Electricity tariffs for the energy transition

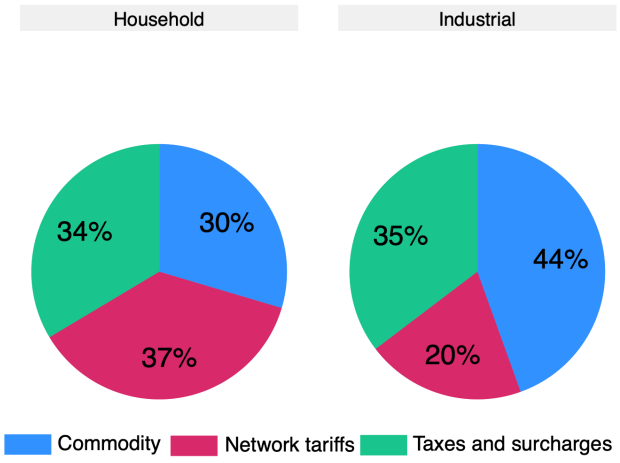
There is no energy transition without electrification. Electrification is a main vector of decarbonation for industrial processes and households. In Belgium, total electricity consumption is expected to increase by a third by 2030 (Elia, 2023). But electrification only reduces CO2 emissions if the electricity used is low carbon. Increase in low carbon generation capacity is expected to come primarily from decentralized production units such as solar PVs and from wind turbines. These are expected to respectively double and triple by 2030 in Belgium (Elia, 2023).

The energy transition poses new challenges. Electrification and increased decentralized electricity generation raise the need to reinforce transmission and distribution grids. In Belgium, grid operators expect their investment needs to triple by 2030, of which €22 billion will be invested in the electricity grid alone (Synergrid, 2024). Additionally, intermittent renewables require either new flexible electricity generation (mostly thermal) to cover periods when wind and solar do not produce or flexible demand to balance the grid.

Demand-side flexibility can lower the cost of the energy transition. According to Elia, demand-side flexibility could reduce investment needs in new production capacity in Belgium by 900 MW by 2028 and 2 GW by 2034, equivalent to a quarter and a third of the required new capacity (Elia, 2023). Demand-side flexibility, by aligning consumption and generation more closely will also reduce investment needs to reinforce the grid.

Consumers' electricity bill provides two levers for demand-side flexibility. In Belgium, energy costs and network charges account for two-thirds of consumers' electricity bill on average (Figure 1). These two bill components could be used to transmit the relevant signals from the wholesale market and the grid to consumers. At the same time, these two components also respond to two different logics: the price of the energy component is set by retailers operating in a liberalized market; network charges are set by regulators to cover the cost of the grid.

Figure 1. Electricity bill decomposition by type of consumer (Belgium, 2021)



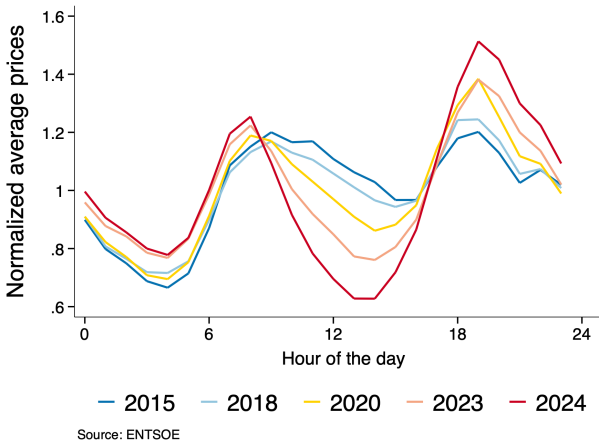
Source: Eurostat

Commodity component

Wholesale prices reflect the contemporaneous marginal cost of electricity. Cheap renewables push prices down but, in the absence of flexible demand or generation, also increase price volatility (Figure 2). Negative prices occur more frequently. In Belgium, they reached 400 hours in 2024 (4.5% of the year). Variations in electricity prices should reward demand and supply-side flexibility.

Yet, consumers in Belgium are hardly exposed to real-time wholesale prices. Dynamic pricing, which exposes consumers to the hourly variation of prices on the wholesale market, is only available in Flanders, and even there, it is chosen by only 1% of households and industrial consumers (VREG, 2024).

Figure 2. Intraday electricity price variation in Belgium in Belgian day-ahead prices across the day



Notes: Normalized average prices are measured by the ratio between the hourly market price on the day-ahead market and the yearly average day-ahead market price.

For the rest, the price which most Belgian households and industrial consumers pay for their electricity is not connected to short-term price variations in the wholesale market. Some consumers have Time-of-Use contracts, which encourage electricity consumption at night and at weekends. These periods typically correspond to periods of low load. Likewise, prosumers who do not benefit from net metering are de facto encouraged to consume when their solar PVs are producing.

Network charges component

New network charges are tackling peak consumption. Electricity grids are increasingly congested. Belgian regulators are confronting this issue with new price signals to consumers. Since 2023, network charges for Flemish consumers include a capacity tariff based on consumers' average monthly peak. In Wallonia (2026) and Brussels (2028), network charges will vary over the day (5 and 3 periods each) in a move set to encourage a shift of consumption from peak to off-peak and "solar" hours (CWaPE, 2024; Brugel, 2024).

The major challenge for the grid is its financing. Grid operators are increasing network charges for consumers: transmission tariffs alone are expected to rise by 77% on average between 2024 and 2027 (CREG, 2023). At the same time, the recently formed government has stated its intention to reduce network charges for large electricity consumers to lower their electricity bill (Federal Government Agreement, 2025). High electricity bills also discourage electrification of energy uses. Network charges may not be the only lever to finance the grid we need for the energy transition, and the cost burden need not be borne solely by electricity consumers.

Setting the right signal(s)

The total electricity bill is what matters. To reduce the cost of the energy transition and foster efficiency, we need tariff structures that align with the costs of the system - the cost of electricity and the cost of the network. We also need electricity price levels that encourage electrification of energy uses.

* * *

The workshop organized by **Demandflex** on April 16^{th}, 2025, will bring together researchers, regulators and industry participants to address the challenges of retail tariffication, identify key obstacles, and discuss potential solutions.

ULB UNIVERSITÉ LIBRE DE BRUXELLES DEMANDFLEX

References

Brugel (2024) Méthodologie tarifaire applicable au gestionnaire de réseau de distribution d'électricité et de gaz actif en Région bruxelloise pour la période 2025-2029.

CREG (2023, November 14) La CREG approuve les tarifs de transport d'électricité pour la période 2024-2027.

CWaPE (2024) Structure tarifaire applicable aux utilisateurs du réseau de distribution basse tension en région wallonne pour les années 2026 à 2029.

Elia (2023) Adequacy & Flexibility Study for Belgium (2024-2034)

Federal Government (2025) Federal Government Agreement.

Synergrid (2024, January 19) 31 milliards à investir dans les réseaux d'énergie belges d'ici 2030: Les gestionnaires de réseaux tripleront leurs investissements d'ici 2030 pour faire de la transition énergétique une réalité.

VREG (2024) Marktrapport 2023.