

Power Burden

Consumption and Cost Sharing in the Austrian Electricity Sector

English summary of the study “PowerBurden – Verbrauch und Kostenverteilung im österreichischen Stromsektor.”¹ by Leonhard Plank and Thi Bich Ngoc Doan.

The fight against climate change requires great efforts not only for numerous sectors such as transport, industry or agriculture, but also for the supply sector of heat and power (CCCA, 2019). For the latter sector, with regards to the achievement of the “Paris climate targets”, **both the expansion of renewable energy sources and the network infrastructure are indispensable**. This expansion goes hand in hand with **high amounts of investments, which are predominantly funded by consumers via electricity prices**. Not every type of consumer pays the same electricity price for each consumption unit. While especially energy-intensive industries benefit from low wholesale prices (purchase prices) in the liberalized electricity market, there is no discount for private households and other small consumers available. Beside the purchase price, the electricity price consists of further components, which differ across countries, mostly including grid fees, taxes and levies as well as renewable energy surcharges. **Not only do energy-intensive industries have advantages on the liberalized electricity market, but also the regulated components of the electricity price are more beneficial for them**. Taking the current composition of the electricity price into consideration, concerns about the funding and the social acceptance of the energy transition emerge. Studies in Germany indicate that the expansion of renewable energy production receives high approval rates, but the situation could change quickly and the acceptance will decline, as soon as citizens are asked to make additional personal financial contributions (Andor/Sommer, 2018). In order to analyse the situation in Austria regarding the cost burden of different types of consumers, the Department of Public Finance and Infrastructure Policy at the Vienna University of Technology has carried out the study “PowerBurden” on behalf of the Chamber of Labour Vienna. Summarizing the results of the mentioned study, this short statement should give **an insight into the current composition of electricity prices of different types of consumers**. Furthermore, by comparing the consumption volumes with the cost burdens for each type of consumer **it shows the uneven burden sharing with drawbacks for households and other small consumers in Austria**.

¹ Doan, T.B. N.; Plank, L.; 2019: PowerBurden – Verbrauch und Kostenverteilung im österreichischen Stromsektor. Wien: Kammer für Arbeiter und Angestellte für Wien.
https://www.arbeiterkammer.at/interessenvertretung/wirtschaft/energiepolitik/Power_Burden_2019.pdf

Components of the electricity price on the example of Austria

The price for electricity in a liberalized electricity market such as Austria is made up of different components, which are regulated by various regulatory mechanisms. While the electricity purchase price is influenced by the developments on the liberalized European electricity market, other price components are determined by public actors. Since each price component (purchase price, grid fee, tax and levy as well as renewable energy surcharge) is subject to different regulatory mechanisms, different recipients benefit from the costs paid by customers. The following descriptions provide an integrated view on the price components in order to uncover structural price differentiations between different types of consumers and point out the disadvantages of households and small-scale consumers in comparison to industrial consumers.

As mentioned above, the **electricity purchase price** is shaped by the liberalized electricity market mechanism, where energy-intensive industries have lots of benefits due to their purchasing power. A comparison of the development of the wholesale price with the average household electricity price (disaggregated by regional energy supplier) shows that the reduction in wholesale prices is reflected to a much lower extent in electricity prices of households, while prices for other consumers, especially industrial consumers are more directly linked to wholesale prices (E-Control, 2018).

Analysis of the grid related costs elements reveal strong preferences for industrial consumers. As the grid infrastructure is separated into seven so-called “grid levels”, which follow the logic of different voltage levels (maximum voltage = grid level 1, lowest voltage = grid level 7 etc.), the use of the respective grid level is depending on the power consumption volume of consumers. On the lowest level 7, private households, agricultural enterprises and small-scale commerce are located, while large-scale industry is often located on grid level 3. The price differentiation of **grid fees** results from the principle of “cost rollover”, which means that the total costs are passed on proportionally from the highest to the lowest grid level. This **grid fee regulation leads to a higher burden for households and other small consumers** (agriculture and small-scale commerce) on the lowest level, as they do not only contribute to finance the respective grid level they use, but also bear a share of the grid fees of all upstream grid levels. Hence, the tariff structure is strongly linked to the grid infrastructural system. The higher the grid level, the lower the average grid fee per kWh to be paid. Taking the electricity consumption into account, the average consumption increases with the height of the grid level, which results in a degressive tariff structure. **Since energy-intensive industries are mostly located on grid level 3, their grid fee is much lower than the average grid fee for private households on grid level 7.** Based on the principle of “cost-rollover”, the lowest grid level accounts for about 70% of the total grid usage and loss charges (which are the two largest cost blocks of grid costs), where the largest part (~50%) is borne by households (with only ~25% of the total annual electricity consumption). Large and medium-scale industries on grid level 3 are liable for barely 5% of these costs (with ~43% of total annual electricity consumption), while large- and medium-scale commerce and small-scale industries cover just under 25% of the considered blocks of grid fees.

Taxes and levies build up a key component of the electricity price. Taxes and levies include the value added tax, the electricity tax, the combined heat and power (CHP) surcharge as well as the user charge. Amongst these items, value-added tax and energy tax make up the largest part. The electricity tax is a state-regulated tax on the consumption and supply of electricity on the basis of the Electricity Duty Act, which has a rate of 1.5 Cents/kWh and varies linearly according to the consumption volume². But the implementation of the Energy Tax Rebate Act in 2004 enables energy-intensive consumers to get the originally paid energy tax refunded through applying for a tax exemption. As a result of this exemption, energy-intensive industries receive a far-reaching financial relief, while private households are required to pay the full amount of tax contribution based on their power consumption. Furthermore, the value added tax (in Austria: 20% on all price components) is only a “pass-through”-position for consumers that

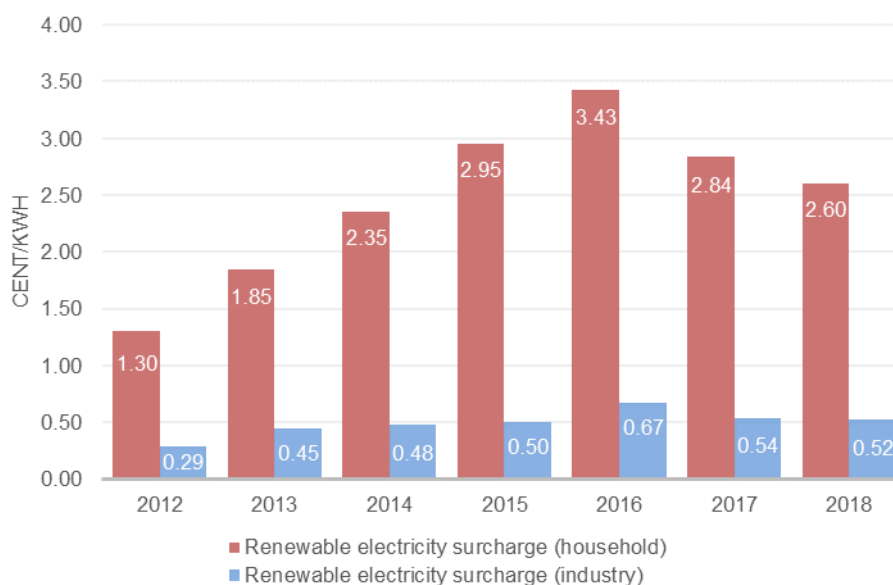
² Elektrizitätsabgabegesetz 1996; Federal Law Gazette No. 201/1996, amended by Federal Law Gazette I No. 64/2014.

are entitled to deduct pre-tax. For this reason, value tax is usually not taken into account in international price comparisons of industrial enterprises.

The composition of the total revenue of all electricity taxes and levies for 2017 in Austria, differentiated between households and non-households, shows that in the gross perspective, about one third of the total taxes and levies come from households and two thirds from non-households. However, this ratio is reversed, if the net tax and levy payments are taken into consideration. Due to various exemptions for non-households mentioned above, **households effectively account for around two thirds of the taxes and levies for electricity**. In total, the refund rules lead to a reduction of revenue from taxes and levies for state budgets by more than half, from around 2.23 billion € to around 1.03 billion € for 2017.

In order to promote the sector of renewable electricity and contribute to the achievement of the climate targets, enormous efforts are needed, including the expansion of renewable electricity sources. Therefore, **renewable energy surcharges**, as an integral part of the electricity bill, represent an important share paid directly by consumers³. Via the central control agency (OeMAG), the remuneration volume will be paid out to operators of renewable energy installations⁴. The renewable electricity surcharge consists of a flat-rate renewable electricity fee and a renewable electricity subsidy. While the flat-rate renewable electricity fee⁵ is calculated per metering point, which is differentiated according to the grid level, the renewable energy subsidy⁶ is calculated as a percentage surcharge on the grid usage and grid loss fees. Due to the strong linkage to the grid fee logic, renewable energy surcharges cause different price burdens per kWh for different types of electricity consumers (Figure 1).

Figure 1: Renewable electricity surcharge for a typical household and industry consumer (2012-2018) (data: E-Control, 2018; calculations of TU Vienna)



As Figure 1 clearly shows, the burden of renewable electricity surcharges for households and industry varies significantly. **The price burden for a typical household** (annual consumption: 3,500 kWh) **is many times higher compared to that of an industrial customer** at grid level 3 (55,000 MWh annual consumption with a connected load of 12 MW). The different price

³ Ökostromgesetz 2012; Federal Law Gazette I No. 75/2011, amended by Federal Law Gazette I No. 42/2019.

⁴ There are also smaller expenditures, i.e. costs for the procurement of balancing energy or other administrative and financial expenses of OeMAG.

⁵ The flat-rate renewable electricity fee is fixed for three years in advance by ordinance of the Federal Minister of Science, Research and Economics (Ökostrompauschale-Verordnung 2018).

⁶ The renewable electricity subsidy is an annual advance ordinance, which is determined by the Minister of Economic Affairs (Ökostromförderbeitragsverordnung 2019).

burdens reached their peak in 2016, when the average household had to pay 3.43 Cents/kWh, which is five times more than the industrial customer price of 0.67 Cents/kWh. This short description of the tariff structure of renewable electricity surcharges refers similarities to the grid logic, resulting again in the following principle: The higher the grid level – and thus the consumption – the lower the average contribution to renewable electricity support scheme.

Electricity consumption and cost burden

As shown above, the electricity tariff structure is degressive, with higher consumption resulting in lower average costs. Against this backdrop, households and small consumers are not only put at a disadvantage, this incentive structure is also problematic in terms of energy and climate policy because it hinders efforts to improve energy efficiency. Based on data of E-Control for 2017, the following section will in the first step compare the average costs of electricity (separated in different price components) for four classified types of consumers (Table 1). The second step will be an analysis of the total electricity costs for 2017, which will be taken into a comparison with the total consumption volumes of the defined groups of consumers. Beyond that, by taking the consumption volume of each type of consumer into consideration, the renewable electricity surcharges paid in 2017 will demonstrate the uneven cost burden for different groups of consumers.

Table 1: Typology of consumers 2017 (data: E-Control, 2019)

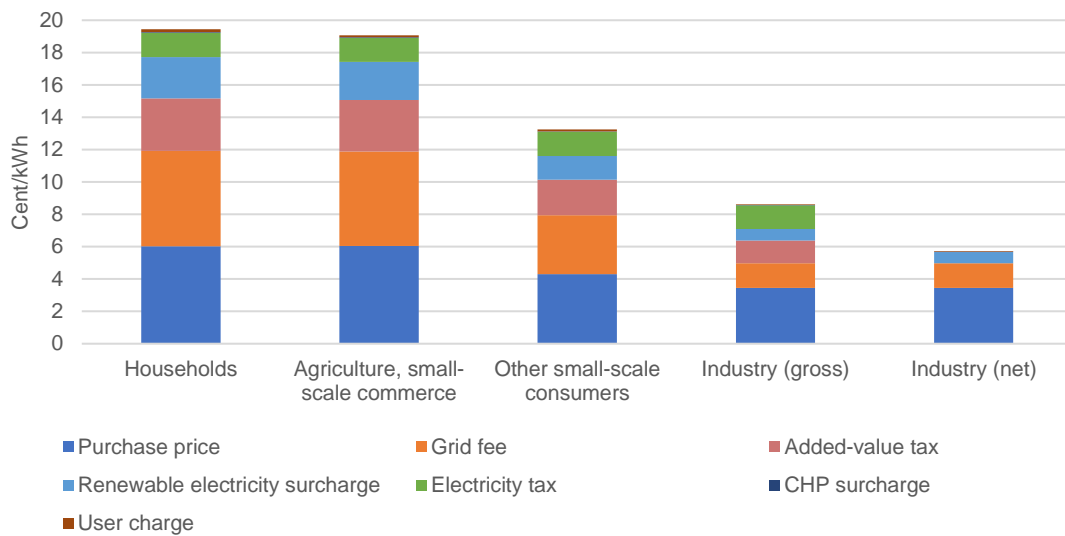
Categories	Grid level	Number of...		Consumption volume		Average consumption
		Customers	Metering points	GWh p.a.	In %	MWh/metering point p.a.
Households	7	3,993,782	4,980,460	14,643	25	3
Small-scale commerce, agriculture	7	494,547	687,872	2,669	5	4
Other small-scale consumers	6	113,723	385,154	16,187	27	42
Industry (medium, large)	3-5	1,293	68,061	25,704	43	378

Average electricity price per kWh

Figure 2 shows significant price differences between groups of consumers for 2017, which again indicates clearly the degressive tariff pattern, in which higher consumption results in lower average costs. Accordingly, households pay the highest average price (19.43 Cents/kWh), while industry pays even in the gross term the lowest price (8.62 Cents/kWh). In between, small-scale commerce and agriculture have an average price per kWh of 19.07 Cents and the group of other small-scale consumers 13.24 Cents. The price difference between households and industry increases further, if deductible taxes and levies (value added tax and electricity tax) are taken into account. After this deduction, the net price of industry is only around 5.70 Cents/kWh.

Energy-intensive industrial consumers do not only pay the low wholesale prices in Austrian liberalized market. Due to the “cost-rollover” principle, their grid costs are by far lower than for households and other small-scale consumers using lower grid levels. In the case of the renewable electricity surcharges, industrial consumers come up with much lower financial contributions because of the linkage of the tariff structure of these surcharges to the grid fee logic. As energy tax and value-added tax are the most important components of taxes and levies on electricity, households are again put at a disadvantage. While they have to pay the full amount of these taxes, energy-intensive consumers benefit from exemptions for both taxes as discussed in the previous part.

Figure 2: Comparison of average electricity prices (separated in components) between consumers in 2017 (data: E-Control, 2019; calculations of TU Vienna)



Comparison of consumption volumes and cost burdens

Based on the average price and average consumption volume of each type of consumer in 2017, Figure 3 compares the cost burden with the consumption volume of each group of consumer. A visible divergence between the cost burdens and the consumption structures can be detected in this figure. **With a consumption volume of about 43%, the industry only made up 21% of the total net costs. Contrary to this, households consumed just under 25% of the total volume in 2017 and were liable to pay around 41% out of the total costs.**

Figure 3: Consumption volumes versus cost burdens of consumers in 2017 (data: E-Control, 2019; Calculations of TU Vienna)

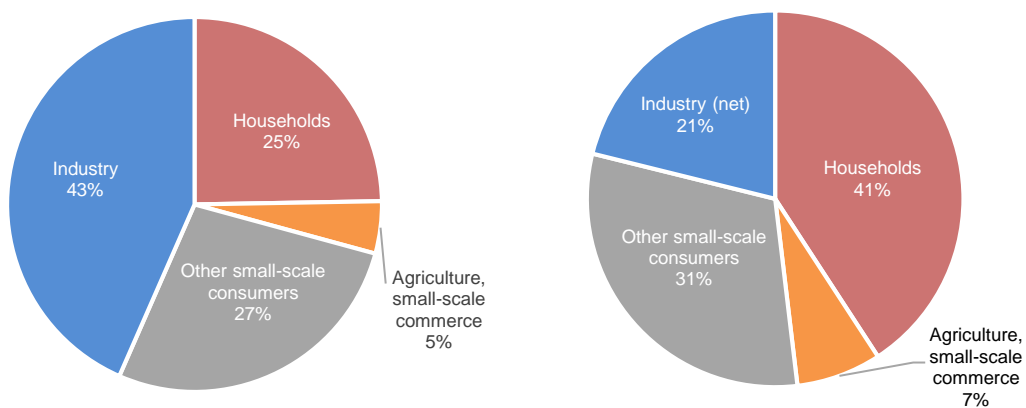
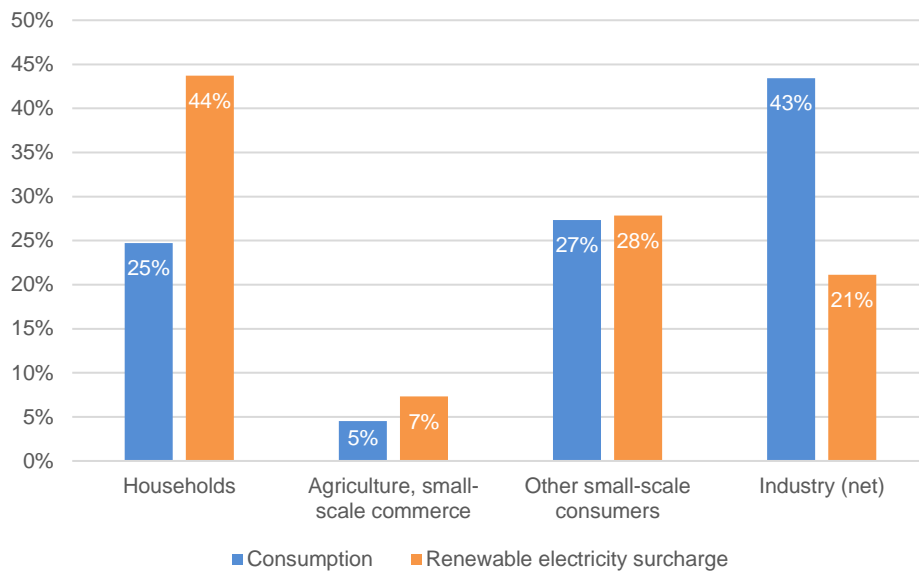


Figure 4 shows the comparison of different consumption volumes and burden sharing of renewable electricity surcharges for the four groups of consumers in 2017. **Although households only consumed a quarter of the total electricity volume, they were charged 44% of the total renewable electricity surcharges in 2017. On the other hand, with the high consumption volume of around 43%, industrial consumers contributed only 21% to support the renewable electricity sector.**

Figure 4: Consumption volumes versus burdens of renewable electricity surcharges of consumers in 2017 (data: E-Control, 2019; Calculations of TU Vienna)



As this brief statement has shown, households contribute a disproportionately high share of the subsidy for the promotion of renewable electricity in Austria. Since not only the energy efficiency but also the expansion of renewable electricity is an important aspect in the context of the energy transition, more attention should be paid to a fair sharing of costs burdens between different consumers. Otherwise, the lack of cost fairness and additional burden on households and other small consumers is likely to endanger the social acceptance of the energy transition.

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