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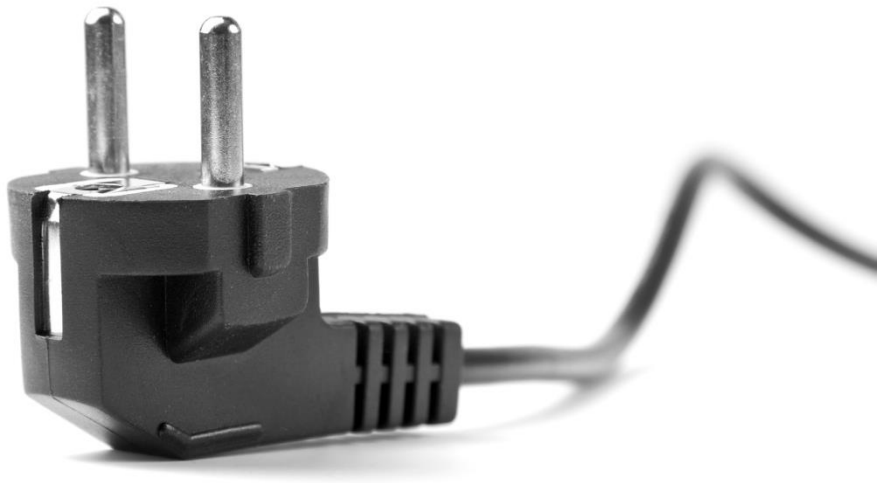
Benchmarking study of electricity prices between Belgium and neighboring countries

June 2014



Agenda

- Objectives and scope of the benchmarking study
- Benchmark methodology
- Results of the benchmarking study
  - Base load profile
  - Peak load profile
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Objectives and scope of the benchmarking study

Objectives and scope of the benchmarking study

The **primary objective of the study that Febeliec commissioned at Deloitte** is to obtain an overview of possible differences in prices for electricity purchased on the electricity market by major industrial consumers such as the members of Febeliec in Belgium as compared to their peers in France, The Netherlands and Germany.

- The **primary focus** is on **relative price differences** that exist on the market for Febeliec member profiles using identical, simplified, standardized, load (base load and peak load) and volume profiles (ranging from 100 GWh to 1.000 GWh).
- The **study covers** the actual prices for electricity that can be purchased in the relevant electricity markets in the **period 2012, 2013 and 2014** based on existing legislation and policies.

Benchmark methodology

Benchmark methodology

The relevant electricity price components used in this study are based solely on public data sources.

Market price:

Market prices are based on electricity market quotations (using appropriate combinations of spot & forward prices) as to obtain objective data that is comparable over the different Febeliec members. This pricing approach neutralizes the impact of:

- different sourcing and hedging strategies
- historical long term sourcing contracts concluded under different market conditions

Network costs: Network costs are regulated tariffs applied by the transmission grid operators (TSO'S) for the transport of electricity over the transmission network (excluding distribution).

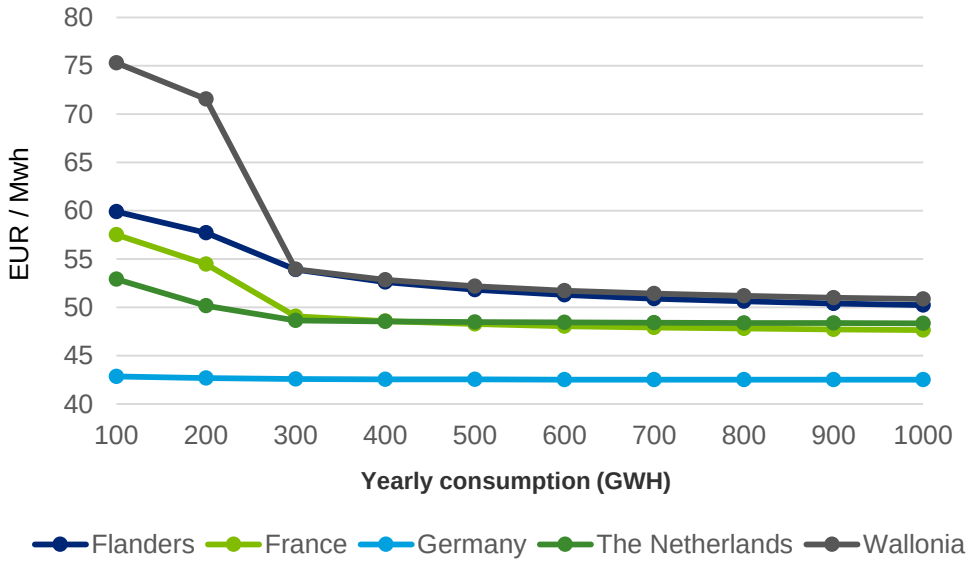
Electricity taxes: Represent all taxes and other levies that are to be paid on top of the market price and network costs in the different jurisdictions.

Results of the benchmarking study

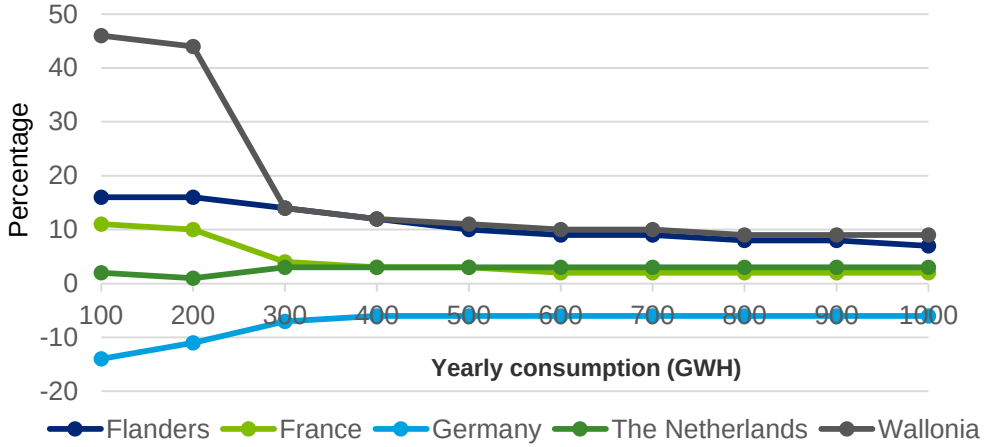
- Benchmark total electricity prices of a base load profile
- Comparative overview of:
  - market prices
  - network costs
  - electricity taxes

Benchmark total electricity prices for a base load profile

Total electricity prices - 2014 – Base load consumer profiles



Relative deviation of electricity prices vs average prices in neighbouring countries – 2014 – Base load consumer profiles

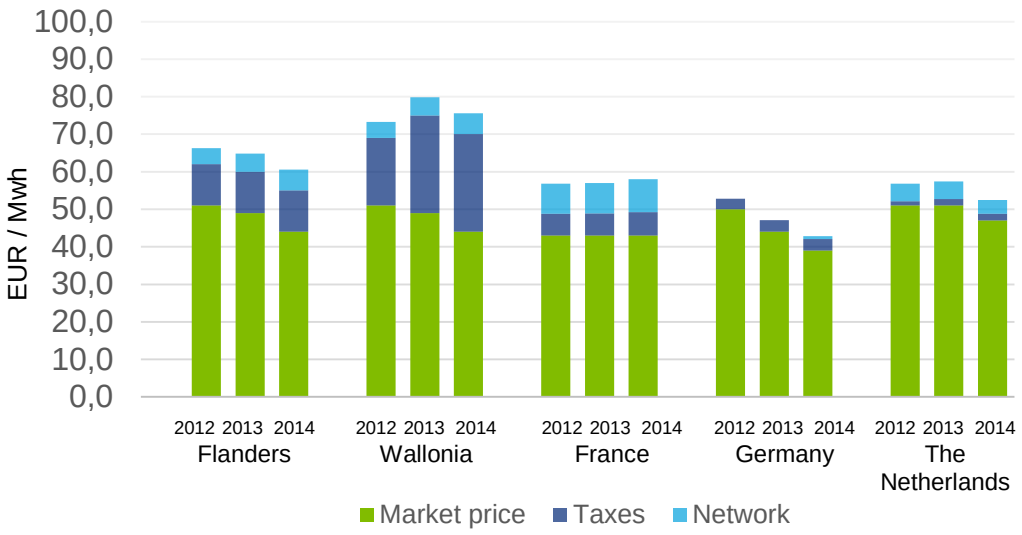


Large industrial base load consumers are facing higher all-in prices for electricity purchased in Belgium versus in its neighboring countries.

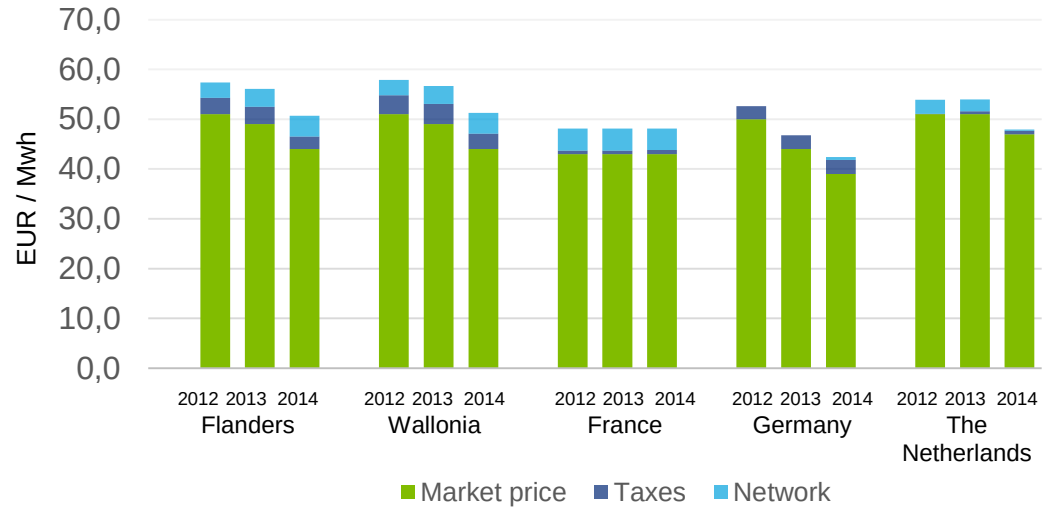
- For 2014, we observe total prices ranging from **43 EUR/MWh** in Germany to **60 EUR/MWh** in Flanders and up to **75 EUR/MWh** in Wallonia.
- Results show a difference in electricity price of approximately **4** to **9 EUR/MWh** for industrial consumers in Flanders and **5** to **24 EUR/MWh** in Wallonia compared to the average of the electricity prices in the neighboring countries.
- All-in electricity prices are between **9%** (for 1000 GWh in Flanders) and **47%** (for 100 GWh in Wallonia) higher than the average in our neighboring countries.
- For a 100 GWh base load consumer this represents a electricity cost difference of **0,9 MEUR** in Flanders and **2,4 MEUR** per year in Wallonia (compared to the average).
- For a 1000 GWh base load consumer this represents an electricity cost difference of **4,0 MEUR** in Flanders and **4,7 MEUR** per year in Wallonia (compared to the average).

Benchmark total electricity prices for a base load profile

Total Electricity prices for base load profiles (100 GwH)



Total Electricity prices for base load profiles (1000 GwH)

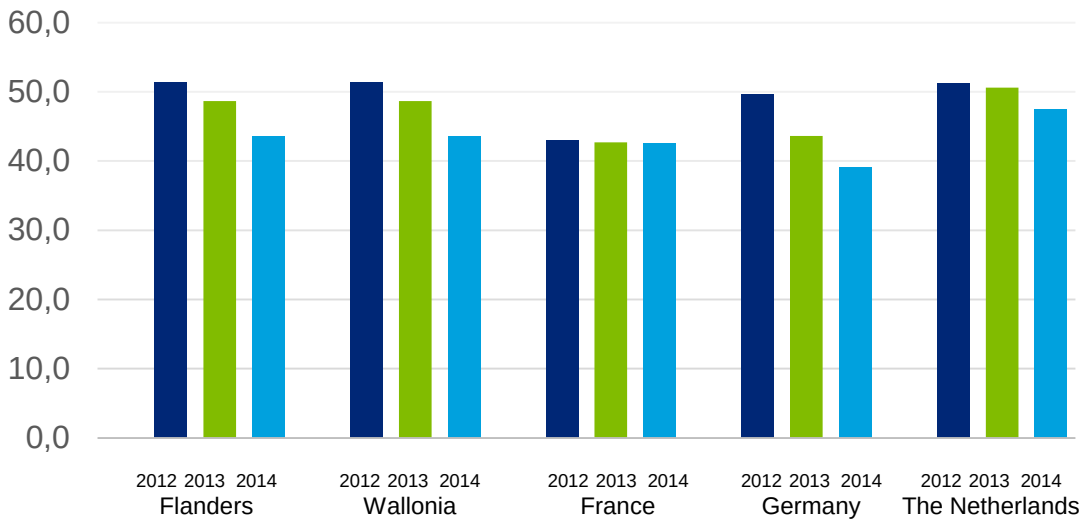


- The **electricity prices have decreased in Flanders and Wallonia in 2014 compared to 2013 while they remain higher** compared to the neighboring countries. In both Flanders and Wallonia taxes have decreased and network costs have increased compared to 2013.
- The observed price difference with the other countries is essentially driven by a combination of the following governmental measures:
  - **Important discounts on network costs (*) in Germany and the Netherlands of up to 90% of the standard tariffs**.
  - **Low electricity taxes** in The Netherlands
  - **Low electricity taxes** in France for consumers with higher volumes

(*) The announced discount on network costs in France of 50 % for certain major industrial energy intensive electricity consumers as of 1/8/2014 is not included in the benchmark prices because of existing uncertainties on applicable implementation criteria.

Comparative overview of market prices Base load profiles

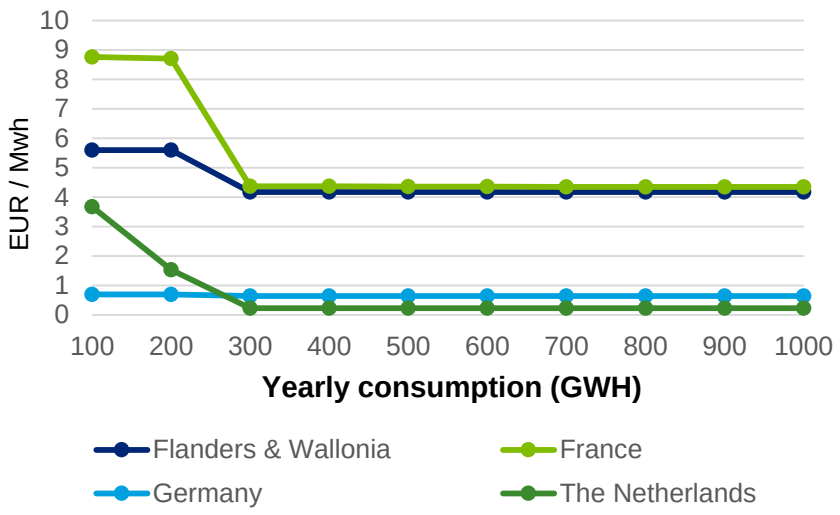
Total Electricity prices for base load profiles (energy component)



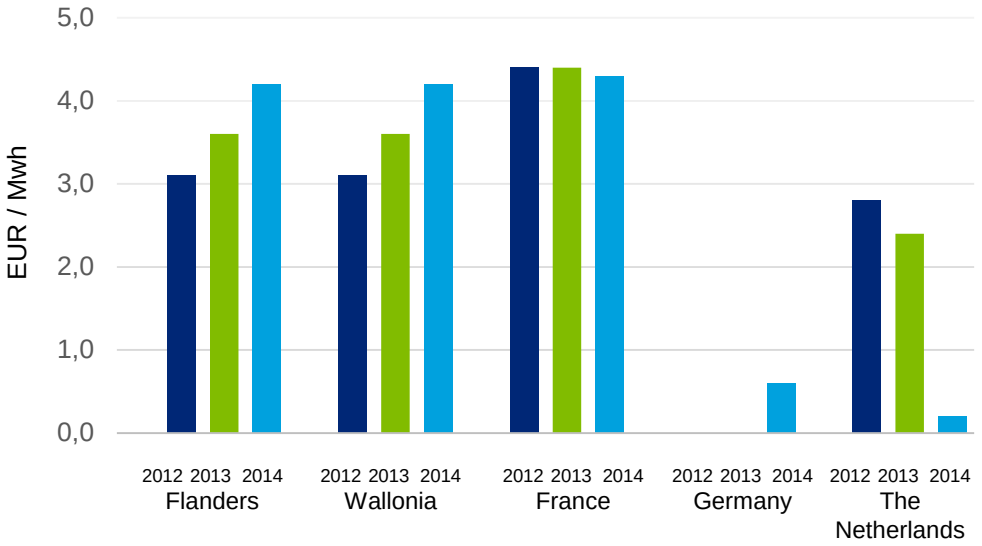
- **In France,** industrial consumers have access to **electricity at regulated prices** for their base load consumption based on access to historical French nuclear generation capacity (La Loi Nome / ARENH).
- **The impact** resulting from the regulated prices available to French base load profile consumers became less important in 2014 as market prices in neighboring countries have decreased close to the level of the regulated price in France.
- For 2014 market prices are higher (+4 EUR/MWh) in the Netherlands (based on observed Cal 2014 prices during 2013) compared to average of the countries in the scope while prices in Germany are 4 EUR/MWh lower than the average.

Comparative overview of network costs Base load profiles

Network cost – 2014 Base load consumer profile

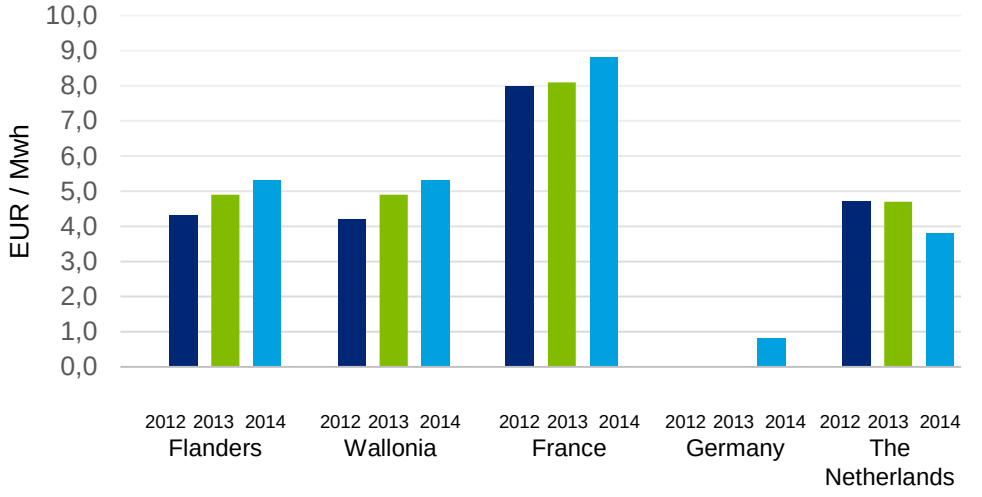


Network costs for base load profiles (1000 GwH)



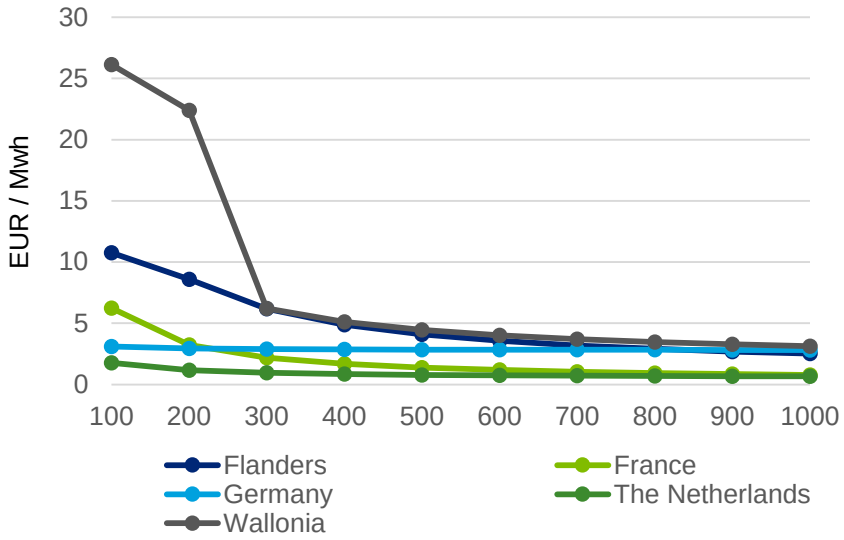
- Until 2013, German industrial consumers with a base load profile were **exempted from network costs.** In 2014 this exemption was replaced by an individualized discount of up to 90% on standard tariffs for a base load consumption of at least 8.000 hours a year.
- In 2014, in the Netherlands a similar **discount scheme up to 90%** on the standard tariffs is introduced for major industrial consumers.
- In **Belgium** network tariffs have increased in 2013 (+14%) and 2014 (+17%) for a 1000 GWh consumer resulting from changes in the tariff structure.

Network costs for base load profiles (100 GwH)

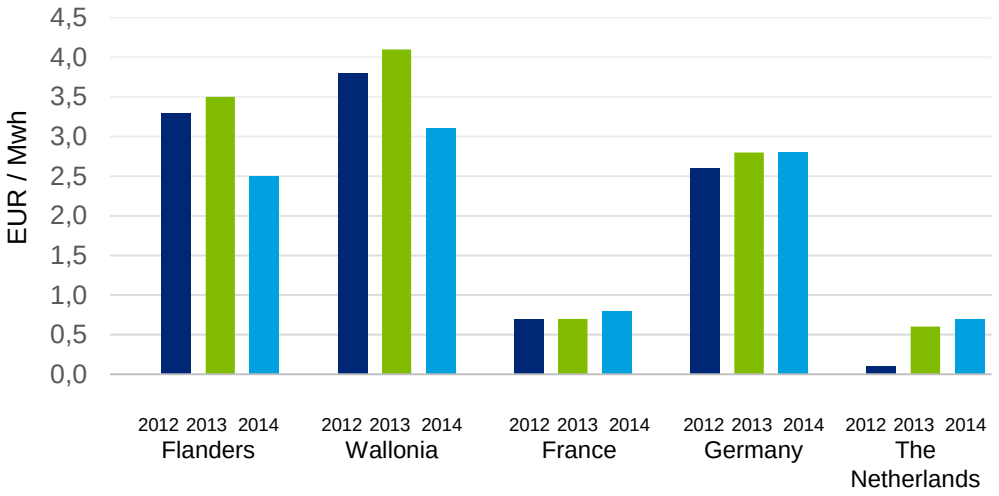


Comparative overview of electricity taxes Base load profiles

Electricity Taxes- 2014- Base load profile

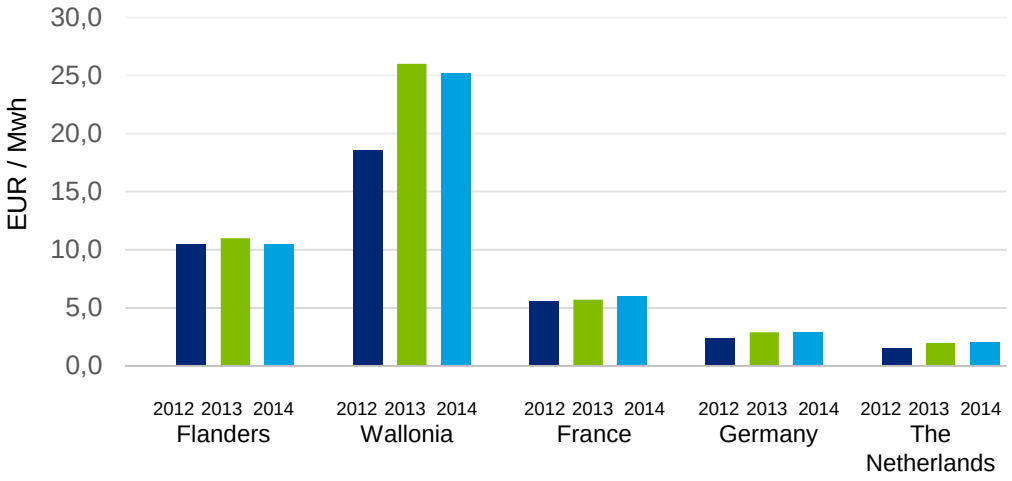


Electricity taxes for base load profiles (1000 GwH)

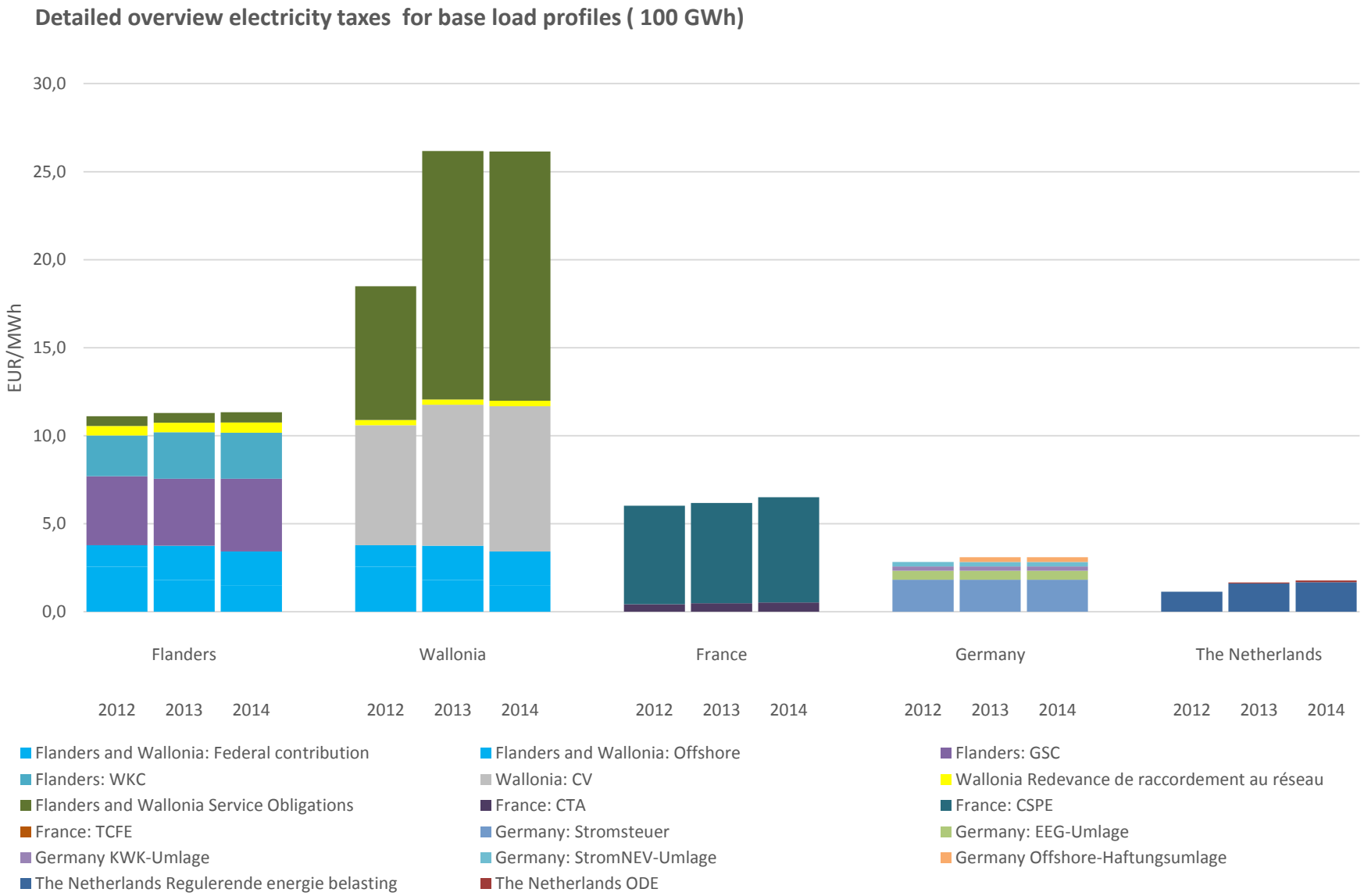


- **In Flanders and Wallonia**, industrial electricity consumers with volumes below 500 GWh are paying on average **higher taxes** compared to their peers in our surrounding countries.
- **In Wallonia**, the **Service Obligation Levies** create a surplus cost for the medium-high voltage network connections (the 100 and 200 GWh consumption profiles)
- **In The Netherlands** industrial consumers benefit **from low electricity taxes.**
- **In France low electricity taxes** need to be paid by base load consumers with higher off-take volumes.

Electricity taxes for base load profiles (100 GwH)

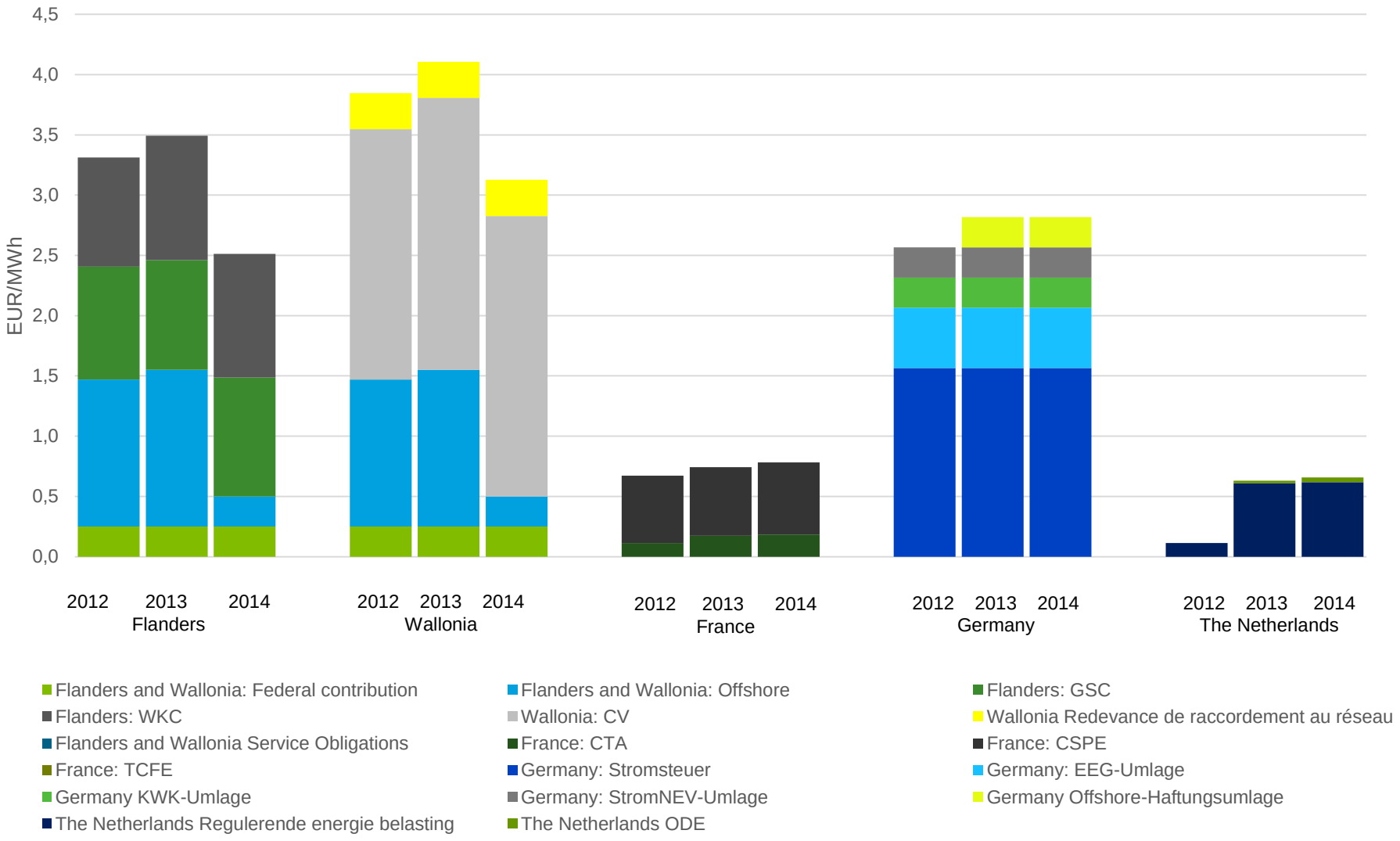


Comparative overview of electricity taxes Base load profiles (100 GWH)



Comparative overview of electricity taxes Base load profiles (1000 GWH)

Detailed overview electricity taxes for base load profiles (1000 GWh)

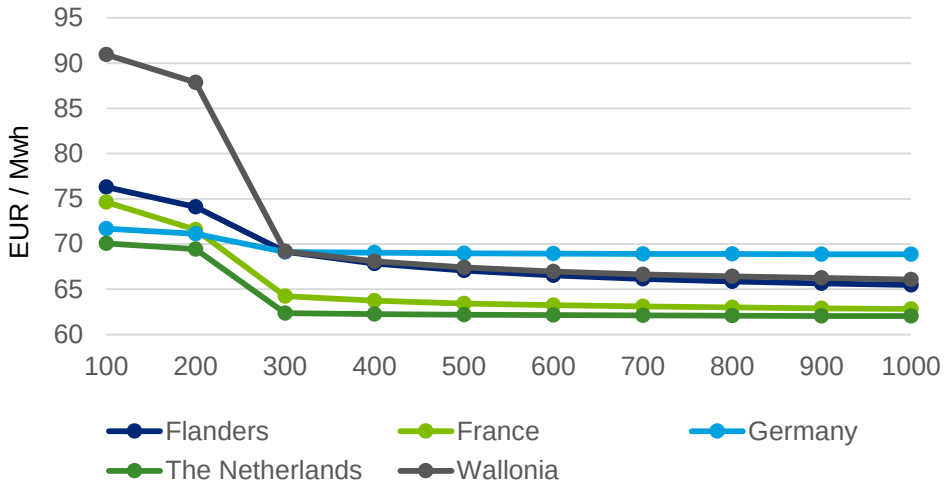


Results of the benchmarking study

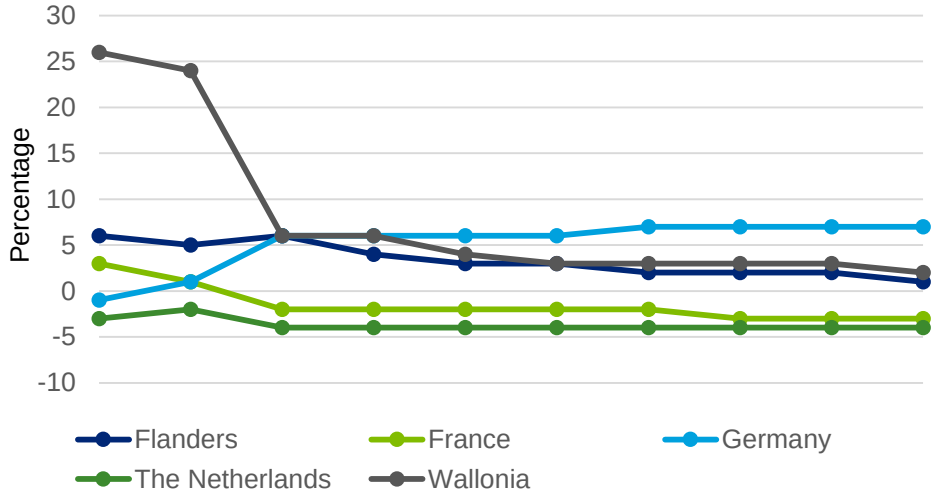
- Benchmark total electricity prices of a peak load profile
- Comparative overview of:
  - market price
  - network costs
  - electricity taxes

Benchmark total electricity prices for a peak load profile

Total Electricity prices - 2014 - Peak load profiles



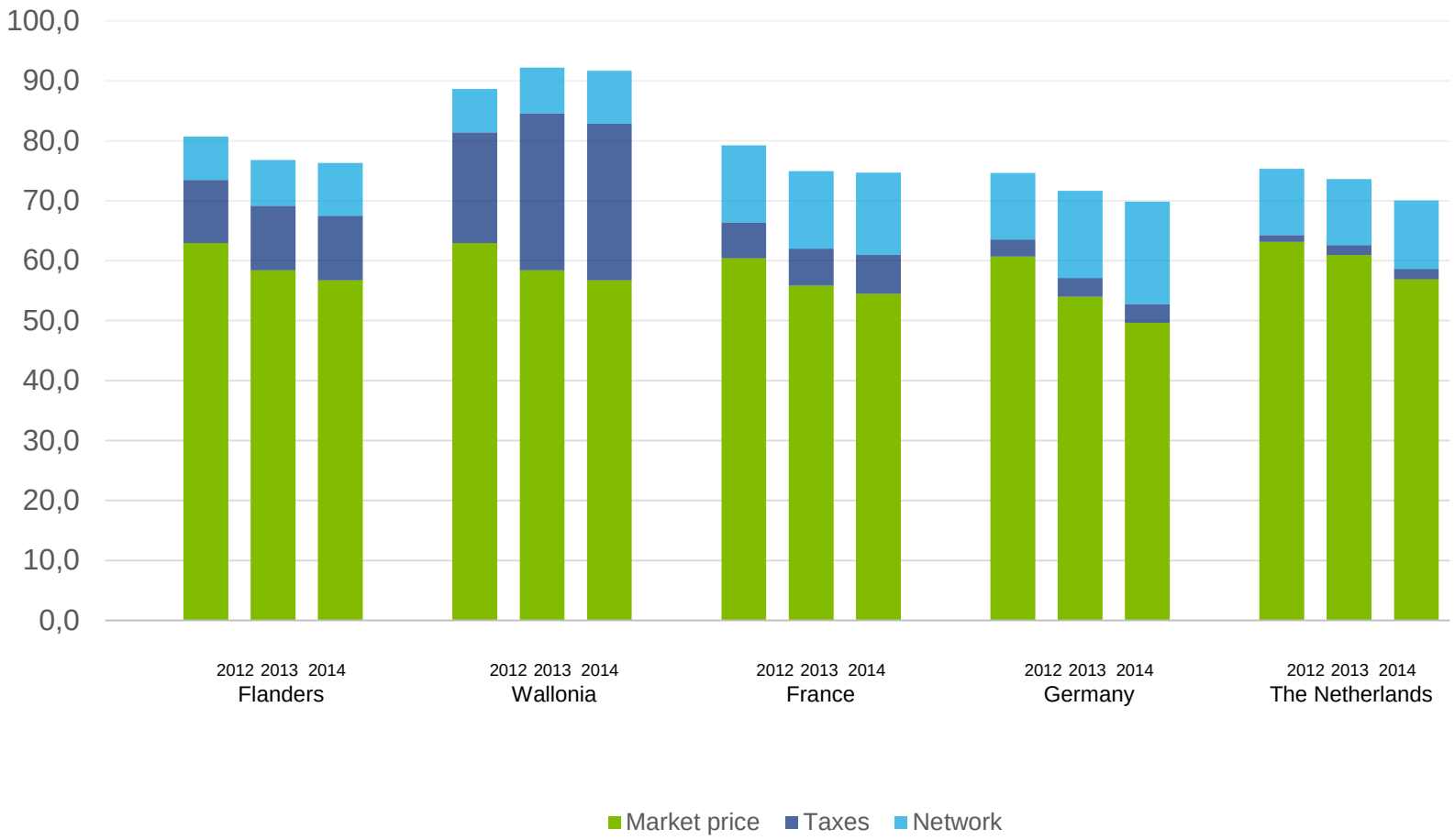
Relative deviation of electricity prices vs average prices in neighbouring countries - 2014 - Peak load profile



- For 2014 we observe total peak load prices ranging from 62 EUR/MWh (in the Netherlands for a 1000 Gwh consumer) to 91 EUR/MWh (in Wallonia for a 100 GWh consumer).
- Total electricity prices for peak load consumers in Wallonia are up to 27% higher (for 100 GWh) compared to the average prices for their peers in France, The Netherlands and Germany.
- For a 100 GWh consumer in Wallonia this represents a price impact of 1,9 MEUR (compared to the average of the other countries in the scope).
- Prices in Flanders are approximately 6% higher than the average in the neighboring countries (up to 400 GWh)
- For a 100 GWh consumer in Flanders this represents a price impact of 0,4 MEUR compared to the average of the other countries included in the study.

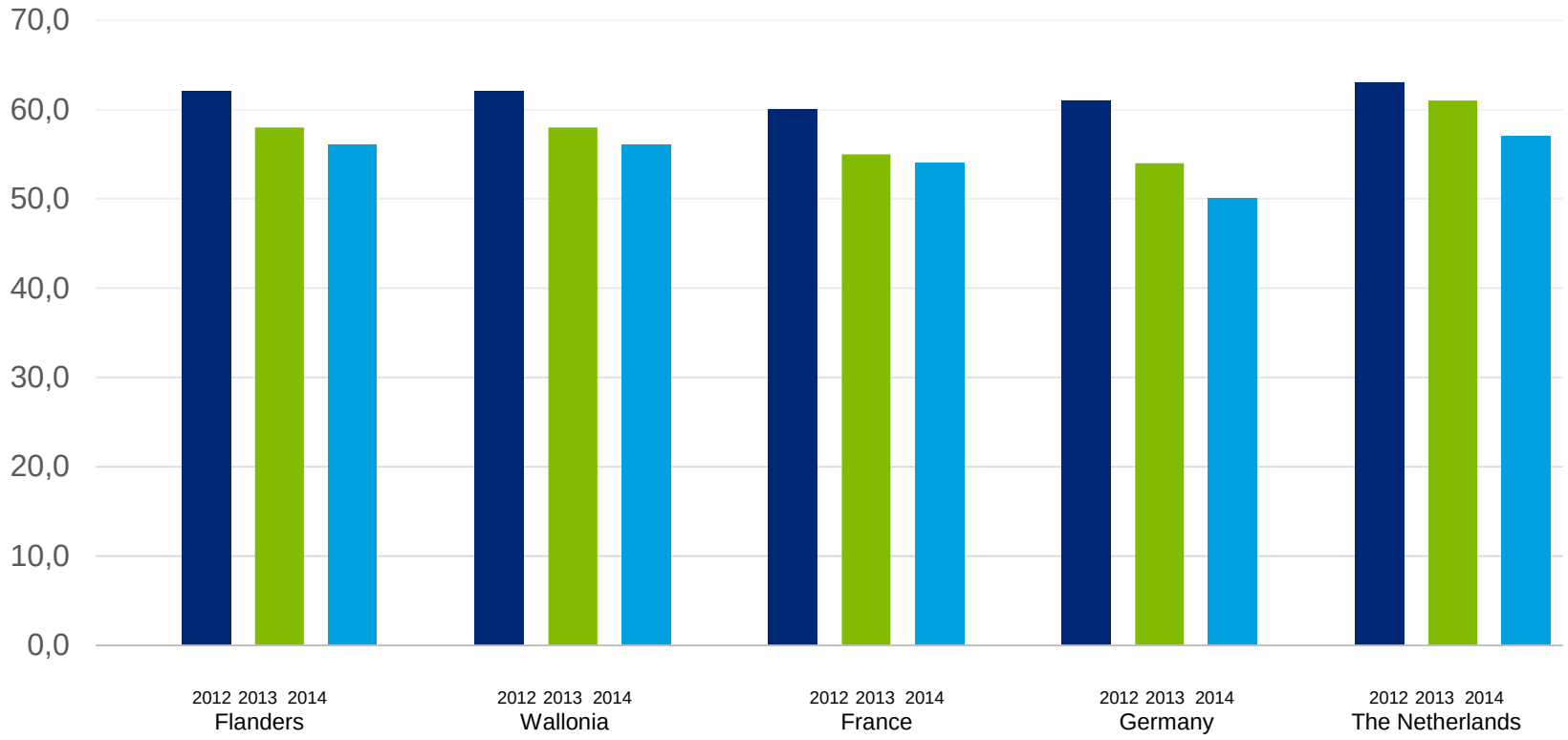
Benchmark total electricity prices for a peak load profile

Total Electricity prices for Peak load profiles (100 GwH)



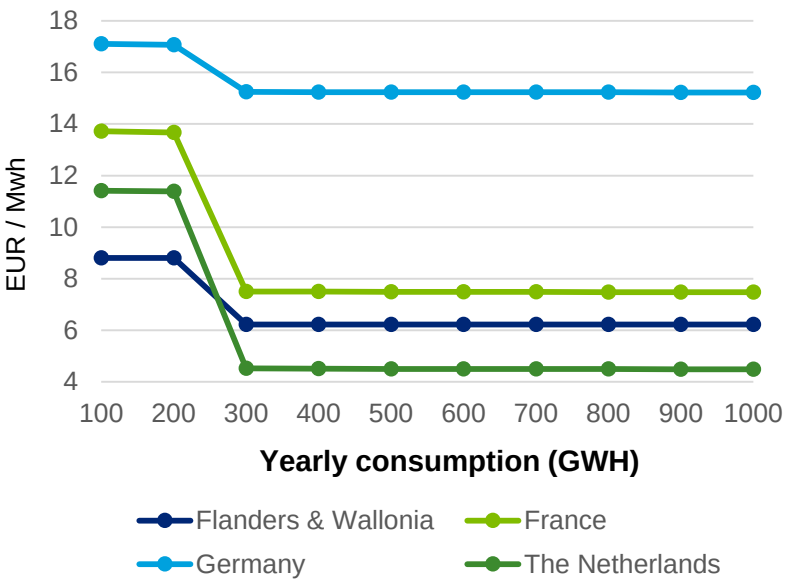
Comparative overview of market prices Peak load profiles

Total Electricity prices for Peak load profiles (energy component)

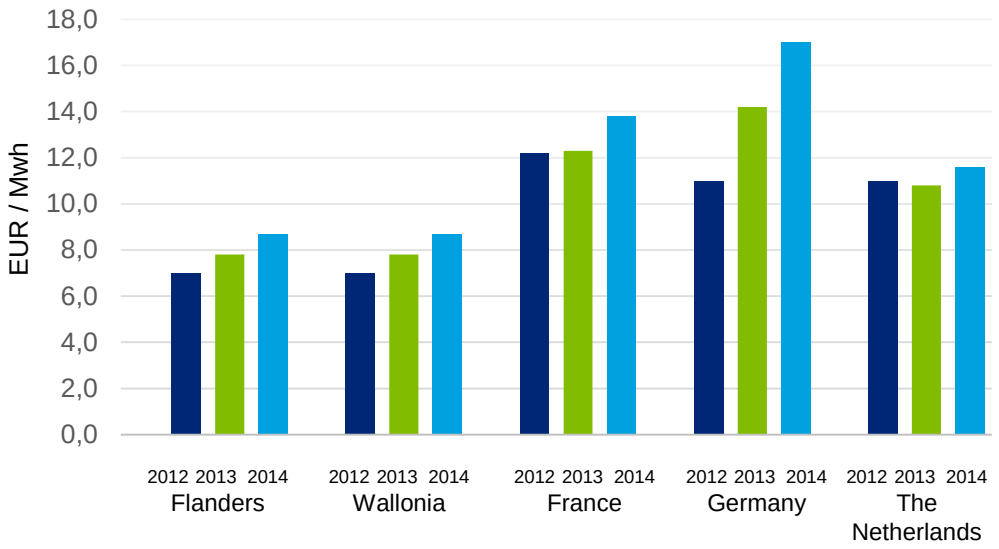


Comparative overview of network costs Peak load profiles

Network cost - 2014 - Peak load consumer profiles



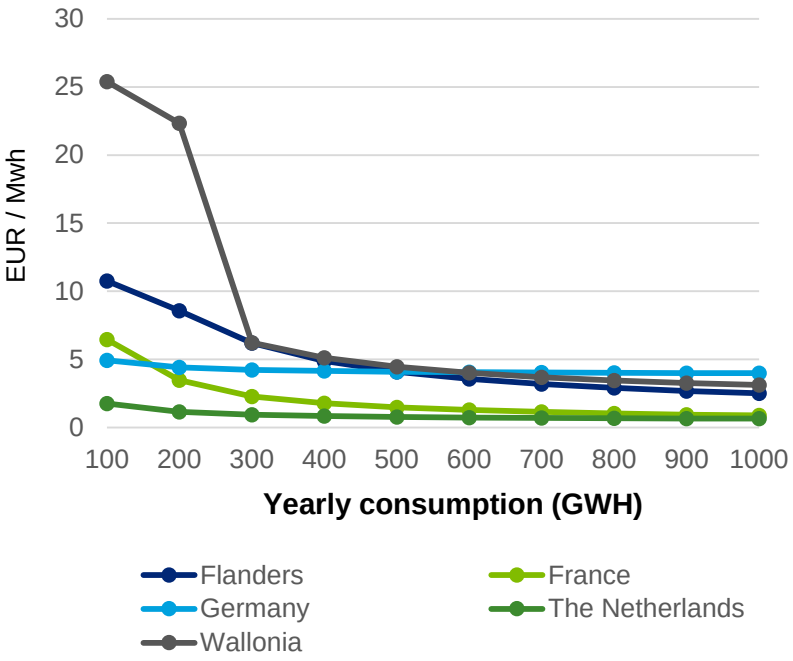
Network costs for peak load profiles (100 GwH)



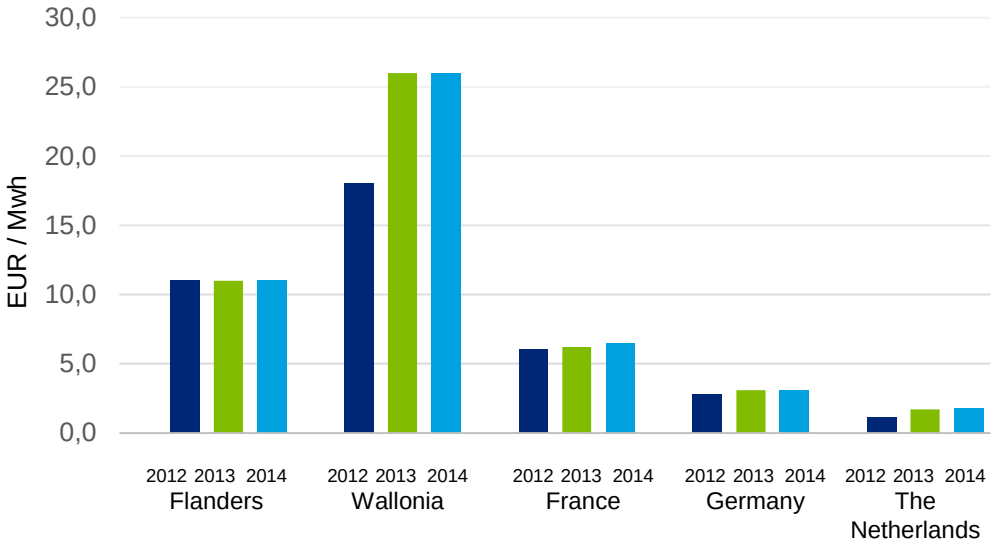
- Compared to the base load profile, industrial consumers with a peak load do not benefit from discounted network costs **in Germany and The Netherlands.** The discounts for base load consumers are explained by the fact that base load consumer contribute positively to the stability of the network.
- Network costs in **Flanders and Wallonia** are up to 37% lower (for a 100 GWh profile) than the average of the neighboring countries in the scope of the study.

Comparative overview of electricity taxes Peak load profiles

Electricity taxes – 2014 – Peak profile

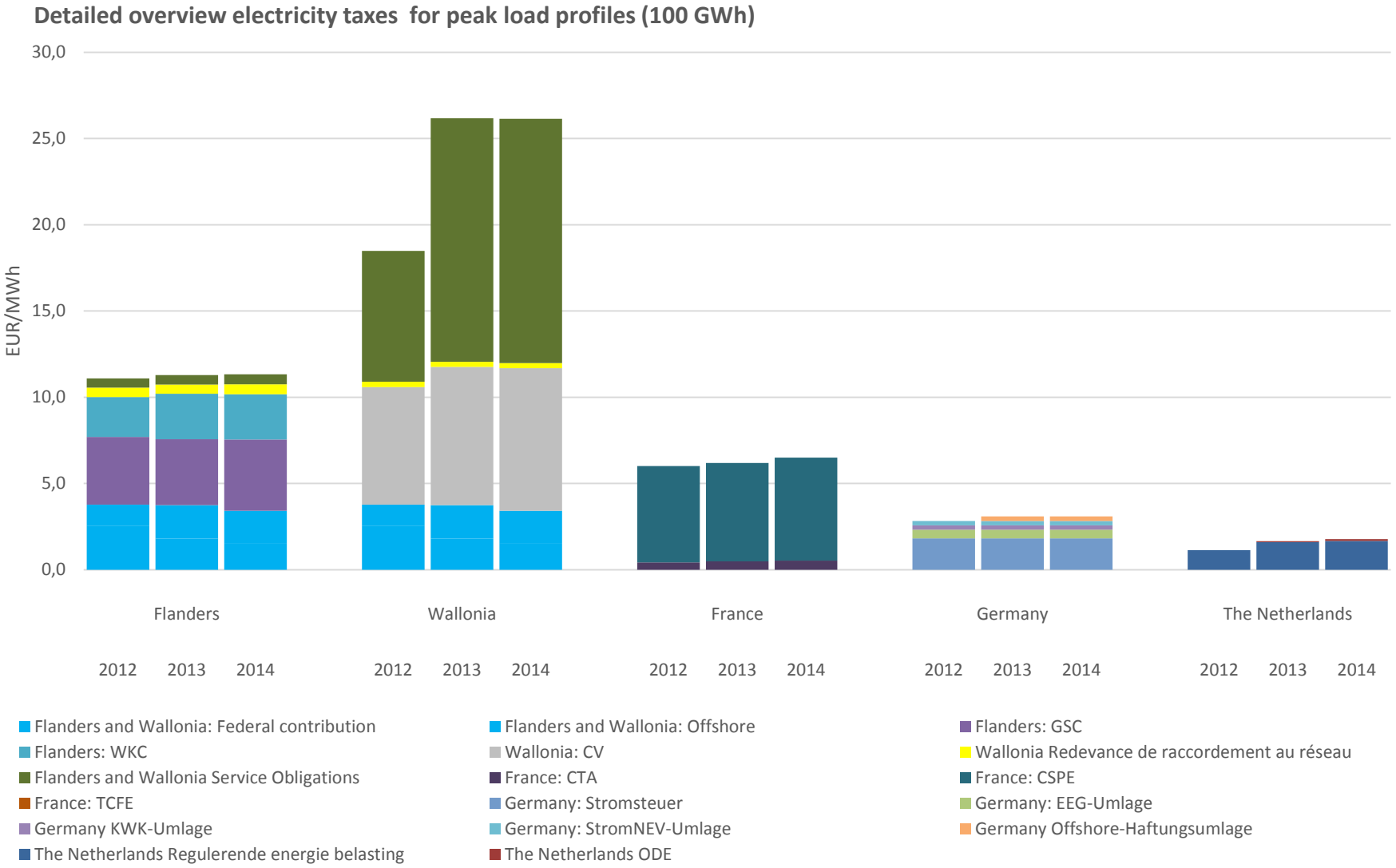


Electricity taxes for peak load profiles (100 GwH)



- Most taxes only depend on the total (yearly) energy consumptions. Therefore no material difference exists between taxes for base load and peak load profiles. Only a slight difference is observed when comparing the taxes paid by base load and peak load consumers. This difference is related to the French CTA contribution that is function of the network costs that in turn depend on the subscribed capacity.
- Observations on taxes for peak load profiles are therefore similar to those for base load consumers.

Comparative overview of electricity taxes Peak load profiles (100 GWH)



Appendices

Benchmark methodology

Market prices

The market price has been determined using following assumptions, validated and approved by Febeliec

Use of market quotations:

- Market prices for 2012 and 2013 are calculated on a combination of spot and forward market prices whereby prices for Year N are determined as follows:
  - 50% of the total market price is determined as the average of the (end of day) market prices for year ahead forwards over the period 1/1/N-1 to 31/12/N-1.
  - 35% of the total market price is determined as the average of the (end of day) market prices for month ahead forwards over the period 1/12/N-1 to 30/11/N
  - 15% of the total market price is determined as the average of the (end of) day ahead spot price for the period 31/12/N-1 to 30/12/N
  - Market prices for 2014 are calculated as the average of the (end of day) market prices for year ahead forwards over the period 1/1/2013 to 31/12/2013.
- The following sources for market prices were used for the different jurisdictions:
  - Flanders and Wallonia: Belpex (day ahead) and Endex (month ahead and year ahead). As no peak load future prices are available for delivery on the Belgian Market, Peak load prices are determined as the average of future prices for delivery on the Dutch and French market.
  - Netherlands: APX (day ahead) and Endex (month ahead and year ahead).
  - France: Powernext day ahead spot prices and EEX future prices (month and year ahead).
  - Germany: Epex day ahead spot prices and EEX future prices (month and year ahead).

Benchmark methodology

Market prices

Use of regulated prices in France

- The market prices for France have been determined taking into account both spot prices and the applicable regulated rates (based on “la Nouvelle Organisation du marché de l’éléctricité (La Loi NOME) and “L'Accès Régulé à l'Électricité Nucléaire Historique” (La Loi ARENH).
- Industrial consumers in France have access to regulated wholesale electricity prices for their base load consumption volumes (with a max threshold). In practice this means that the percentage of the power that can be sourced at such regulated tariffs heavily depends on the consumption profile of the consumer. Full base load profiles or profiles will benefit the most. For peak load profiles, the benefit is rather limited.
- In this study, market prices in France have been determined using the following combination of regulated and market prices:
  - For a base load profile: 95% ARENH rates and 5% market quotations
  - For a peak load profile: 15% ARENH rates and 85% market quotations
- ARENH rates amount to 40 EUR/MWH for 2011 and to 42 EUR/MWH for 2012, 2013 and 2014. In this study an increase of 0,5 EUR/MWH is added as a margin for the supplier.
- Market prices are determined as described in the previous slide.

Benchmark methodology

Network costs

- Network costs relate to the regulated tariffs applied by the transmission grid operators (TSO's) for the transport of electricity over the transmission network. In order to determine benchmark rates, the following assumptions have been included as validated and approved by Febeliec:
  - *A connection with ≥70 KV (no connection to the distribution network);*
  - *The subscribed capacity of the connection point was determined by adding a 10% contingency to the theoretical peak power levels;*
  - *The total energy taken off the grid on a yearly basis.*
- Only fixed connection costs are included for one meter per access point. No additional fee or one-off costs are included for connection equipment (e.g. transformers, switches, …).
- For Belgium (where network losses are billed by the supplier), a fee equal to 1% of the market price is added to the network tariff in order to ensure comparable rates with other countries in scope where network losses are part of the network tariff.
- No seasonal rates are applied.
- For Germany we used the average of the rates of all 4 TSO's active on the German territory.
- For Germany and the Netherlands it is assumed that the base load profiles exceed the 8.000 hours (grid use) minimum threshold required to get a full discount of 90% on the network costs.
- The planned reduction in grid tariffs in France for certain energy intensive base load consumers as of 1/8/2014 is not included in the benchmark study because of remaining uncertainties on the applicability criteria and pending further implementation guidance.

Compensation for indirect emissions
Impact on electricity costs

We note that the emission trading scheme (ETS) in the EU has a significant impact on electricity prices. Since the spot commodity market price for electricity is determined by the variable cost of the marginal generation unit (i.e. including the CO_2 cost), the electricity price includes the cost of CO_2 whenever a carbon-emitting plant is marginal. The EU has recognized this effect and the impact it might have on the competitiveness of electricity consumers, and has therefore under certain circumstances allowed for compensation mechanisms at member state level.

Since the start of the 2nd phase (2013-2020) of the ETS in the EU (and although the impact already existed in the first phase in 2008-2012), member states can compensate certain industrial consumers for the impact of indirect emissions. This is only allowed for industrial activities that are at the same time energy intensive and exposed to global competition, and these activities are explicitly listed on the so-called indirect carbon-leakage list. The compensation is however lower than the effective impact of the CO_2 cost on the electricity price, given that it is based on an electricity consumption benchmark of the best performing plants in each sector and this value is then capped at 85% and degressive in time.

For the countries in the scope of the study, Germany, the Netherlands and Flanders have already introduced a compensation scheme for carbon leakage activities. The Walloon region has given its principle approval. France has decided not to compensate its industry for indirect emissions. The approved schemes need clearance from the European Commission and have to satisfy a certain number of strict criteria. Although the compensation mechanisms in these countries converge largely, it is not yet possible to calculate the specific impact on the electricity cost for the defined consumer profiles without further and very detailed assumptions. The impact is therefore not included in the results of the benchmark study.

From a high level perspective and for those activities that can benefit from the compensation, the impact of the compensation on the electricity price in Germany, the Netherlands and Flanders can be estimated at approximately 2,5 to 3,5 EUR/MWh.

Benchmark methodology
Electricity Taxes

Electricity Taxes relate to all taxes and other levies that are to be paid by the industrial electricity consumer in addition to market price and network costs. In order to determine benchmark rates, the following assumptions have been included which were validated and approved by Febeliec:

- VAT is not applied as it is not considered to be a cost element for these industrial consumers.
- For Belgium, we assumed that 85% of the theoretical cost of green certificates (e.g. electricity produced by renewable solar power and cogeneration plants) is charged through by the supplier to the industrial consumer.
- For Flanders and Wallonia regional service obligations are due on 30-70 kV network (and not on 150 kV).
- We note that a political agreement exists for a reduction of the public service obligation tariff in Wallonia. As actual implementation is still pending, the projected tariff reduction is not yet applied in practice and therefore not included in this benchmark study.
- For the CSPE (Contribution au Service Public de l'Electricité) cap in France, we assumed that the 598 kEUR cap is applicable (instead of the 0,5% of the added value cap).
- For Germany we assumed that
  - *Electricity costs exceed 4% of Turnover and exceed 20% of the Added Value and,*
  - *That the exemption for the Konzessionabgabe is applicable (i.e. electricity price paid by the consumer is lower than the "Grenzpreise" threshold determined at 118,9 EUR/MWh for 2014).*

Components of Electricity taxes (1/2)

Flanders

In Flanders the following federal and regional taxes and levies are currently applicable:

- The federal contribution which raises money to:
  - Cover the costs related to the CREG (Belgian regulator for energy market)
  - Fund the decommissioning of the Mol-Dessel nuclear site
  - Support policies to reduce greenhouse gases in line with Kyoto
  - Fund public service obligations related to energy deliveries to financially vulnerable consumers
  - Fund a heating premium for an allowance to eligible consumers
- Federal offshore wind contributions (cable and certificates)
- Regional contribution to purchase Green (GSC) and Cogen (WKK) certificates at guaranteed minimum prices
- Regional public service contributions.

Wallonia

In Wallonia the following federal and regional taxes and levies are identified:

- The federal contribution which raises money to:
  - Cover the costs related to the CREG (Belgian regulator for energy market)
  - Fund the decommissioning of the Mol-Dessel nuclear site
  - Support policies to reduce greenhouse gases in line with Kyoto
  - Fund public service obligations related to energy deliveries to financially vulnerable consumers
  - Fund a heating premium for an allowance to eligible consumers
- Federal offshore wind contribution
- Regional contribution to purchase Green certificates (CV)
- Regional contribution to connect to the transport system (Redevance de raccordement au réseau)
- Regional public service contributions

Components of Electricity taxes (2/2)

France

In France the following federal and regional taxes and levies are identified: :

- CTA: the “Contribution Tarifaire d’Acheminement”. This contribution depends on the network costs. As the network costs depend on the type of profile, this contribution is different for Base load and Peak load profiles. It is the only component of the taxes that depends on the type of profile.
- CSPE: the “Contribution au Service Public de l'Electricité” has to cover the costs of the public service assignments (development of renewable power generation, of the social electricity tariffs and of the nationwide harmonization of electricity tariffs)
- TCFE: the “Taxe sur la consommation finale d'électricité” replaced the different local taxes that existed before.

Germany

In Germany the following federal and regional taxes and levies are identified:

- Stromsteuer: general tax on energy consumption
- Konzessionablage consists of a concession fee to local authorities (communes) that is due for low and medium high voltage connections.
- EEG-Umlage intends to increase the market penetration of electricity produced from renewable energy in accordance with the Renewable Energy Act
- KWK-Umlage intends to promote electricity produced from combined heat and power (CHP) plants, according to the Combined Heat and Power Act
- StromNEV-Umlage: electricity grid charges
- Offshore-Haftungsumlage finances the costs relating to Germany's shift from nuclear to green energies

The Netherlands

In the Netherlands the following federal and regional taxes and levies are identified:

- The regulerende Energie Belasting (REB) is a tax which intends to improve the rational use of energy.
- The ODE tax (Wet Opslag Duurzame Energie) is a tax that is intended to finance the support for the production of renewable energy.

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