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SIMULATION-BASED ANALYSIS OF THE NEW DYNAMIC ELECTRICITY PRICES IN GERMANY AND DERIVED RECOMMENDATIONS FOR TAX POLICY

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ABSTRACT

The dynamic electricity price system, which was introduced in Germany at the beginning of 2024, has been largely negated by the legislation in force at the same time, as constant charges of around 0,20 € are almost always incurred. On the basis of hourly dynamic electricity prices from the beginning of 2023, various simulation scenarios for market price and charge distribution alternatives were modeled and calculated, which could result in higher incentives for end customers with regard to storage expansion. Of course, real implementation would require an amendment to the laws and tax codes for energy suppliers. Whether this is possible in the German political environment is currently being discussed with energy market experts.

1 INTRODUCTION

Since January 1, 2024, large energy suppliers in Germany have been legally obliged to offer end customers optional dynamic electricity prices (like in the US). Depending on market demand and the supply of highly volatile alternative energies, these fluctuate between negative values of up to -0,10 €/kWh when demand is low and up to 0,40 €/kWh when demand is high. Unfortunately, this very interesting new approach is largely negated by the legislation on electricity market charges such as network fees, concession fees and taxes which is currently in force, as 0,20 €/KWh or more taxes are charged. With a net price on the electricity exchange of 1 cent, the gross price is 21 cents and the tax burden is therefore >2000%! As a result, dynamic electricity prices are hardly attractive for end customers who don't have their own electricity storage. Even with an electricity storage system, the savings over the year are not enough to replace or even expand the storage system after 10 years. This means that there is no effective incentive for end customers to participate in electricity storage investments! As a result, the entire energy transition is in danger because without sufficient storage expansion, the electricity grid will be less and less balanced.

2 SIMULATION OF DYNAMIC ENERGY PRICES

Based on hourly dynamic electricity prices (ISE-API 2024) starting at the beginning of 2023, various simulation scenarios for market price and tax distribution alternatives were modeled and calculated, which could result in significantly higher incentives for end customers regarding storage expansion. The simulation was carried out by using a Microsoft-Access-DB and Visual-Basic algorithms. As shown in (Dynplus 2024) a profit of only 333 € per year is generated by using the current dynamic price system. And this is only one possible scenario based on the real data between 1.1.2023 and summer 2024. Lower profits are even possible in dark winter times! With these amounts, refinancing of storage systems is impossible!

If dynamic electricity prices were to be exempted from all taxes, the difference would be around €2,500 plus per year per typical house installation. This would make it easy to refinance and even expand electricity storage. Unfortunately, the total tax losses currently amount to the same amount per house. For Germany, these could amount to up to €10 billion per year. Such an exemption is not conceivable, given the current budget situation in Germany, as in addition to the state (VAT, etc.), municipalities and energy companies would also lose this amount each year.

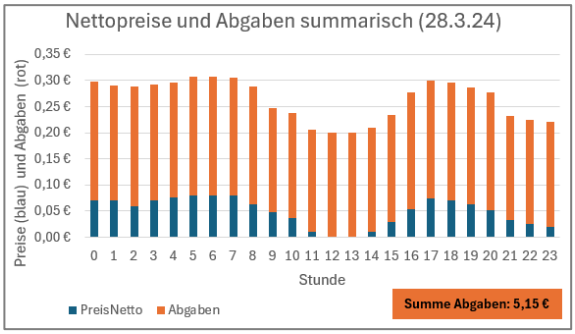

Figure 1: Current net and gross electricity prices.

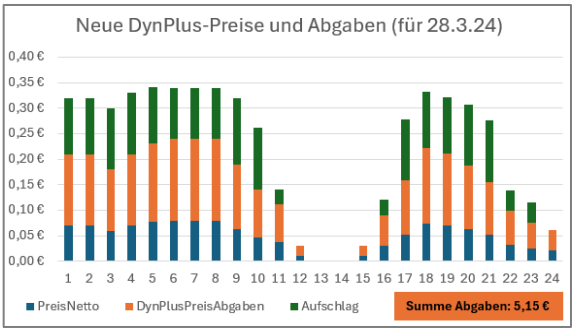

Figure 2: New prices with DynPlus-shift.

The actual ratio of net to gross electricity prices is shown in Figure 1. It seems possible to shift taxes over time. For low net prices, only low taxes should be due, and for medium prices, these should be financed with a surcharge. High net prices should remain unaffected. In the current draft, for low net prices, only a maximum percentage tax burden of 200% is assumed. For net prices of €0.00 or less, taxes of €0.00 would be applied, which is exactly what is desired. The resulting overall trend can be seen in Figure 2. The desired minimum gross price for charging the electricity storage system is reached at lunchtime. The additional charges result in the same tax charges per day *(€5.15 bottom right)* in total over the day, so the new price approach is revenue-neutral for the state and the energy industry! Simulations of this approach show that this idea can be implemented in principle by redesigning the dynamic electricity prices, hereinafter referred to as DynPlus prices. However, during longer periods of high prices, the electricity storage units run dry again and electricity is then consumed from the external power net. This could reduce the savings to just €800 per year and better options should be discussed.

3 A RECOMMENDATION TO THE LEGISLATURE AND CONCLUSION

A real implementation of the DynPlus pricing model would require corresponding amendments to the electricity market legislation and/or the implementing provisions for calculating charges. Since the degrees of freedom in the new distribution of charges is very large and politicians and the energy suppliers' lobby will have the final say, the following proposal is made for determining new adaptive dynamic electricity prices, called DynPlus-prices:

The tax burden for dynamic electricity prices may not exceed 200% of the net electricity price.
The difference to the actual calculations of prices can be offset by surcharges at other times.

The use of a free-to-chose percentage limit on electricity price leads to a gentle and non-sudden reduction in the tax burden. With the above percentage value of a maximum of 200% tax, a tax burden of 2 cents would result for net electricity costs of one cent. From a net price of €0.00 and below, these taxes go down to €0.00. In result it would be possible to get enough profit from a storage installation and to expand the system. Long term simulations show a development of about 1300% in 10 years only in Germany with new investments of Billion € (= Billion $).

The study presented is currently being discussed with colleagues from the energy industry and economic investment planning. If no fundamental legislative restrictions are identified, the experts in the political committees will then be approached together with colleagues from the VDI (Association of German Engineers), VDE (Association for Electrical, Electronic and Information Technologies) and other professional associations in German and European business and society. The actual state of the project is/will be published at on Dynplus (2024).

REFERENCES

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