



**ELECTRICITY PRICE FORECAST  
AND COST CALCULATION**

**András Mezősi**  
**Enikő Kácsor**  
**András Kis**  
**Gábor Ungvári**  
REKK

2021.06.16

# Structure

- The European Power Market Model
- Electricity price forecast and CO2 intensity
- Logic of the cost calculation

# Price outputs of the model

- The model provides wholesale electricity prices for each hour and each country
- From this different average prices can be calculated
  - monthly, yearly
  - high/low period or day/night period
  - Average price in the 1., 2., etc. hour of the day in a given year
- Wholesale prices are not equal to retail (end user) prices
  - Wholesale prices can be the basis of estimating the energy price component
  - In our calculation energy component fee = wholesale price\*1.02

# Main features of EPMM

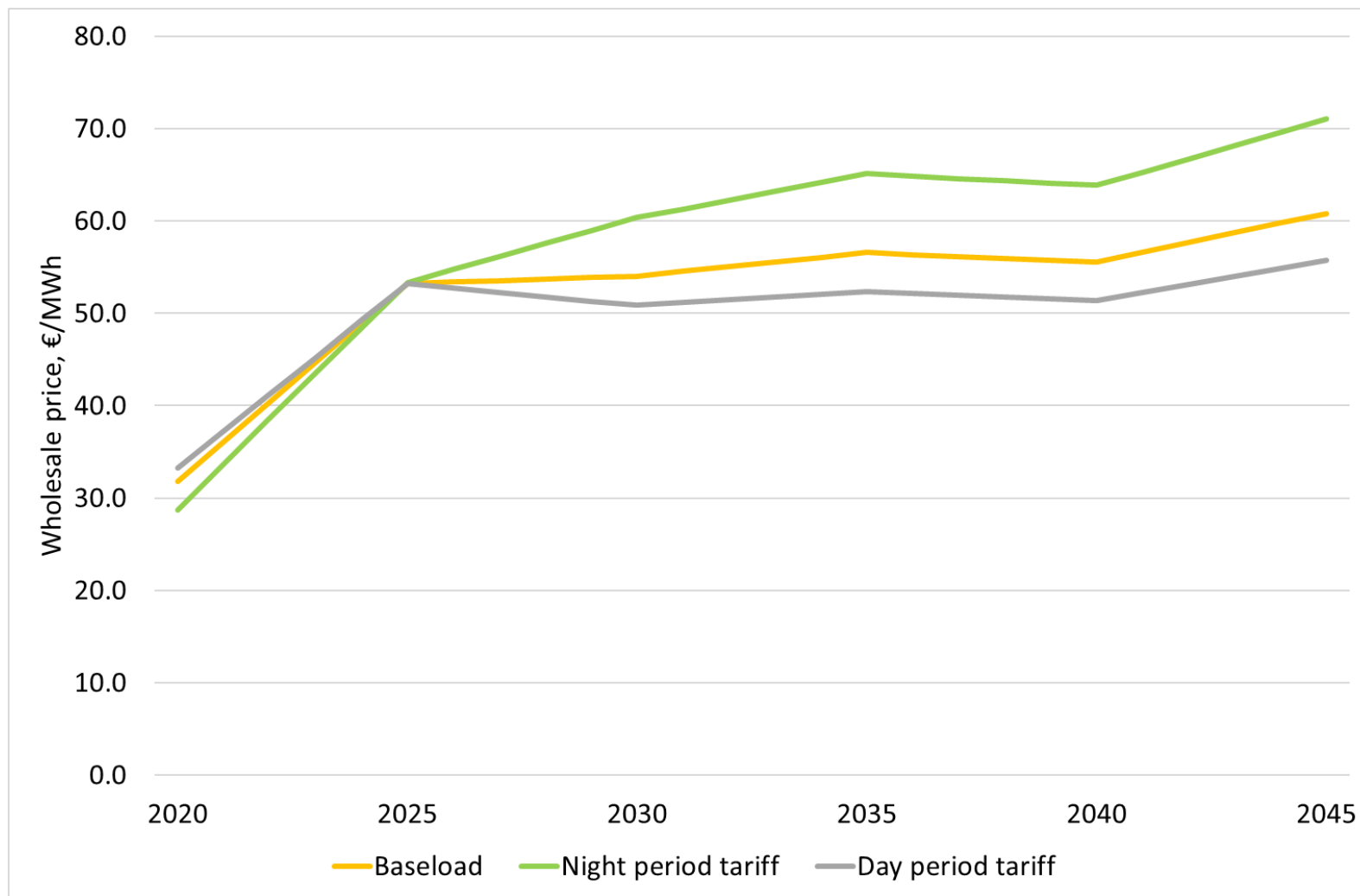
- Hourly based Unit Commitment and Economic Dispatch model
- Covering the electricity markets of 38 countries
- Weekly optimization: meet electricity demand and operating reserve requirements at each market at the lowest possible cost
- All the 8760 hours in a year can be modelled
- The main input parameters are:
  - ▶ Power plants: fossil and nuclear plants are included on a unit level, for renewables an aggregated capacity is included by type and country
  - ▶ Interconnector capacities, represented by net transfer capacity (NTC) values
  - ▶ Yearly electricity consumption by country
  - ▶ Fuel prices (natural gas, coal, CO<sub>2</sub> price)

# Wholesale price change in the future

- Prices are increasing overall year by year
- There is a switch between the relative prices of day and night periods
  - Now the day is more expensive, because the electricity demand is higher in the daytime than in the nighttime
  - When more and more solar energy is used the period when PV panels can produce energy (~between 8-18) becomes cheaper
  - This is especially true in the summer months, thus price differences between winter and summer increase further

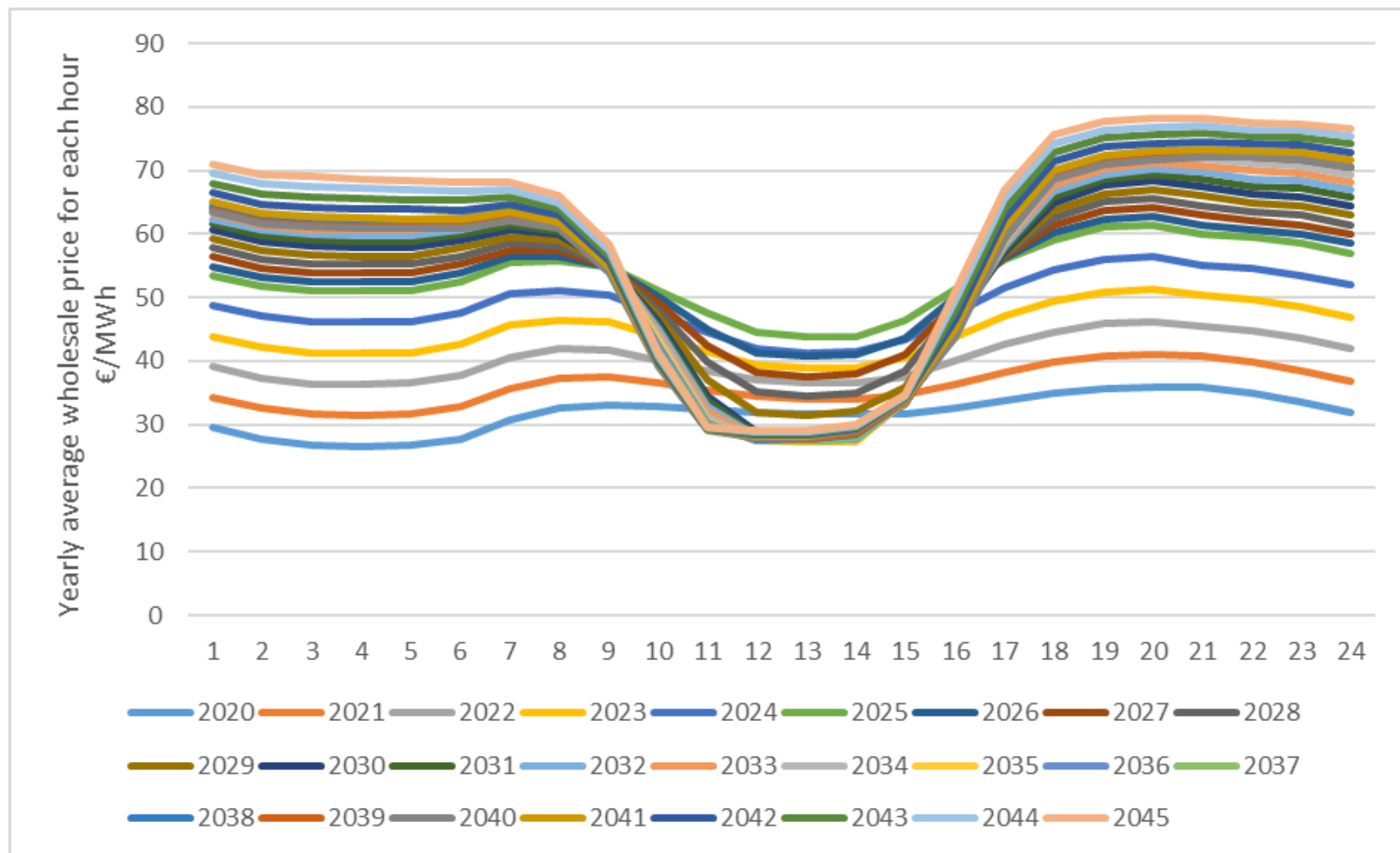
# Wholesale electricity price forecast

Switching in Day/Night due to PV penetration in Europe



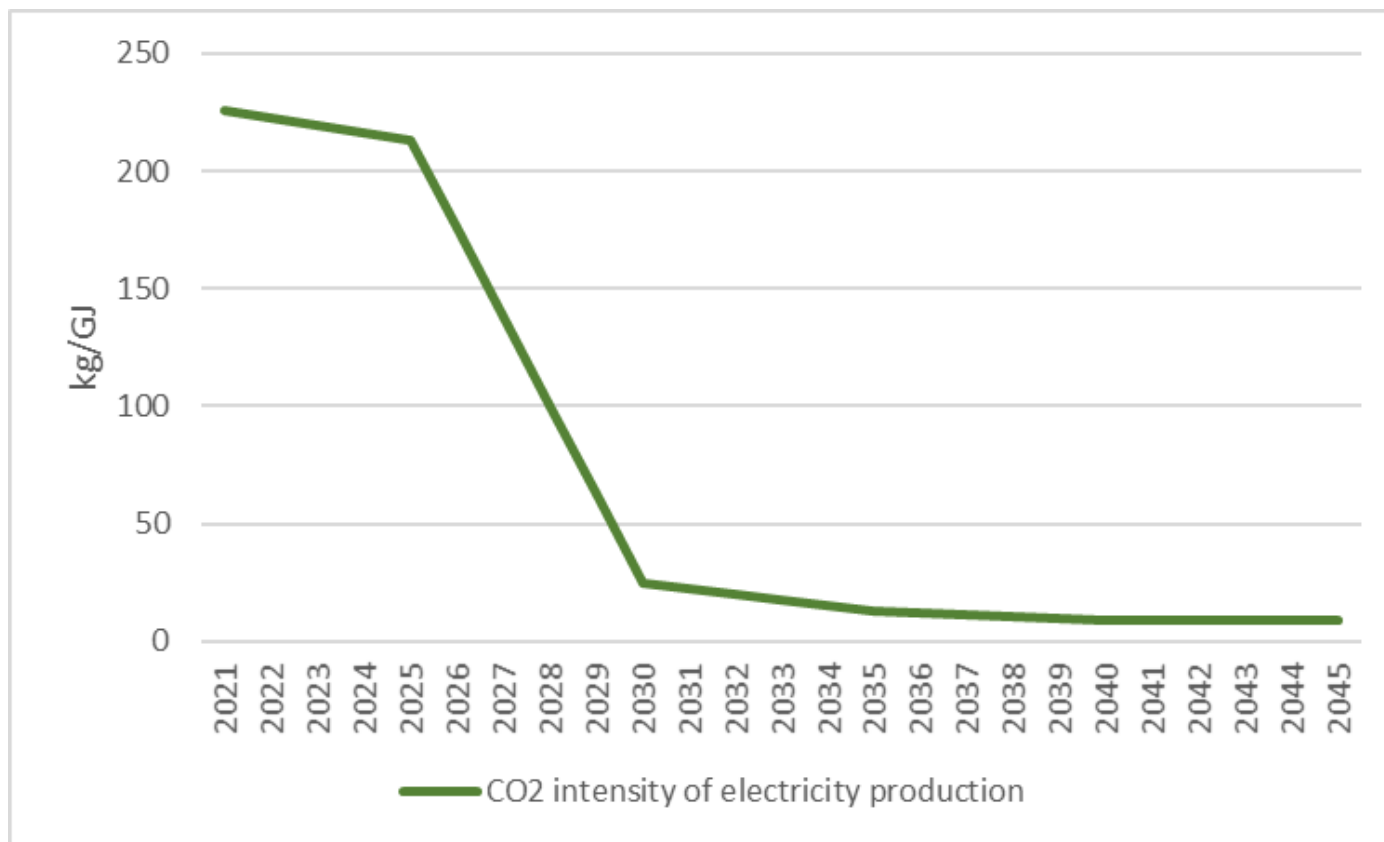
# Average prices throughout the day

Switching in day and night



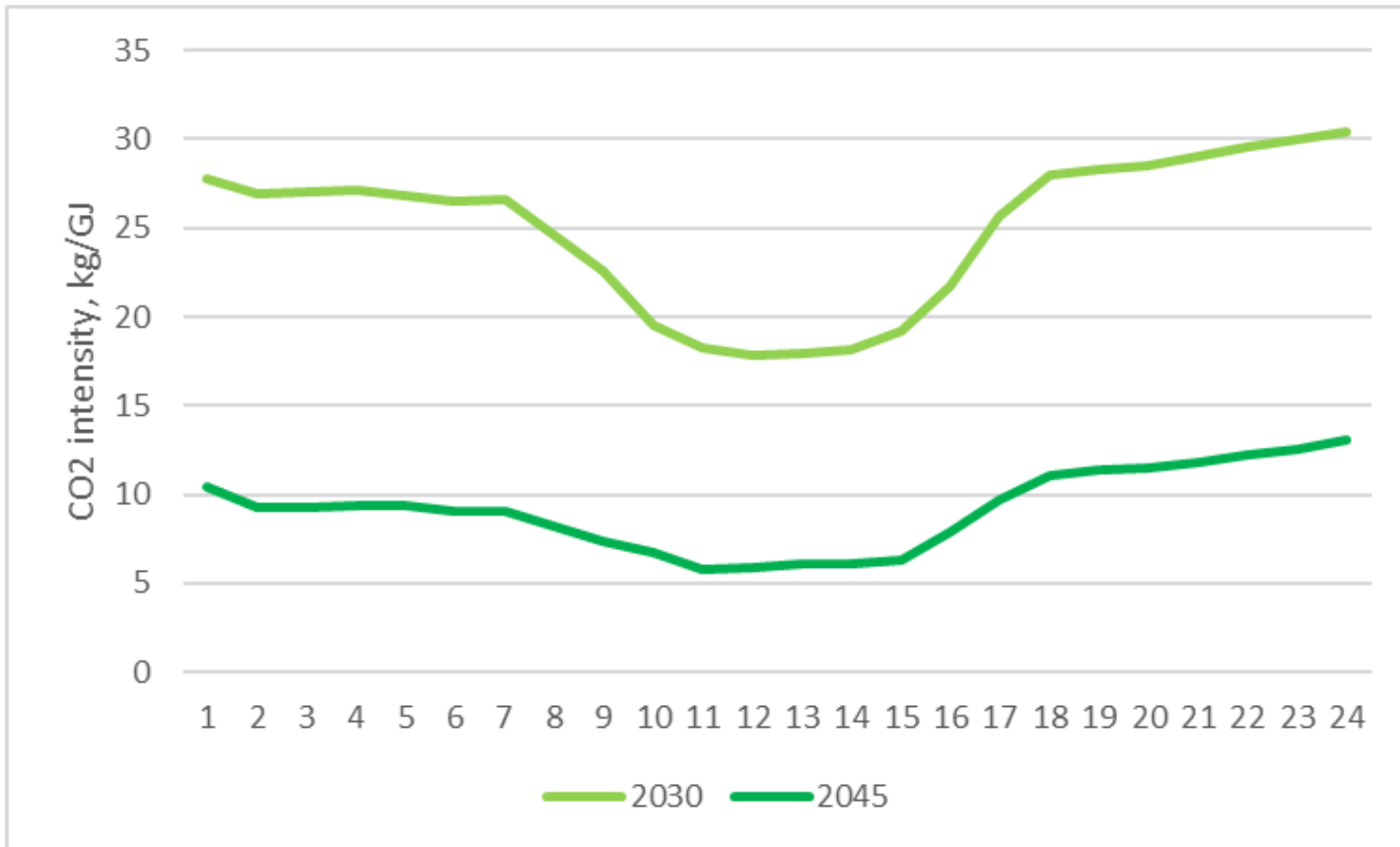
# CO2 intensity of electricity production

Less fossil fuels, more renewables in the future





# CO2 intensity throughout the day

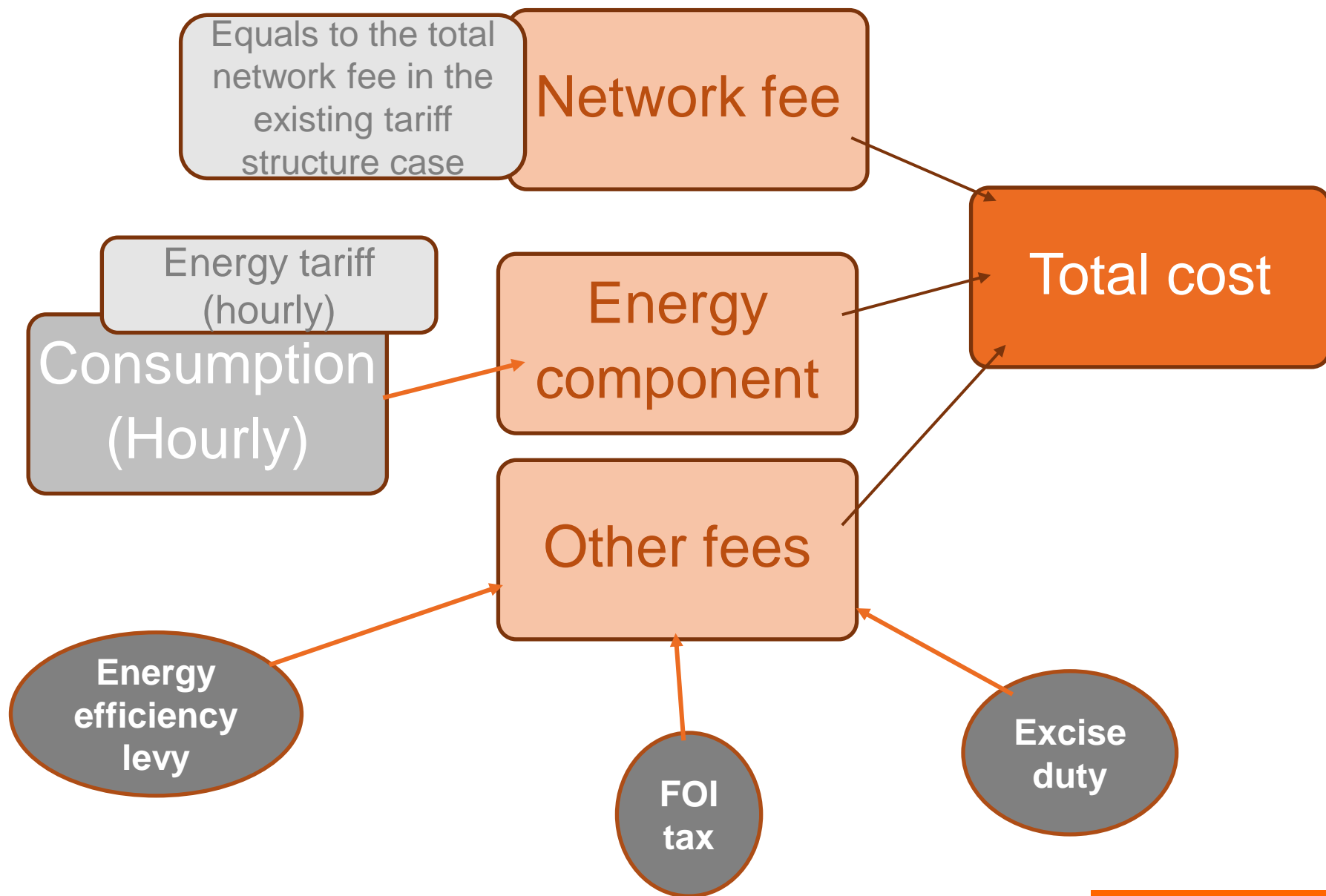


# Logic of the cost calculation

- The logic of the calculation is based on the elements of the present pricing
- Most of the elements are kept at present levels (as of 2020 May)
- **Energy fee** changes across years and scenarios (based on wholesale price forecast)
  - Existing tariff structure:
    - there are two periods, High and Low (or: day and night)
    - High tariff = average prices of „high“ (day) hours for the given year
    - Low tariff = average prices of „low“ (night) hours for the given year
  - Hourly tariffs:
    - There is a different tariff (energy fee) for all hours

# Logic of the cost calculation

## Hourly tariffs



**Thank you for your kind  
attention!**

[eniko.kacsor@rekk.hu](mailto:eniko.kacsor@rekk.hu)