



ELEC0018-1

Energy Markets

Lecture 1 – Contextualisation

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and

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The question of this lesson

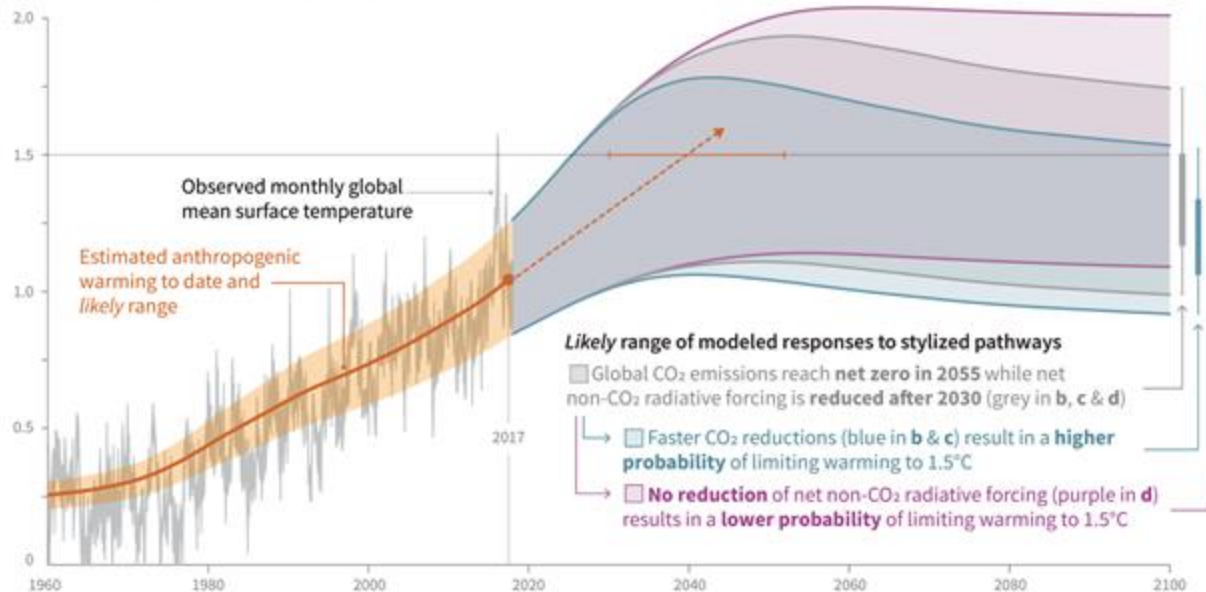
Why should you study
electricity markets?



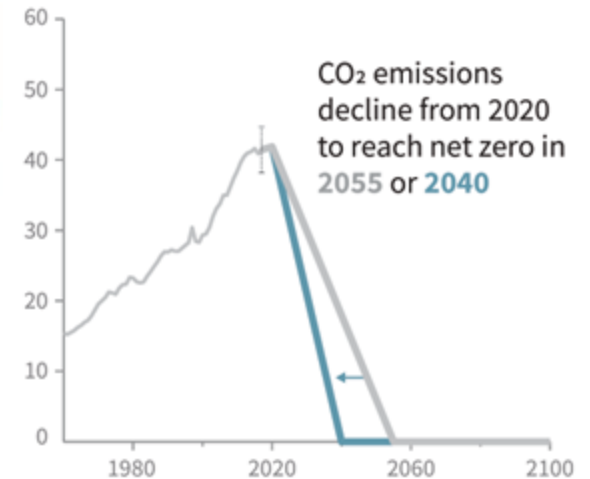
Context: IPCC last report

a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways

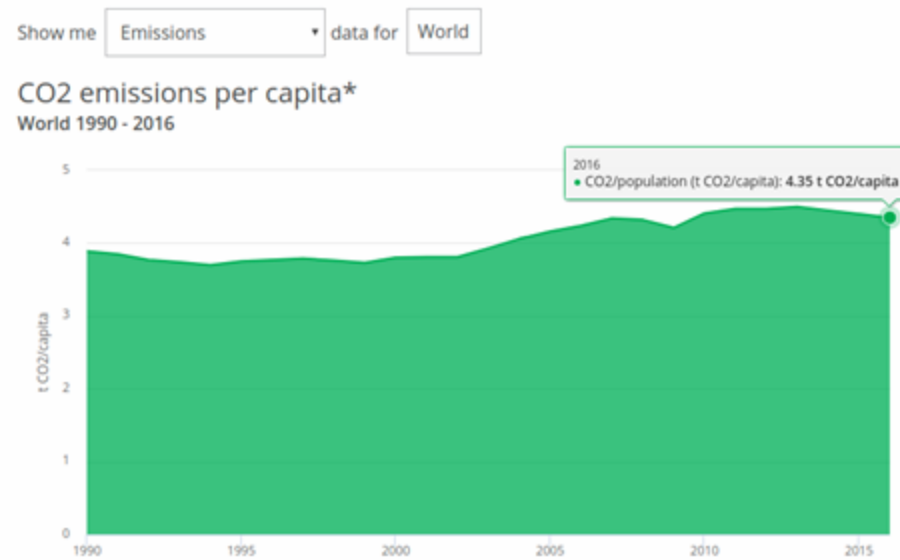
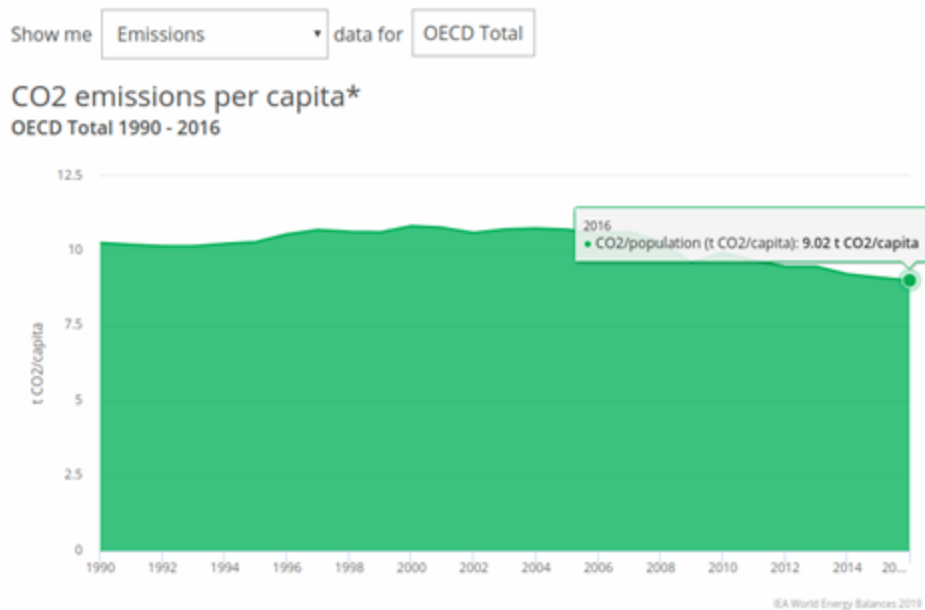
Global warming relative to 1850-1900 (°C)



b) Stylized net global CO₂ emission pathways Billion tonnes CO₂ per year (GtCO₂/yr)



Are we on the right track ?

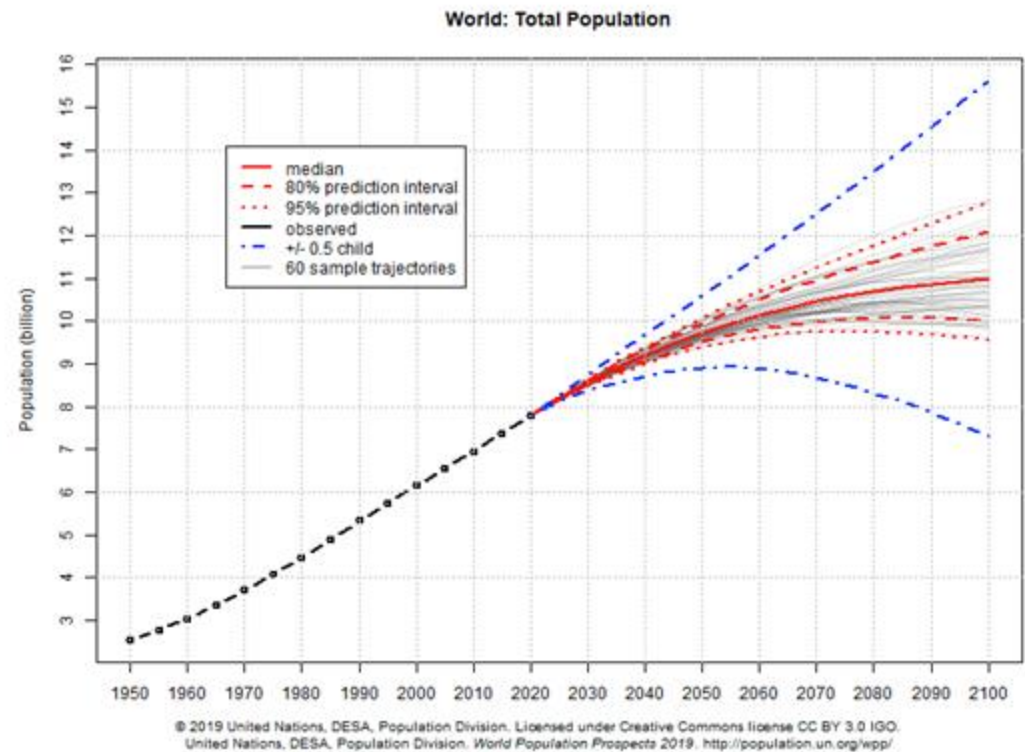


* CO2 Emissions from fuel combustion only. Emissions are calculated using IEA's energy balances and the 2006 IPCC Guidelines.

Are we on the right track ?

In 2050:

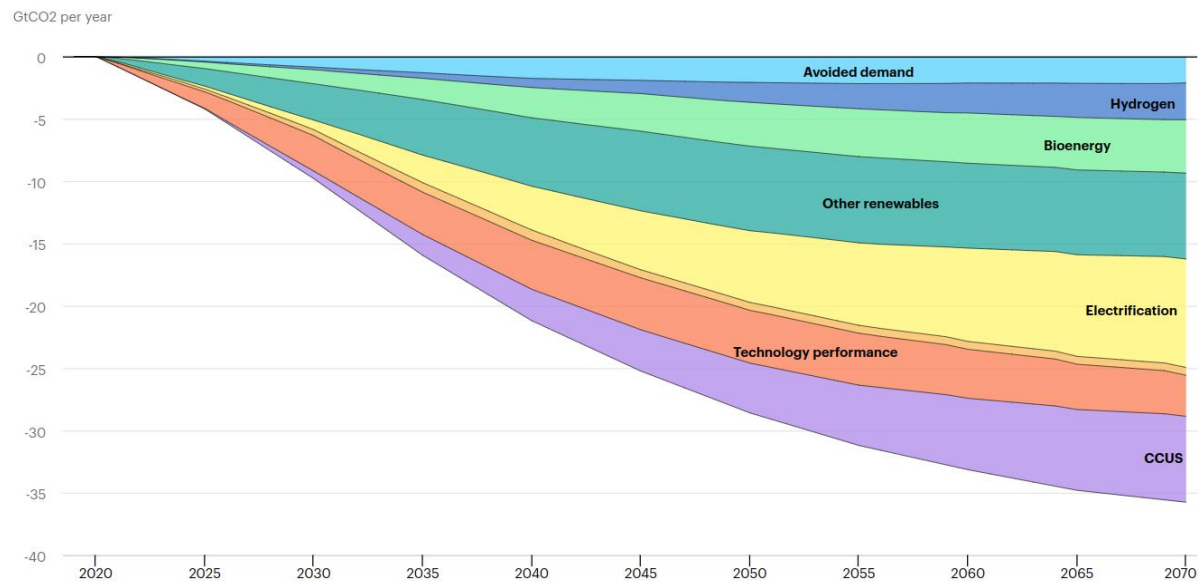
- ~9.5 billion humans
- At 2016 World emissions rate
 - $9.5 * 4.35 > 40$ GtCO₂
- At OECD level of living
 - $9.5 * 9.02 > 85$ GtCO₂



How to reduce GHG emissions?

1. Capture carbon when it is released
2. Reduce energy demand
3. Improve energy efficiency
4. Switch to carriers that are not fossil fuels

Global energy sector CO₂ emissions reductions by measure in the Sustainable Development Scenario relative to the Stated Policies Scenario



Source: <https://www.iea.org/reports/energy-technology-perspectives-2020/technology-needs-for-net-zero-emissions>



Why study electricity markets ?

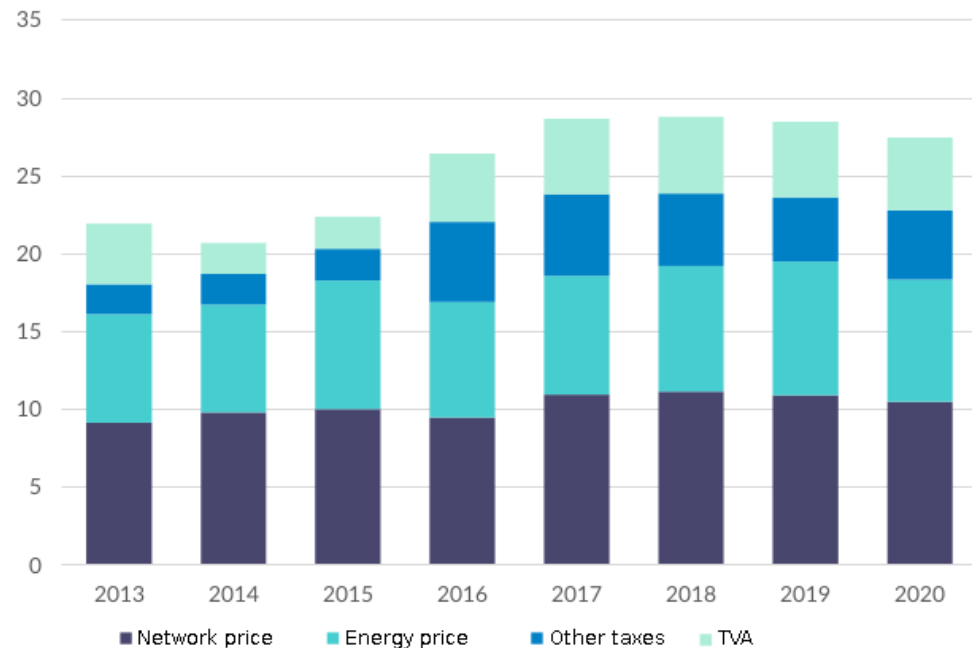
Reason 1: Because electricity will become more and more prominent in our societies.

Your point of view (the small consumer)

- Average residential price in Belgium 2020: 0.275€/kWh
- Average energy consumption per consumer: 2.5 to 5 MWh/year

⇒ between ~700 and 1400 € per year

⇒ between 57 and 115€ per month

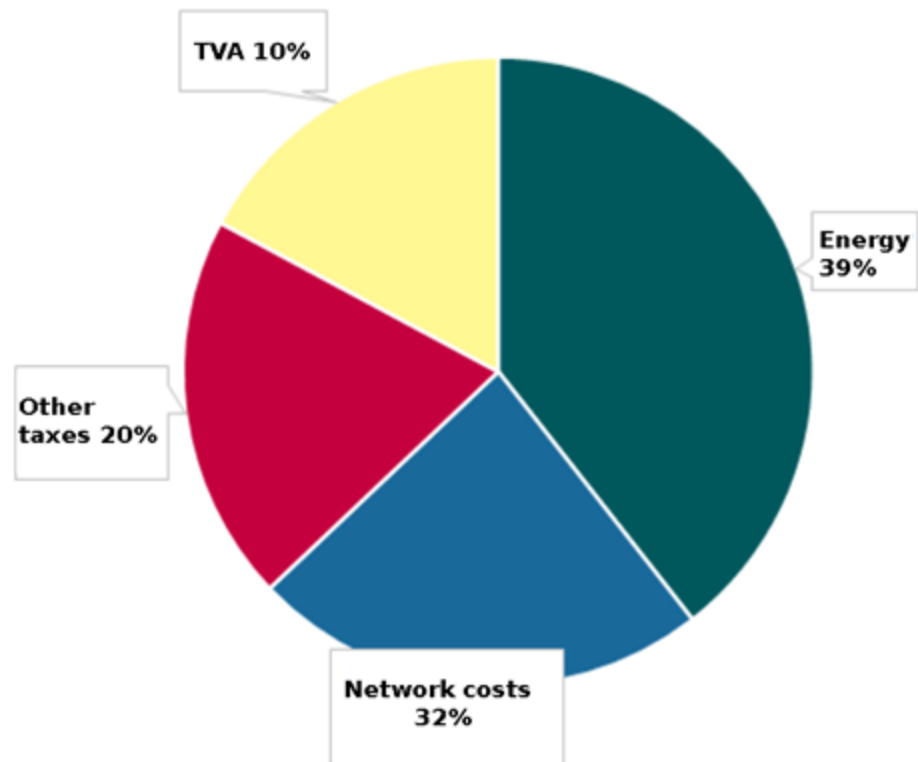


Source: <https://economie.fgov.be/fr/publications/energy-key-data-fevrier-2022>

Your point of view (the small consumer)

In the price you pay → **less than 50% for energy!**

Only this part is affected by electricity markets



Your point of view (the small consumer)

- Small consumers pay a **fixed price per kWh** (per month)
- Some pay a price that vary every three months or so

⇒ very different to what happens in markets

Auction > Day-Ahead > 60min > BE > 05 November 2021

Last update: 04 November 2021 (12:49:12 CET/CEST)



Source: <https://www.epexspot.com/en/market-data>



Why study electricity markets ?

Reason 2: As a small consumer, you **do not participate** directly in the electricity market, but **you are directly impacted by it**.

- Prices fixation mechanism will affect the final price you pay as a consumer.
- Markets also influence future investment decisions (e.g. whether to keep some nuclear plants open, whether to build new wind turbines, ...). Those investments will have both financial and climatic impacts on your future.

Why study electricity markets ?

Reason 3: **Hot topic!** The electricity markets have entered a phase where common approaches are challenged due to two major changes in the electricity market structure.

1. The remarkable increase in renewable production in the last 10 years, while allowing the production of electricity at zero marginal costs, has dramatic effects on the reliability of networks. We, therefore, need to understand how the reliability of the electricity network influences prices to be able to promote these clean energy sources.
2. Recent years have seen an increasing number of prosumers (*i.e.* consumers who are also producing electricity) enter the market. Understanding the structure of the market can help us understand how these new players have to interact with it and how regulation needs to evolve in order to integrate them.

Your time
to work!

Try to answer the
following question:

“Why has the electricity
bill of consumers risen
so dramatically in the
last months/years?”

“Why has the electricity bill of consumers risen so dramatically in the last months/years?”

We give you 30 minutes to answer this question.

- Find at least 3 sources: news articles, videos, scientific articles, ...
- Identify which reasons are highlighted in those articles
- Identify the main actors of the electricity sector
- Note all the terms that you do not understand

After 30 minutes, we will put our findings in common.

Some Twitter accounts to follow

