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The Innovation Fund as a Complementary Financing Model for Renewables

Dr Patrick Matschoss, Prof. Dr Klaus Töpfer

IASS POTSDAM

* This Policy Brief is based on the 2015 study by Patrick Matschoss and Klaus Töpfer: *The Innovation Fund. A Complementary Financing Mechanism for Renewables and a Model for the Future Financing of Infrastructure*?, IASS Study, February 2015 (hereinafter cited as Matschoss & Töpfer 2015), which provides detailed background information on different fund models as well as describing how they work and assessing their advantages and disadvantages. All prices are real 2014 prices. Thanks to Carolin Sperk for her review of this Policy Brief and support in the preparation of the IASS Study.

In Germany, the costs of renewable energies are currently financed by a surcharge on the price of electricity. There are, however, many good reasons for a more broad-based financing of the Energiewende – not least the demands of innovation and technology policy. Above all, the fact that the reorientation of the entire German energy supply system is a strategic project involving the whole of society, a collaborative endeavour, makes it worthy of public financing, even in the longer term. Until now, the cost of developing technologies and expanding capacity for renewable energies – a significant part of the Energiewende – has been covered by the surcharge provided for in the German Renewable Energies Act (EEG) and thus by the current payments of non-privileged electricity consumers.[1]

To facilitate the further expansion of renewables, the Transdisciplinary Panel on Energy Change (TPEC) at the IASS therefore recommends an alternative part-financing of the costs through an Innovation Fund and is currently putting forward proposals on the design of that fund as well as various refinancing options. In the process, more general questions in relation to the financing of major societal infrastructure projects – in the context of the Energiewende and other areas – and involving institutional investors are also being investigated.

The transfer of payment obligations – especially the costs of technological development – from the EEG system to a fund would bring several advantages: first and foremost, it would show that the transition to renewables already makes economic sense. That would send an important message not only to German electricity customers but also to international observers of the Energiewende. It would become clearer that electricity generated from renewables is not just a sound environmental and economic option for wealthy states like Germany. Secondly, such a fund would put renewables on a more level playing field with conventional energy technologies. And thirdly, more broad-based financing would make the Energiewende the collaborative endeavour it is supposed to be.

■ **Recommendation 1:** The past and future costs of technological development for photovoltaic and offshore wind energy, defined as that portion of the EEG surcharge above 9 ct/kWh, should be taken out of the EEG system and financed via a complementary Innovation Fund.

■ **Recommendation 2:** With the introduction of such a fund, the EEG surcharge should not be allowed to fall suddenly but rather kept at its current level in order to avoid the annual, controversial surcharge increases for electricity customers that would otherwise ensue.

■ **Recommendation 3:** At political level it must be decided – firstly – whether the financing of the fund should be much more broad-based than today in keeping with the notion of a collaborative endeavour, i.e. via public spending as opposed to payments within the EEG system, and – secondly – whether those payments should be stretched over a longer period through borrowing (either public borrowing or within the EEG system).

[1] Non-privileged electricity consumers are charged the EEG standard rate. However, around 30% of total electricity consumption (primarily in energy-intensive industries and industrial own generation) is privileged and charged at just 0–10% of the EEG standard rate.

1. Proposal for an Innovation Fund

The past and future costs of technological development for photovoltaic and offshore wind energy, defined as that portion of the EEG surcharge above 9 ct/kWh[2], should be taken out of the EEG system and financed by a complementary Innovation Fund. Since payments for onshore wind energy lie below this mark as it is, they should continue to be financed solely via the surcharge. Payments for biomass may lie above this mark, but a development that would significantly lower costs is unlikely in the case of these technologies. Thus in terms of innovation, there is little to justify their inclusion in a fund that is intended to cover the costs of technological innovation (Matschoss & Töpfer 2015, 15–16).

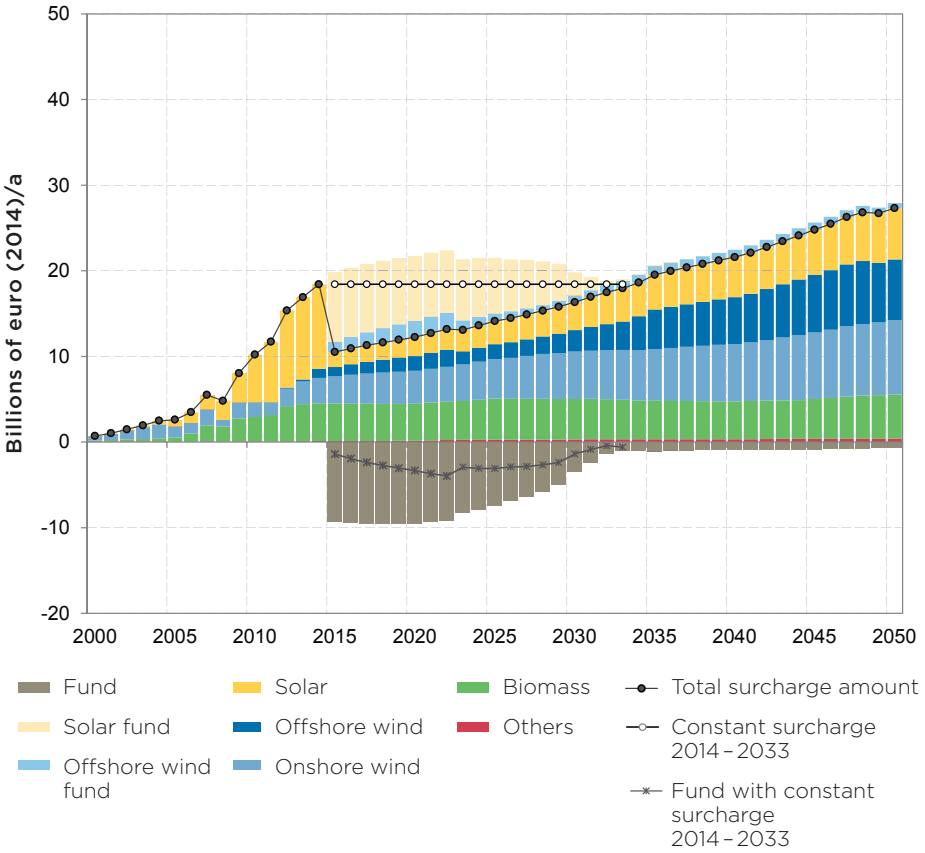
Were the fund to be introduced in 2015, the total surcharge amount (and with it the EEG surcharge in ct/kWh) would fall abruptly before rising gradually, but at a lower rate than without the fund. Since this drop would reduce the incentive to use electricity efficiently, and given that increases in the EEG surcharge have always faced strong political resistance, we recommend not lowering the EEG surcharge despite the introduction of the fund. It should instead be kept at its current level until such time as the 'stable surcharge bonus' has been exhausted and the surcharge exceeds its previous level regardless of the fund.

A study by the Oeko Institute presents a model projection of the EEG system up to 2050, which predicts the EEG payment obligations and differential costs[3] that will have accrued by then and evaluates various fund models. This projection implies that by 2050 renewables will account for 80 % of power generation and be financed via the EEG surcharge. Thus, the differential costs that will have accrued by then are not (solely) incurred as additional costs, but represent rather a (partial) reallocation of 'normal' electricity costs to the EEG surcharge. The switch to direct marketing that was ushered in by the 2014 EEG and the possible forthcoming switch to tendering processes do not call these findings into question, since they merely represent a competitive determination of payment amounts. The same applies to other instruments that could be introduced in future, such as capacity charges for renewables. The sole purpose of the projection is to evaluate various fund models. It is not meant to clarify the general issue of how to organise an electricity market in the case of leading technologies with minimal or no marginal costs (PV and wind).

[2] Most proposals regard costs in excess of 9 ct/kWh as a contribution to technological development.

[3] The difference between payment obligations under the EEG and proceeds from sales on the wholesale electricity market.

Figure 1: IASS fund model 'modified payments cap'



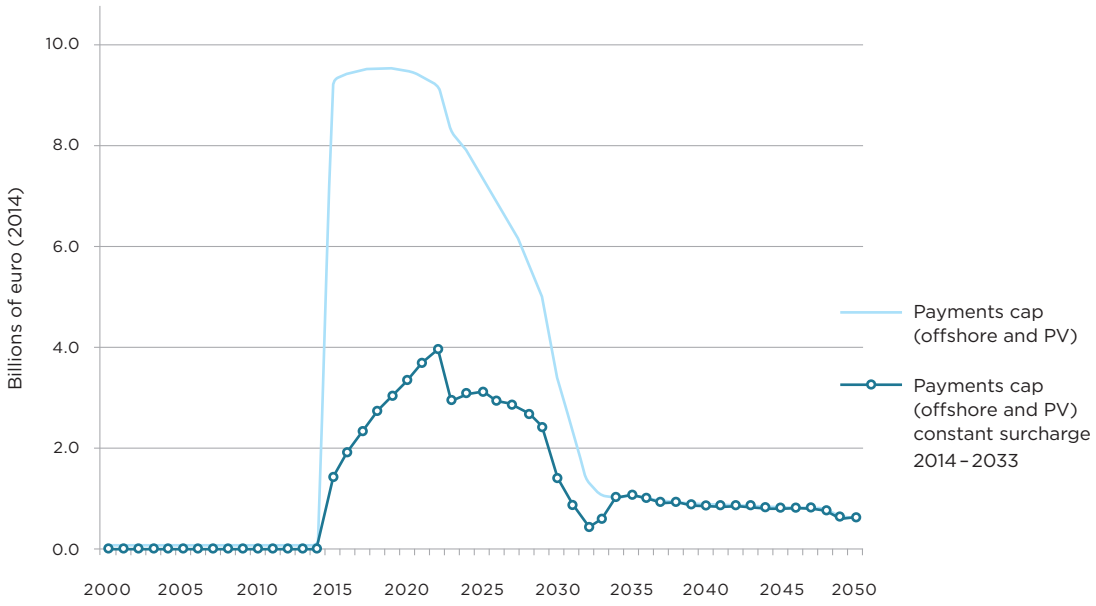
Source: Matschoss & Töpfer 2015, 16, fig. 2 (IASS, based on Matthes et al. [2014b, 51, fig. 5–6])

Figure 1 is a visual representation of the proposal (electricity price scenario €40/MWh, 2014 prices). The differential costs that add up to the total surcharge amount are represented above the timeline with a different colour for each technology. The darker colours represent that part of the total surcharge amount that will continue to be financed by the EEG surcharge (the black line indicates the total). Lighter colours (above the black line) represent the remainder that is expected to be financed by the fund, i.e. the share of photovoltaic and offshore wind energy that is above 9 ct/kWh. Given the different levels of remuneration for each technology, the shares financed by the surcharge on the one hand and the fund on the other vary from one technology to the other. A mirror image of the fund is represented below the timeline. The abrupt drop in the surcharge after the introduction of the fund is obvious. The dotted horizontal line (2015–2033) at the level of the 2014 surcharge represents the scenario where the EEG surcharge does not drop. The more modest fund that would result from that is represented by the broken line below the timeline (i.e. the area between the timeline and the broken line). All conceivable permutations of a partial drop in the surcharge and part-financing of the fund are also possible.

2. Progression of fund and development of EEG surcharge

Were the fund to be introduced in 2015, there would be an additional annual requirement of EUR 9 to 9.5 billion in the first eight years (see figure 2). After that, the annual volume of the fund would shrink over a period of ten years to the relatively constant requirement of around EUR 1 billion per year; it would then continue to fall gradually before plateauing at around EUR 0.6 billion euro by 2050. Were the surcharge to be maintained at its current level in the period from 2015 to 2033 despite the introduction of the fund, the additional financing requirement for the first 20 years would be less than half. In this scenario, the fund would rise gradually from around EUR 1.4 to 4 billion per year over the first eight years, before sinking to around EUR 0.4 billion in the period from 2023 to 2032. The 'bonus' that would arise from not allowing the surcharge to sink would be 'exhausted' by 2034, when the annual financing requirement would reach a level identical to the scenario without a constant surcharge.

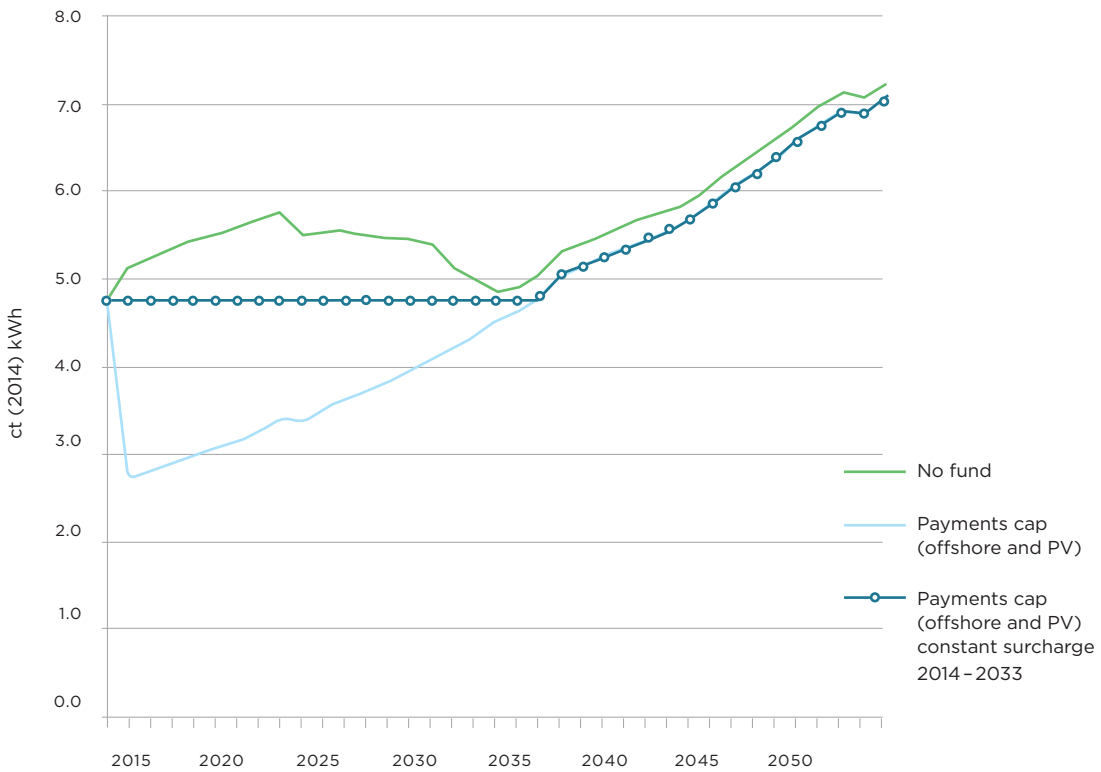
Figure 2: Progression of the fund with and without a constant EEG core surcharge 2014 – 2033



Source: based on Matschoss & Töpfer 2015, 18, fig. 3 (IASS, based on Matthes et al. [2014b])

Thus most of the required financing would be due in the first two decades after the introduction of the fund. And when the surcharge is not allowed to drop, the financing requirement is more than halved for this period before it begins to follow the same pattern as the scenario without the fund from 2034 on. The 'golden end' (recovery of profits made by renewable generation sites after the end of the surcharge period) will only begin to generate significant amounts from 2030 on – an average of EUR 0.75 billion per year – and could thus mainly be used to cover the financing requirements of an Innovation Fund when they level out. All other options either do not require the construct of a fund (diminishing EEG exemptions) or lead simply to shifts within the price of electricity (electricity tax).

Figure 3: EEG Core Surcharge



Source: based on Matschoss & Töpfer 2015, 19, fig. 4 (IASS, based on Matthes et al. [2014b])

The (core) EEG surcharge[4] (figure 3) would fall suddenly by 2 ct/kWh on the introduction of the fund. After that, it would begin to rise steadily – but at a slower pace than without the fund – until 2050, returning to its 2014 level by 2033. If, as recommended, the surcharge is not allowed to drop, it will by definition remain constant in the period from 2014 to 2033. The new EU state aid guidelines will not affect existing facilities, since the latter were promised funding prior to the introduction of the fund. In the case of new facilities, the fund is likely to be deemed state aid. It would, however, be permissible, as long as the advantages it grants conform with the aid guidelines. In other words, the permissibility of this form of assistance will be determined on the basis of the guidelines. Yet the decision on the nature of refinancing (state or private) is up to the individual Member State.

[4] 'Core surcharge' refers to the total surcharge amount when other payments included in that figure such as corrections due to deviations from prognoses, liquidity reserve, etc. are not taken into account.

3. Refinancing the fund

For the introduction of the fund, it is important to be aware of the refinancing options that exist and the landmark political decisions they require. This relates to two dimensions: on the one hand, a decision must be made on whether the financing of a fund should, in keeping with the notion of a collaborative endeavour and as recommended by TPEC, be much broader-based than it is today, i.e. funded through public spending as opposed to payments within the EEG system. On the other hand, the question of whether current payments should be reduced and stretched over a longer period through borrowing – to implement a pay-as-you-use principle over time – needs to be resolved. This could be done either as part of public financing (state borrowing) or within the EEG system. Various permutations of these two basic dimensions are possible, with each giving rise to different distribution (who's paying?) and efficiency/cost effects (how much has to paid in total?). Table 1 represents the different options and their effects (keeping the fund within the EEG system with no credit financing would be equivalent to the status quo). Of course, hybrid models would also be possible.

Table 1: Distribution and cost/efficiency effects of different financing options

	Distribution effect	Cost/efficiency effect
Public spending today: higher taxes or consolidation	In accordance with the resulting burden on people and companies **today**	
Future public spending/further borrowing: state stretching of payments	In accordance with the resulting burden on people and companies **in the future**	Additional credit costs in accordance with state borrowing conditions
Credit financing within the EEG system: EEG stretching of payments	Non-privileged **future** electricity consumption	Additional credit costs ■ Possibly in accordance with state borrowing conditions (e.g. KfW guarantee) ■ Otherwise possibly higher
EEG today	Status quo	Status quo

Source: Matschoss & Töpfer 2015, 20, Table 3

Public financing would be in line with the aforementioned broader societal financing of the collaborative Energiewende project. In terms of distribution, that would mean a reallocation of financing from non-privileged electricity consumption to the taxable entity. When it comes to reciprocal financing, various tax increases and/or spending cuts are conceivable, each of which would have different distribution effects. As a further distribution effect, the further state borrowing option would entail a partial transfer of payment obligations to tomorrow's taxpayers. Since further state borrowing may fall under the scope of the debt brake enshrined in the German constitution, it would be necessary to check whether the introduction of a special state fund would be an option. Several examples of this kind of fund can be found in the history of the Federal Republic of Germany (Burden-sharing Fund, German Unity Fund, residential construction debts as part of the Redemption Fund for Inherited Liabilities, etc.).

With regard to efficiency/cost effects, capital market financing would mean additional credit costs. In general, the current low interest rates offer good conditions, and the favourable credit terms for state bonds could be availed of in the context of new state borrowing. Credit financing within the EEG system (i.e. via the surcharge) would, on the other hand, only amount to a partial temporal shift of financing within non-privileged electricity consumption. The question of whether a fund within the highly regulated EEG system qualifies for the same favourable credit conditions as state bonds also needs to be investigated. Alternatively, processing via a state institution (e.g. the KfW) might be conceivable in order to guarantee such conditions. Otherwise the costs would be correspondingly higher.

Once a decision has been taken on a specific kind of financing, options for implementing it in a way that would minimise costs must be examined. Thus, in the case of public financing the question of whether there is in fact a need to establish a fund would have to be clarified. Alternatively, a separate disclosure of the share represented by the fund in the total EEG surcharge amount and a corresponding subsidy from the state (similar to that provided to the pension fund) could suffice and lower transaction costs accordingly.

4. Recent debates and the fund as a model for the financing of infrastructure

The search for alternative models for financing the EEG costs must be seen in the context of the growing financing challenges faced by major infrastructure projects, some of which are connected with the Energiewende and some of which are relevant to other areas (digital networks, transport infrastructure, etc.). Yet despite the arguments in favour of a publicly financed Innovation Fund, public financing is increasingly controversial, and some recent political developments seem to point in an entirely different direction. In addition to the 'debt brake' and 'breaking even', German discussions have recently been revolving around direct user financing, for example in the form of a road toll. At the same time, the downside of low interest rates is that life insurance companies, for example, are increasingly hard-pressed to meet their interest payment commitments. So greater involvement of institutional investors may be advisable for sociopolitical and macroeconomic reasons. Such investments can be attractive for institutional investors. In this way, life insurance companies and other institutional investors can provide their (considerable) funds on terms that are – for infrastructure projects – relatively favourable. However, before this can happen, the regulatory barriers that make it difficult for life insurance companies to invest in anything other than state bonds must be removed. An Energiewende that is funded via capital markets (rather than via the EEG) could set an example for the financing of other infrastructure projects. Linking pension funds to infrastructure in accordance with the principle of pension funds financing infrastructure projects and the return on those projects flowing back into pension funds would ultimately mean that a larger share of the returns generated would remain in the country. Such a link has the potential to strengthen the general public's identification with and acceptance of the intergenerational and future-oriented Energiewende project.

TRANSDISCIPLINARY PANEL ON ENERGY CHANGE (TPEC)

The Transdisciplinary Panel on Energy Change (TPEC) at the IASS provides scientific guidance to drive and shape energy transitions in Germany, Europe and beyond to fulfil the promise of sustainable energy for all. As a facilitator of transdisciplinary research and dialogue, TPEC engages with stakeholders from politics, civil society and business in Germany and around the world to connect successful practices, lessons learned and opportunities sparked by the German Energiewende with the experiences of energy transitions elsewhere. Our focal points include the international dimension of the Energiewende, the financing and flexibility of the future energy system, political and financial ownership in energy transitions, renewable energy as a development opportunity, and the transition from coal to renewables, including its social and economic implications. As team of researchers with various scientific backgrounds, we take a transdisciplinary, independent approach to the transition, serve as dialogue forum for all stakeholders, and provide recommendations with a long-term policy perspective.

Institute for Advanced Sustainability Studies (IASS) e. V.

Founded in 2009, the IASS is an international, interdisciplinary hybrid between a research institute and a think tank, located in Potsdam, Germany. The publicly funded institute promotes research and dialogue between science, politics and society on developing pathways to global sustainability. The IASS focuses on topics such as sustainability governance and economics, new technologies for energy production and resource utilization, and Earth System challenges like climate change, air pollution, and soil management.

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Editing:
Corina Weber

Translation:
Dr Anne Boden

Address:
Berliner Strasse 130
14467 Potsdam
Germany
Phone 0049 331-28822-340
www.iass-potsdam.de

e-mail:
media@iass-potsdam.de

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