

Babylon and the German Energiewende: A Gloss

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(translated by Michael Twomey)

A "100 percent renewable electricity supply" is the goal of the German energy transformation. In order to decide where we currently stand and determine what still needs to be done, we need percentage calculations. The beginnings of these go back 4000 years, when influential merchants in the Babylonian Empire came up with the idea of increasing their assets through financial transactions. Interest was agreed on, and a rule was developed as to how it must be calculated as "part of the whole". Since then, strict rules have applied to the calculation of percentages, based on the definitions of basic value and percentage.

One would prefer to see the progress of the energy system transformation in a single number, the percentage of "renewables". This number itself may have seemed too small to some of today's influential traders. Thus arose the idea of amending the EEG and at the same time reforming the percentage calculation. The EEG §1 (2) in its 2012 version still mentioned the goal of increasing "the share of renewable energies in the electricity supply" [1] by prescribed percentages. In the same paragraph, the EEG 2017 now states that the goal is to "increase the share of electricity generated from renewable energies in gross electricity consumption to ... at least 80 percent by 2050" [1].

Unfortunately, the law says nothing about how this percentage is to be determined. And that is where the problem begins. Physicists are not the only ones who know that electrons are indistinguishable particles. And so, as soon as electrons leave the wind turbine or solar plant and are fed into the grid, they lose their innocence and their green colour [2]. In times of oversupply of electricity from renewable sources, the urge to send electricity abroad is particularly great. Then the price on the electricity exchange inevitably drops through the floor. Indeed, it is becoming increasingly common for the exchange price to become negative, and for the buyer beyond the border to earn money for being willing to "buy" the surplus electricity. This is a bitter pill for domestic electricity customers to swallow, because the EEG stipulates that they must also pay for the fact that electricity can be sent abroad.

It is often claimed that it is practically impossible to quantify as required by law the proportion of electricity generated from renewable energy sources that is consumed domestically. Fortunately, there is Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009, which covers the promotion of the use of energy from renewable sources [3]. Article 5 (3) states that "... gross final consumption of electricity from renewable energy sources shall be calculated as the quantity of electricity produced in a Member State from renewable energy sources, ..." [3]. Although Article 6 of the same Directive regulates the transfer of renewable energy between Member States, it was apparently overlooked that renewable energy transfer also should be adequately taken into account in Article 5.

This makes it again very convenient for energy statisticians in Germany: one establishes a quotient of the electricity produced from renewable energies in the numerator and the gross electricity consumption in the denominator, then multiplies this value by 100, and the percentage sign (%) is simply added. Done! In this miraculous way, we arrive at "36.4 % renewables" for 2017 [4]. In fact, however, the share of electricity generated from renewable energy sources in 2017 and consumed in Germany is likely to be 31.8% [5].

One can be quite sure that this new kind of "percentage calculation" will soon find further supporters. If, for example, the head of a German car manufacturer suddenly notices that the share of his brand in the registration figures for electric cars is only 12 %, it would be obvious for him to relate the total number of all electric cars of his brand produced in Germany to the total number of registered electric vehicles in the future. So he could easily claim "60 %." With this trick it might soon even be possible to reach values "over 100 per cent". By then, in the end many like him will be standing by the roadside and wondering why so many electric cars from other manufacturers are still driving past them.

1] EEG 2012 and 2017, cf. Erneuerbare Energien Gesetz of 21 July 2014

(BGBl. I p. 1066), last amended by Article 1 of the Act of 21 June 2018 (BGBl. I p. 862).

2] "Stromexporte sind weder grün noch grau (Electricity exports are neither green nor grey)",
Energiewirtschaftliche Tagesfragen 67 (2017) Issue 12, p. 49.

3] 2009/28/EC of the European Parliament and the Council of 23 April 2009.

4] Bruttostromerzeugung in Deutschland ab 1990 nach Energieträgern ab 1990 (Gross electricity generation in Germany from 1990 onwards according to energy sources), AG Energiebilanzen e.V. (Status: 02.02.2018).

5] In 2017, 83.3 TWh of the electricity generated was exported. The share of renewable energies in the electricity mix of electricity generation was 33.3 %. Assuming that the electricity mix in export electricity corresponds to that of generation, 27.5 TWh of the exported electricity will come from renewable energy sources.