



Position Paper of the
European Energy Exchange and EPEX SPOT

Further Development of the
Renewable Support Schemes in Germany

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1. Introduction

The current version of the German Renewable Energy Act (EEG) has effectively led to a significant expansion of a large variety of technologies for the generation of electricity from renewable sources within Germany. In addition, the EEG introduced the possibility of direct marketing in 2012, allowing to actively trade electricity generated from renewable resources (“renewable energies”) and to bring them closer to the market.

Expansion targets for renewable energies confirmed in the German coalition agreement

The broad technology basis achieved by the EEG is required in order to meet the expansion targets of the current German federal government's energy concept: In 2020, more than 35% of the energy consumed in Germany is to be generated from renewable resources and this amount is set to increase to 50% in 2030 and, ultimately, to 80% in 2050. Furthermore, the expansion targets have been confirmed and specified in more detail in the current coalition agreement between the CDU (Christian Democratic Union), the CSU (Christian Social Union) and the SPD (Social Democratic Party). The coalition agreement states that: *"The renewables expansion will be continued within a statutory expansion corridor: 40% to 45% by 2025 and 55% to 60% by 2035. The progress in terms of target achievement, grid expansion and affordability will be checked on an annual basis [...]."*ⁱ

EU emissions trading remains the decisive climate protection instrument

As a result, the further promotion of renewable energies is both desirable and sensible from a policy perspective. Nonetheless, the EU Emissions Trading System (ETS) is the decisive instrument for attaining CO₂ reduction targets because it permits the cost-efficient avoidance of CO₂ emissions across different sectors. Therefore, the ETS should be strengthened as the main instrument of climate policy, regardless of national rules on the promotion of renewable energies. This means that the targets should be based on the long-term framework up until 2050, supported by a sustainable structural reform of the trading system.

Stabilisation of the dynamic cost development by strengthening the competitive structures

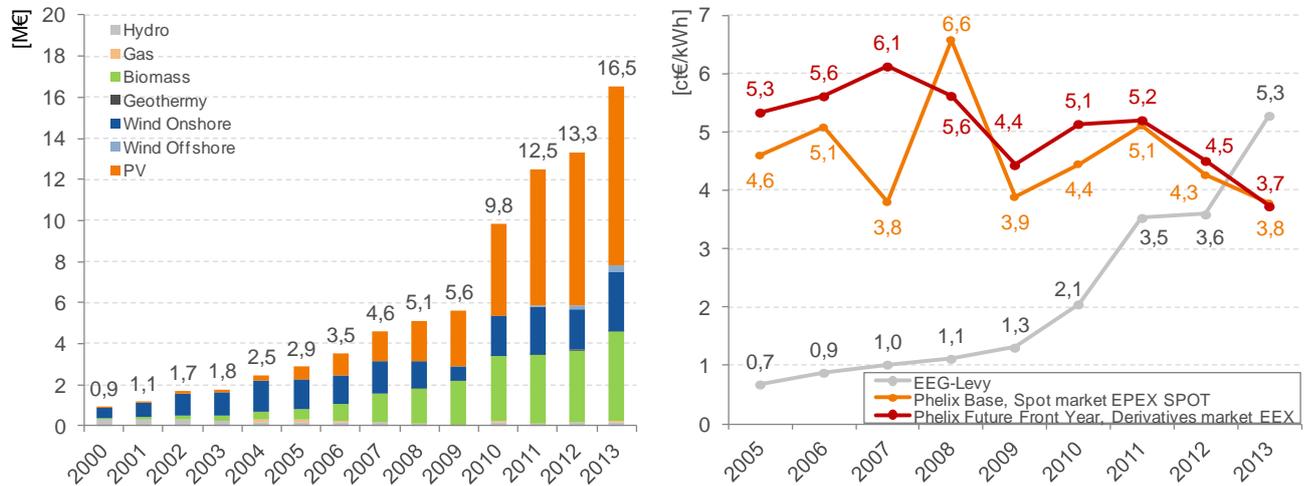
There is a broad consensus within the energy industry and among the political actors that the rules regarding the promotion of renewable energies have to be developed further. This is explained by the need to control and stabilise the costs for the promotion of renewable energies.

Instead of the EEG levy and its numerous distorting effects, the gap between revenues generated from renewable energy trading and expenses for feed-in tariffs or market premiums is often used as indicator for the funding costs (so-called “difference costs”, see Figure 1, left-hand side)ⁱⁱ. The limitation of these funding costs constitutes a declared aim of the EEG reform announced in the coalition agreement.

Figure 1 (Sources: EEX, EPEX SPOT, BDEW)

Development of difference costs (left-hand side)

Development of EEG levy, EEX Derivatives market price and EPEX SPOT Spot market price (right-hand side)



The drastic increase in the funding costs over recent years (and the rules on the allocation of these costs) have resulted in a situation in which the EEG levy (before taxes) accounts for approximately one quarter of household electricity prices. Compared with this, 15 years after the liberalisation of the power markets, the component of household electricity prices which is established competitively accounts for less than 24% of the costs today and continues to decline in importance.ⁱⁱⁱ This is reflected by the wholesale price levels: today, the EEG levy exceeds both the derivatives market price for the front year and the spot market price (see Figure 1, right-hand side).

Two core requirements for the further development of the EEG

EPEX SPOT and EEX welcome the federal government's plan for the EEG reform, which constitutes an important step in the right direction. Instead of a complete move away from the current system, such as through a change to a quota system, EPEX SPOT and EEX advocate a continuous development of the current EEG towards mandatory direct marketing with a funding level determined in line with the market. In addition, EPEX SPOT and EEX propose that this further development be aligned to two core features:

- **Market integration of renewable energies based on marginal costs:** Marketers of renewable energy offer this energy at marginal costs. In this context, the amount of the marginal costs is secondary; in particular, zero marginal costs, as in the case of wind, lead to bids at a price of zero.
- **Ex-ante determination of the funding amounts using a competitive mechanism:** This ensures that the costs for the promotion of renewable energies are as high as necessary, but also as low as possible.

The first aspect addresses the structure of the payments, while the second aspect focuses on the amount of the payments to EEG plants. The funding mechanisms for renewable energies should be further developed to ensure that these two targets are reached. Moreover, cost control should be ensured, e.g. by limiting the funding budget for renewable energies. If an expansion path or corridor is specified at the same time, long-term planning security for all market actors will become possible.

2. Market Integration of Renewables Based on Marginal Costs

Since 2010 electricity supported by EEG has been successfully and transparently marketed on EPEX SPOT markets in the context of the German Equalisation Scheme Ordinance. The integration of EEG-volumes into the coupled Central Western European markets permits balancing of daily or seasonal fluctuations of renewable generation, smoothing both positive and negative price peaks.

Market integration and flexible trading constitute the key to an efficient energy turnaround

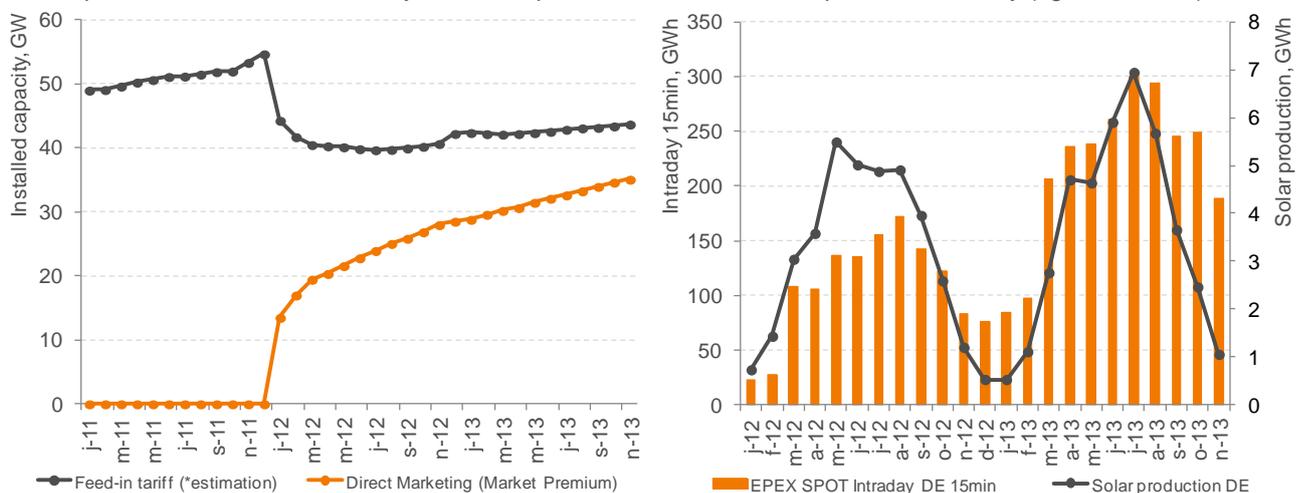
In addition, since 2012 direct marketing within the market premium model encouraged producers to increasingly feed their EEG power into the grid in line with demand and directly sell their electricity on the exchange. As of November 2013, nearly one half of installed renewable capacity used the market premium model, which is applied particularly frequently by wind power plant operators (see Figure 2, left-hand side).

Flexible power trading on liquid intraday markets, e.g. with fifteen-minute products, also constitutes an efficient possibility for integrating renewable energies into the market in the short term (see Figure 2, right-hand side). In fact, the volumes traded on the EPEX SPOT intraday markets over the last five years have increased tenfold.

Figure 2 (Sources: EPEX SPOT, Eurowind, Transmission System Operators)

Development of support mechanisms in Germany (left-hand side)

Development of EPEX SPOT Intraday 15-minute products & feed-in of solar power in Germany (right-hand side)



Actors from the political sector as well as the energy industry agree that these first steps are important for the future complete integration of renewable energies into the wholesale market:

- The **evaluation report by the Federal Network Agency** states: *“The new form of marketing of EEG-volumes by the TSOs via the spot exchange (day-ahead & intraday) [is] very suitable to trade those volumes successfully and transparently.”*^{iv}
- And, furthermore, the **coalition agreement of the federal government** states: *“Our principle is: EEG is a tool for the market introduction of renewable energies. They need to sur-*

vive on the market without subsidies in the future. For this reason, the coalition will integrate renewable energies into the power market.¹⁰

Feed-In Tariffs and direct marketing with a sliding market premium as transitional models

In spite of these first steps towards market integration of renewable energies, the marketers of EEG power still do not fully respond to price signals on the spot market. In deviation from the guidelines of the EU Commission^{vi}, this can lead to inefficient production decisions because the marketers of EEG power do not offer their EEG power based on marginal costs. As a result, current forms of power marketing according to EEG could lead to an undesirable distortion of the wholesale power price in the long run.

And, de facto, sellers of EEG power have an incentive to place negative bids on the exchange even though the short-term marginal costs of power generation are positive for EEG plants:

- In the case of the **fixed Feed-in Tariff**, price-independent bids are submitted for EEG power. As a result, producers of EEG power do not have any incentive to respond to prices and to produce in line with demand.
- In the case of the **market premium model**, the incentive to place negative bids is significantly lower. However, in this case, marketers of EEG plants also have an incentive to bid up to the negative value of the expected market premium and, if applicable, the additional management premium. Therefore, the short-term marginal costs of the plant are of subordinate importance. In the long run, this can cause a distortion of the merit order and bring about inefficient production decisions.

As a result, this bidding behaviour which optimises the EEG plant with regard to the total of the feed-in remuneration and/or market premium and the exchange price does not reflect the fundamental demand and supply situation on the market. During those hours in which EEG plants set the price, prices on the spot market are distorted and lower than they would be if EEG plant operators bid their short-term marginal costs.

This is an issue which will increasingly play a role in the long run if the share of renewable energies continues to grow and if these regularly set the price. In the case of direct marketing under the market premium model, this brings about a self-reinforcing effect: If marketers bid the negative value of the market premium, this lowers the price to an inefficient level. As a result, the market premium rises, which further reduces prices and increases the EEG levy. This dynamic development is not sustainable in the long run.

Further development towards mandatory direct marketing on the basis of energy- or capacity-based funding

The current practice of direct marketing using the market premium model already constitutes a step in the right direction compared to the fixed Feed-In Tariff - at least, it prevents disproportional negative bids. For this reason, EEX and EPEX SPOT welcome the strategic direction of the EEG reform which foresees mandatory direct marketing for plants of 500 kW and more from 2015.

In order to ensure a true market and system integration of renewable energies, EPEX SPOT and EEX propose further steps for new EEG plants, by introducing mandatory direct marketing with an ex-ante determination of the funding amount.

This is intended to ensure that market players within the direct marketing scheme respond directly to the wholesale price and efficiently match demand and supply. Essentially, two versions are currently being discussed to improve EEG marketers' response to wholesale prices¹:

- **Energy-based funding with a volume quota:** in addition to revenues on the wholesale market, this corresponds to a funding per megawatt hour fed into the grid, with a limitation of the number of hours per year which are eligible for funding;
- **Capacity-based funding:** in addition to revenues on the wholesale market, EEG plants are not compensated per megawatt hour fed into the grid, but for the capacity they provide.

Capacity-based funding

In the case of capacity-based funding, EEG plants do not receive any compensation for energy generated but for the installed capacity, in addition to the revenue generated on the wholesale market. This creates an incentive to sell power at marginal costs. As a result, the short-term use of the generation facilities (dispatch) is efficient and the resulting price correctly reflects the market situation.

In the case of conventional power plants, the provision of capacity has a value because it is needed in order to safeguard the uncertain feed-in of renewable energy. However, in the case of weather-dependent renewable energies, this value is reduced significantly because these forms of energy hardly provide any secure capacity. For this reason, a sensible funding mechanism for renewable energies should aim to provide electric energy as cost-efficiently as possible.

In this case, a technology-neutral approach to capacity-based funding is not sensible: Such funding does not support the plants with the lowest average costs per MWh as desired but plants with low capital costs. This can put plants which have high capital costs but low average costs (because they have a relatively high degree of utilisation) at a disadvantage. Compared with this, technology-specific and capacity-based funding is conceivable on principle because only plants from one segment compete here because their cost and generation structures are fairly similar. The remaining counterproductive incentives in plant dimensioning can be dealt with by a benchmarking procedure.

Energy-based funding with volume quota

In the case of the energy-based funding with a volume quota, a limitation of the number of hours for which a market premium is paid has been discussed. As a result, a solution under which only a specific total number of generated megawatt hours would receive compensation throughout the

¹ In addition, there are some proposals to stop paying out remuneration during hours with negative prices or to ban the submission of negative bids outright. However, both of these proposals insufficiently resolve the existing misdirected incentives and are only attempting to alleviate symptoms. Moreover, a ban on negative prices would also affect conventional power plants (for which the submission of negative bids can be commercially sensible and desirable).

amortization period of a generation plant is conceivable. In addition, a solution under which only a certain number of hours per year would receive compensation is also possible.

If the number of remunerated hours for a certain technology per year, at maximum, corresponds to the number of hours during which the price is higher than the short-term marginal costs of the technology, and if marketers optimally anticipate prices, this creates an incentive for the operators of EEG plants to offer their power at short-term marginal costs. This concept shows that the determination of the appropriate volume quotas is difficult and that volume quotas would have to be adjusted regularly. Moreover, it is not clear whether or not volume quotas should be determined on a technology-specific basis. The misdirected incentives specified in plant dimensioning of capacity-based funding also exist in this case.

Ultimately, energy-based funding with a volume quota and capacity-based funding are essentially identical.^{vii} This becomes clear if we consider a low-volume quota. In this case, the total funding to be expected is de facto energy-independent. So we can note that both funding versions can ensure the market integration of renewable energies. Since the implementation of energy-based funding seems more demanding, the capacity-based funding may seem preferable, even if the differences between the two versions are minor.

3. Determination of Funding Amounts on a Competitive Basis

The funding payments for renewable energies (which are expected to amount to EUR 20.4 billion in 2013)^{viii} have been determined by the legislator so far and they are undoubtedly sufficient to bring about the needed investments. At the same time, it is likely that the compensation rates can be lowered without stopping the expansion of renewable energies. In order to avoid unnecessary burdens for consumers and ensure that the compensation rates are as high as necessary and, at the same time, as low as possible, they should be determined in a periodic competitive procedure. Therefore, EEX and EPEX SPOT welcome the federal government's plans in the framework of the EEG reform, aiming to determine funding amounts on a competitive basis through call for tenders.

Call for tenders to determine funding amounts on a competitive basis

On principle, call for tenders in which certain target volumes of renewable energies are advertised for bids are appropriate. Call for tenders constitute a promising approach for reaching volume targets in a cost-efficient and controlled manner:

- A concrete expansion path for renewable energies can be determined and complied with. As a result, the volume aims specified above can be attained effectively.
- Potential investors submit a cost-minimising bid in the call for tenders (provided a sufficient number of investors take part): participants in the call for tenders then try to undercut each other in order to be awarded the contract and select their bid so as to make sure that the sum of bid and revenue on the wholesale market exactly covers total costs.

- In addition to the bid submitted by the investors, other factors, such as locations and plant dimensioning, can be taken into account, on principle.
- The costs for the promotion of renewable energies can be controlled and limited. The described approach based on call for tenders permits compliance with an optionally specified funding budget.

The exact design of the call for tenders depends on which of the funding models discussed in section 2 is selected:

- In the case of **energy-based funding with a volume quota**, capacity is procured in a call for tenders. In this case, two versions are conceivable on principle: If the sliding market premium is retained, bidding is effected on the basis of full costs and a market premium is calculated and allocated to the volume quota in such a way that the sum of market premium and revenues on the wholesale market exactly corresponds to these full costs. As an alternative, the sliding market premium can be abandoned and replaced with a fixed market premium instead. In this case, the participants in the call for tenders bid exactly the fixed premium which permits full cost coverage for the plant together with the revenue from marketing on the spot market. Moreover, a compromise in which the fixed premium might e.g. be connected with the derivatives market price for the front year is also conceivable.
- In the case of **capacity-based funding**, renewable capacity is also procured in a call for tenders. However, such a solution can lead to distortions if the call for tenders is provided in a technology-neutral form: In this case, the lowest bids are not submitted by plants with the lowest average costs but by plants with a favourable proportion of capital costs and generation structure. This challenge can be resolved with a technology-specific call for tenders.

As a result, the procurement of capacities of renewable energies means that potential investors first have to assess the contribution margin which they can generate by selling their power on the wholesale market. The missing total required to cover the full costs of power generation then determines the investors' response to the call for tenders.

The coalition agreement foresees to determine the funding amount through call for tenders as of 2018, *“provided a pilot project has been able to prove by then that aims of the energy turnaround can be achieved more cost-efficiently that way”*. Such a pilot project is sensible provided the technologies included in the pilot project do not have the alternative options of fixed feed-in tariffs or of the market premium model. Otherwise, these options would prevent the funding determined in the pilot project from being lower than today.

4. Conclusion and Recommendation

Over recent years, the dynamic expansion of renewable energies has led to major and uncontrolled increases in funding costs. Furthermore, the importance of established wholesale power prices has been weakened. Therefore, the current **funding systems** laid down in EEG **should be developed further in the short run** in order to avoid inefficient production decisions and distortions of wholesale prices in the long run.

Moreover, a comprehensive revision of the funding mechanism for renewable energies is necessary to make sure that market and competition are safeguarded - especially as the share of renewable energies continues to grow. The **preservation of market and competition** is important, in particular in the context of the **completion of the European single market**. The core requirements specified by EPEX SPOT and EEX are in line with the guidelines of the EU Commission.^{ix} These guidelines also require an increased market participation of renewable energies, a limitation of funding costs to the required minimum and incentives for efficient production decisions.

The **mandatory direct marketing for new plants** which was adopted by the federal government in January 2014 achieves an important step towards the reform of EEG. As a result of mandatory direct marketing the EEG plants will partly respond to market prices. This is facilitated by the direct marketers' and grid operators' control of the plants as provided for in the coalition agreements.

In addition, a complete market integration of renewable energies can be achieved through the **further development of the current direct marketing scheme** by creating short-term incentives for marginal cost-based trading through adapted payments (see Table 1).

In addition to this, the **amount of funding of renewable energies should be determined on a competitive basis in the future**, such as in the form of call for tenders. This is the only way that funding can be kept as low as possible, while ensuring that it is still as high as needed.

Regardless of this, **EU emissions trading as a climate protection instrument has to be reinforced**. In the framework of emissions trading, CO₂ emissions are avoided efficiently while the promotion of renewable energies can be restricted to attaining other (e.g. industry) policy aims.

A further step towards shifting costs for the promotion of renewable energies to a competitive market would include the direct and independent **marketing of the "green property"**: The revenue

Table 1 (Source: EEX, EPEX SPOT)

Funding model	Market premium	Incentives for feed-in in line with the market	Long-term effect on exchange prices
Feed-In Tariffs	None	None	Strongly distorting
Optional direct marketing	Energy-based, sliding market premium, based on an ex-post determination	Low	Distorting
Mandatory direct marketing	Energy-based market premium with volume quota, based on an ex-ante determination (in a call for tenders)	High	No distorting effect (with correct design)
	Capacity-based market premium, based on an ex-ante determination (in a call for tenders)	High	No distorting effect

generated through the sale of Guarantees of Origin by operators of EEG generation plants would lower the costs for the promotion of renewable energies. This separate marketing of the “green property” is possible within any EEG reform which provides for a competitive determination of the funding amount, since in this case market mechanisms prevent double marketing.

A recommended course of action can be derived from this:

- To achieve **marginal cost-based market integration** of renewable energies, the energy-based funding with volume quotas and the technology-specific capacity-based funding constitute possible options. However, implementing the promotion of renewable energies with a volume quota appears complex since a new volume quota would have to be determined for all technologies on an annual basis. Compared with this, possible advantages of the capacity-based funding model have to be analysed.
- For the purposes of a **competitive determination of the market premium**, the call for tenders should consider both the design of the plant as well as the submitted bid. This way, the construction of plants with an inefficient design can be prevented, for example by excess dimensioning of the generator output in order to get additional funding. This applies to both capacity-based funding with a volume quota and to energy-based funding.

EEX and EPEX SPOT advocate a reform of EEG in such a form as makes sure that new plants are remunerated on the basis of the capacity provided through mandatory direct marketing, in addition to the revenue generated on the wholesale market. As an alternative to this, the energy-based funding with volume quotas (which can achieve comparable results on principle provided the right design is selected) should be analysed. In any case, the remuneration rates have to be determined ex-ante on a competitive basis in an invitation to tender. This reform proposal is consistent with the European Commission guidelines. Moreover, conformity with European law should also be ensured in the further detailed preparation of the proposal by the legislator.

5. Contact Data

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ⁱ Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD, 18. Legislaturperiode [Designing Germany's Future. Coalition Agreement between the CDU, CSU and SPD, 18th parliamentary term].

ⁱⁱ BDEW, Erneuerbare Energien und das EEG, 2013.

ⁱⁱⁱ BDEW, Strompreisanalyse 2013 / Monitoringbericht von BNetzA/BKartA [German Association of Energy and Water Industries, 2013 Power Price Analysis / Monitoring report by the Federal Network Agency/Federal Cartel Agency].

^{iv} Bundesnetzagentur, Evaluierungsbericht zur Ausgleichsmechanismusverordnung 2012 [Federal Network Agency, Evaluation Report on the 2012 Balancing Mechanism Ordinance].

^v Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD, 18. Legislaturperiode [Designing Germany's Future. Coalition Agreement between CDU, CSU and SPD, 18th parliamentary term].

^{vi} European Commission guidance for the design of renewable support schemes, European Commission, 2013.

^{vii} Wege in ein wettbewerbliches Strommarktdesign für Erneuerbare Energien, Arrhenius Institut, MVV Energie, Ecofys, Takon, 2013 [Paths towards a competitive power market design for renewable energies, Arrhenius Institute, MVV Energie, Ecofys, Takon, 2013].

^{viii} BDEW, Strompreisanalyse 2013 / Monitoringbericht von BNetzA/BKartA [German Association of Energy and Water Industries, 2013 Power Price Analysis / Monitoring report by the Federal Network Agency/Federal Cartel Agency].

^{ix} European Commission guidelines for the design of renewable support schemes, European Commission, 2013.