

Benchmarking study  
of electricity prices  
between Belgium and  
neighboring countries

April 2016



# Agenda

- Objectives and scope of the benchmarking study
- Benchmarking methodology
- Results of the benchmarking study
  - Base load 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 (base load 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 2014, 2015 and 2016** based on existing legislation and policies.

# Benchmarking 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).

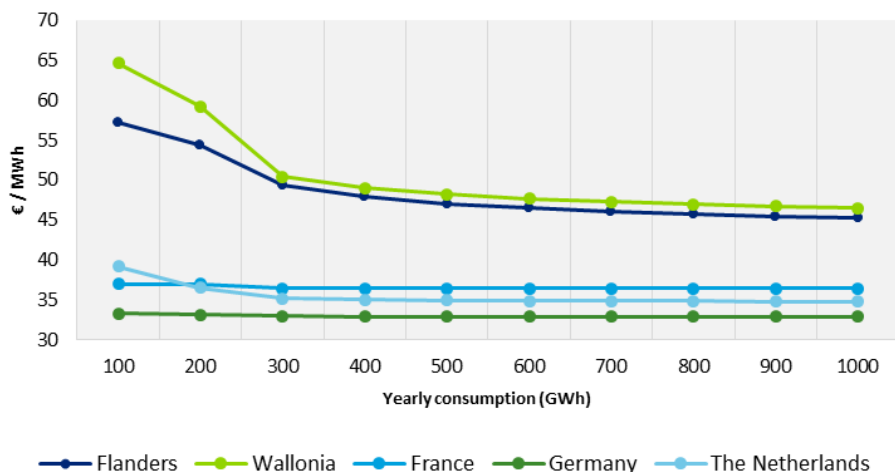
**Electricity taxes:** Represent all taxes and other levies that are to be paid on top of the market price and network costs in the different jurisdictions.

# Results of the benchmarking study

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

# Benchmark all-in electricity prices for a base load profile

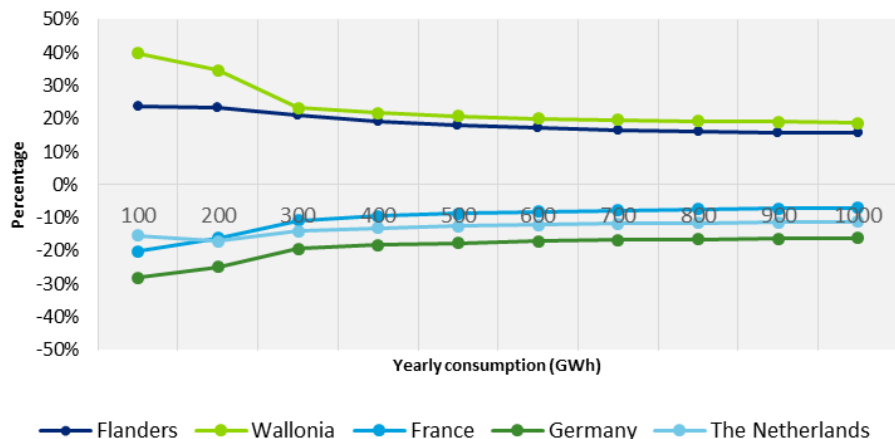
All-in electricity prices - 2016 – baseload consumer profiles



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

- For 2016, we observe all-in electricity prices ranging from **33 €/MWh** in Germany to **57 €/MWh** in Flanders and up to **65 €/MWh** in Wallonia.
- Results show a difference in electricity price of approximately **6 to 11 €/MWh** for industrial consumers in Flanders and **7 to 18 €/MWh** in Wallonia compared to the average of the electricity prices of the countries in the scope of the study.
- All-in electricity prices are between **16%** (for 1000 GWh in Flanders) and **40%** (for 100 GWh in Wallonia) higher than the average of the neighboring countries in the benchmark scope.
- For a 100 GWh base load consumer this represents an electricity cost difference of **1,1 million €** in Flanders and **1,8 million €** per year in Wallonia (compared to the average of the countries in the study).
- For a 1000 GWh base load consumer this represents an electricity cost difference of **6,1 million €** in Flanders and **7,4 million €** per year in Wallonia (compared to the average of the countries in the scope).

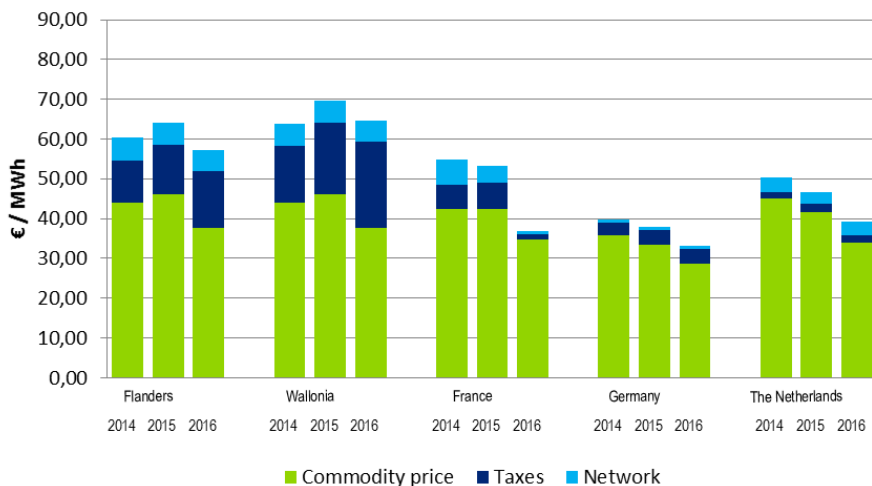
Relative deviation of electricity prices vs average prices in Belgium and its neighboring countries - 2016 - Baseload consumer profiles



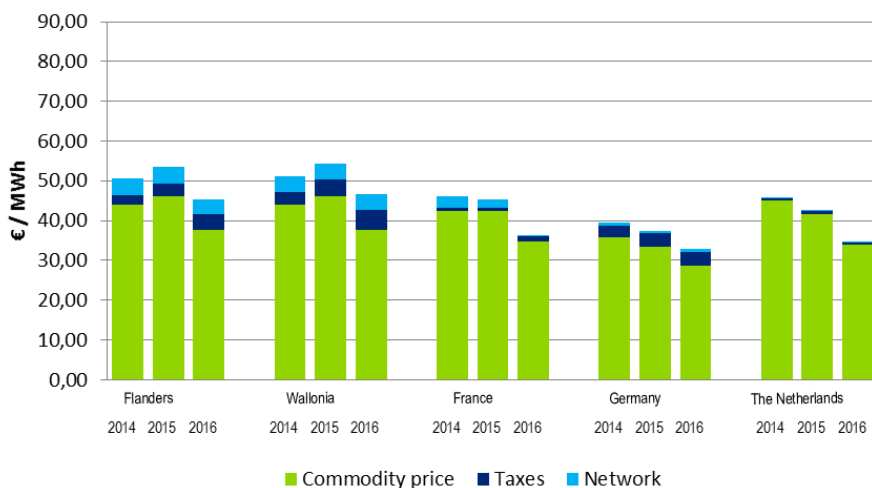


# Benchmark all-in electricity prices for a base load profile

All-in Electricity prices for baseload profiles (100 GWh)



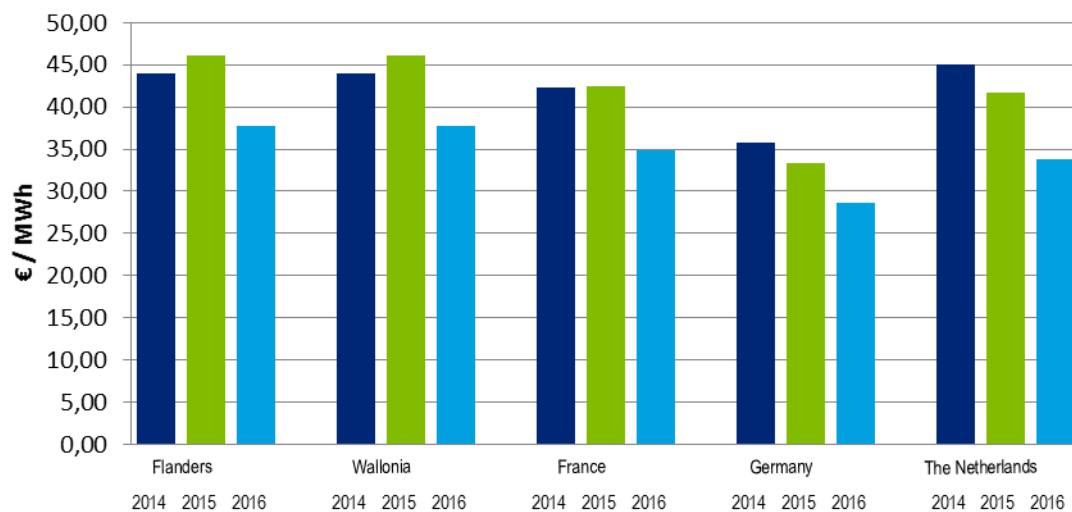
All-in Electricity prices for baseload profiles (1000 GWh)



- The all-in **electricity prices have decreased** in Flanders and Wallonia in **2016 compared to 2015**.
- In both Flanders and Wallonia electricity commodity prices and network costs have decreased while taxes have increased.
- The observed price difference with the other countries is essentially driven by a combination of the following elements:
  - **Higher commodity prices in Flanders & Wallonia** compared to the neighboring countries.
  - **Important discounts on network costs in France, Germany and the Netherlands of up to 90%** of the standard tariffs **for baseload consumption**. Before 2016, the discount in France was 50%, which explains the important drop between 2015 and 2016 in France.
  - **Substantially higher electricity taxes** in Flanders and Wallonia compared to the neighboring countries.

# Comparative overview of market prices base load profiles

Commodity price



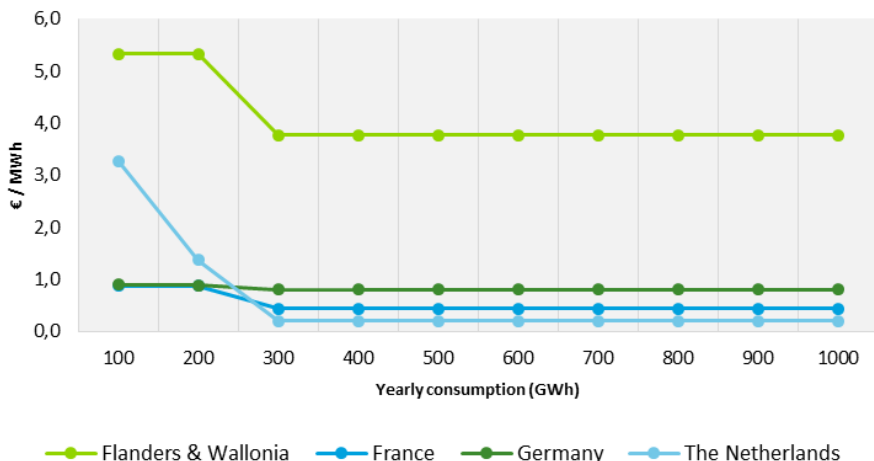
The wholesale electricity prices in **Germany** have further decreased substantially below the market prices in the other countries in the benchmarking scope.

For 2016, **Belgian market prices are higher** than the average of the countries in the scope.

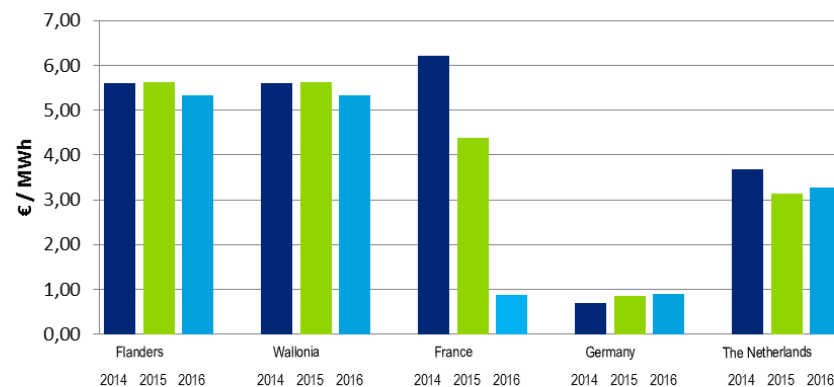
**For France**, La Loi Nome (ARENH) has no longer been taken into account for 2016 as market prices have dropped below the regulated prices as identified in ARENH.

# Comparative overview of network costs base load profiles

Network cost – 2016 - Base load consumer profile

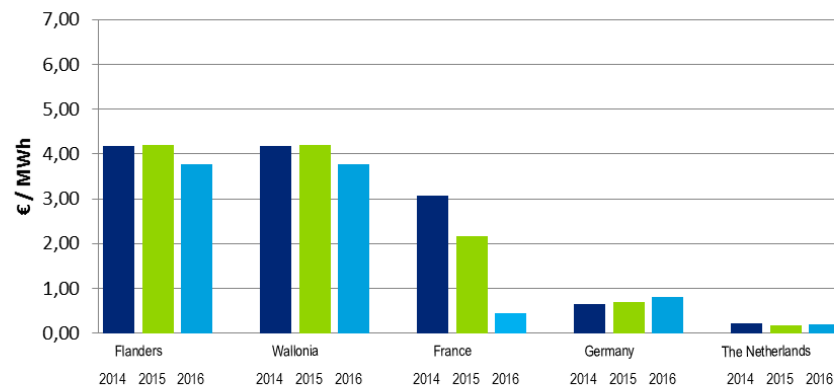


Network costs for baseload profiles (100 GWh)



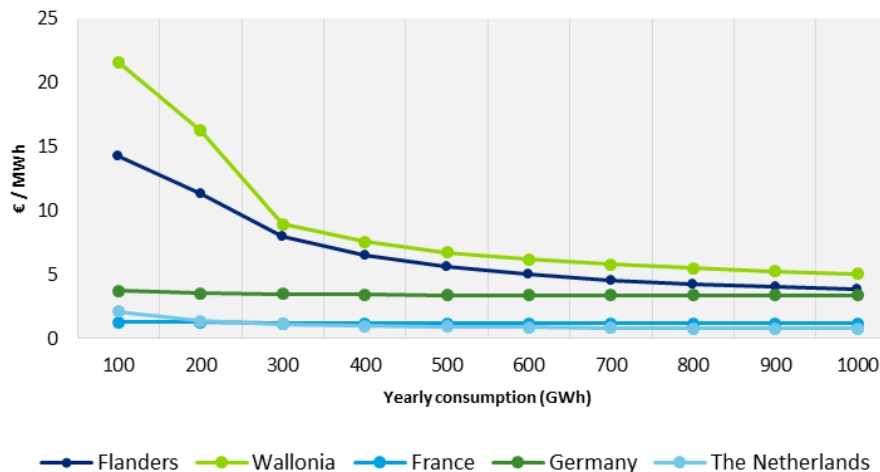
- Network tariffs in Belgium decreased in 2016 but remain higher than those in the neighboring countries.
- In **France** a 50% discount on network costs is introduced for major base load consumers (> 8000 hours a year) as of 1/8/2014. As from 1/1/2016 the maximum discount increases to **90%** for certain consumers.
- In **Germany** the prior full exemption of network costs for base load industrial consumers was replaced as from 2014 by an individualized discount (approval of regulator required) of up to 90% on standard tariffs for a base load consumer (> 8.000 hours a year).
- As from 2014 major **Dutch** industrial base load consumers can benefit from a **discount scheme of up to 90%** on the standard tariffs.

Network costs for baseload profiles (1000 GWh)

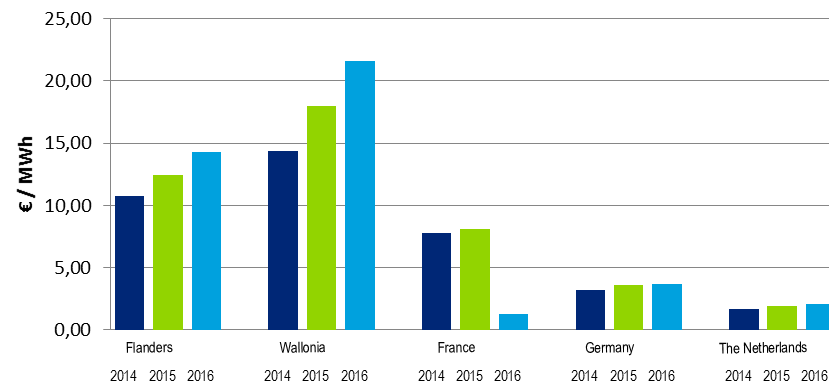


# Comparative overview of electricity taxes base load profiles

Electricity Taxes - 2016 - Baseload profile

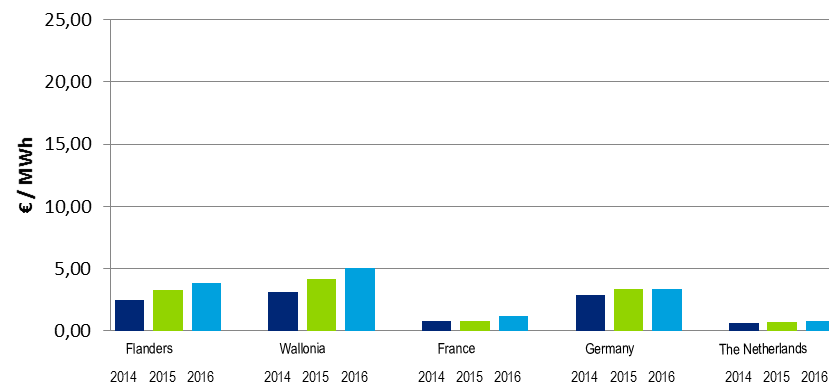


Electricity taxes for baseload profiles (100 GWh)



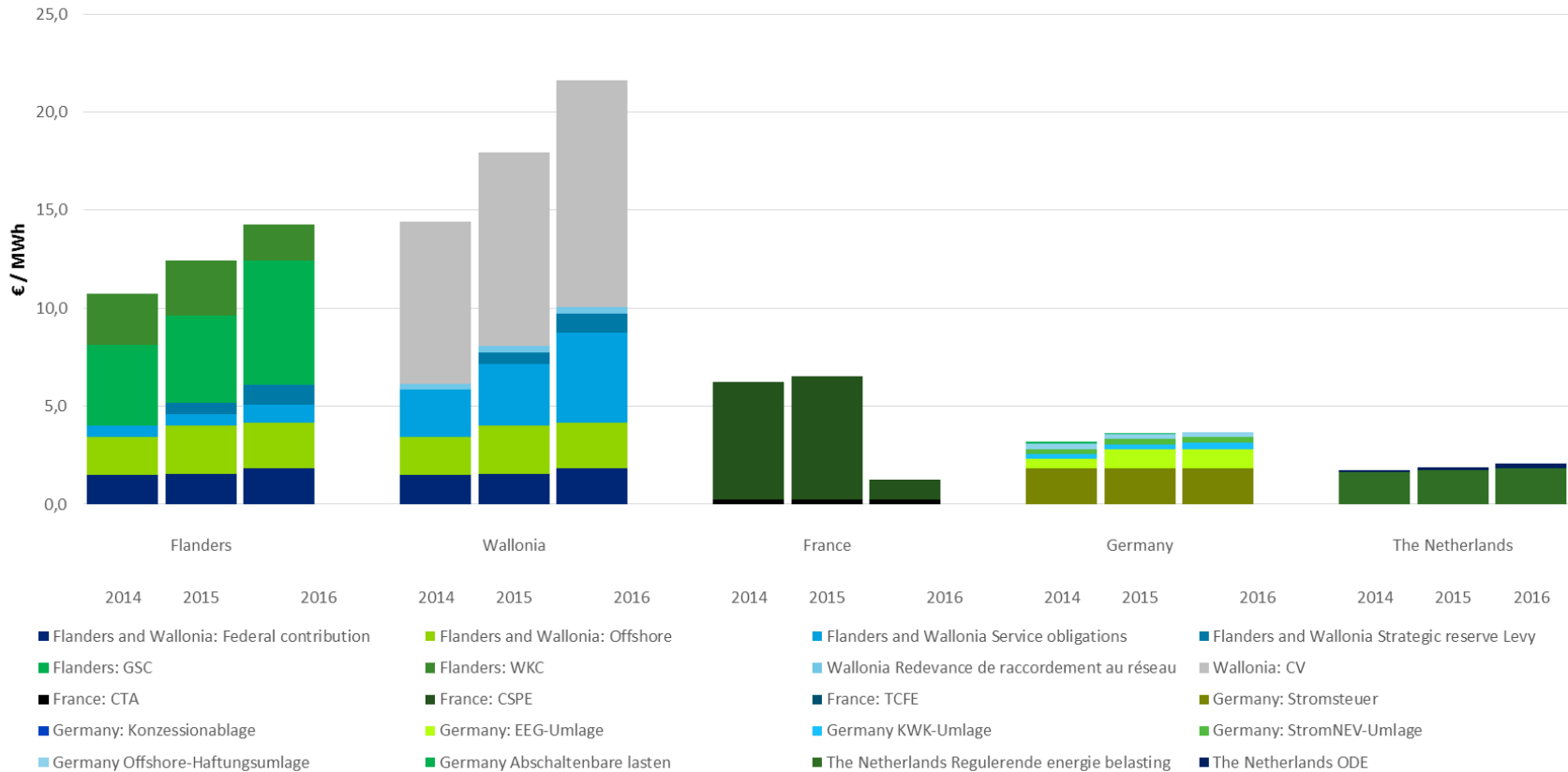
- In **Flanders and Wallonia**, taxes were higher and have continued to increase in 2016 compared to the neighboring countries due to a further increased levy for strategic reserve capacity and for funding of renewable energy policies.
- In **The Netherlands** industrial consumers benefit from **low electricity taxes**.
- Also in **France** electricity taxes are significantly lower.

Electricity taxes for baseload profiles (1000 GWh)



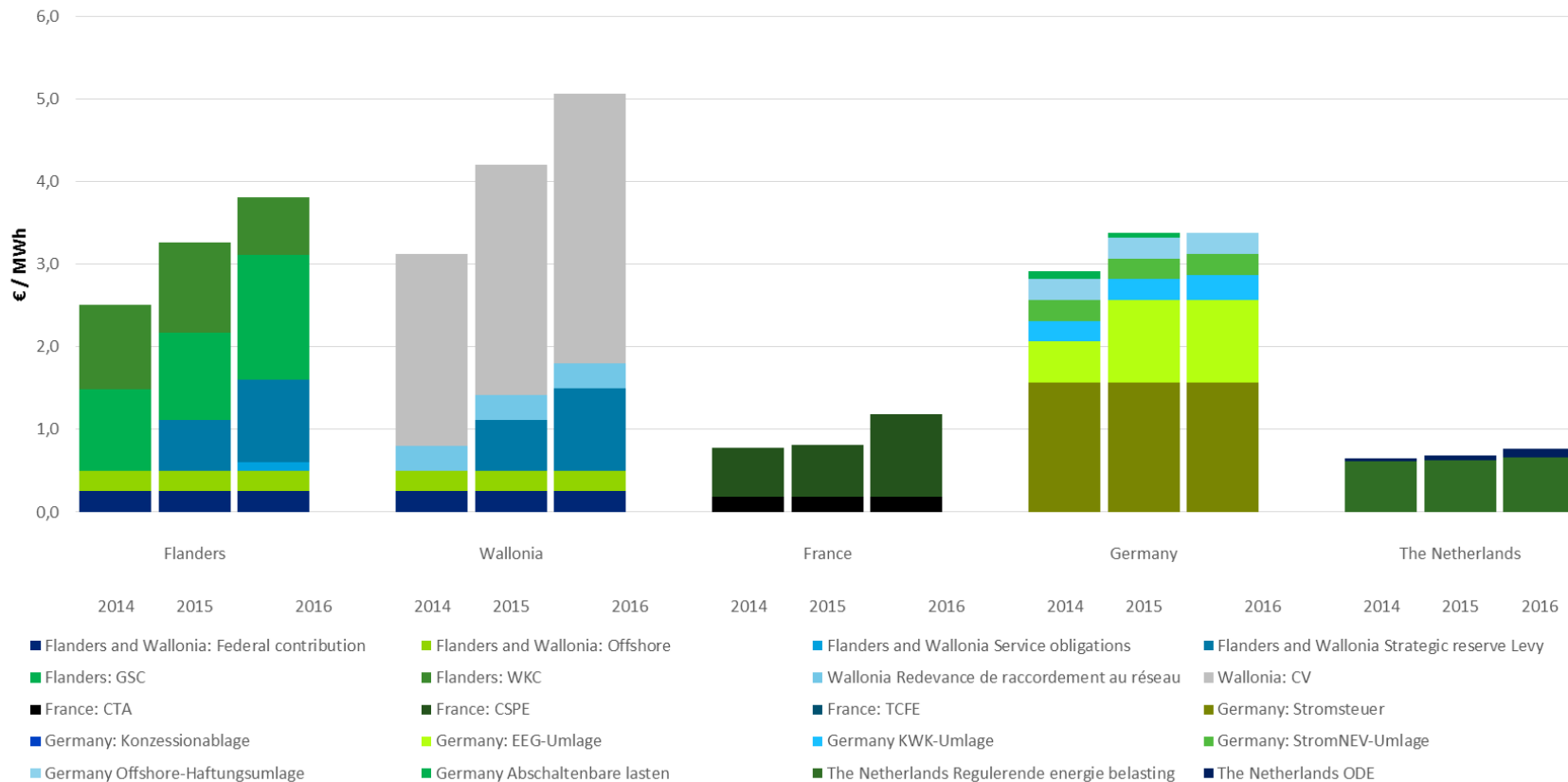
# Comparative overview of electricity taxes base load profiles (100 GWh)

Detailed overview electricity taxes for baseload profiles ( 100 GWh)



# Comparative overview of electricity taxes base load profiles (1000 GWh)

Detailed overview electricity taxes for baseload profiles ( 1000 GWh)

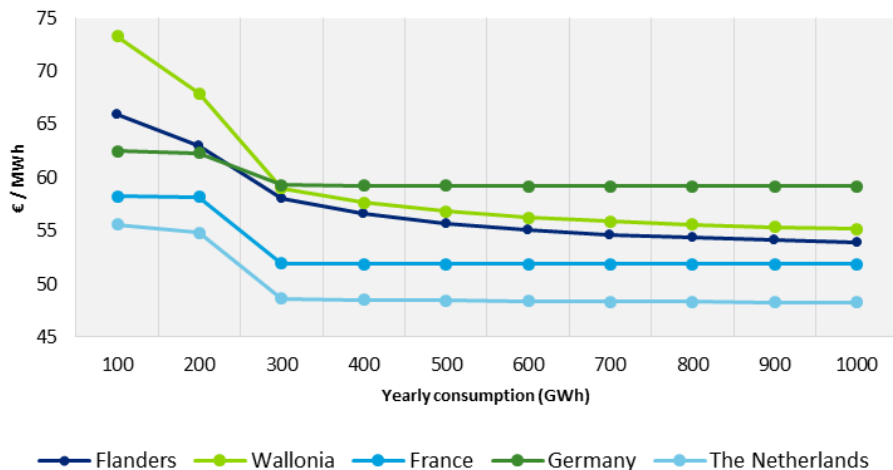


# Results of the benchmarking study

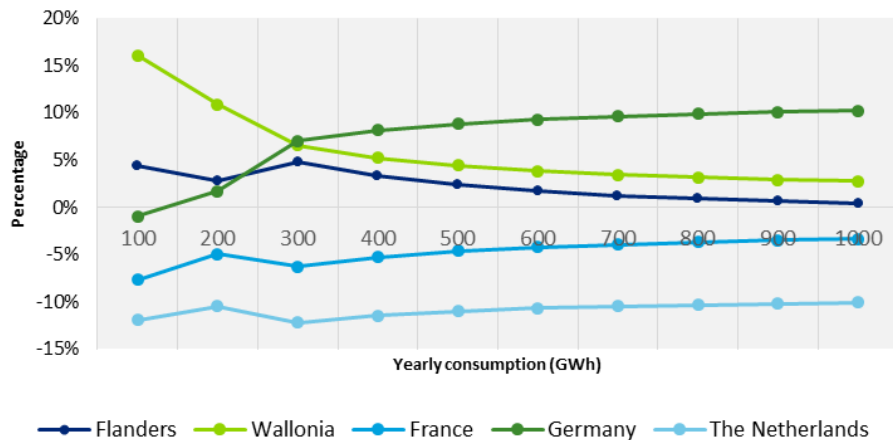
- Benchmark all-in electricity prices of a peak load profile
- Comparative overview of:
  - market price
  - network costs
  - electricity taxes

# Benchmark all-in electricity prices for a peak load profile

All-in electricity prices - 2016 – peak load consumer profiles



Relative deviation of electricity prices vs average prices in neighboring countries - 2016 - peak load profile

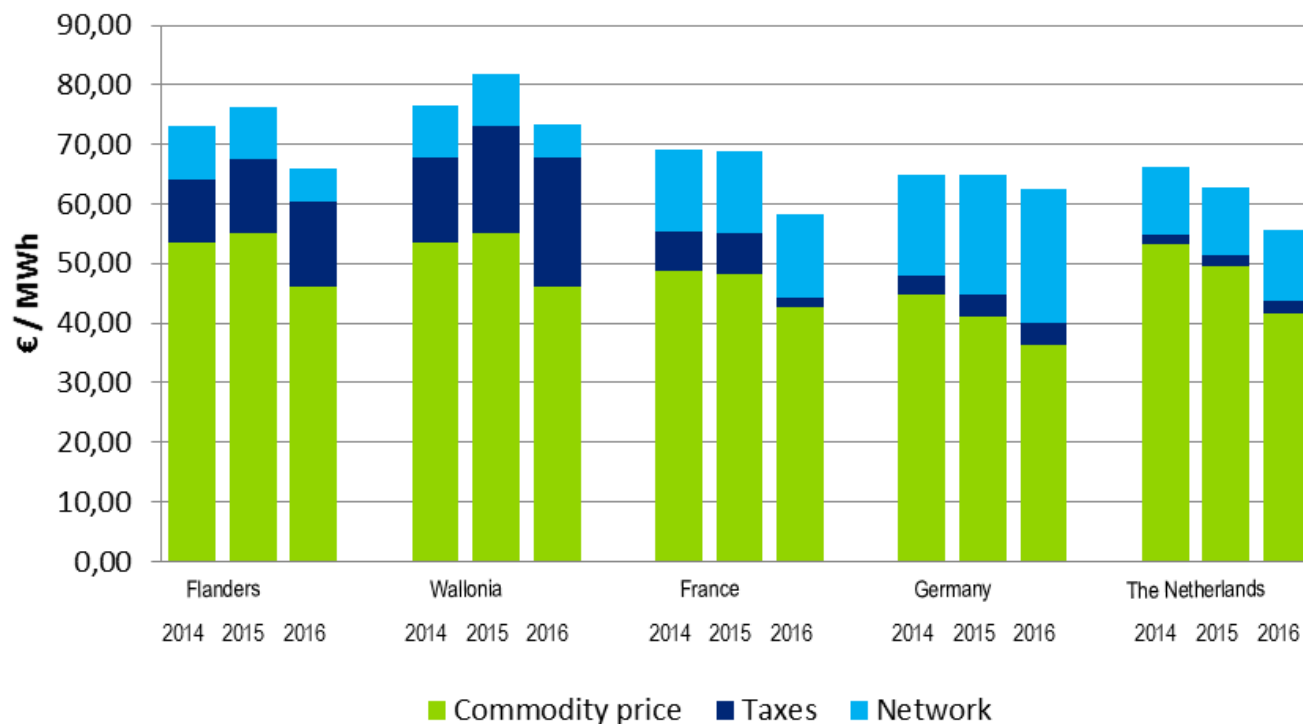


- For 2016 we observe all-in peak load prices ranging from **48 €/MWh** (in the Netherlands for a 1000 GWh consumer) to **73 €/MWh** (in Wallonia for a 100 GWh consumer).
- The all-in electricity price for peak load consumers in **Wallonia** is **16%** higher (for 100 GWh) compared to the average prices for their peers in France, The Netherlands and Germany.
- For a 100 GWh consumer in **Wallonia** this represents a price impact of **1,0 million €** per year compared to the average of the countries in the study.
- Prices in **Flanders** are **4%** higher (for 100 GWh) than the average of the other countries in the benchmark study.
- For a 100 GWh consumer in **Flanders** this represents a price impact of **0,3 million €** per year compared to the average of the other countries included in the study.

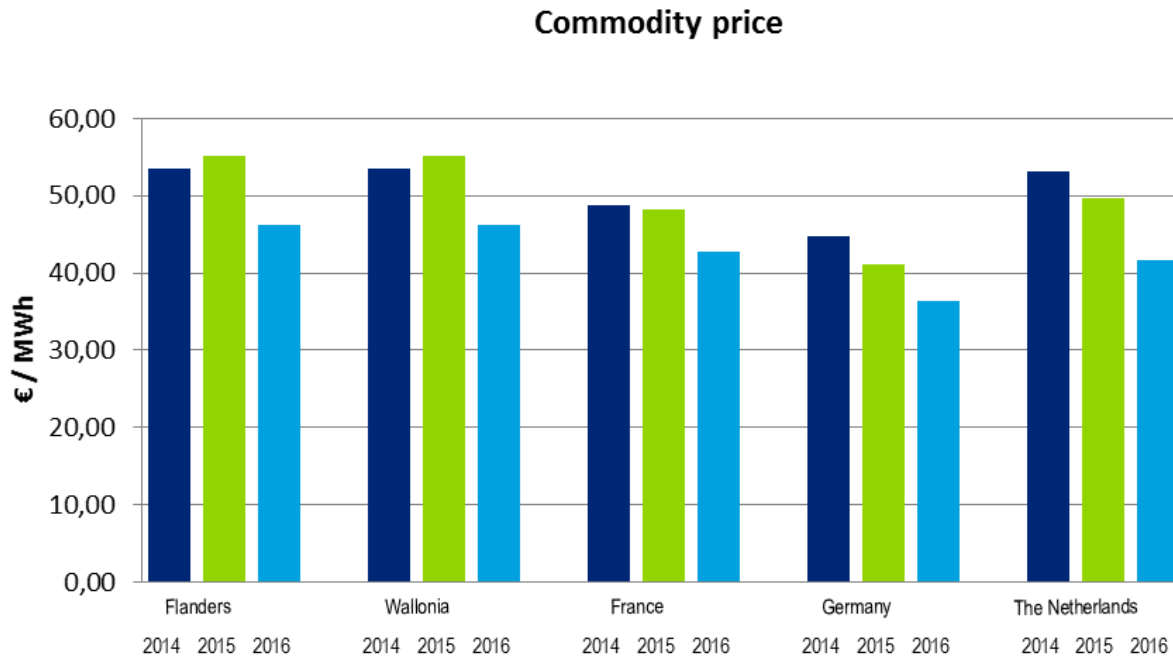


# Benchmark all-in electricity prices for a peak load profile

## All-in Electricity prices for peak load profiles (100 GWh)



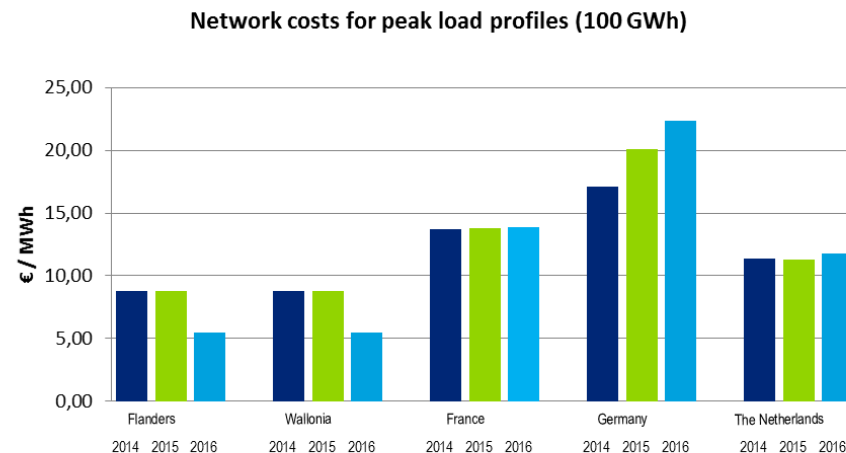
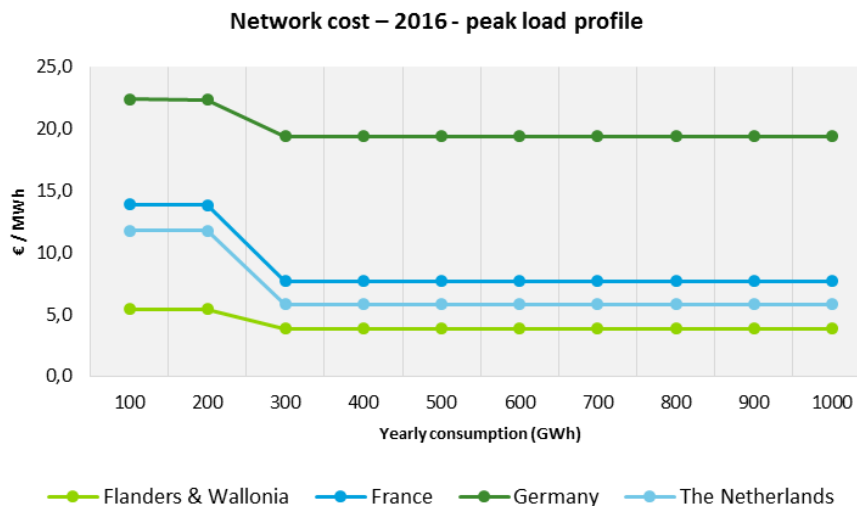
# Comparative overview of commodity prices for a peak load profile



No peak load future prices are available for delivery on the Belgian Market for month and year ahead.

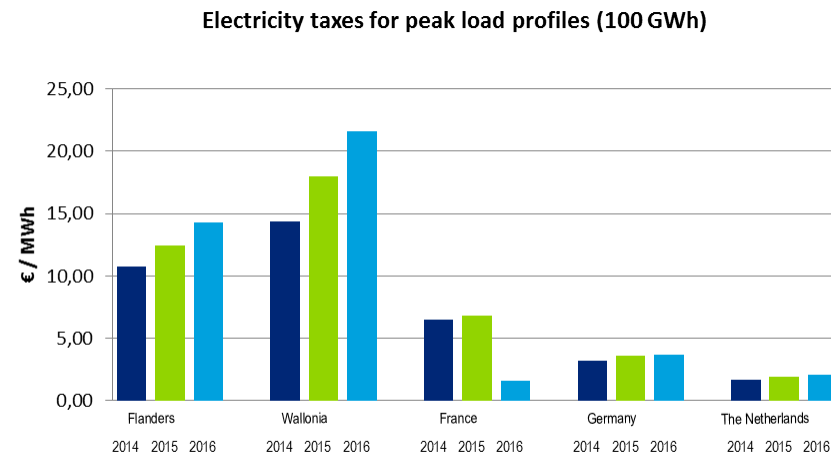
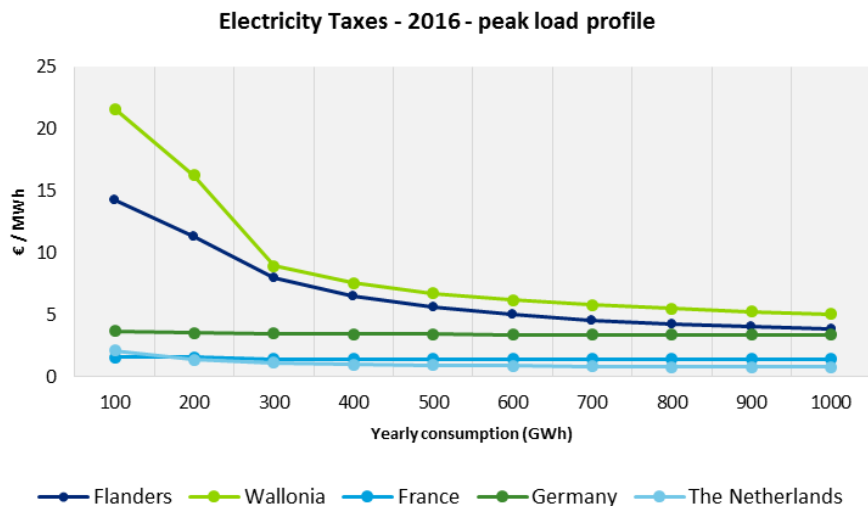
As a proxy for the peak load prices in Flanders and Wallonia the adjusted average of future prices for delivery on the Dutch and French market is used in this study. The adjustment consists of a factor representing the relation between forward base load prices in Belgium compared to the respective base load prices in France and the Netherlands. This factor has been introduced retrospectively as from the 2015 update of the study in order to take into account the diverging electricity price evolutions observed in Belgium compared to the neighboring countries.

# Comparative overview of network costs for a peak load profile



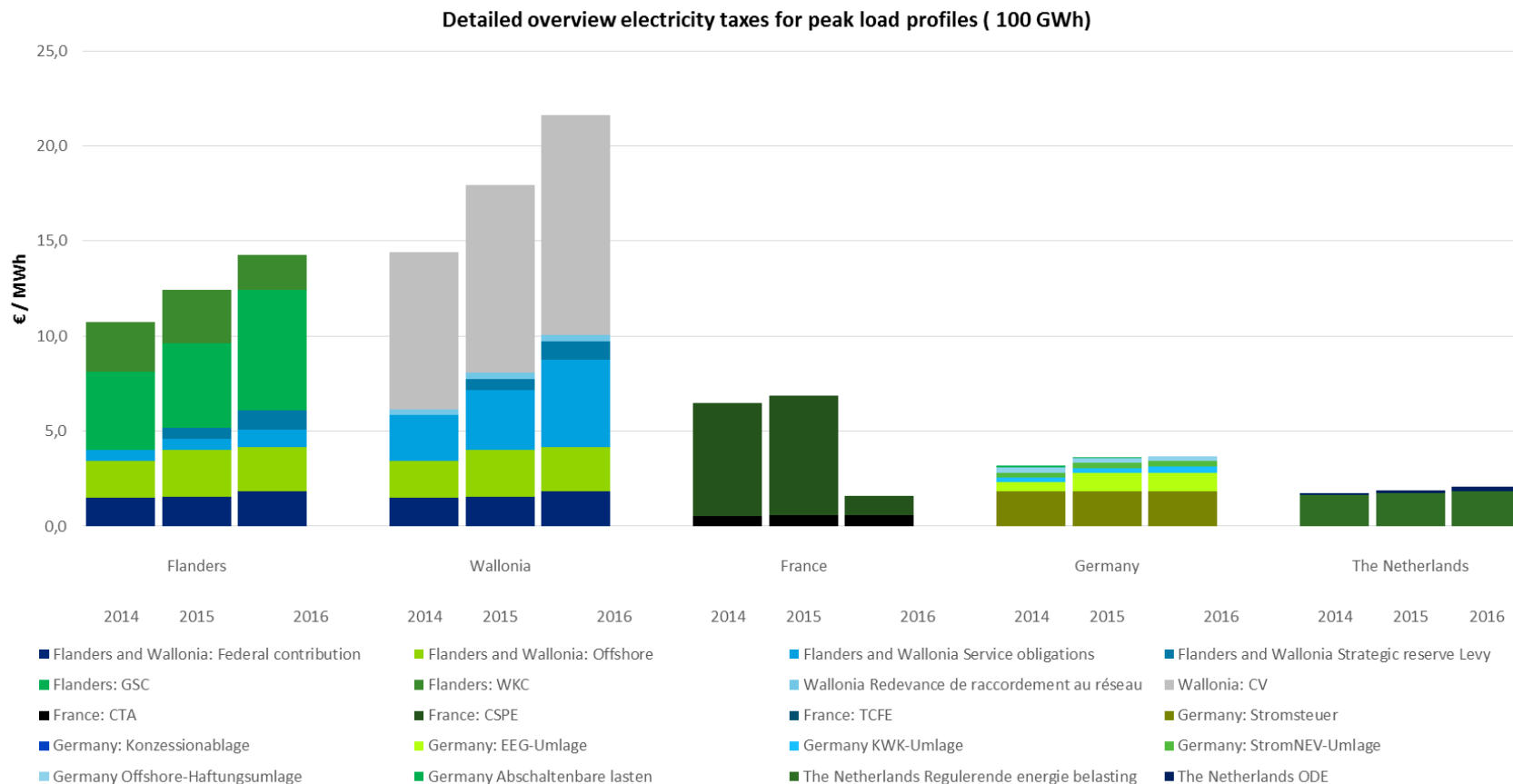
- **In France, Germany and The Netherlands** industrial consumers with a peak load profile do not benefit from discounted network costs. Discounts for base load consumers are justified by the fact that base load consumer contribute positively to the stability of the network.
- Network costs in **Flanders and Wallonia** are 54% 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 base load consumers, as most taxes depend on the total (yearly) energy consumption, not on the consumption profiles (base load versus peak load). Only in France a slight difference is observed between taxes for base load 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)



# Appendices

# Benchmark methodology

## Market prices

The market prices are 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 2016, the day-ahead and month-ahead components are based on available market data until 01/03/2016. It is assumed that the day-ahead and month-ahead components throughout the rest of the year equal the average value of the period 01/01/2016 – 01/03/2016.

# Benchmark methodology

## Market prices

- 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 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 base load prices in Belgium compared to the respective base load prices in France and the Netherlands.
  - 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

- 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 will benefit the most. For peak load profiles, the benefit is rather limited.
- For 2016, these applicable regulated rates (based on “la Nouvelle Organisation du marché de l’électricité (La Loi NOME) and “L’Accès Régulé à l’Électricité Nucléaire Historique” (La Loi ARENH) have no longer been used in the model, as market prices have decreased below regulated ARENH rates. For 2014 and 2015, 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 2014 and 2015, 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 42 EUR/MWh for 2014, 2015 and 2016. 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  $\geq 70$  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 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.

### France

- The reduction in grid tariffs in France for certain energy intensive base load consumers is included as of 1/8/2014 in the benchmark study and for the full year in 2015 and 2016.
- For 2014 and 2015, the maximum reduction of 50% was assumed.
- For 2016, the maximum reduction of 90% was assumed.

### Netherlands

- No additional assumptions on top of the general assumptions for network costs.

# 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 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.
- For the CSPE (Contribution au Service Public de l'Electricité) in France, a cap of €597.889 and € 627.783 are applied for respectively 2014 and 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).
- 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) 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 132,7 €/MWh for 2016).*

# Components of Electricity taxes (1/3)

## 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 (2/3)

## 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
- Federal levy for holding and maintaining a strategic generation capacity

# Components of Electricity taxes (3/3)

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

## 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 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 Abschaltbare 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:

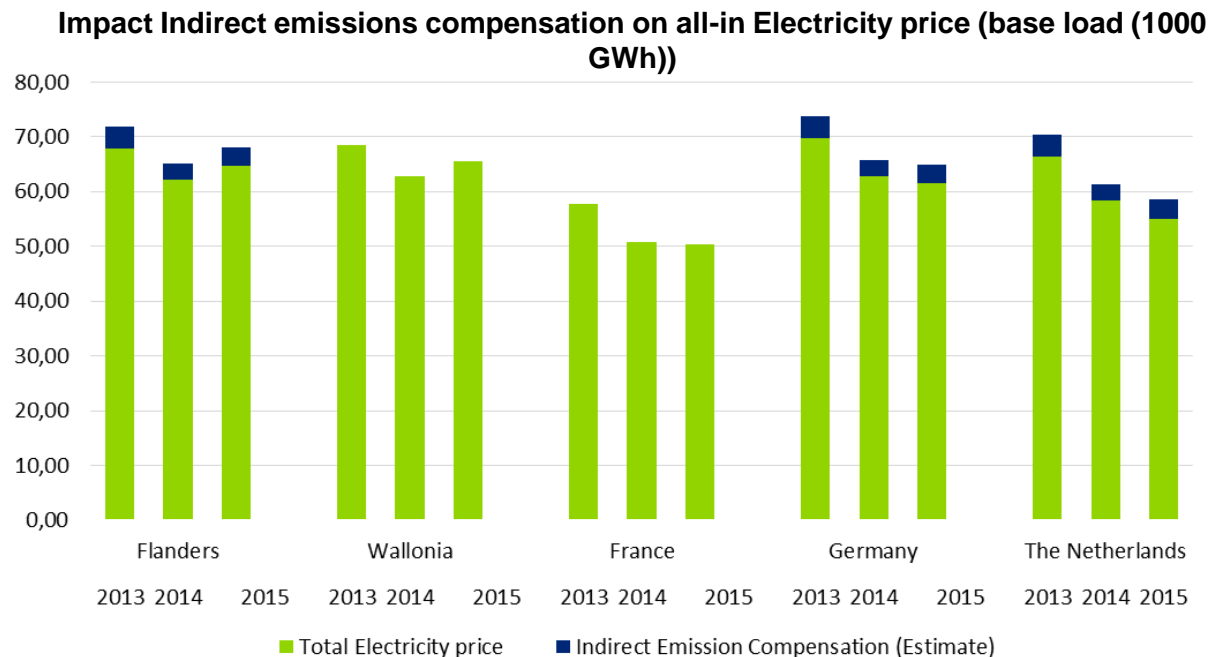
- The regulerende Energie Belasting (REB) is a tax which intends to improve the rational use of energy.
- The ODE tax (Wet Opslag Duurzame Energie) is a tax that is intended to finance the support for the production of renewable energy.

# Compensation for indirect emissions

## Impact on electricity costs

For the countries in the scope of the study, Germany, the Netherlands and Flanders have introduced a compensation scheme for carbon leakage activities while Wallonia and France do not provide compensations (both are, however, 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 and the Netherlands can be estimated at approximately 3,5-4,5 €/MWh for 2013, 2,5-3,5 €/MWh for 2014 and 3-4 €/MWh for 2015.







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