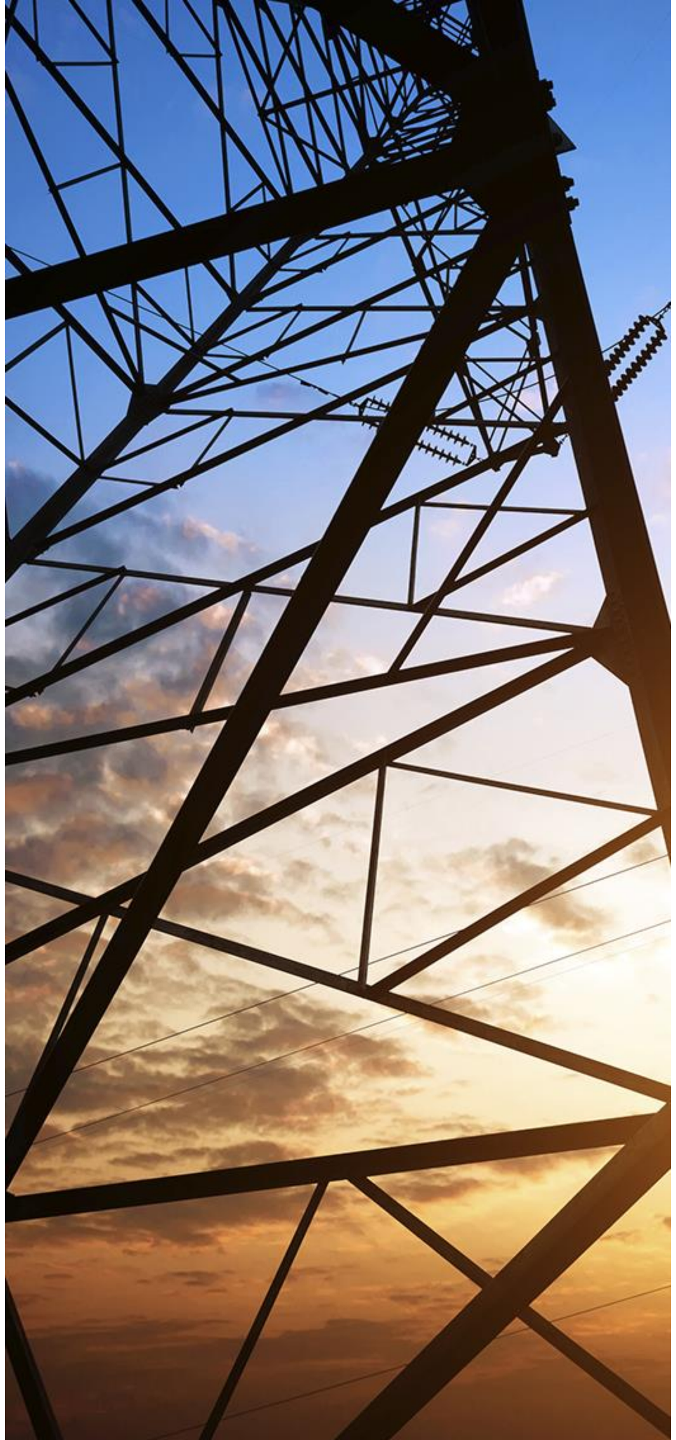
Benchmarking Study of Electricity Prices between Belgium and neighboring countries

24 April 2017

Benchmarking Study
Agenda

- Objectives and scope of the benchmarking study
- Benchmarking methodology
- Results of the benchmarking study
  - baseload profile
  - Peak load profile
- Appendices



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 (baseload and peak load) and volume profiles (ranging from 100 GWh to 1000 GWh).
- The **study covers** the actual prices for electricity that can be purchased in the relevant electricity markets in the **period 2015, 2016 and 2017** 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 (TSOs) 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.

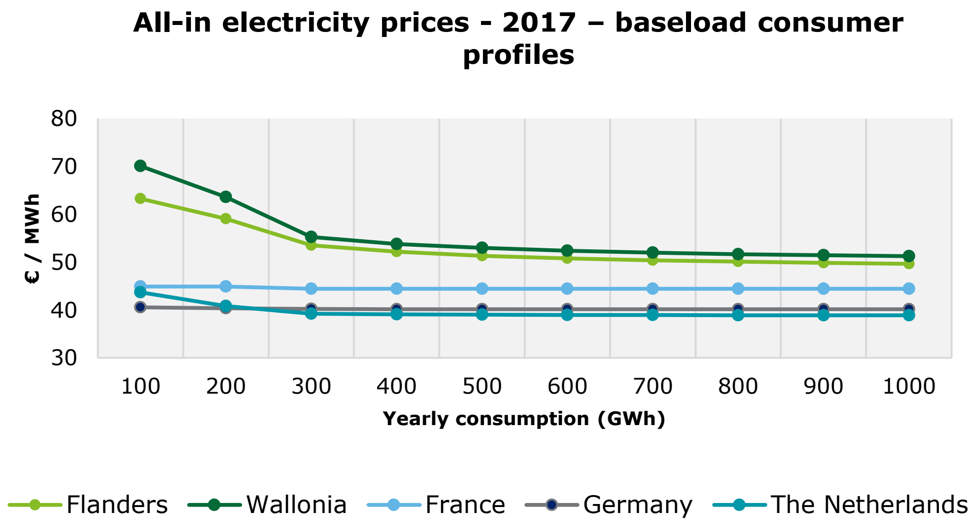
Results of the benchmarking study

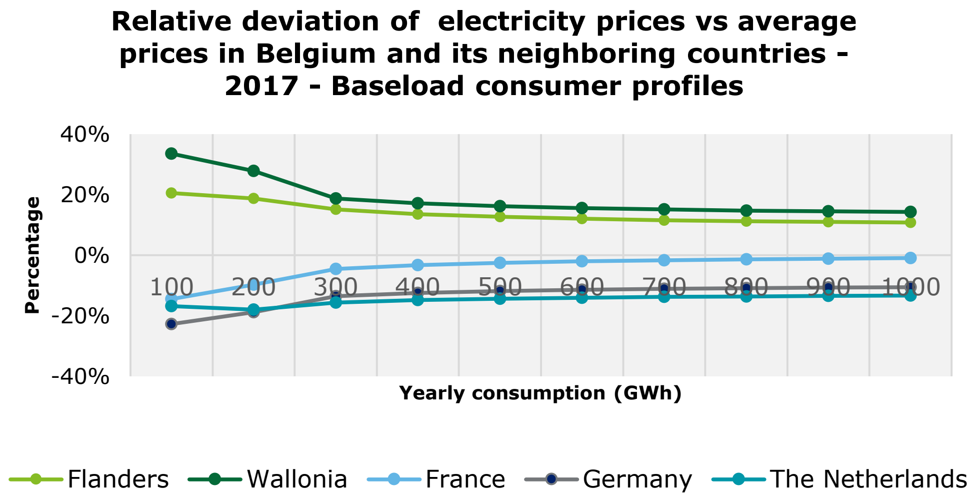
baseload profile

Results of the benchmarking study
baseload profile

- Benchmark all-in electricity prices of a baseload profile
- Comparative overview of:
  - market prices
  - network costs
  - electricity taxes

Benchmark all-in electricity prices for a baseload profile





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

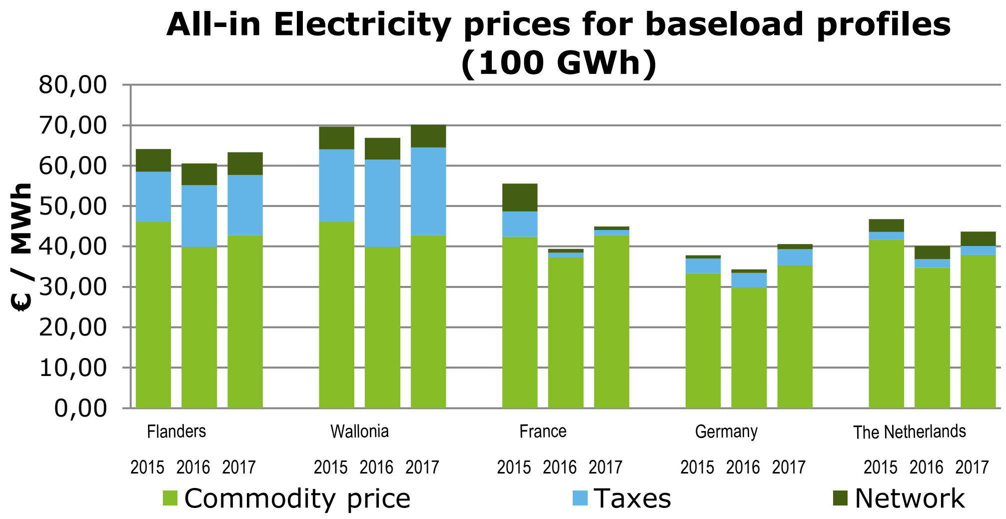
- In 2017, we observe all-in electricity prices ranging from **41€/MWh** in Germany to **63€/MWh** in Flanders and up to **70€/MWh** in Wallonia for a 100GWh baseload consumer.

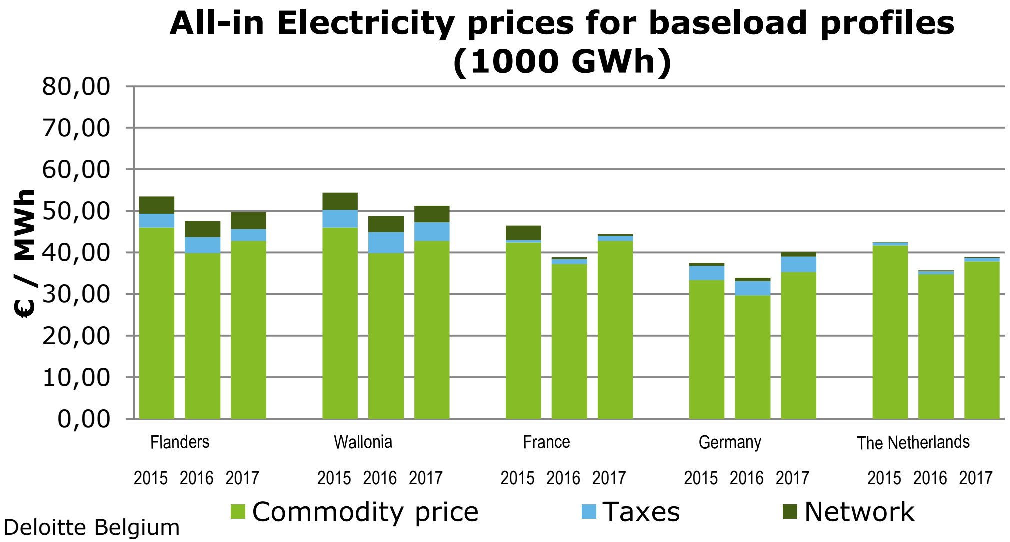
- In Flanders, results show a difference in electricity price of approximately **5€/MWh (+11%)** for a 1000GWh industrial consumer up to **11€/MWh (+21%)** for a 100GWh industrial consumers compared to the average of the electricity prices of the countries in the scope of the study. In Wallonia, we see differences of approximately **6€/MWh (+14%)** for a 1000GWh industrial consumer up to **18€/MWh (+33%)** for a 100GWh industrial consumer compared to the average of the electricity prices of the countries in the scope of the study.

- For a 100 GWh baseload consumer, this represents an annual all-in electricity cost difference of **1,1 million €** in Flanders and **1,8 million €** in Wallonia (compared to the average of the countries in the study).

- For a 1000 GWh baseload consumer this represents an annual all-in electricity cost difference of **4,8 million €** in Flanders and **6,4 million €** per year in Wallonia (compared to the average of the countries in the scope).

Benchmark all-in electricity prices for a baseload profile





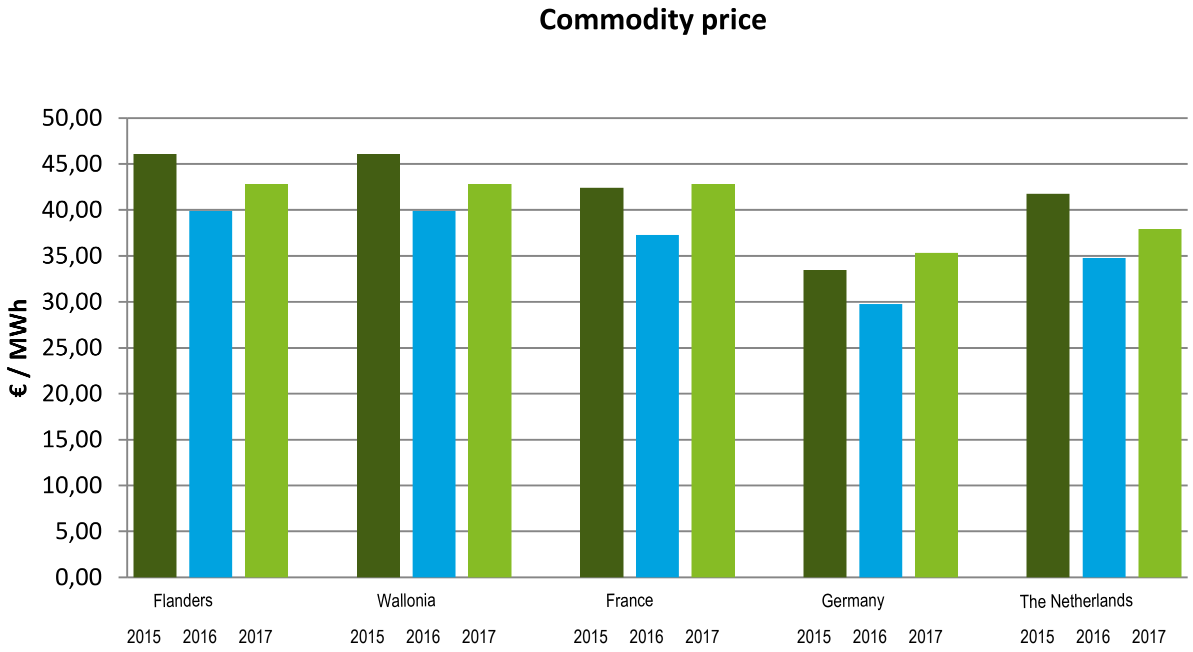
The all-in **electricity prices have increased** in Flanders and Wallonia (+5%) **in 2017 compared to 2016**.

Partially, this increase is explained by an increasing commodity cost (+7%). Also network costs have increased (+4% to +5%), both in Flanders and in Wallonia, while taxes in both regions have remained stable or decreased (down to -25%).

The observed price difference with the other countries is essentially driven by a combination of the following elements:

- **Commodity prices** in Flanders & Wallonia are about 6% higher than the average commodity cost for all countries in scope.
- **Substantially higher electricity taxes** in Flanders and Wallonia compared to the neighboring countries. Up to 70kV, both in Flanders and Wallonia taxes are higher compared to all neighboring countries. In Flanders, taxes are up to 68% higher compared to the average of all jurisdictions in scope. In Wallonia, taxes are up to 146% higher compared to the average of all jurisdictions in scope. Above 70kV, only in Wallonia taxes are higher than the average of all jurisdictions in scope. (Up to 70% higher than the average of Flanders, Wallonia, the Netherlands, France and Germany).
- **Important discounts on network costs in France, Germany and the Netherlands** of up to 90% of the standard tariffs for certain consumption profiles. More details can be found in the appendix to this report.

Comparative overview of market prices baseload profiles



The wholesale electricity prices in Germany remain substantially below the market prices in the other countries in the benchmarking scope.

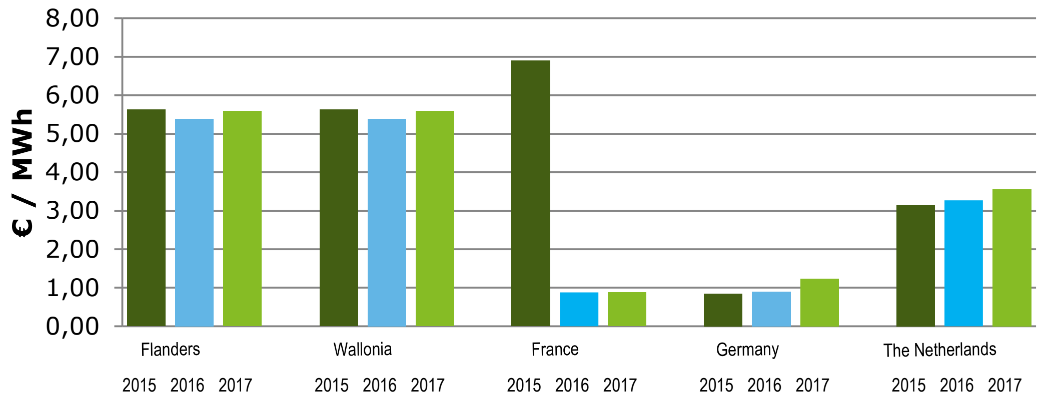
For 2017, Belgian market prices are nearly **in line with** market prices in **France**, but remain **13%** more expensive than in the Netherlands and **21%** more expensive than in **Germany**.

Comparative overview of network costs baseload profiles

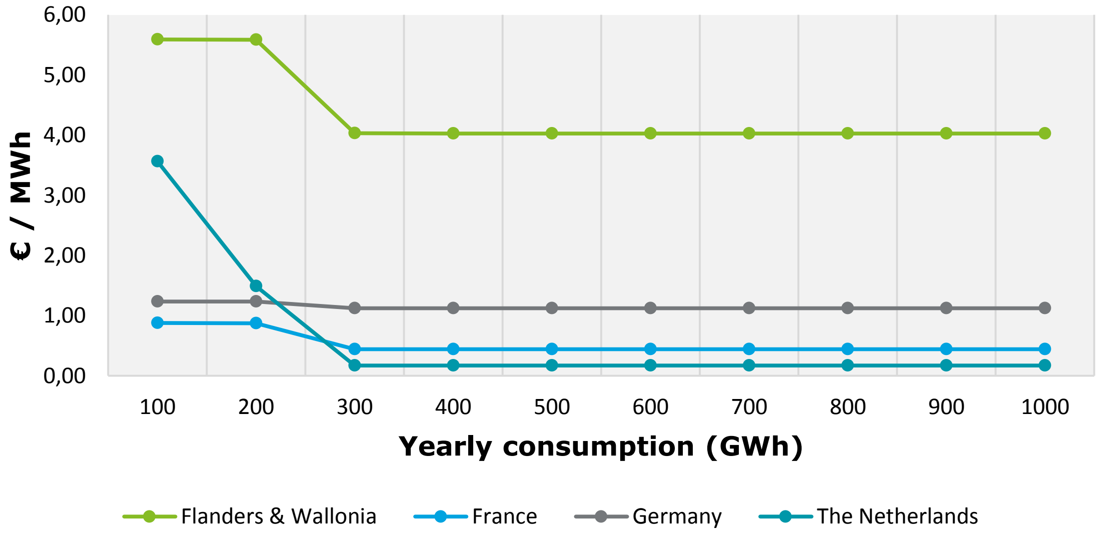
Network tariffs in Belgium **increased** (+4% to +5%) in 2017 and remain higher than those in the neighboring countries.

In France, Germany and the Netherlands, a maximum **90% discount** on network costs is applicable for certain consumption profiles. This discount does not exist in Belgium, which explains the large differences between Belgium and its neighboring countries. More details can be found in the appendix to this report.

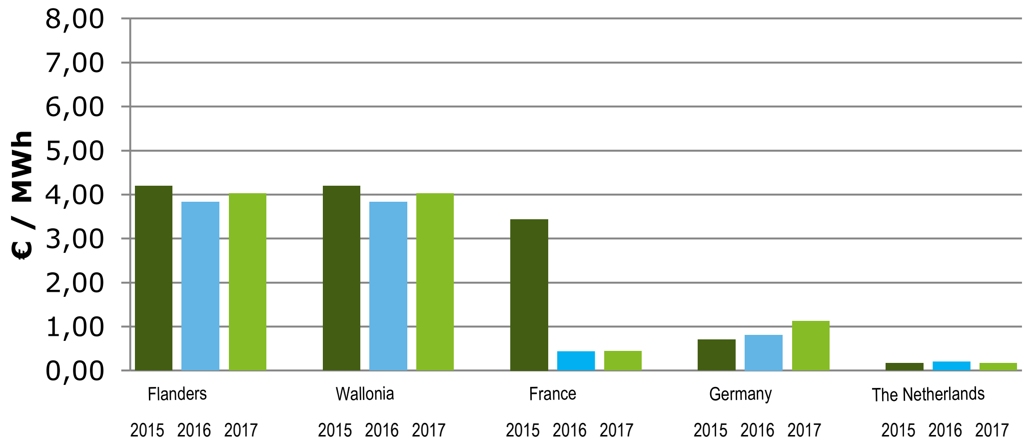
Network costs for baseload profiles (100 GWh)



Network cost – 2017 – Baseload consumer profile



Network costs for baseload profiles (1000 GWh)

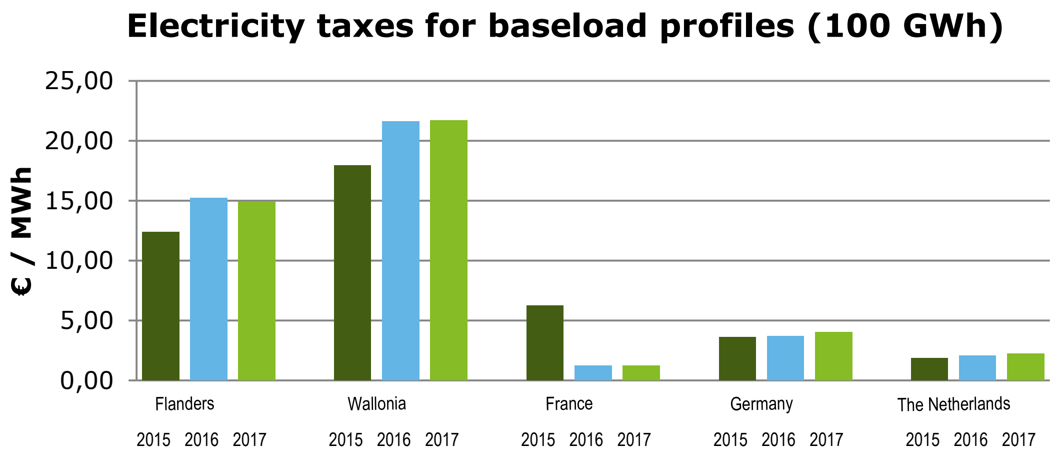


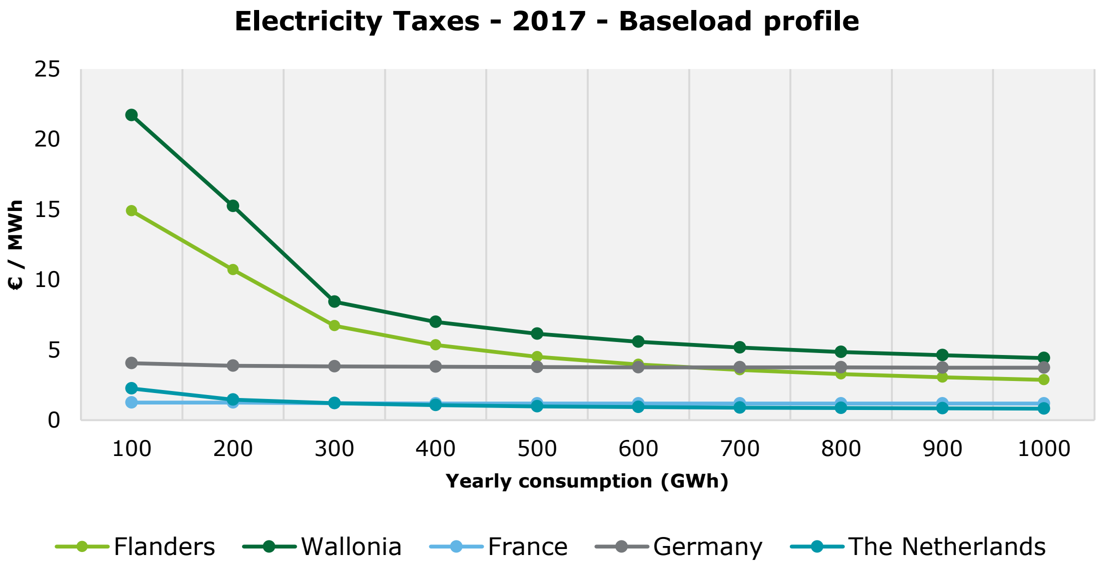
Comparative overview of electricity taxes baseload profiles

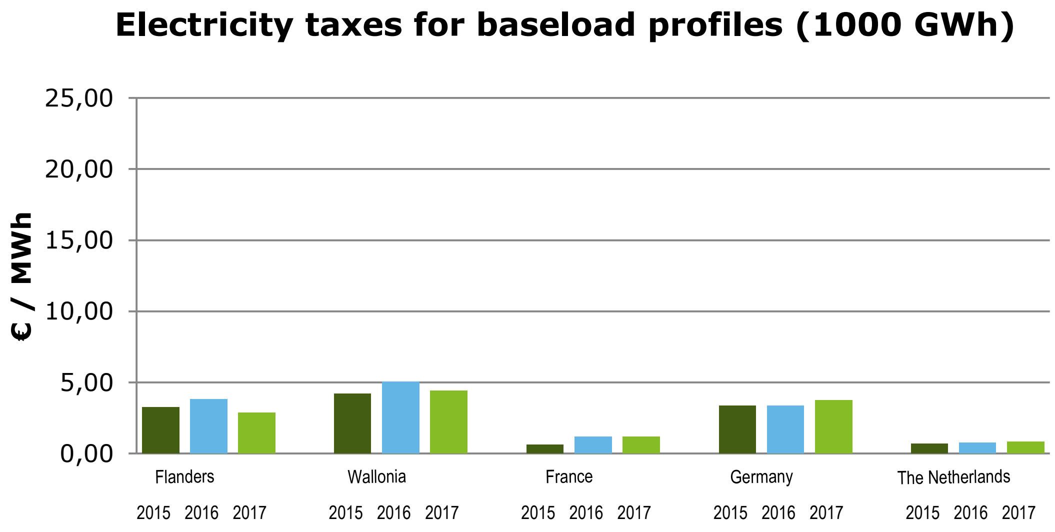
In Flanders and Wallonia, taxes decreased in 2017, compared to 2016. This decrease was down to 25% for consumers connected to 150kV or above in Flanders, while the decrease is down to 12% for consumers connected to 150kV or above in Wallonia. Nevertheless, taxes in Belgium remain higher compared to the neighboring countries.

In the Netherlands industrial consumers benefit from low electricity taxes.

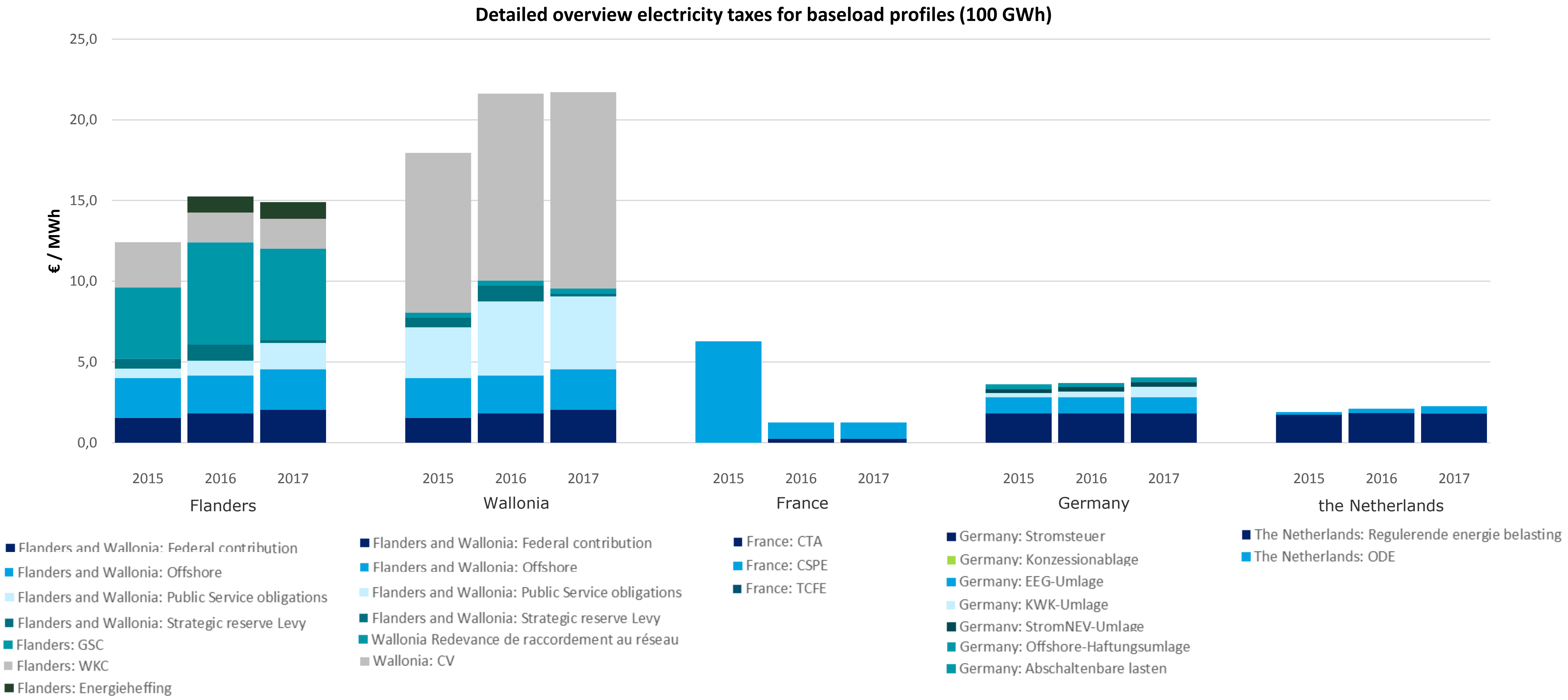
Also in France electricity taxes are up to 85% lower than the average of Belgium and its neighboring countries.



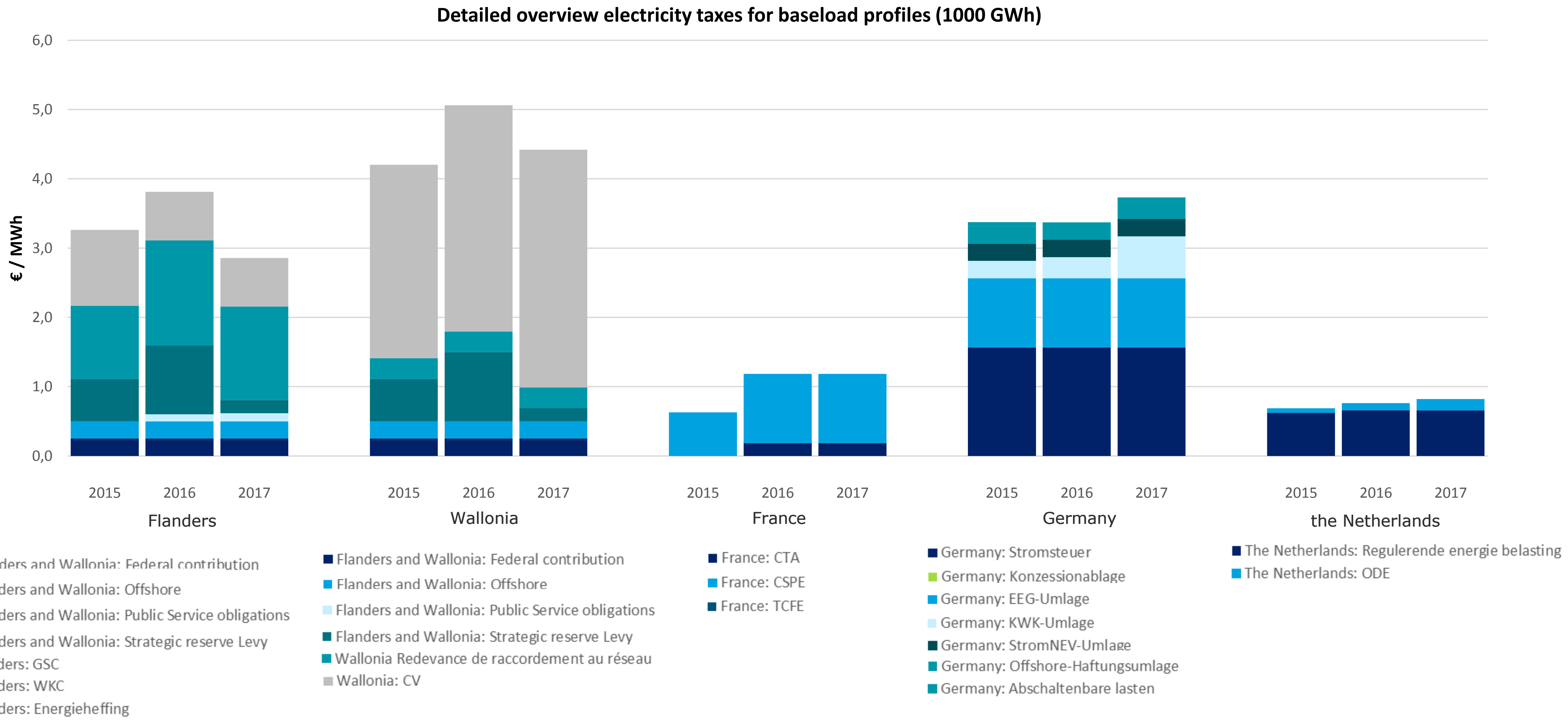




Comparative overview of electricity taxes baseload profiles (100 GWh)



Comparative overview of electricity taxes baseload profiles (1000 GWh)



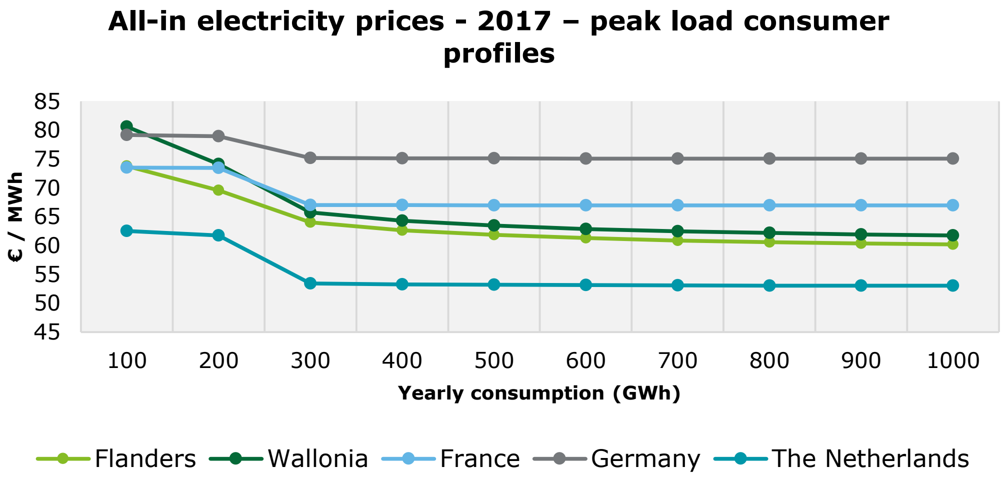
Results of the benchmarking study

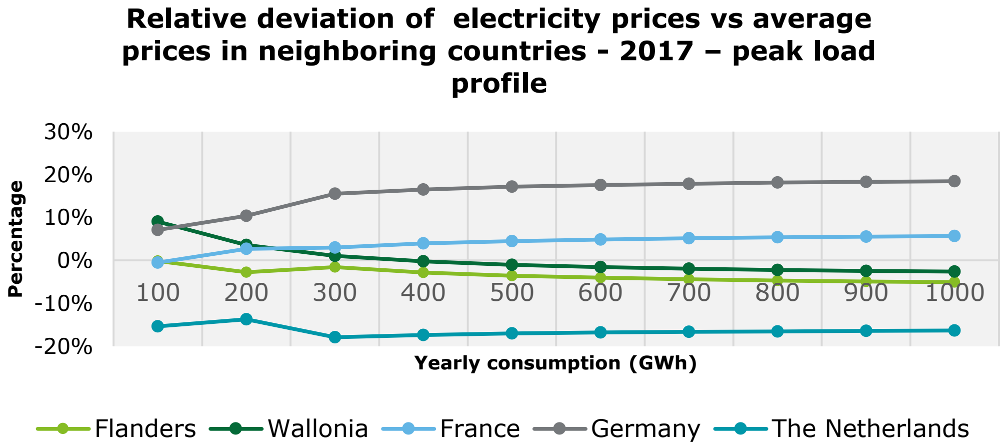
Peak load profile

Results of the benchmarking study
Peak load profile

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

Benchmark all-in electricity prices for a peak load profile





For 2017, we observe all-in peak load prices ranging from **53€/MWh** in the Netherlands for a 1000 GWh consumer to nearly **81€/MWh** in Wallonia for a 100 GWh consumer.

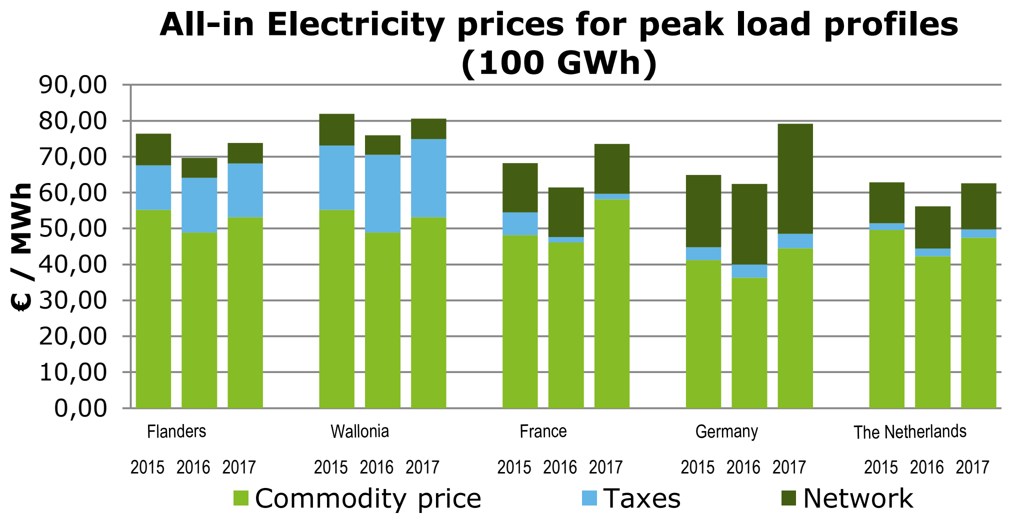
The all-in electricity price for peak load consumers in **Wallonia** is **9%** higher (for 100 GWh) compared to the average prices for their peers in France, the Netherlands and Germany.

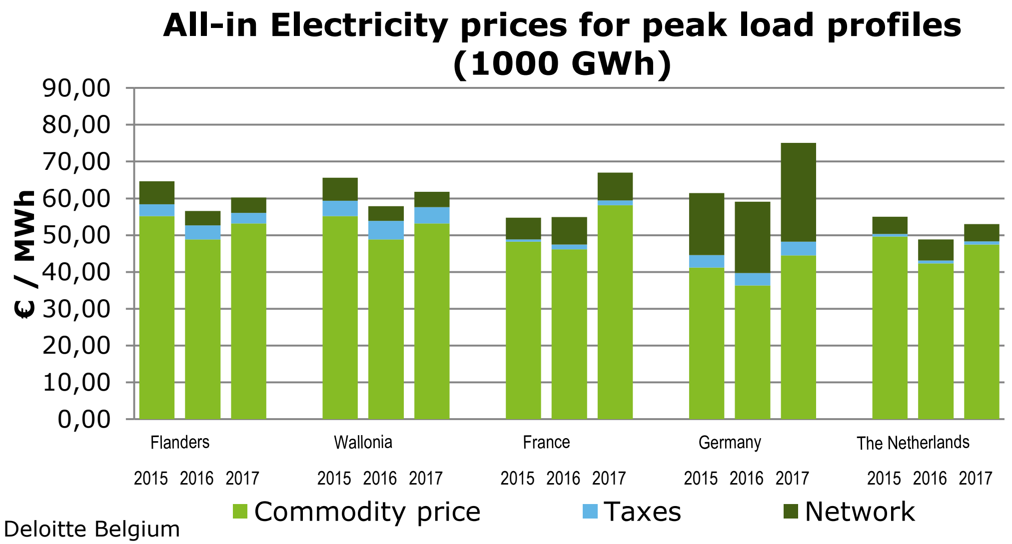
For a 100 GWh consumer in **Wallonia** this represents a price impact of **0,7 million €** in 2017 compared to the average of the countries in scope of the study.

Prices in Flanders are slightly below the average of the other countries in the benchmark study. Though, prices in **Flanders** are between **13%** (for 1000GWh) and **18%** (for 100GWh) higher **compared to the Netherlands**.

The impact of this price difference between Flanders and the Netherlands is **1,1 million €** for a 100GWh consumer and **7,2 million €** for a 1000GWh consumer.

Benchmark all-in electricity prices for a peak load profile





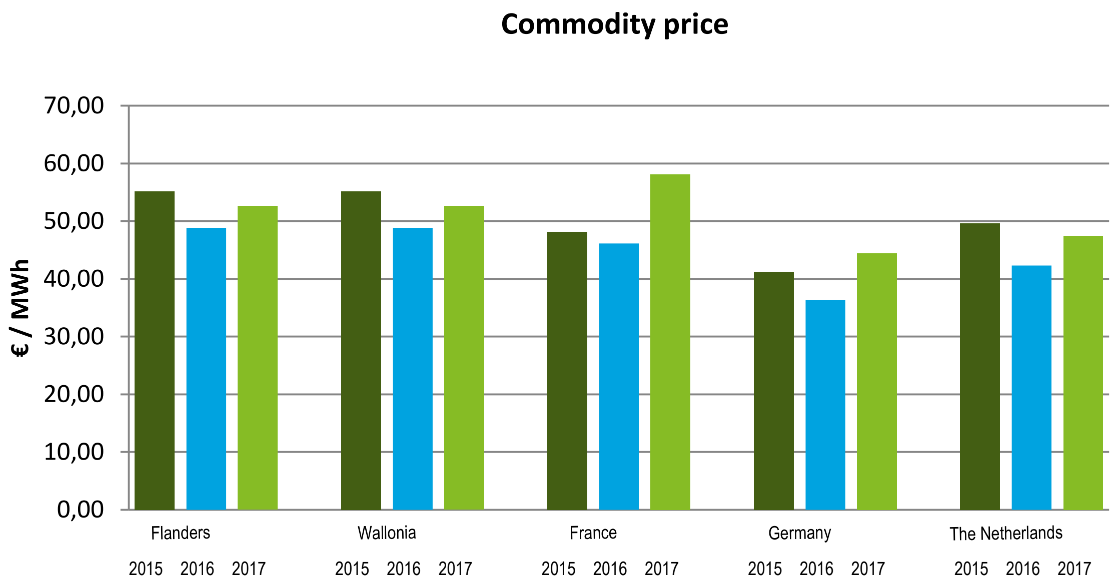
The all-in **electricity prices have increased** (+6% to +7%) in Flanders and Wallonia **in 2017 compared to 2016**.

Partially, this increase is explained by an increasing commodity cost (+9%). Also network costs have increased (+4% to +5%) in both regions.

The observed price difference with the other countries is essentially driven by a combination of the following elements:

- **Commodity prices** in Flanders & Wallonia are about 4% higher than the average commodity cost for all countries in scope.
- **Substantially higher electricity taxes** in Flanders and Wallonia compared to the neighboring countries. Up to 70kV, both in Flanders and Wallonia taxes are higher compared to all neighboring countries. In Flanders, taxes are up to 68% higher compared to Belgium and its neighboring countries. In Wallonia, taxes are up to 144% higher compared to Belgium and its neighboring countries. Above 70kV, in Wallonia taxes are up to 96% higher compared to all neighboring countries (for a 300GWh consumer).

Comparative evolution of commodity prices for a peak load profile



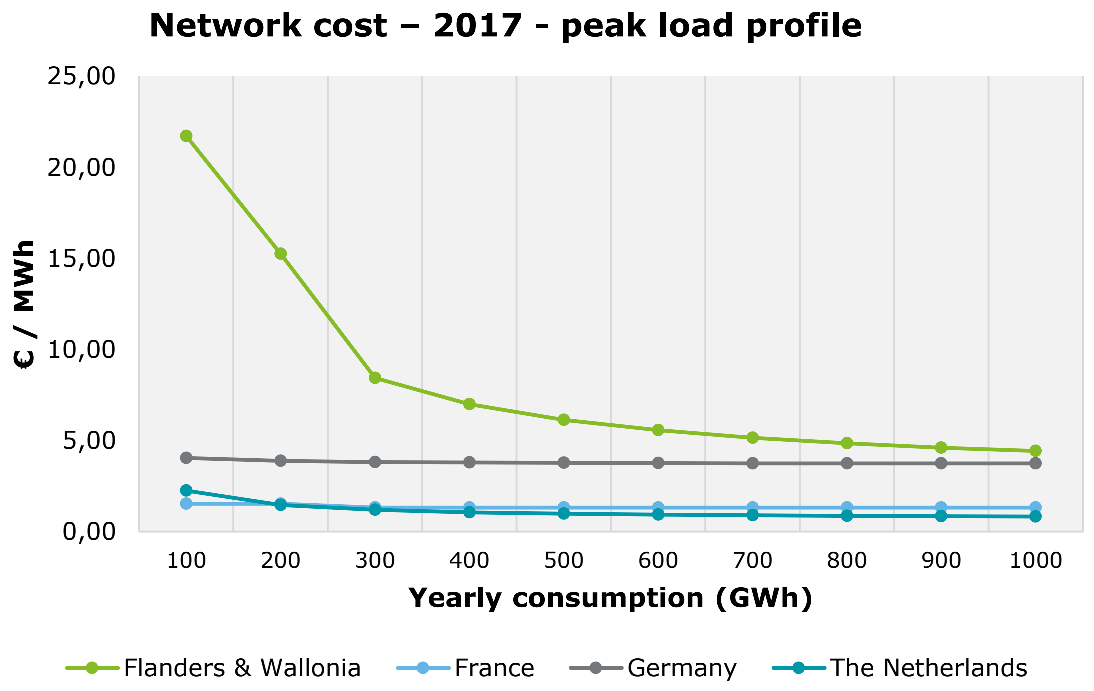
The wholesale electricity prices for peak load in Germany and the Netherlands remain substantially below the market prices in the other countries in the benchmarking scope.

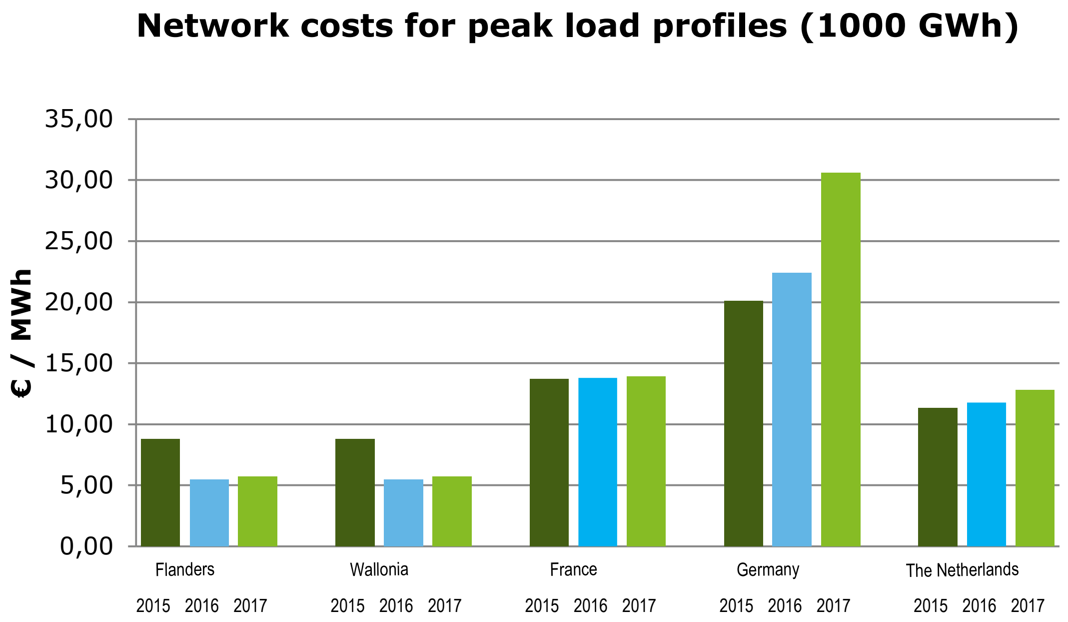
For 2017, Belgian market prices for peak load are 12% more expensive than in the Netherlands and nearly 20% more expensive than in Germany.

Comparative overview of network costs for a peak load profile

In **France, Germany and the Netherlands** industrial consumers with a peak load profile do not benefit from discounted network costs. Discounts for baseload consumers are justified by the fact that baseload consumer contribute positively to the stability of the network.

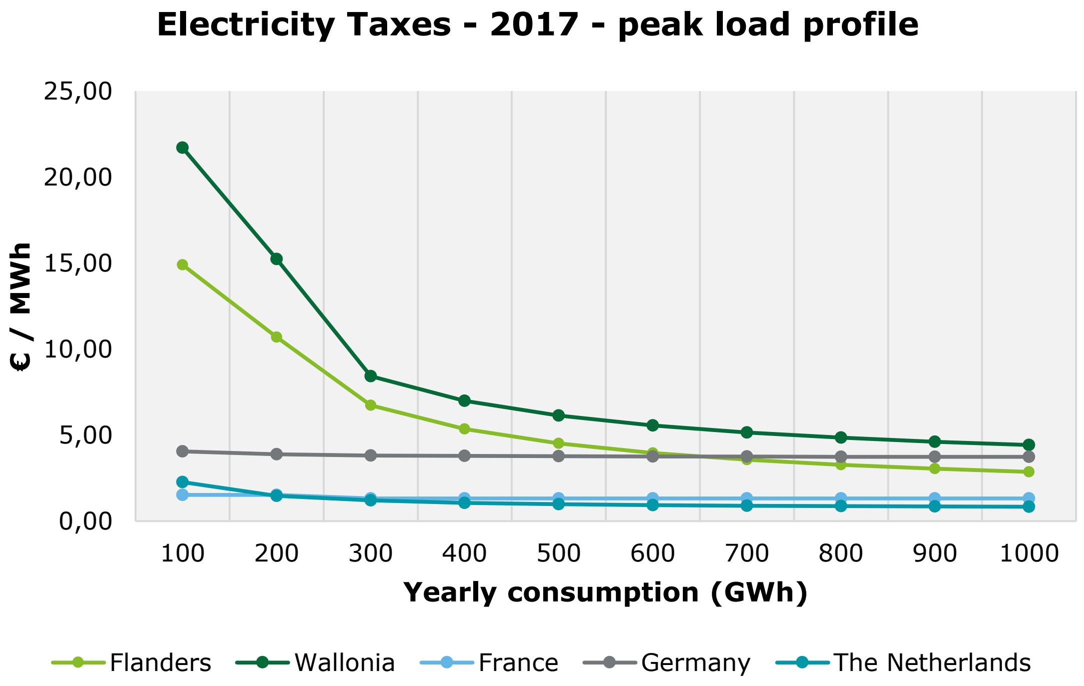
Network costs in Flanders and Wallonia are 59% lower (for a 100 GWh profile) than the average of the neighboring countries in the scope of the study. It must be noted however, that the energy consumption is assumed to be constant throughout peak hours and that no power peaks occur, nor on a yearly, nor an monthly basis. Consumption profiles which do show these peaks, are paying additional network costs for this in Belgium.

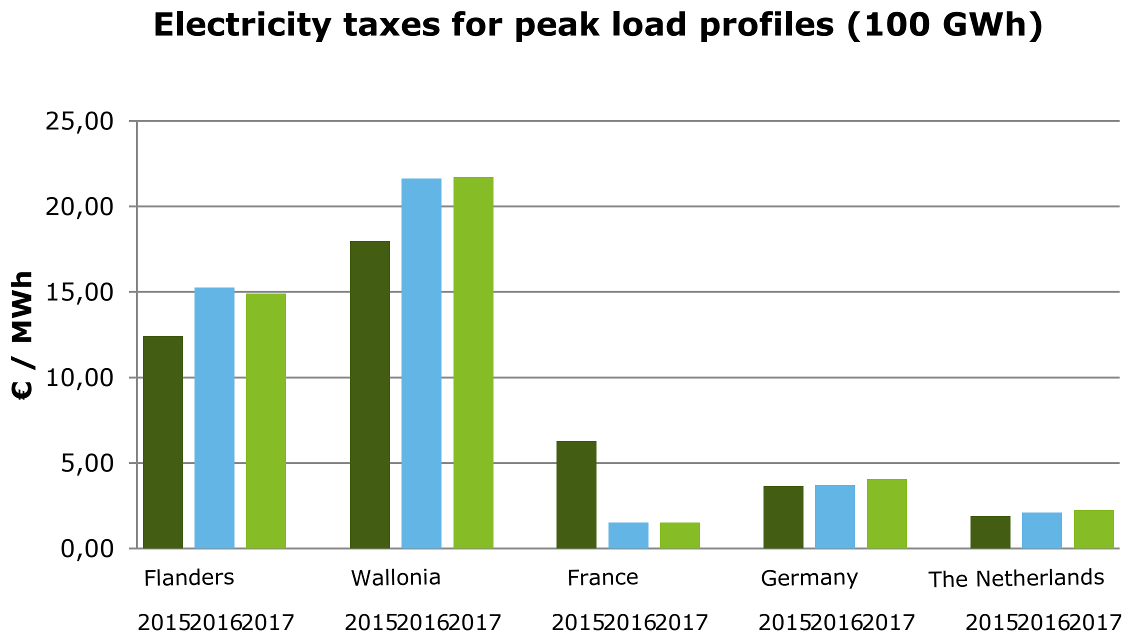




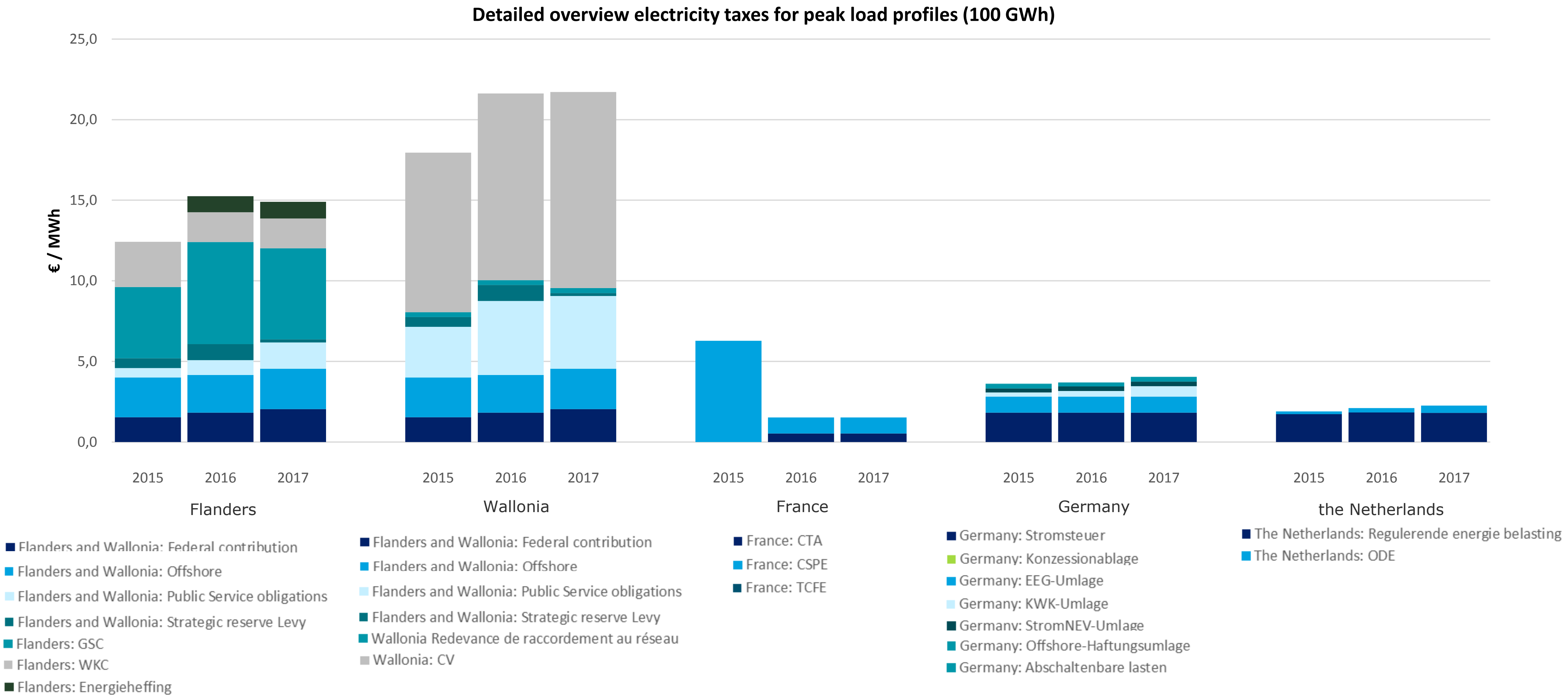
Comparative overview of electricity taxes for a peak load profile

Observations on taxes for peak load profiles are similar to those for baseload consumers, as most taxes depend on the total (yearly) energy consumption, rather than on the consumption profiles (baseload versus peak load). Only in France a slight difference is observed between taxes for baseload versus 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.

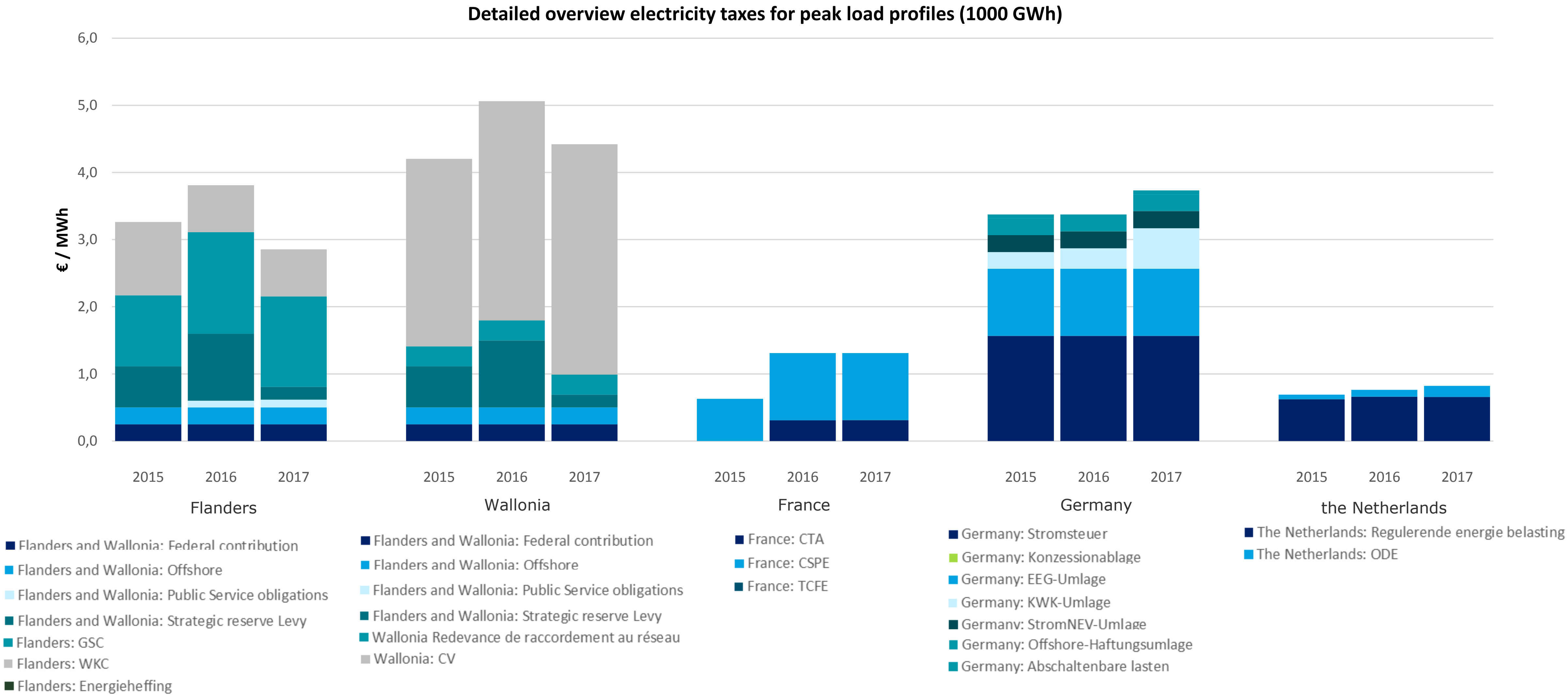




Comparative overview of electricity taxes for a peak load profile (100 GWh)



Comparative overview of electricity taxes for a peak load profile (1000 GWh)



Appendices

Benchmark methodology
Market prices

The market prices used are based solely on publically available data and have been consistently calculated in accordance with the following assumptions, validated and approved by Febeliec.

Use of market quotations:

- Market prices are calculated on a combination of spot and forward market prices whereby prices for Year N are determined as follows:
    - 50% of the commodity 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 commodity 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 commodity 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
- For 2017, the day-ahead and month-ahead components are based on available market data until 01/03/2017. It is assumed that the day-ahead and month-ahead components throughout the rest of the year equal the average value of the period 01/01/2017 – 01/03/2017.

Benchmark methodology
Market prices

The following sources for market prices were used for the different jurisdictions:

- Flanders and Wallonia: EPEX Spot Belgium (day-ahead) and APX-ENDEX (month-ahead and year-ahead). As no peak load future prices are available for delivery on the Belgian Market, a proxy is used consisting of the adjusted average of future prices for delivery on the Dutch and French market. The adjustment consists of a factor representing the relation between forward baseload prices in Belgium compared to the respective baseload prices in France and the Netherlands.

- Netherlands: EPEX Spot Netherlands (day-ahead) and APX-ENDEX (month-ahead and year-ahead).

- France: EPEX Spot France (day-ahead) and EEX future prices (month and year ahead).

- Germany: EPEX Spot Germany (day-ahead) and EEX future prices (month and year ahead).

Benchmark methodology
Market prices

Use of regulated prices in France

- Industrial consumers in France have access to regulated wholesale electricity prices for their baseload 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 baseload profiles will benefit the most. For peak load profiles, the benefit is rather limited.

- In 2016, these 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) have not been used in the model, as market prices decreased below regulated ARENH rates. For 2015 and 2017, this ARENH rate has been taken into account as market prices tended to be higher.

- As a result, market prices for France for 2016 have been determined completely in line with the approach as explained on the previous slide.

- For 2015 and 2017, market prices in France have been determined using the following combination of regulated and market prices:

    - For a baseload profile: 95% ARENH rates and 5% market quotations

    - For a peak load profile: 15% ARENH rates and 85% market quotations

- ARENH rates amount to 42 EUR/MWh for 2015, 2016 and 2017. 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 page.

Benchmark methodology
Network costs

General

- Network costs relate to the regulated tariffs applied by the transmission grid operators (TSOs) 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:
  - Industrial consumers have a connection with ≥70 KV (no connection to the distribution network);
    - Consumers which consume less than 200GWh/year are assumed to be connected to the 70kV grid in Belgium or equivalent in the neighboring countries.
    - Consumers which consume more than 200GWh/year are assumed to be connected to the 150kV grid in Belgium or equivalent in the neighboring countries.
    - This is in line with the real connection level of most Febeliec members.
  - 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.
- It is assumed that no power peaks occur in the consumption profile, nor on a yearly, nor an monthly basis. Consumption profiles which do show peaks, have to pay additional network costs for this in Belgium.
- 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, …).
- No additional costs are taken into account for excessive consumption of reactive energy, nor for exceeding the subscribed power.
- Peak hours are assumed to exist 5 days/week, during 12 hours/day.
- No seasonal rates are applied.

Benchmark methodology
Network costs

Belgium

- For Belgium (where network losses are billed by the suppliers), 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.

Germany

- For Germany the average of the rates of all 4 TSO's active on the German territory are used.
- For Germany it is assumed that the full discount of 90% applies on the network costs
  - Exemption criterion is that the annual consumption ≥10GWh and that the threshold of 8000 consumption hours is exceeded

France

- The reduction in grid tariffs in France for certain energy intensive baseload consumers is included in the benchmark study and for 2015, 2016 and 2017. For 2015, the maximum reduction of 50% was assumed. For 2016 and 2017, the maximum reduction of 90% was assumed.
  - Exemption criterion is that the consumer is a baseload consumer ((> 7000 consumption hours AND annual consumption > 10GWh) OR (use rate during off-peak hours > 44% AND annual consumption > 20GWh) OR (use rate during off-peak hours > 40% AND annual consumption > 500GWh)) and specific energy consumption > 6kWh/€ added value and exposure to international competition > 25%

Netherlands

- For the Netherlands it is assumed that the full discount of 90% applies on the network costs
  - Exemption criterion is that the annual consumption ≥50GWh and that the threshold of 7446 consumption hours is exceeded

Benchmark methodology
Electricity taxes (1/2)

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 Flanders 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).
- The Energy Fund Contribution, which was introduced in Flanders as from 2016 is only applicable up to 70kV and not on 150kV grids.
- We note that a political agreement exists for a reduction of the public service obligation tariff in Wallonia
    - In accordance with Article 42 bis, §5 of the Walloon Electricity Decree, a partial (85%) exemption from the first component of the Walloon green certificates levy is granted to the the final customers with a sector agreement, regardless of the level of consumption.
    - If the surpluses from the levy collected by Elia and referred to in Article 42 bis, §1 of the Walloon Electricity Decree do not cover all or some of the amounts to be refunded by the local transmission system operator, Elia has to defer payment of the refunds in question, in accordance with Article 42 bis, §8, para. 3 of the Decree. Accordingly, the payment due date depends on the subsequent observation that the levy has returned to a surplus position. This is currently the situation, the exemption is not being refunded by Elia, although the amounts are due and can be taken into account for accounting purposes.

Benchmark methodology
Electricity taxes (1/2)

- For the CSPE (Contribution au Service Public de l'Electricité) in France, a cap of € 627.783 is applied for 2015. For the new CSPE starting in 2016, we assume that all companies are electro-intensive and exposed to international competition and carbon leakage and thus pay a tariff of 1€/MWh. Please note that this tariff can be lower for hyper-electro-intensive companies (down to 0,5 €/MWh) or (much) higher for non-exposed or non-electro-intensive companies (up to 7,5 €/MWh).
  - Criteria to be eligible for a 1€/MWh rate are:
    - CSPE (in its standard rate) is at least 0,5% of the added value created by the consumers
    - Consumer has an important risk for carbon leakage due to indirect emission costs
    - Electric consumption is at least 3kWh per € of added value created by the consumers

Benchmark methodology
Electricity taxes (2/2)

- For the Netherlands it is assumed that an '*Energie akkoord*' is signed
- For Germany we assumed that
  - A reduced EEG umlage applies with a floor of 1 EUR/MWh (i.e. consumer qualifies as electricity intensive)
    - Exemption criterion is that the ratio of electricity costs to gross value added at factor costs amounts to 16% (as of 2016: 17%) or 20%, depending on the sector in which the consumer has its activitis
  - A reduced KWK umlage applies of 0,6€/MWh
    - Exemption criterion is that annual consumption >100MWh and that the ratio electricity cost versus revenu > 4%
  - A reduced StromNEV umlage of 0,25€/MWh applies for the consumption beyond 1000MWh
    - Exemption criterion is that that the ratio electricity cost versus revenu > 4%
  - A reduced Offshore umlage of 0,25€/MWh applies for the consumption beyond 1000MWh
    - Exemption criterion is that that the ratio electricity cost versus revenu > 4%
  - That the reduced tarrif for the Konzessionabgabe is applicable
    - Criteria to be met are:
      - Annual consumption is at least 30.000kWh
      - The consumer's load exceeds 30kW during at least 2 months a year

Components of Electricity taxes (1/4)

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.
- Federal levy for holding and maintaining a strategic reserve capacity
- Regional energy tax, which is mainly used for financing of the green certificates

Components of Electricity taxes (2/4)

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, including the first term (85% reduction assumed to be applicable) and the second term
- Federal levy for holding and maintaining a strategic generation capacity

Components of Electricity taxes (3/4)

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 baseload 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)
- As from 01/01/2016, the TICFE (“Taxe intérieure sur la consommation finale d'électricité”) has been integrated in the CSPE.

Components of Electricity taxes (4/4)

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 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 charge compensating the lost revenue from TSOs that need to apply the grid fee exemptions
- Offshore-Haftungsumlage finances the costs relating to Germany's shift from nuclear to green energies
- As from 01/01/2016, the “Umlage Abschaltenbare lasten”, which related to a levy for the costs related interruptibility payments has been stopped.

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.

Compensation for indirect emissions
Impact on electricity costs

For the countries in the scope of the study, Germany, the Netherlands, Flanders and (since 2015) France have introduced a compensation scheme for carbon leakage activities, while Wallonia does not provide compensations (but is considering doing so in the near future). 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 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 Flanders, Germany the Netherlands and (since 2015) France can be estimated at approximately 2,5-3,5 €/MWh for 2014, 3-4 €/MWh for 2015 and 3,5-4,5 €/MWh for 2016.