.

Based on their spending on electricity, the ranking of households is largely maintained, except between blue and white collar (Lehr, Drosdowski 2015). From the distributional perspective, the shares of current expenditure for electricity in total consumption of households are particularly relevant. Low income households spend a larger share on electricity, which confirms the regressive nature of the surcharge.

Table 2: Share of expenditure for electricity in household expenditure by household income (in %).

Share of expenditure for electricity	**2008**	**Lower scenario 2015**	**Upper scenario 2015**	**Additional costs**
Below 1,300	3.9	4.6	4.7	0.15
1,300 – 2,600	2.5	3.0	3.1	0.10
2,600 – 3,600	2.1	2.5	2.5	0.08
3,600 – 5,000	1.7	2.1	2.1	0.07
5,000 – 10,000	1.2	1.4	1.5	0.05
Total	1.9	2.3	2.4	0.08

Source: Statistisches Bundesamt (2010), EVS-Sonderauswertung, own calculation

Table 2 shows the results from the income class perspective. Annual spending on electricity rises with rising income. Additional costs from the EEG surcharge do so, too. They range between 19 and 45 Euro, with an average value of 30 Euro. Table 2 compares the share of electricity expenditure in available income.

Household from the lower income bracket are burdened twice as much as the average and three times as much as the upper income level. Still, the effects are on a very low level.

The difference reflects the fact that the consumption structure moves with increasing income of basic goods toward luxury goods. The shares rise, especially in the years 2008-2013, in which the rise in prices is stronger than in the following years. Still, comparing 2015 to 2013, yields the same pattern.

As a sensitivity, increases in the surcharge are included in the analysis. As pointed out in the introduction, rising surcharges gave rise to the analysis of social impacts. In the upper scenario, the EEG surcharge increases from 6.2 ct/kWh (2014) to 6.9 ct/kWh (2015). This results in a difference to the lower scenario of about 1 ct/kWh in 2015. A higher surcharge increases electricity prices, but the overall economic effects are rather small. In nominal terms wages increase, but in real terms production, income, demand and employment are lower compared to the low-price scenario This dichotomy also applies to the current expenditure of households that are lower in real terms due to price and income effects and rise nominally. In the respective household groups effects differ, which (due to consumption patterns) reflects changes in disposable income, household specific price developments and the empirical income and price elasticities.

The results are highly dependent on the selected specification for the regression equation to estimate demand. If price-dependent adjustments are not included and the (price-adjusted) current outputs only depend on the (price-adjusted) income. On average, a higher EEG surcharge then causes additional expenditures of just over 33 euros in 2015. The additional amounts spent depending on households groups span about 21 and 63 euros and correspond to the ranking of disposable income. An obvious exception is the working class household who spend disproportionately much for electricity.

The results change if the estimation approaches are extended to the price impact. In four of the seven household groups this influence is found significant (and negative). In this estimation households have the opportunity to adjust their electricity consumption in reaction to increased prices.

Particularly high is the reduction in the workers' and self-employed households, relatively low at the pensioners. The amount of these "savings" directly reflects the magnitude of the price elasticity, which is obviously higher among working households. Conversely, the incomes elasticities tend to decrease with increasing household income. The fact that civil servant households have high additional costs reflects that no significant price dependence was observed.

The above results show that on average small but for the individual household under certain circumstances noticeable negative effects are coming from the EEG surcharge under the current regulatory framework. The remaining sections discuss different opportunities to alleviate the burden or cause a fairer burden sharing.

4 SEARCHING FOR MORE DISTRIBUTIONAL FAIRNESS

Against this background, different approaches to reduce the financial burden of households. The can be summarized under the following headlines (Diekmann, Breitschopf, Lehr 2015):

- reduction of the additional costs of renewables,
- broadening the non-privileged basis,
- financing renewables from public budgets,
- financing renewables from a fund,
- reduction of the electricity tax,
- increase of social transfers or
- improving energy efficiency.

These approaches are briefly described and discussed.

4.1 REDUCTION OF THE ADDITIONAL COSTS OF RENEWABLES

The reduction of additional costs of renewables helps to slow the increase of the EEG surcharge. EEG cost reduction, however, should not be translated into a reduced expansion of renewable energy. If possible, the target corridor should be realized at least economic costs. Least cost should not being measured by a static approach or short terms profits, but understood as dynamic efficiency, including a long-term sustainable technologically diverse path. A focus on technologies which are least expensive today would be myopic and not sufficient.

A fierce competition between investors and operators of renewable energy plants contributes to cost reductions. Such competition is possible in principle under different funding models. The promotion by EEG thus far essentially relies on feed-in tariffs and market premiums to be calculated on the basis of predetermined values. Fixed feed-in tariffs provide high investment security and favourable financing conditions that contribute to the low capital costs of the plant operator. To avoid free riding or windfall profits, the tariff is technology specific. Furthermore, the tariff is degressive, so that learning effects are explored and too high profits cannot occur. Lately, the tariff also reflects new installations in comparison with the corridor. To what extent in the future the cost of EEG can be further decreased by tenders, cannot yet be assessed.

Apart from the regulation, the EEG additional costs also depend on factors that influence prices on the electricity market. Fuel prices and the electricity market design play a role (cf. White Paper of the BMWi, 2015). Also, interactions with the European Emissions Trading Scheme (EU ETS) and national action on climate change is important. Strengthening the EU ETS as the current introduction of market stabilization reserve and other climate protection policy measures in power plants lead to an increase of the market price for electricity. Thus, the additional costs of renewable energy and the increase EEG surcharge are reduced. Nevertheless, consumer prices increase.

Although future costs of RE expansion can be kept at bay, the largest share of the surcharge stems from installations which have been built in the past and at higher prices.

4.2 BROADENING THE NON-PRIVILEGED BASIS

The EEG differential costs will be allocated primarily to the non-privileged final consumption of electricity. Exemptions for energy-intensive businesses under the special compensation scheme and for self-consumption (self-consumption of self-generated electricity) reduce the reference base and thus increase the financial burden of other power consumers. A reduction of such privileges could contribute to a reduction of the surcharge (cf. Löschel et al 2012).

Introduced in 2003 and thereafter repeatedly adapted, the special compensation scheme has determined the redistribution of the EEG amount. For the years 2014 and 2015 this volume is of the order of around Euro 5 billion per year (Horst 2015). In recent years, this volume increased. This increase was as a result of rising EEG additional costs and the expansion of the circle of beneficiaries.

Auto-production initially was not included in the EEG surcharge. However, this creates (as with other levies or taxes) an advantage which distorts the incentives for auto-production. The auto-produced self-consumed electricity plays an important role from an economic point of view. Of total net electricity consumption of 530.6 billion kWh in 2013, the conventional auto-generation was (mostly in cogeneration) 60.7 billion kWh; on top of this came self-consumption of solar power (1.4 billion kWh, Prognos 2014).

In the discussion preceding the latest EEG amendment suggestions were developed for the special equalization scheme and auto-production (Neuhoff et al. 2013b, Matthes, Cludius et al. 2014). According to some authors, the EEG surcharge for the non-privileged electricity consumption could be reduced by more restrictive special rules by up to 20% without the increasing electricity costs of trade-intensive companies to an extent that reduces their competitiveness on global markets.

With the EEG 2014, the special equalization scheme has been redrafted taking into account the requirements of the environmental and energy aid guidelines of the European Commission in April 2014 and the rules for self-consumption and auto-production changed. Auto-production from more than 10 kW systems participate in the surcharge. For electricity from renewable energy plants and high efficient cogeneration plants reduced contributions 30-40% of the surcharge have to be paid. In the special equalization scheme, auto-production is taken into account and thus favored as purchased electricity (Bundesregierung 2014, P. 32).

To reach a noticeable shift of the burden on households, a larger participation of now exempt enterprises would be necessary.

4.3 FINANCING RENEWABLES FROM PUBLIC BUDGETS

Some authors asked: Why not pay for renewables from public budgets? (Hüther 2012; Verbraucherzentrale Bundesverband 2013; Bardt 2014; Heindl, Schüßler, Löschel 2014). They argue that parliament would have more control, regressive effects could be reduced, and external effects from technology diversity justify the subsidy. If no new taxes shall be introduced, the payment can substitute other public expenditures or be financed from public debt. Bardt, Brügelmann, Niehues, Schaefer 2012 studied income and distribution effects of different tax increases to financing EEG costs in 2013, i.e. costs of Euro 18 billion. The authors analyze additional sales tax, electricity tax and income tax.

The sales tax is designed as VAT and burdens private consumption. The standard VAT rate is currently 19%, with a reduced rate for food, books and other necessities. VAT acts regressively, this effect can be mitigated by a differentiation of tax rates. To finance the EEG, the rates could be increased according to the authors to 21 % and 8 % respectively. Only in the lowest income bracket people would be better off compared to the EEG surcharge.

The electricity tax is levied on the consumption of electricity, benefits apply to enterprises in the production sector. The regular rate of the electricity tax is currently 2.05 ct/kWh (excluding VAT). For private households, the current tax acts regressively. To finance renewables from the electricity tax, it could be increased by 2 ct/kWh, whereby, however, electricity-intensive businesses that currently benefit from the compensation scheme of EEG would be excluded. In combination with a VAT increase (to 20% and 8%), the average load of private households would also increase by more than the EEG surcharge, while the regressive distribution effect in this variant would be higher than in the case of a pure VAT increase.

The income tax is progressive, so that lower income households are charged less than high-income households. Renewables could be financed in the form of a solidarity surcharge ("Energy Soli"). The solidarity surcharge is currently 5.5 % of income tax. For financing renewables, this rate could be increased as calculated to 12.5 % (with an electricity tax increase to 9.5 %). The average burden on households would thereby also increase, but result in a significant relief for low-income households. Thus, the regressive distributional impact would be replaced by a progressive burden. The incentive to save electricity, however, would be reduced.

In all tax variants, private households will be more burdened than with the EEG surcharge, while companies would be relieved. A significant reduction in the burden of lower-income households would be attained only by increasing the income tax. Against this background, Hüther (2012) suggests an “Energy Soli”.

However, there are strong reasons against fully financing of the EEG costs from public budgets:

1) Although Parliament should basically control the cost of support policy, financing from the respective annual budget can be problematic if this is associated with the risk of a stop-and-go policy. A steady expansion of renewables may be jeopardized.
2) Funding by taxes alleviates the distribution effects only to a certain extend. A regressive distributional impact is avoided only in the case of increasing the income tax whose implementation, however, (if only in view of the recent criticism of the solidarity surcharge) is also likely to encounter political resistance.
3) Energy savings incentives are reduced.

Therefore, the EEG costs should continue to be basically funded by a surcharge on electricity prices.

4.4 PARTIAL FINANCING OF RENEWABLE ENERGY FROM A FUND

After a sharp rise in the EEG surcharge in 2013 suggestions were discussed to finance renewables at least partly from a fund. The aim is to reduce the current burden on electricity consumers through the EEG surcharge by redistribute a portion of the cost (costs of old or market distant technologies) and shift into the future. The evaluation of the introduction of a fund depends largely on how it is justified, designed and financed. For this purpose, in studies of the Öko-Institut and the IASS different scenarios were analyzed (Matthes, Haller, Hermann, Loreck 2014; Matschoss, Töpfer 2015).

Without establishing a fund, the annual EEG differential costs in the Reference Scenario of the study by the Öko-Institut would be (at a real constant electricity price of 40 Euro/MWh) by 2035 in the order of Euro 20 billion (at prices of 2014) and then in 2050 to rise to around Euro 28 billion (ca. 7 ct/kWh). Three models are considered:

In the first (Fund for stock of systems already installed) past investment is refinanced from the fund. There is a "vertical cost cut", as the new surcharge only includes new installations and 2015 abruptly drops to zero. Over the next two decades, The fund has to pay Euro 231 billion, the annual amount would start from around Euro 20 billion in 2015 and continuously decrease. The annual total surcharge would roughly increase by 2035 to the initial level of 2014 and thereafter develop as in the case without funds.

In the second model (Fund for surcharge ceiling) the EEG surcharge for non-privileged electricity consumers (as proposed by Aigner, 2013) may only amount to a nominal 4.9 ct/kWh and amounts above this limit will be fund financed ("horizontal cut"). The real surcharge amount would decline steadily to around Euro 10 billion in the year 2050. Accordingly, the annual payment from the fund would increase to Euro 18 billion in 2050. The funds’s total amounts to Euro 266 billion over time.

In the third model (Fund for tariff ceiling) tariffs above 9 ct/kWh are paid by the Fund instead of the surcharge. In this model, the surcharge would initially be reduced to 3 ct/kWh, again reach the initial level in 2035 and then continuously increase to (real) 6 ct/kWh in the year 2050. The Fund needs a sum of Euro 254 billion.

All three models need rather large amounts. In particular, the first model (existing plants) seems unconvincing because of the surcharge declining sharply at first only to then rise sharply again. IASS (Matschoss, Töpfer 2015) suggests a modification of the third model with a focus on innvovation related additional costs. This reduces the financial burden in the immediate future, but the reduction of the burden on the consumer will also be rather small.

Whichever costs are paid by the fund, the question arises how the fund could be financed. The discussion of various fund models leads to the conclusion that the EEG would ultimately be partially funded through the state budget. However, this could question the "total architecture" (Matthes, Haller et al 2014) of the EEG. An EEG fund could only partly contribute to a fairer intertemporal distribution of cost burdens.

4.5 REDUCING THE ELECTRICITY TAX

To partially compensate for the financial burden on electricity consumers by increasing EEG surcharges, the electricity tax could be lowered. As a general lowering of the electricity tax would benefit households with high power consumption, the DIW Berlin has proposed instead a basic allowance for the electricity tax (Neuhoff et al. 2012). The basic allowance would be applied for all households equally. Because the basic allowance for low-income households covers a larger share of electricity consumption than in high-income households, low-income households would thus be disproportionately relieved of the electricity tax.

This example shows that a reduction of the electricity tax could partially counteract the adverse effect of the surcharge. The monthly decrease of the burden of this adjustment to a private household, however, would be quite low.

4.6 INCREASE OF SOCIAL TRANSFERS

Due to the regressive distributional impacts of electricity price increases, the question arises, to what extent additional financial burdens on the electricity consumers call for adjustments in the area of social policy (Neuhoff et al. 2012, Tews 2013). At the center of social policy is ultimately people's participation in society. In a narrower sense social policy should redistribute (e.g. social assistance) and hedge various risks (e.g. retirement). Next to general distribution aspects, in particular the protection of vulnerable groups is an aim of social policy.

A low-income one person household (bottom 15%) spent in 2008 by-average Euro 28.12 per month for electricity (without heating) (see above). The most recent increases in electricity prices are not immediately covered.

Due to the automatic adjustments of benefits and the relatively small effects that come from delays in updating the transfers, currently a general adjustment of the rules for social assistance does not seem called for. The problem of households who would be eligible for transfers but do not apply, cannot be solved through improvements of the transfers.

4.7 IMPROVING ENERGY EFFICIENCY

Energy expenditures are the product of energy price and energy consumption. Thus, price increases can be at least partially offset by reduced consumption. The power consumption can be reduced mainly by more efficient equipment and improved user behavior. Great saving potentials exist, e.g. for refrigerators and information technology equipment.

Due to different barriers this potential remains untapped. Barriers include lack of information and motivation and financial barriers (lack of profitability or access to finance) particularly in low-income households. Several tools are already in place: information and consulting by the federal government, various agencies, consumer organizations, and for example, the German Caritas Association. In addition, financial incentives can help to ensure that energy efficiency increases in private households.

A special focus on low-income households have the power saving checks by Caritas and energy and climate agencies (www.stromspar-check.de). An extension of these programs alleviates the burden and is useful from an environmental perspective.

5 CONCLUSION

The social acceptance of the energy policy depends inter alia on how high the entire financial burden is, and how it is shared between households and enterprises. Simulation results show the increase in households' expenditure for electricity. The average effects are small. The simulation further confirm the regressive effects of the EEG surcharge. Large households, the lower income bracket and non-income households are more burdened compared to high-income households. The reason is twofold: firstly, these households spend a larger share of their income on electricity and secondly, they have less opportunities to adapt. Against this background, different approaches have described, how the financial burden on electricity consumers through the EEG could be reduced as a whole or for specific consumer groups such as low-income households.

If renewables were cheaper, future increases of the surcharge could be moderate. The financial burden of non-privileged end consumers could be reduced by widening the non-privileged consumption basis. Therefore exceptions for energy intensive companies by the special compensation scheme and for the self-consumption should be limited. The competitiveness of energy- and trade-intensive companies should not be jeopardized.

Financing of EEG from public budgets rather than the levy could counteract a regressive distribution effect. However, they would change the basic character of the EEG and would in turn be associated with considerable problems. There is the risk of a stop-and-go funding policy depending on the respective budgetary situation. In addition, the financial incentives for energy efficiency and energy savings would be reduced. Therefore, the EEG costs should continue to be basically funded by a levy on electricity consumption.

A partial financing of the EEG by an EEG fund could appear useful only if the EEG costs were only temporarily high and fell considerably after a few years.

To partially compensate for the financial burden on electricity consumers by increasing EEG surcharges, electricity tax could be lowered. Through an allowance the energy saving incentive would be kept. The relief effect would be fairly limited.

Electricity price increases may be at least partially offset by reduced consumption. Moreover, targeted financial incentives for low-income households can particularly contribute to reduce power consumption and hence electricity costs can be reduced.

All in all, the discussion of the various proposals shows that no simple silver bullet for reducing the distribution effects of the EEG surcharge. In particular, for risk of poverty households the increase in electricity prices can lead to significant burdens, unless they are offset by the adjustment of social benefits. In addition to the expected price decreases for renewables, the special rules for energy-intensive companies should continue to be critically examined in order to limit the overall burden of non-privileged electricity consumers. In addition, attention should be directed specifically to the financial burden of low-income households in the discussion of distribution effects. On the part of social policy it must be ensured that the benefits meet the current requirements.

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