

Focus on Economics

No. 97, 15th July 2015

Energy cost drivers: It's not just about electricity!

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In public debates, energy costs are usually equated with electricity prices. For households and manufacturers in particular, gas costs are just as relevant and yet they are ignored. Although electricity prices have risen sharply due to the German Renewable Energy Act (EEG) levy, energy costs increasingly reflect the larger input factor of fossil fuels (especially oil and gas).

To carry out a proper analysis of energy costs in Germany, the different consumption groups (private households, trade, commerce and services, industry, transport, etc.) must be considered separately. The level of energy costs depends in particular on:

- the fuels used
- the prices of those fuels and
- the quantities consumed.

Oil and gas top the list

Owing to its use in the transport sector, oil accounts for the largest proportion of Germany's total energy consumption (37%). Private households consume about twice as much gas as electricity and the manufacturing industry also uses more gas than electricity (see Figure 1). Furthermore, some buildings are still heated with heating oil. Renewable energies account for over 10% of domestic energy consumption.

Coal plays only a minor role in final energy consumption but nevertheless still makes up over 40% of the fuel used in (gross) electricity generation. Renewable energies now contribute just under 30% of the energy used in electricity genera-

tion. In general, however, renewable energies still account for only a small part of final energy consumption.

Electricity prices are high because of the government's share

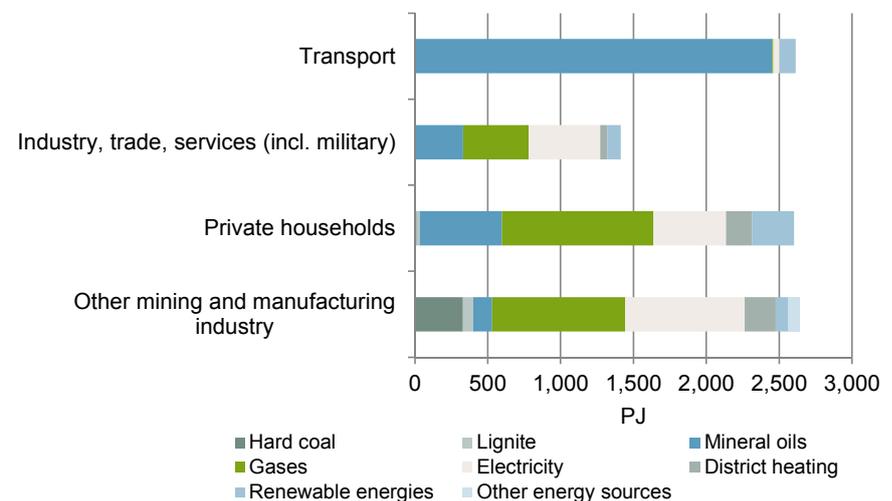
A comparison of prices (per unit of energy) for electricity and gas (see Figure 2) shows that electricity prices are significantly higher than gas prices, partly because electricity is the result of a further energy conversion step (via power stations). Nevertheless, most of the difference comes from the substantial electricity taxes and levies, particularly the levy imposed under the German Renewable Energy Act (EEG). Significant differences are also found between domestic and industrial prices. Large industrial customers have the option of purchasing electricity and gas on the wholesale market. They also benefit from tax concessions and, in the case of electricity prices, exemptions from the EEG levy.

However, conclusions may not be drawn about the energy cost burden based on prices alone. Although electricity prices are considerably higher than gas prices, more gas is consumed than electricity.

Domestic heating: energy cost drivers of a typical household

In 2013 there were 39.9 million households in Germany. An average household with two people spent EUR 261 per month on energy (including fuels), or 8% of total private consumer spending. An average household spends just under EUR 100 per month on domestic heating and hot water, which is approximately 60% of building energy costs (see Figure 3). A similar amount is spent on (motor) fuels. Expenditure on lighting, other electronic devices and cooking (EUR 41 plus EUR 23) is less than the amount spent on heating. Heating costs therefore account for a larger share of the energy cost burden of households in absolute terms than electricity costs. The ways in which households are heated account for the relatively high consumption of gas (see Figure 1): natural gas is used to heat just under half of German homes, whereas only 6% are heated with electricity (including heat pumps). Some 25–30% of German buildings and homes are heated with heating oil. Less than 15% use district heating, mostly

Figure 1: Breakdown of final energy consumption in Germany 2013



Source: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen)

from coal or gas-fired heating (and power) plants.

Between 2008 and 2013, the energy costs of a typical household rose by nearly 14%. This is primarily due to the increase in electricity costs: the costs of lighting, electrical appliances, cooking, etc. rose by just under 35% over this period, while gas prices remained relatively stable. The slight rise in heating costs is mainly attributable to increased demand for heat due to cold weather.

Industrial energy costs vary widely

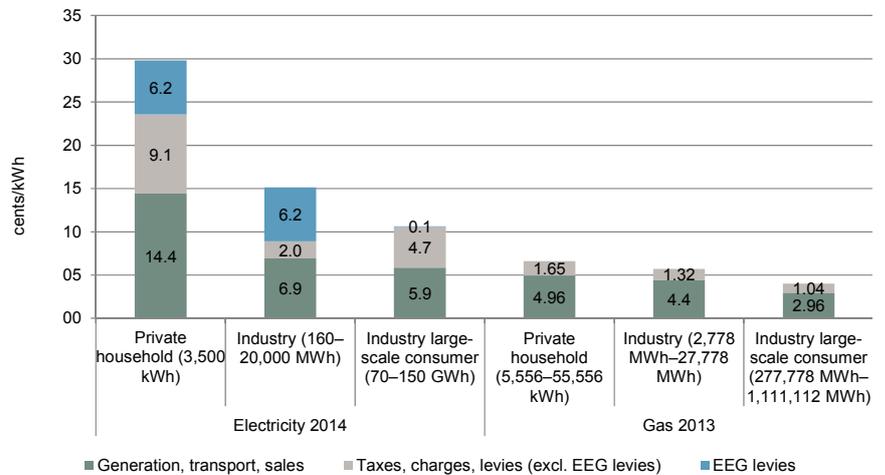
Like electricity and gas prices, the energy cost burdens for industry vary considerably. They depend in particular on the quantities purchased and hence the sector. The energy cost burden for the manufacturing industry averages approximately 2% of gross value added. However, in energy-intensive sectors the figure tends to range between 4 and 8% and in certain cases can be significantly higher.

The fuel mix varies widely from one sector to another. For example, the chemical industry uses relatively large amounts of oil and gas, whereas half the metal industry's energy consumption comes from coal, with the other half equally divided between electricity, gas and other fuels (primarily oil) (see Figure 4). Gas and oil are mainly used to generate process heat, while oil is used for secondary processing in the petrochemical sector. Electricity is used, amongst other things, to generate mechanical energy. In energy-intensive industries, electricity generally plays a minor role in quantitative terms compared with fossil fuels.

EEG levy – a cost driver?

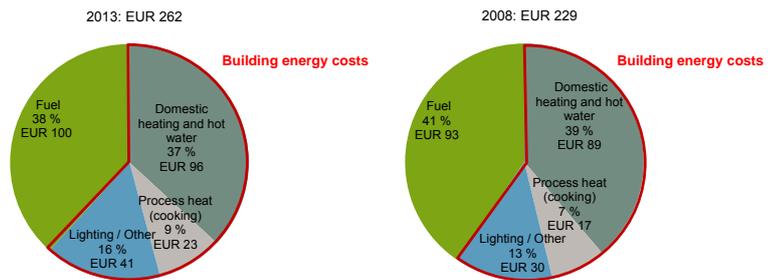
Data on industrial energy costs broken down into different energy sources are not available. However, from an examination of the energy costs of energy-intensive industries, it appears that the increase in electricity prices was not a significant cost driver. In the chemical and metal industries, the costs per unit of energy (TJ) fell in 2012 compared with 2008, despite rising electricity prices (see Figure 4). Electricity consumption in the chemical and metal industries remained constant, or relatively constant.

Figure 2: Electricity and gas prices



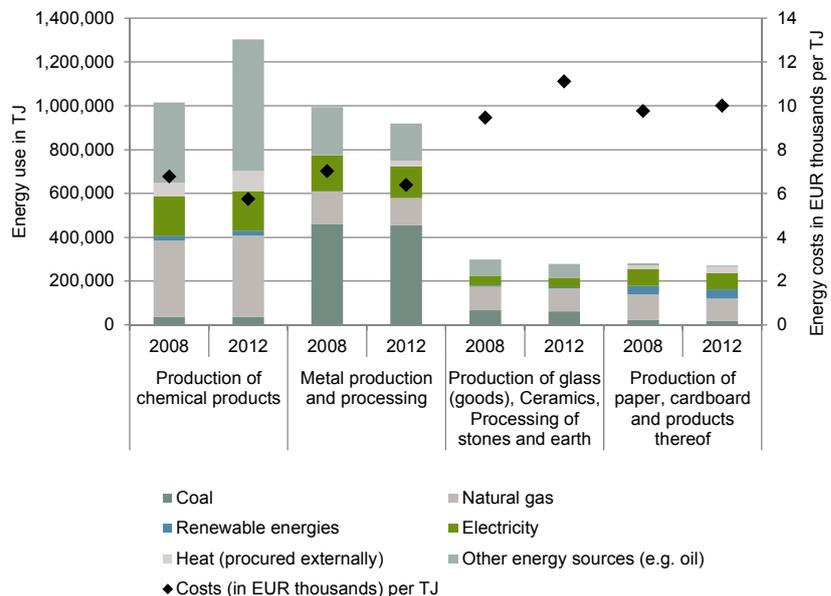
Sources: German Association of Energy and Water Industries (BDEW)

Figure 3: Monthly spending on energy per household



Sources: German Federal Ministry for Economic Affairs and Energy, Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen), German Institute for Economic Research, Federal Statistical Office, German Association of Energy and Water Industries - "Useful Energy Balances" project group

Figure 4: Energy consumption and costs of energy-intensive industries



Sources: Federal Statistical Office No data was available for energy consumption in 2012 based on coal and renewables in the chemical sector, therefore the 2008 values were kept constant.

As might be imagined given the relatively low use of electricity compared with fossil fuels in quantitative terms, energy costs in energy-intensive industries tend to depend on fossil fuel prices. The trend of energy costs as a proportion of the gross output of energy-intensive industries (see Figure 5) shows that these costs are driven not so much by the EEG levy as by the prices of fossil fuels. Energy costs of the four energy-intensive industries shown here as a proportion of gross production value grew on average by less than 5% p.a., while the EEG levy grew by an average of 29% p.a. between 2000 and 2012. Gas prices (imported) rose by an average of 11% p.a.

over this period. In particular, the relative trend of gas prices has been unfavourable for European industries competing with the United States in view of American shale gas production. On the other hand, the increase in the EEG levy has had little effect on electricity prices for energy-intensive industries, since they benefit from significant relief arrangements, and the costs of electricity generation, transport and distribution actually decreased.

Conclusion

Public discussions on energy costs focus mainly on electricity prices. This ignores the fact that:

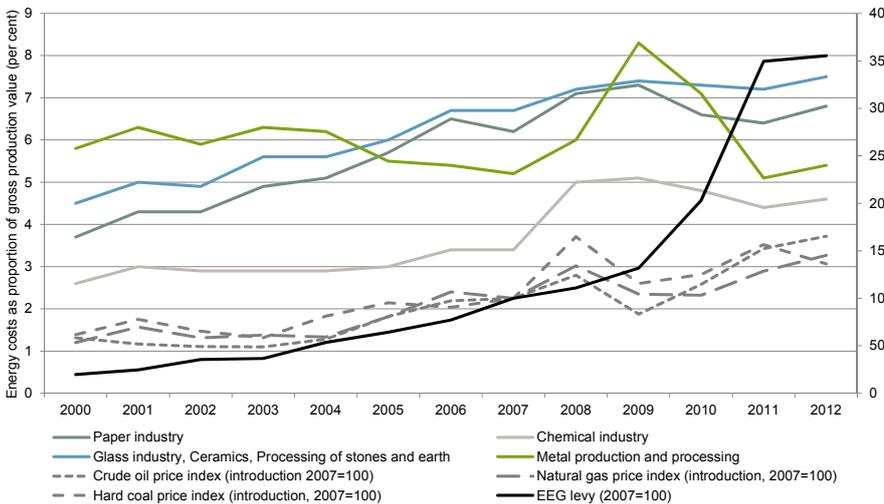
- 1.) energy costs depend on both prices and quantities, and
- 2.) electricity costs are not the only factor – oil and gas costs are important too.

Oil and gas account for the majority of household energy costs. However, the increase in the monthly energy spend of households in recent years has been driven mainly by rising electricity prices. Electricity prices are high for households and small businesses because of high taxes and levies (particularly the EEG levy) but not for electricity-intensive industries as these enjoy numerous exemptions.

Oil prices have fallen sharply in recent months, which is currently having a positive effect on the cost burden of industry (especially the chemical industry) and also on the costs of oil-based heat generation. However, prices are expected to rise in the medium term.

Gas costs are usually ignored in public debate, as gas prices are significantly lower than electricity prices and include fewer components susceptible to government influence, such as taxes and levies. However, gas and oil play a major role in energy-intensive industries in quantitative terms. The trend of relative energy costs in industry is therefore driven more by fossil fuel prices than by the EEG levy. ■

Figure 5: Energy costs and price trends



Sources: Destatis, Federal Ministry for Economic Affairs and Energy.