

10 Questions and Answers on the 2014 Reform of the German Renewable Energy Act

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Germany has decided to gradually transform its energy sector – away from nuclear, coal, oil and gas towards renewable energy, i.e. wind, solar, biomass, hydro and geothermal. By 2050, at least 80% of Germany's electricity use is to come from renewables.

As of today, about a quarter of electricity consumption comes from renewables. This is an outcome of the German Renewable Energy Act, a set of policies established in 2000 to encourage the production of renewables. Since 2000, renewable electricity use in Germany has increased drastically, from 6.3% to 25.4% in 2013.

With the policies in place for more than a decade, some key findings indicated a need to reform the Renewable Energy Act. First, two technologies have won the "renewable technology race" and are now able to produce clean electricity at low cost: onshore wind power and solar photovoltaics. Second, with renewables making up a quarter of supply, it becomes clear that they substantially change the power market and require more market integration than before. Third, renewable producers are paid a set rate, called a Feed-in Tariff, with the costs recovered from customers through a surcharge on their consumption. Due to the higher than expected growth of solar especially, the surcharge has risen substantially.

Thus, German lawmakers passed legislation to reform renewable energy policies to better reflect new market conditions and ensure a smoother transition. In some cases incentives were reduced, but this largely reflects the increasing competitiveness of renewable technologies, rather than a step backwards on the underlying commitment to Germany's renewable energy transformation. The energy transition, or *Energiewende*, enjoys widespread public support with approval from 89% of the population¹, and remains on track to meet its interim target of 40 to 45% renewable electricity use by 2025.

In this briefing paper, the key elements of the 2014 Reform of the German Renewable Energy Act are described and a first tentative prognosis of its effects is given.

¹ Source: BDEW-Energiewendemonitor 2014, www.bdew.de

1.) What are the major goals of the reform?

The reform of Germany Renewable Energy Act that entered into effect in August 2014 had four goals:

1. To continue progress towards aggressive renewable energy targets. By 2025, the act calls for renewables to make up a 40-45% share of electricity consumption; by 2035 this share is to reach 55 – 60%. These targets are on path to the pre-existing goal of 80% by 2050.
2. To reduce the cost of the renewable expansion by focusing on the most cost-effective technologies, primarily onshore wind and solar photovoltaics. This involves decreasing the incentives given to other energy types.
3. To better integrate renewables into the market, so that renewable producers are increasingly market actors, able to react effectively to wholesale market price signals.
4. To better distribute the cost of renewables among consumers. Currently the surcharge for some industrial consumers is kept low through exemptions, which drive costs up for other consumers.

2.) How does the reform encourage the growth of renewable energy?

The reforms are intended to make the growth of renewable energy more predictable by introducing more detailed controls of development. For each of the key renewable technologies, the act sets a target amount of installed capacity:

- Onshore wind: 2,500 Megawatt (MW) increase per year Onshore wind is currently at 34,638 MW of capacity.
- Solar photovoltaics: 2,500 MW increase per year. Solar capacity is currently at 37,448 MW, with over 21,000 MW of that installed between 2009 and 2012.
- Offshore wind: 6,500 MW by 2020 (implying an increase of about 800 MW per year). Offshore wind is currently at 520 MW.
- Biomass: 100 MW increase per year. Biomass makes up about one-third of renewable power currently, but has a high cost and limited future potential.

Hydropower and geothermal have no targets since there is little development activity and limited potential.

The law also introduces “flexible caps” to reach these targets. If the targets are met or exceeded during a given year, the amount of the following year’s feed-in-tariffs for that technology will be reduced (see question 3). The more the targets are exceeded, the more the payments decrease. Likewise, if installed capacity is less than the target, the feed-in-tariff will remain higher.

3.) How are the costs of the renewables expansion being controlled?

To make renewable development more cost effective, the annual targets for the more expensive technologies, offshore wind and biomass, were set lower than the targets for the cheaper technologies, onshore wind and photovoltaics. In addition, the feed-in-tariffs for new onshore wind and solar installations were moderately reduced with future decreases tied to deployment rates. For photovoltaics, the feed-in-tariff is still higher than for wind onshore but will continuously decrease over the coming months.

The feed-in-tariffs for the different technologies, paid over 20 years of production, are now as follows:

- Onshore Wind: €0.06 to €0.09 per kilowatt-hour (kWh), depending on local wind conditions. This tariff for new projects will decline by 0.4% each quarter.
- Photovoltaics: €0.09 to €0.13 per kWh, depending on the size of the plant. This tariff will decline by 0.5% monthly.
- Biomass: €0.06 to €0.24 per kWh, depending on the type of biomass and the size of the power plant. This tariff will decline by 0.5% each quarter.
- Offshore Wind: Over the 20 year duration of the contract, offshore wind parks will be paid €0.19 per kWh in the first 8 years, falling to €0.15 and later to €0.04 per kWh, depending on the distance to shore and the depth of the sea. On average for the whole 20 years, they will receive €0.13 to €0.14 per kWh. The tariff will be reduced in 2018 by €0.01 per kWh for the first 8 years.
- Hydro: €0.04 to €0.13 per kWh, depending on the size of the plant. This tariff is reduced by 0.5% each year.

4.) How are renewables further integrated into the market?

The new law will expose renewable energy producers to more market forces by phasing in a switch from feed-in tariffs to a “contract for difference” system of payments. Under a contract for difference, or CFD, producers will sell their power themselves. They will also be

paid the difference between the current market price and the administratively-set feed-in tariff.

The CFD approach will apply to all new installations larger than 500 kW in 2015 and to installations over 100 kW in January 2016. It implies that all new wind and solar projects larger than a home or farm scale will now be paid through CFDs.

While the feed-in tariffs are still set by the law, the main difference is that new installations now need to sell the electricity they produce themselves (or have this done by a third party) – and then they are being rewarded the difference between the feed-in-tariff and the revenues that the electricity was earning on the wholesale power market during the times when they were producing electricity. Thus, new installations need to sell their electricity on a daily basis to the wholesale power market (or find another consumer that pays at least at the wholesale power price) in order to receive the level of the feed-in-tariff.

The main purpose of this reform is to have renewables participate in the markets and react to market prices. For example, developers may create projects to earn higher market prices by producing at times when other renewables are not producing – because this is when the prices are higher.

5.) What are the effects of the reform on industrial and retail consumers?

The Renewable Energy Act is funded by a surcharge on consumers' electricity bills. Industrial consumers are partly exempted from the charge – or almost entirely exempted, depending on how energy-intensive and exposed to foreign competition they are.

This exemption for some industrial consumers drives up the surcharge for other consumers who are not exempted. Originally, one of the goals of the reform was to distribute the costs of the renewables expansion more evenly between private households and industry.

In the end, after intense discussions about the international competitiveness of German industry, the new rules will likely result in the same amount of exemptions for industry as before. A final say on this will only be possible in December 2014, when the individual firms' exemptions for 2015 are to be announced, but it is already clear that private households will continue to pay the biggest share of the renewables costs.

As a result, energy-intensive industries will get a double benefit. First, they will be almost entirely exempted from the renewables surcharge and other supplementary charges on the electricity bill. And second, they profit from the very low level German wholesale

electricity prices – caused partly by renewable power that is paid through the renewables' surcharge (the so-called merit order effect). With wholesale prices currently in the €30-35 per MWh range, German industrial power prices are among the lowest in Europe.

However, one change was made in the surcharge rules. Consumers with new renewable installations larger than 10 kW (larger than a typical rooftop solar installation on a house) will now have to pay parts of the renewable surcharge even if they consume their electricity themselves. The thought was that "home-grown" electricity was getting an implicit extra subsidy by avoiding the renewables surcharge – with the effect of other consumers having to pay more.

6.) What will be the effects on the German electricity prices?

The renewable surcharge is currently at €0.0624 per kWh, up from €0.013 in 2009. This sharp increase in the past five years was mainly caused by the rapid growth of solar photovoltaics from 2009 to 2012, when solar costs were rapidly falling but feed-in tariff prices did not keep pace. At the same time, many biogas installations were built, which also received high feed-in tariffs. Furthermore, a decline in wholesale power prices contributed to the rise in the renewable surcharge, since the surcharge is calculated as the difference between the cost of renewables and the revenues generated from selling their power on the wholesale market.

The renewables surcharge is part of the reason that Germany has one of the highest retail prices in the OECD world – households pay around €0.30 per kilowatt-hour consumed. However, because German homes are comparably efficient, their total consumption is low, making the total *bill* only average. Typical households in the U.S. and Canada pay larger electricity bills than the average German household, even though the price per kilowatt-hour in Germany is much higher. On average, German households currently spend around 2.5% of their household income for electricity, a level which is comparable to the 1980s. (However, in the 1990s and 2000s it was below 2.0%.)

For the coming years, the renewable surcharge is expected to remain fairly constant between €0.06 and €0.065 per kWh, partly because the Renewable Energy Act will now promote cheaper onshore wind and solar. This development – in combination with falling wholesale electricity prices – should keep total retail prices constant at roughly €0.30 per kWh for the coming years.

7.) What will the reform mean for different technologies?

The law entered into force on August 1, 2014. While it is too early to quantify the effects, we can make the following prognosis:

- *Onshore Wind:* There will be a continued increase in onshore wind. We expect new installations of 3,300 to 3,700 MW this year, and the annual 2,500 MW target to be reached or even exceeded in future years.
- *Offshore Wind:* Most projects have been facing delays, but with the new law giving investors greater certainty, we expect the goal of 6,500 MW by 2020 is within reach. From 2014 to 2016, we expect around 1,000 to 1,500 MW will be installed each year.
- *Solar Photovoltaics:* The situation for solar PV is a bit unclear, since the market has drastically decreased in the past 12 months – partly because of shrinking margins for new installations due to reduced feed-in-tariffs and partly because of insecurity caused by the legislative debate. For 2014, analysts expect new installations of 2,000 to 2,200 MW. However, the new feed-in-tariff rate combined with new rules for home-grown electricity still provides a favourable market case for new PV installations on private and commercial rooftops. Furthermore, global prices for PV modules continue to fall, dropping by more than 5% in the first half of 2014. Thus, we consider installations of 2,000 to 2,500 MW are also realistic for 2015 and 2016.
- *Biomass:* The new law decreases the feed-in-tariffs substantially for all new biomass except small-scale biogas installations using liquid manure from livestock operations. We expect 50 to 100 MW of additional biomass capacity per year from 2014 to 2016.

8.) What will be the effects for small scale producers?

Small-scale producers are the backbone of Germany's renewable system since most of the installed capacity is owned by private households, farmers, and cooperatives. During the legislative debate, these actors were concerned that the new marketing rules would drive them out of the market.

However, there are already a number of companies able to handle marketing on behalf of the owner of the renewable installations, at costs from around €0.001 to €0.003 per kWh. In fact, 80% of all wind installations are already participating in "direct marketing," as it's called, since there has been an extra payment to encourage it. In effect, the new rules make direct marketing mandatory, rather than voluntary. While the new rules will make the lives of small producers more complicated, they will probably not drive them out of the market.

9.) Was this the last reform of the Renewable Energy Act?

No, the government has already announced plans to propose further reforms to parliament in 2016. In accordance with the new 2014 environmental state aid guidelines from the European Union, the next reform will introduce competitive auctions for renewables, to go into effect in 2017. The goal will be a more competitive process of setting the tariff for renewables. To test the process, the just-enacted reform includes a pilot auction scheme for 600 MW of ground-mounted photovoltaics annually.

Thus, while the 2014 reform received a lot a media attention and was subject of a heated debate, it did not substantially change renewable energy policies in Germany. The biggest challenge is still coming: designing the auction so that renewables will continue to grow after 2017 and that small scale producers will continue to be part of the game.

10.) What is the outlook for the German energy transition?

It is fair to conclude that the German *Energiewende* is on track and continuing to progress. Recently published figures show that in the first half of 2014, renewable market share rose by another 3% to 28.5%, with further increase in coming years. At the same time, the phase-out of nuclear is continuing, with the next nuclear power plant to be shut down in May 2015.

One key challenge remains to be tackled. Since 2011, low-cost coal power has pushed gas power plants out of the market. This is taking place all over Europe, but especially so in Germany where large fleets of coal and gas power plants compete on the wholesale power market. The reason is straightforward: Europe still faces quite high gas prices, whereas global coal prices have been falling, partly as a side-effect of the US shale gas revolution. In addition, the European emissions trading scheme is facing very low carbon credit prices due to a large oversupply of emission rights within the system. This combination renders coal fired power plants currently much more competitive than gas fired power plants. Germany and the European Union as a whole need to fix their carbon policy soon, in order to reverse the recent coal resurrection that we have been witnessing all over Europe.

More Questions on the German *Energiewende*?

Please visit www.agora-energiewende.org
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Agora Energiewende is a joint initiative of the Mercator Foundation and the European Climate Foundation