Enerdata
intelligence + consulting

Global Energy Trends Quarterly Update

Based on its monthly data for G20 countries, Enerdata analyses global energy market trends in 2020.

Global Energy Trends Quaterly Update
Focus Asia

2020 new yearly estimates

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Public webinar, October 20th, 2020

Global Energy Trends webinar, October 20th, 2020

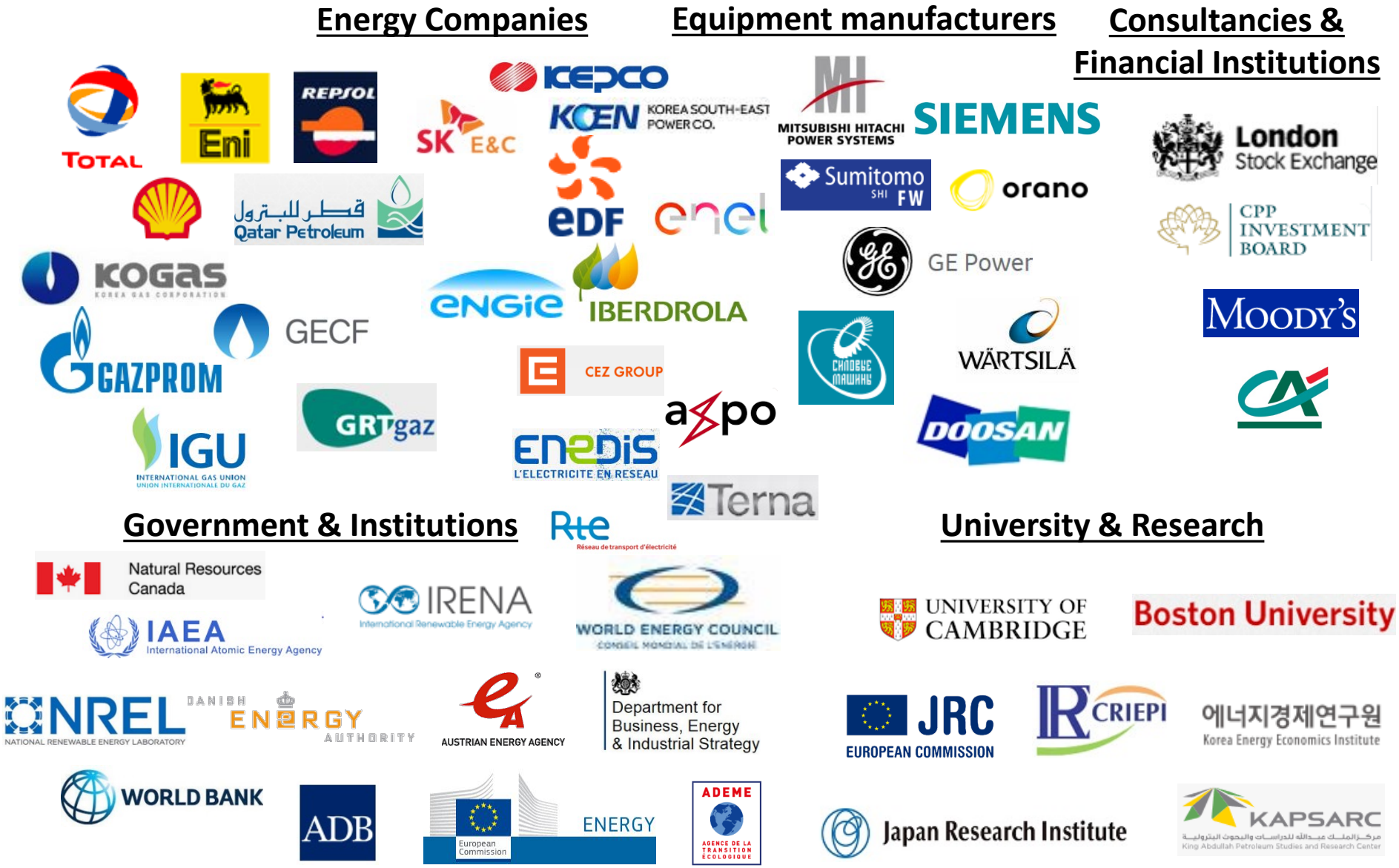
- Enerdata presentation
- 2020 trends
  - Methodology
  - First results
  - Next steps
- Conclusions

Enerdata presentation

We Help You Shape Your Strategies and Policies

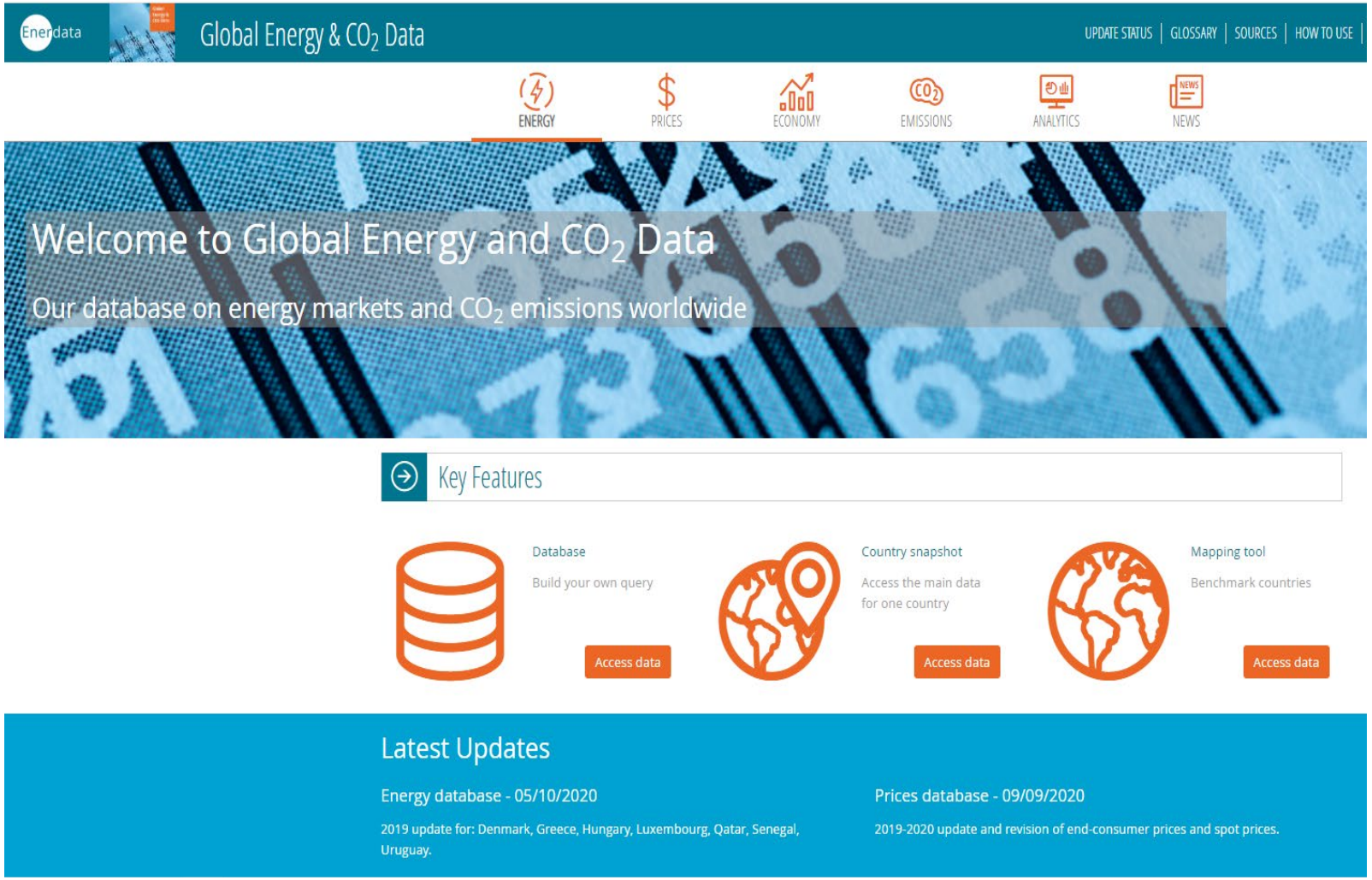
- **Independent** energy research company since 1991
- Expert in **analysis and forecasting** of **global energy & climate** issues
- In-house and globally recognised **databases** and forecasting **models**
- Headquartered in Grenoble (French Alps)
- Subsidiary in Singapore
- Global network of partners
- **Global reach**: clients and projects in Europe, Asia, Americas, Middle East, Africa

Enerdata's sample clients



GLOBAL Energy & CO_2 Data

- Annual Data from 1970-2019
- All energies in 186 countries
- Global supply, demand, prices, indicators and emissions
- Production, imports and exports, demand by sector, prices and taxes
- Advanced data: economic data, industry indicators, energy balances
- Detailed balances (transport by type, industry by branch)
- CO_2 emissions by fuel, activity and industry process



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2020 forecasts

Agenda

- Update of methodology developed in spring 2020
- GDP forecasts
- Energy consumption estimates
  - Focus on transport energy consumption
  - Focus on power consumption and power mix evolution
- CO_2 emissions

2020 estimates update – challenges and methodology

- The countries' energy **consumption** and **emissions** are strongly influenced by
  - the extent of the **economic recession**, which is estimated and whose projections have been revised (since early in June 2020),
  - and the way in which different countries have managed the process of **lockdown** and **restart**.
- **Enerdata has developed a detailed methodology** that uses economic activity forecast updates from major international organisations* and monthly energy data**.
- **Consumption** and **emissions** estimates are made by country for all G20 countries:
  - At the level of the **major energy demand sectors**, to consider the different sensitivities of these sectors to recession and lockdown,
  - At the level of the **power sector**, to take into account changes in the power mix.
- CO_2 emission factors were calculated based on these estimates and not extrapolated from the past.
- The rest of the world has been covered in a more aggregated way, **integrating international aviation and maritime transport**.

*: *OECD, European Commission for the EU.*
**: *from Enerdata EnerMonthly database*

2020 New Estimates: World

Economic growth: -4.5%

Source: OECD Sept 2020

-5.9%

Energy consumption*

-8.6%

CO_2 emissions*

- Energy consumption is falling 30% faster than the GDP
- CO_2 emissions are decreasing 50% faster than energy consumption, due to the higher impact of the economic crisis on sectors with a relatively high carbon factor (thermal power generation, transport)

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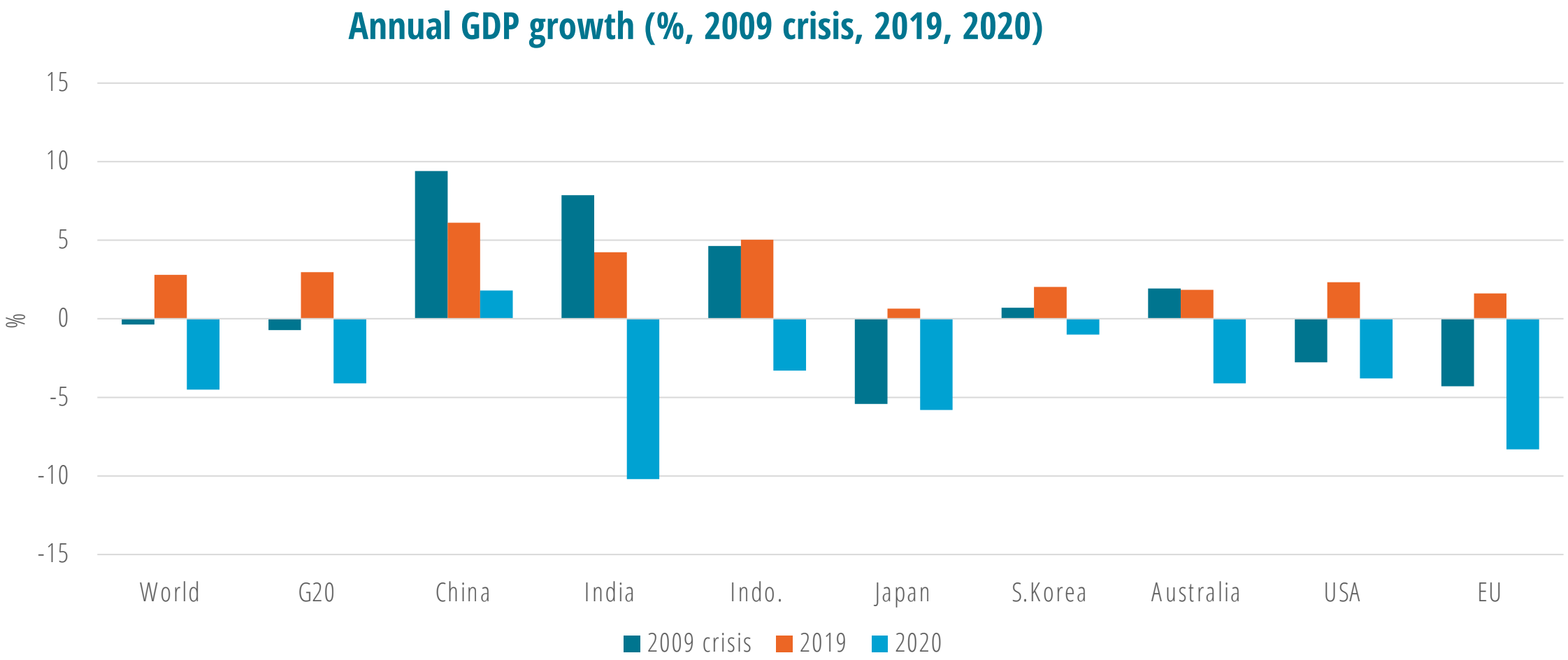
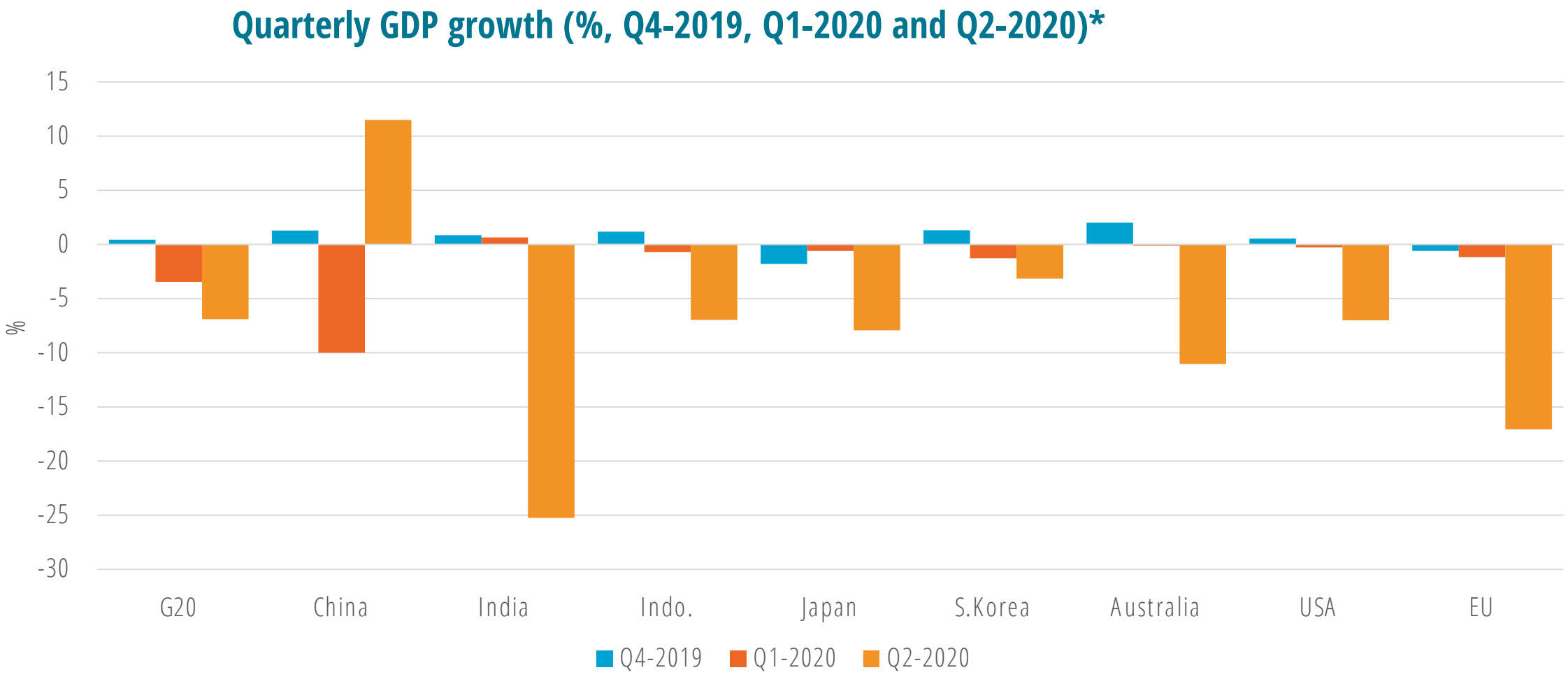
** Includes International air and sea transport (not included in country data).*

A huge economic crisis – much bigger than in 2008-09



Source: OECD, European Commission

As expected, the world economy crashed in Q2 2020



*: Growth rate compared to previous quarter, seasonally adjusted

Source: OECD

From GDP evolution to CO_2 emissions: key drivers

GDP: -4.5%

- Energy intensity
  - **Economic structure**
    - Industry vs services
  - **Energy efficiency**
- Non GDP-only related sectors (lockdown impact)
  - **Residential** sector
  - **Transport** demand
    - Freight (economy)
    - Passenger (lockdown)

Energy demand: -5.9%

- **Electricity** share in the mix
- Energy **mix** evolution:
  - Coal
  - Oil
  - Gas
  - Power mix

CO_2 emissions: -8.6%

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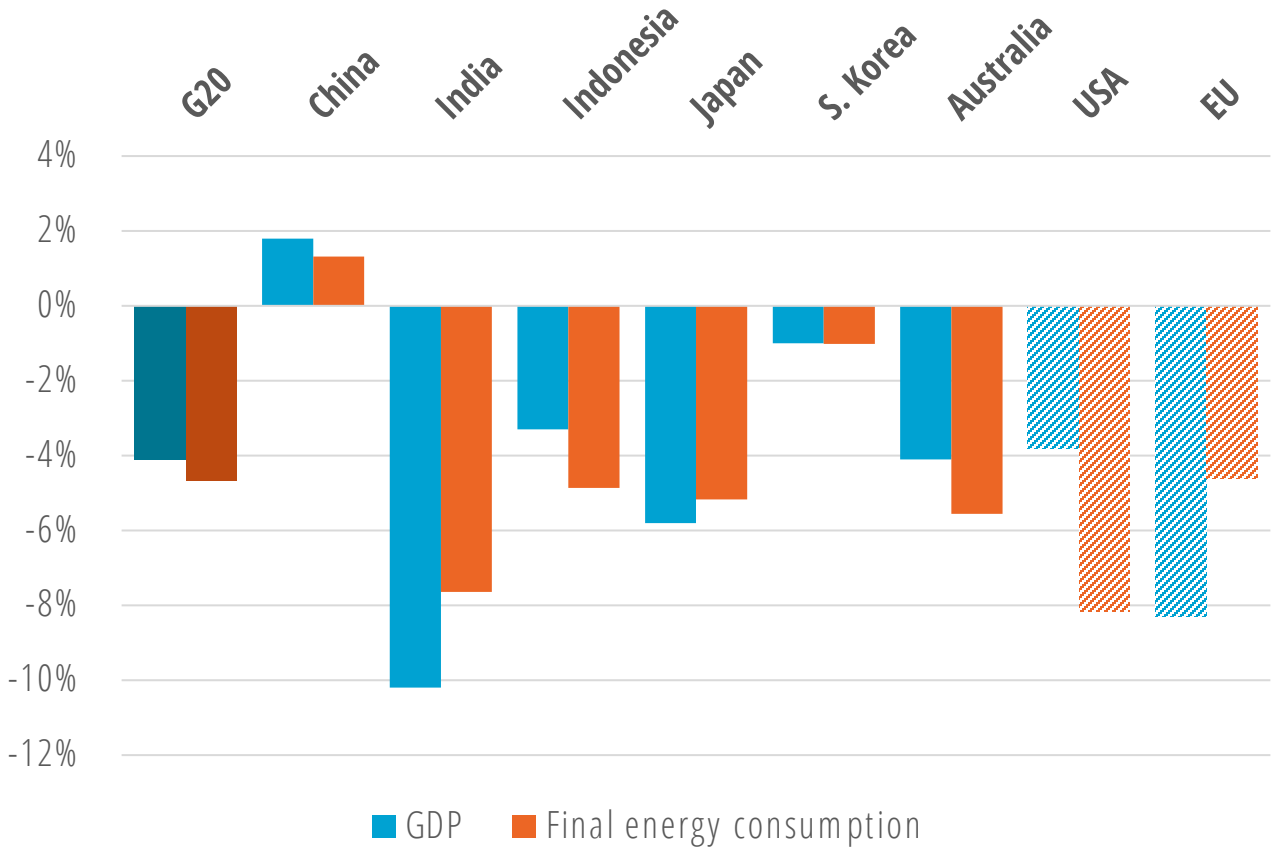
Big drop in final energy consumption

Evolution of GDP and final energy consumption*



*: Final energy consumption: industry, transport, buildings and agriculture

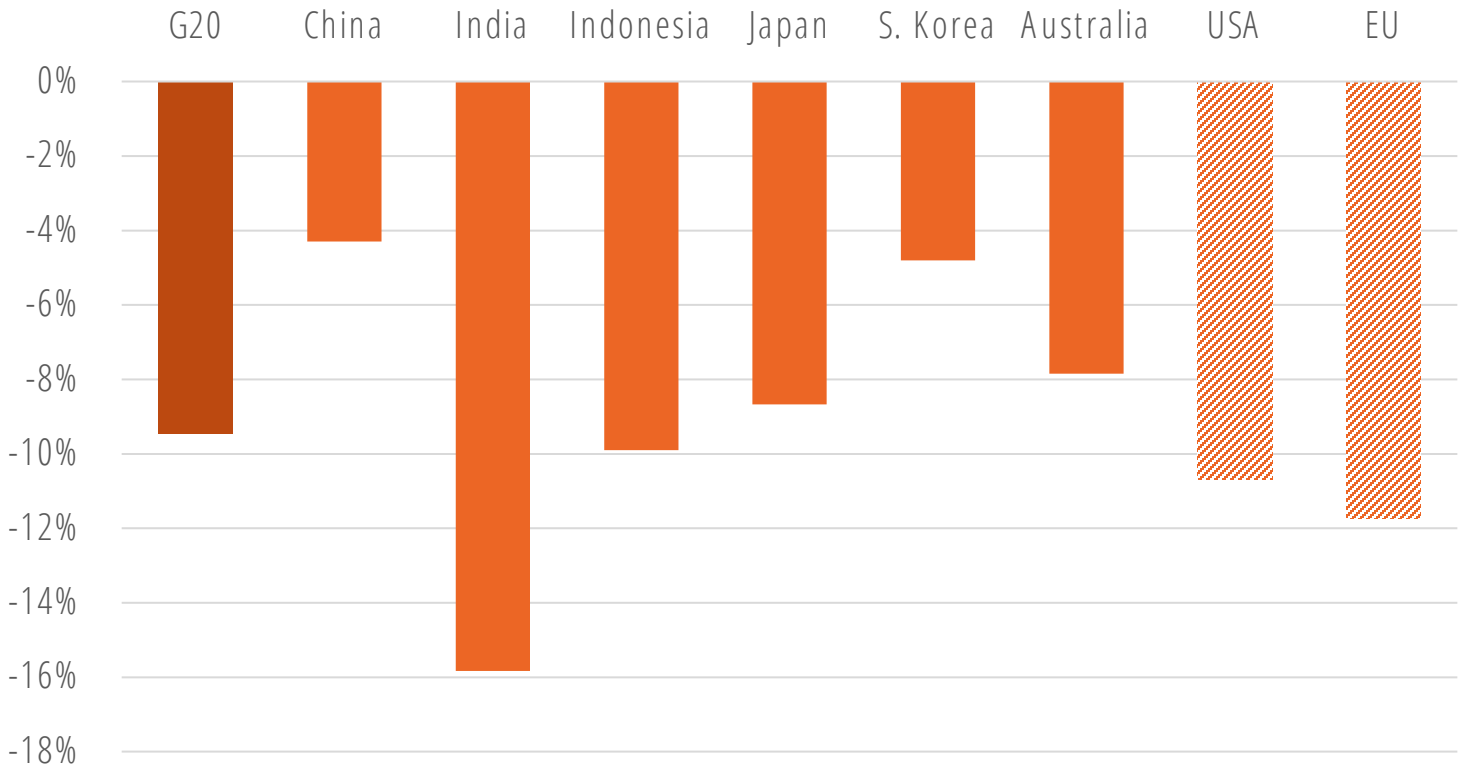
Source: Enerdata Estimates – October 2020

G20 energy demand drops by 4.5%, mostly due to the economic recession + very specific situation of the transport sector:

- **China**: final energy consumption driven by robust industry, including construction and real estate.
- **India**: final energy consumption follows low activity in energy-intensive industries.
- **Indonesia** : final energy consumption down mainly because of mobility restrictions.
- **Japan** : final energy consumption drop < GDP drop because of tertiary sector (low energy intensity).
- **South Korea**: final energy consumption contraction in line with low exports (manufacturing).
- **USA**: GDP drop < final consumption drop because of the fall in the transport sector.
- **EU**: GDP drop > fall of final consumption because of the weight of the tertiary sector.

Unprecedented fall of transport energy consumption (close to -10%)

Final energy consumption of transport – full year 2020

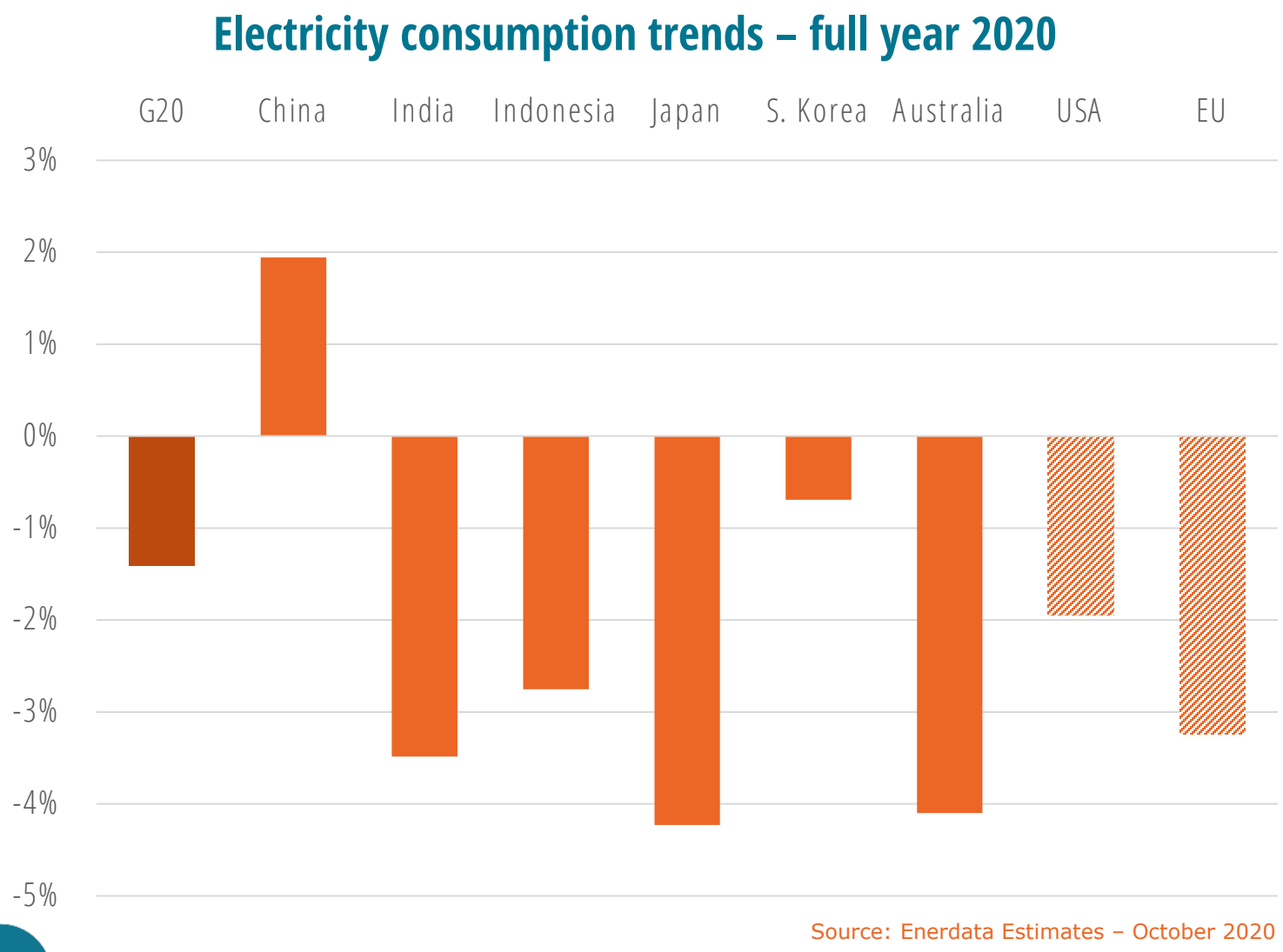


Source: Enerdata Estimates – October 2020

- Transport of goods and people have strongly diminished in 2020, and so did the energy consumption in the sector :
  - ✓ Lockdown: ground passenger transport and air transport* (strong impact).
  - ✓ Economic slowdown: freight (lower impact) and business.
- Estimates are based on the lockdown duration and the speed of restart, using 6 to 8 months data on transport fuel consumption reductions.
- Asian countries (except India) are less impacted that the USA and the EU.
- USA: road transport impact and internal flights.
- EU, except Germany: stringent lockdown measures.

** Only domestic air transport is included here; international air transport is included in the global round-up.*

Limited decrease of electricity consumption in 2020



Source: Enerdata Estimates – October 2020

While energy consumption is falling by around 5%, electricity demand should only decrease by 1.5%.

- The decline is mainly linked to industry, which is highly sensitive to economic activity, and to a lesser extent to the tertiary sector, where the lockdowns have played a greater role. Conversely, the residential sector contributes positively.
- During lockdown, electricity consumption fell by up to 15-20% depending on the country.

In most regions, the power mix is less carbon intensive in 2020, but for different reasons

Temporary factors

- Less demand → priority dispatch for renewables vs fossil fuels
- Favorable weather conditions for renewables production in H1 2020 (wind and hydro in Europe)

Economic factors: low gas price (USA)

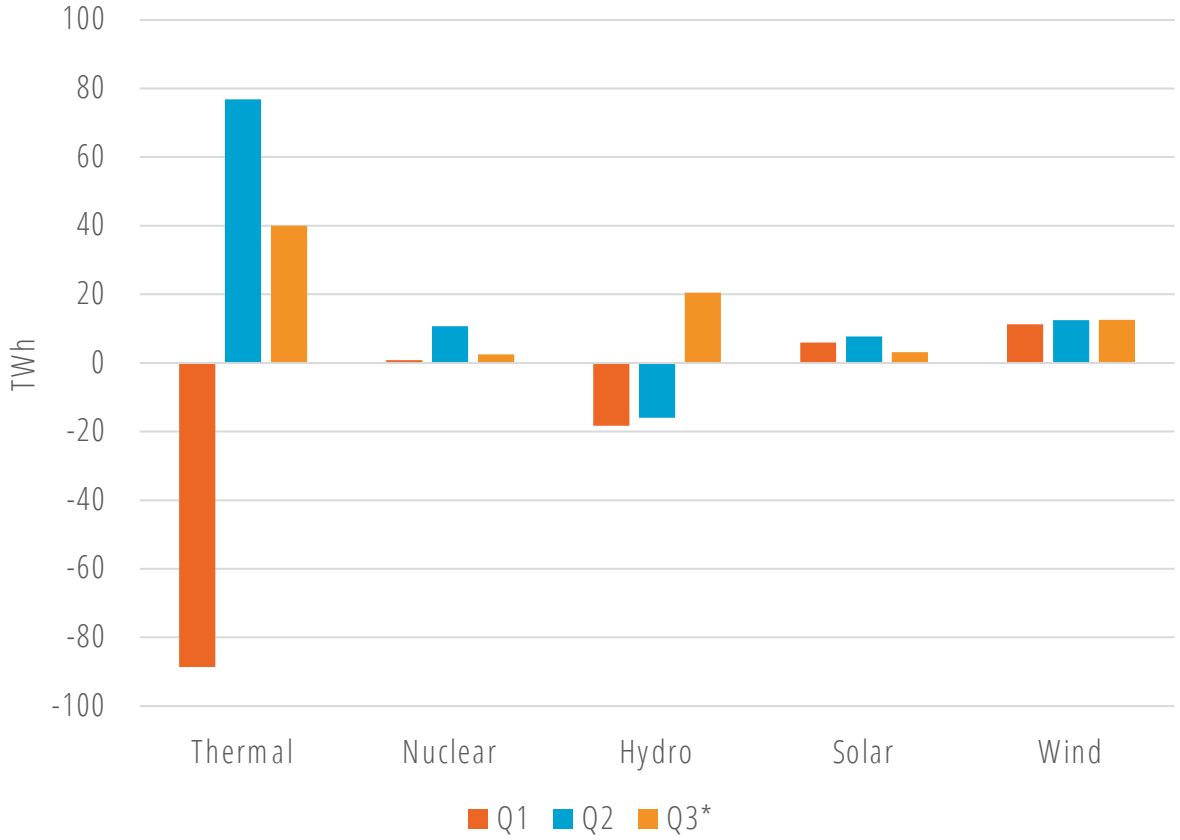
Structural/political factors:

- closure of coal plants (USA, DE, UK)
- Continuing growing renewable capacity development (worldwide)

NB: no significant change in China (high demand & coal capacities)

China: coal share in the power mix will remain stable

Quarterly power generation variation by technology (2019/2020; Y-o-Y)



*: Q3 = July + August

Catch up phenomenon in Q2 and Q3 mainly due to public support to industry and construction.

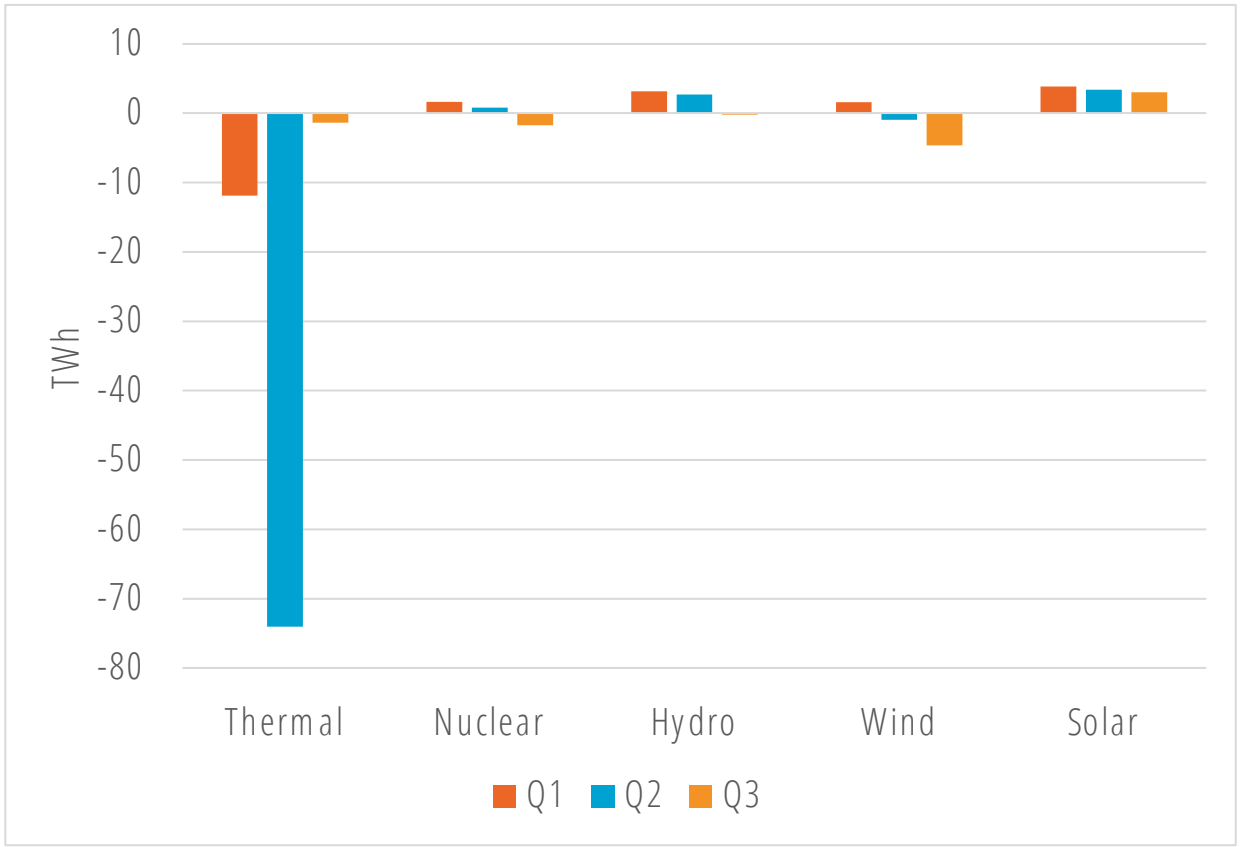
New capacity (at end-August 2020):

- Coal: +21 GW
- Gas: +4 GW
- Hydro: +8 GW (Wudongde dam)
- Wind: +10 GW (~ -10% vs Aug. 2019)
- Solar: +15 GW (~ -5% vs Aug. 2019)

Source: Enerdata EnerMonthly

India's drop in power demand absorbed by coal power generation

Quarterly power generation variation by technology (2019/2020; Y-o-Y)

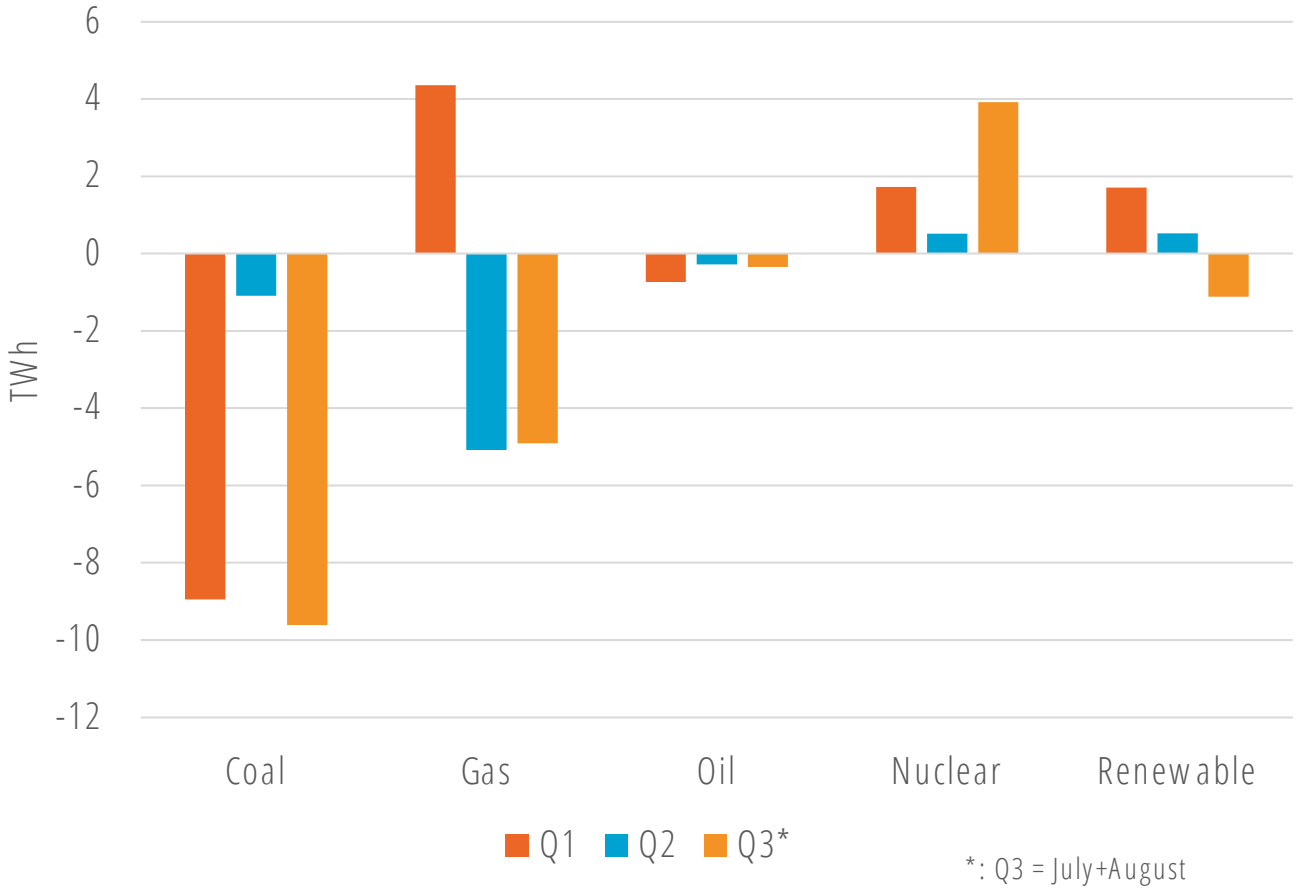


- Drop of power consumption has been absorbed by coal-fired power gen.
- RES capacity addition at end-Sept 2020 is 60% lower than in Sept 2019:
  - ✓ Coal: +0.5 GW (for comparison)
  - ✓ Hydro: +0.4 GW
  - ✓ Wind: +0.6 GW
  - ✓ Solar: +2.3 GW

Source: Enerdata EnerMonthly

South Korea: renewables do not gain market share

Quarterly power generation variation by technology (2019/2020; Y-o-Y)



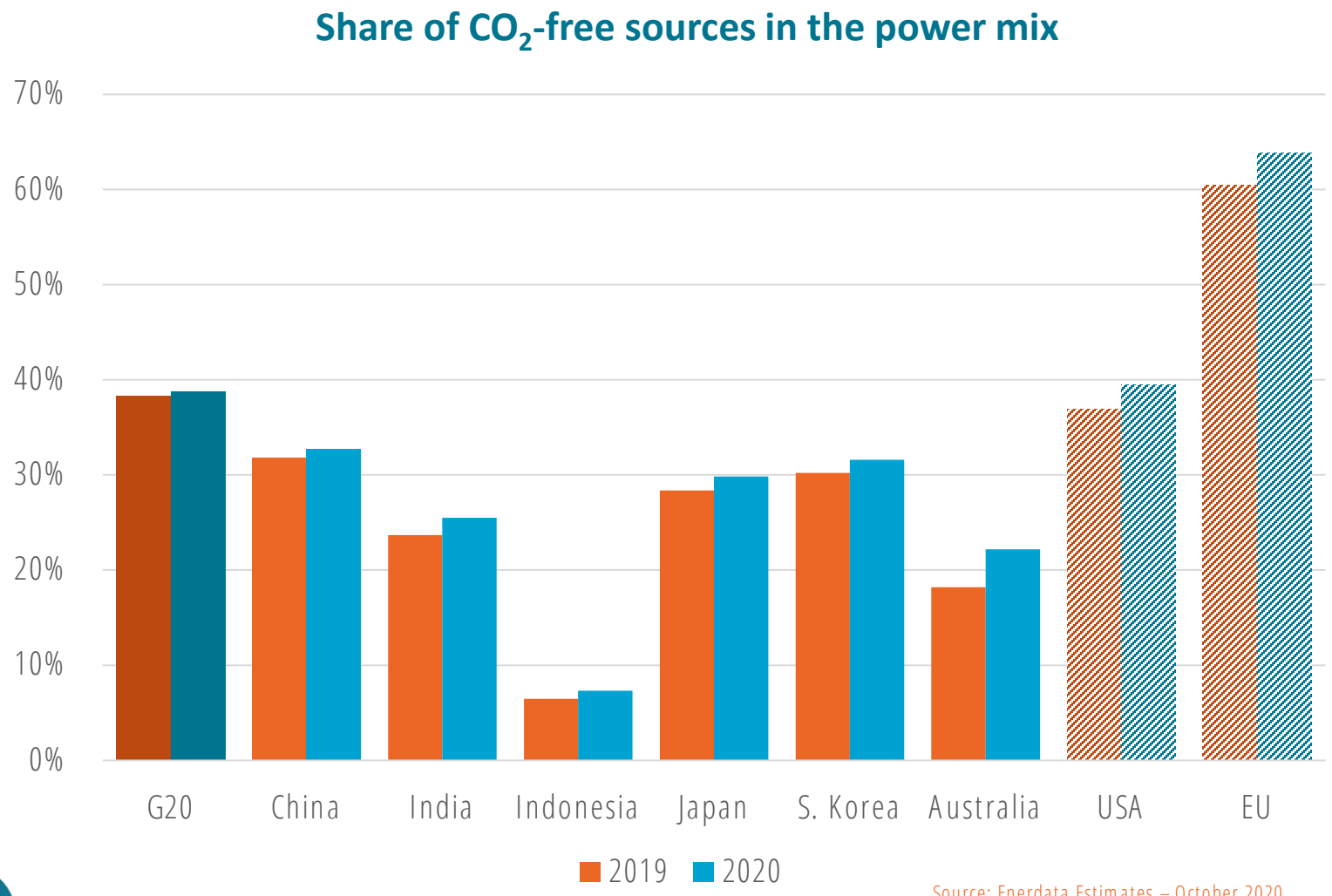
Low drop of power consumption has been absorbed

- firstly by coal-power generation (GHG and air quality related policy)
- and, in a lesser extent, by gas-fired power generation although lower international LNG prices and +2 GW new gas-fired plants since 2019

- Share of nuclear is increasing

Source: Enerdata EnerMonthly

The share of CO_2-free power sources increases slowly in Asia

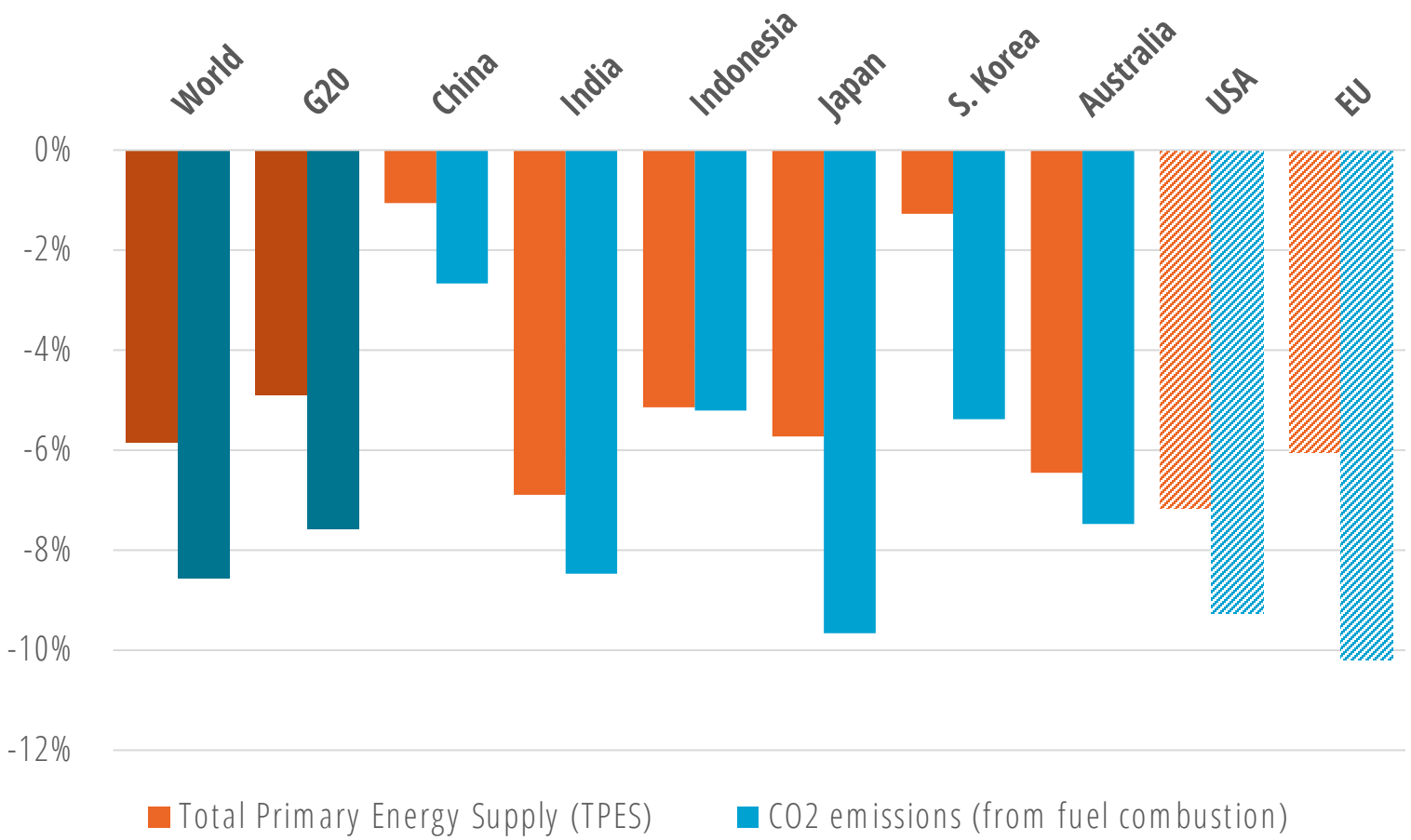


Source: Enerdata Estimates – October 2020

- The share of the electricity mix coming from non-carbon energies is growing faster in the EU.
- The share of renewables is increasing everywhere, although quite slowly in Asian countries
- Nuclear power declined in France (reactor maintenances), the USA and Germany (reactor closures) but increased in China (commissioning of power plants in 2019).

World forecasted drop in CO_2 emissions: -8.6 %
Beyond the drop in energy consumption

Change in CO_2-energy emissions and energy consumption - Forecasts 2019/20



Source: Enerdata Estimates – October 2020

- Energy-related CO_2 emissions vary as does the consumption of fossil fuels (coal, gas and oil).
- Emissions are falling everywhere faster than energy consumption:
  - ✓ Slight penetration of the renewable in the power mix, fossil fuels absorbing demand reduction.
  - ✓ Sharp drop in transport consumption (high emission sector)

2020 estimates: China

+1.8%

Change in GDP

- 4%

Transport sector consumption

-1%

Energy consumption

very limited change in the power mix

CO_2 -2.5%

CO_2 Emissions

Source: Enerdata Estimates – October 2020

2020 estimates: India

-10.2%

Change in GDP

-16%

Transport sector consumption

-7.5%

Energy consumption

slight change in the power mix

-8.5%

CO_2 Emissions

Source: Enerdata Estimates – October 2020

2020 estimates: South Korea

-1%

Change in GDP

-5%

Transport sector consumption

-1.3%

Energy consumption

change in the power mix (nuclear) and lower coal consumption in industry

-5.4%

CO_2 Emissions

Source: Enerdata Estimates – October 2020

2020 estimates: USA

-3.8%

Change in GDP

-11%

Transport sector consumption

-7%

Energy consumption

Increase in share of renewables + switch from coal to gas

-11%

CO_2 Emissions

Source: Enerdata Estimates – October 2020

2020 estimates: EU 28

-8%

Change in GDP

High GDP drop in Tertiary sector (low energy intensity)

-12%

-6%

Energy consumption

Increase in share of renewables + decrease in share of gas and coal

-10%

CO_2 Emissions

Source: Enerdata Estimates – October 2020

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Conclusions

From GDP evolution to CO_2 emissions: key drivers

- **GDP: -4.5%**
- Energy intensity
  - **Economic structure**
  - **Energy efficiency** **?**
- Non GDP-only related sectors (lockdown impact)
  - **Transport** demand ↘
  - **Residential** sector ↘

- **Energy demand: -5.9%**
- **Electricity** % in the mix ↗
- Energy **mix** evolution:
  - Coal ↘
  - Oil ↘
  - Gas →
  - RES in Power ↗

- **CO_2 emissions: -8.6%**

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Conclusions

Methodology:

- Update of estimates of the crisis impact on energy consumption and CO_2 emissions
- Updated regularly with improved economic forecasts and more comprehensive data to measure the effect of lockdown-restart, particularly in transport.
- Compared to other studies, this estimate is based on a detailed modelling of demand and of the electricity sector by country, focusing on the effect of growth and using statistics available at the end of September 2020.

Results:

- **The differences between the declines in GDP, energy consumption and emissions are significant and explainable.**
- **The drop in CO_2 emissions in 2020 is historical but should be taken with caution: it is mostly a direct result of the economic recession and lockdown policies during the sanitary crisis.**
- **The increasing weight of renewables in the mix has also a noticeable impact but will probably be temporary (low power demand). At best it will return to the previous trajectory or at worst a slowdown, depending on whether players slow down their investments in this area.**
- **A rebound effect of the CO_2 emissions in 2021 is likely, depending on the economic recovery and people mobility.**

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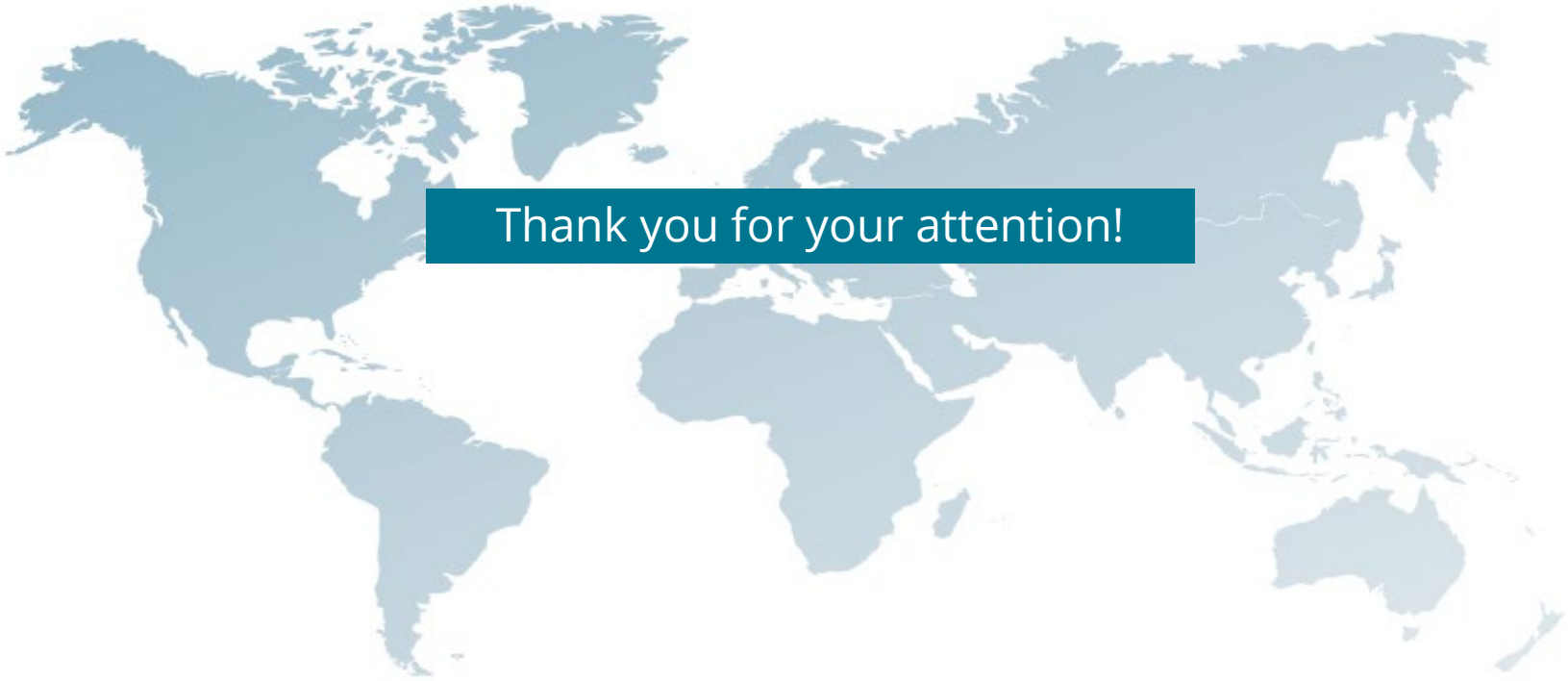

Thank you for your attention!

2020 → 2025 – Key Years!

Post-covid : uncertainties, risks and opportunities…

2° scenario- emissions reduction

Transports

Buildings

Industry

Energy

Pump price

Use of individual car vs public transportation

Relocalisation & supply chains?

Experience and devt of soft mobility

Expansion of home office

Rebound effect / travel & holidays

Development of rail vs road?

Less international travels

Public authorities

Less financial support for retrofit

House & space vs flat

Continuing IT consumption growth

Citizens

Consumption drop, sufficiency

Climate targets on the back burner

Conditional state support

Business

Less impact of carbon markets such as ETS

Less RES investments (financial capacities)

Return back to 2019 mix

Return on investment RES vs fossil

Local - National - international

Fossil fuel prices

Coal bouncing back in Asia

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What possible world configurations?

- From the current state, images of the future can be structured using double bipolarity:
  - On the state of **international relations**, between withdrawal (deglobalisation) and resumption of cooperation efforts (multilateralism).
  - On **climate policy goals**, depending on whether priority is given to a rapid return to the *status quo ante* or whether the opportunity is seized to accelerate ecological transitions.
- The combination of these variables gives 4 possible configurations…

	Deglobalisation	**Cooperation**
Return to the status quo	1. Every man for himself. Growth profile V then W?	2. Save the whole ship. V (or Z)
Ecological transitions	3. Back to the territories. U or more likely, L	4. New Green Deal. U

Configurations and structuring hypotheses for the construction of four scenarios for the future…

2020-2030	Deglobalisation	Cooperation
Return to the status quo	GDP: - - ENE/GDP: + CO_2/ENE: + +	GDP: - ENE/GDP: 0 CO_2/ENE: 0
Ecological transitions	GDP: - - ENE/GDP: - - CO_2/ENE: -	GDP: - ENE/GDP: - CO_2/ENE: - -

- Using the three explanatory variables of the Kaya equation: CO2 = (CO2/ENE) x (ENE/GDP) x GDP
- Reference: EnerBase scenario from Enerdata. Rating from "- -" (much lower) to 0 (same) and to "++" (much higher)

Development of a new tool to analyse these scenarios over 5 - 10 years

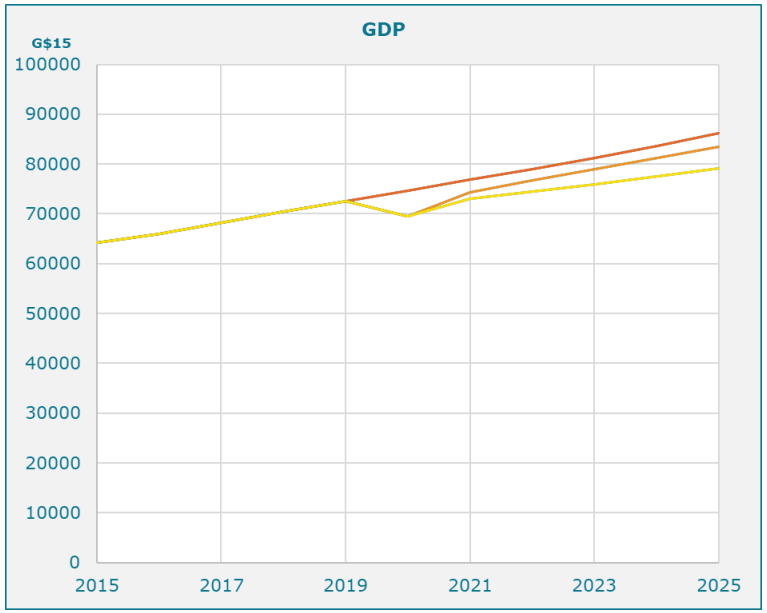
- Methodological principles :
  - Integration of macro-economic variables, sectoral approach & drivers, energy policies…
  - Work on very recent data (e.g. 2020 forecasts)
  - Coverage: G20 countries + World - possible enlargement

- Objectives :
  - To show the possible differences between different scenarios over a few years
  - Focus on 2025 and extension to 2030
  - Linking history, short term and long-term scenarios → to feed EnerFuture scenarios

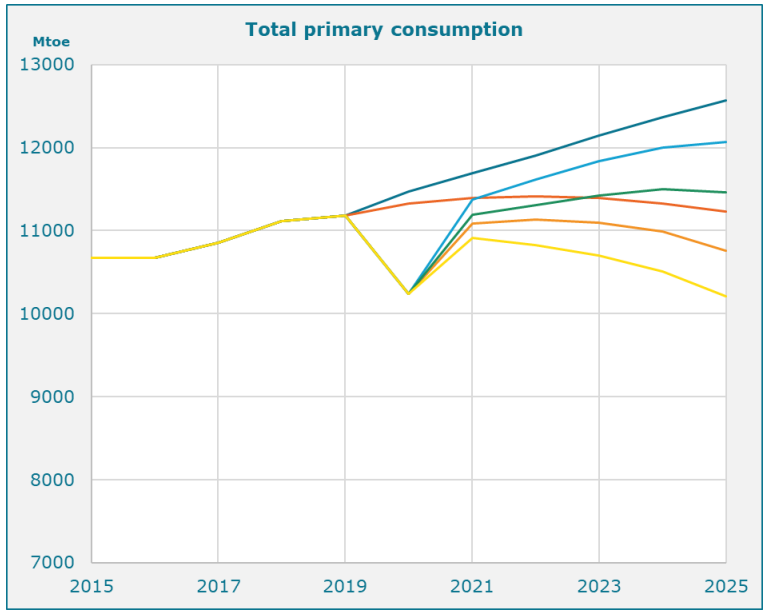
- Planning :
  - 1st release of results in June
  - G20 coverage and scenario analysis in H2 2020

Scenarios to 2025 – First results – G20

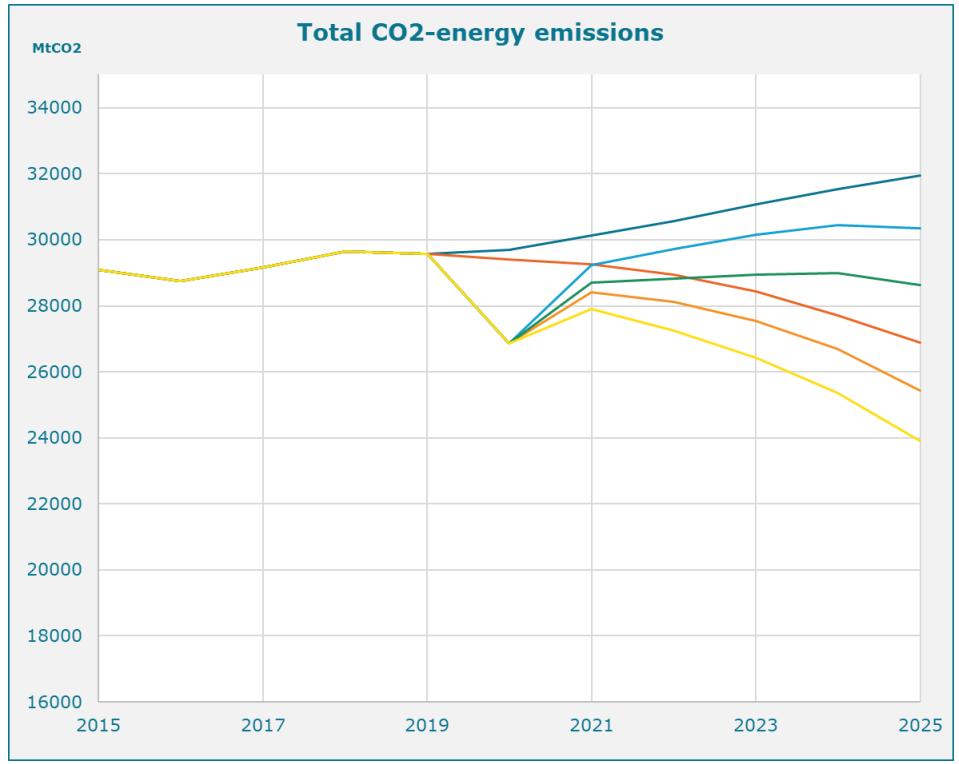
Comparison of *before* and *after* scenarios



Source: Enerdata based on Oxford Economics



Source: Enerdata Estimates based on G20 – May 2020



- The 2020 CO_2 emissions reduction has no significant impact on trends and could be erased quickly depending on the scenarios
- Because of / thanks to the uncertainties arising from the Covid-19 crisis, the next few years will most likely shape long-term trends

Scenarios to 2025 – First results – EU28

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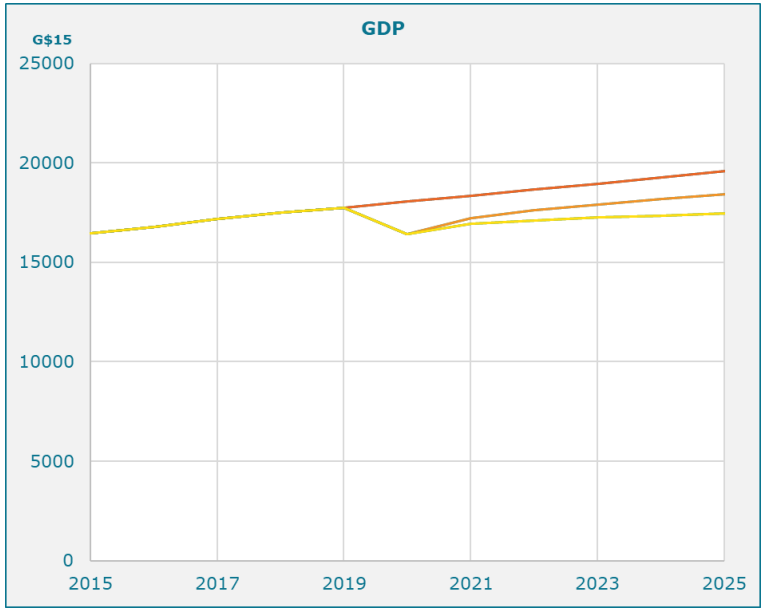
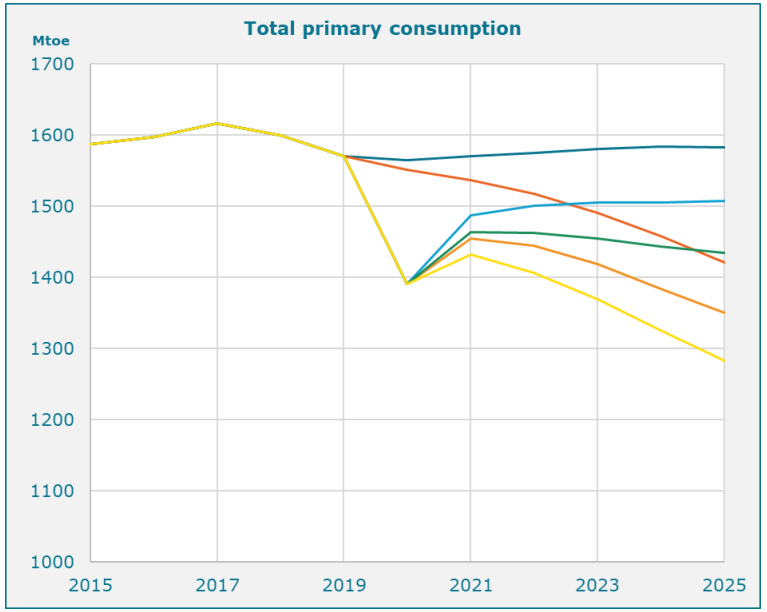
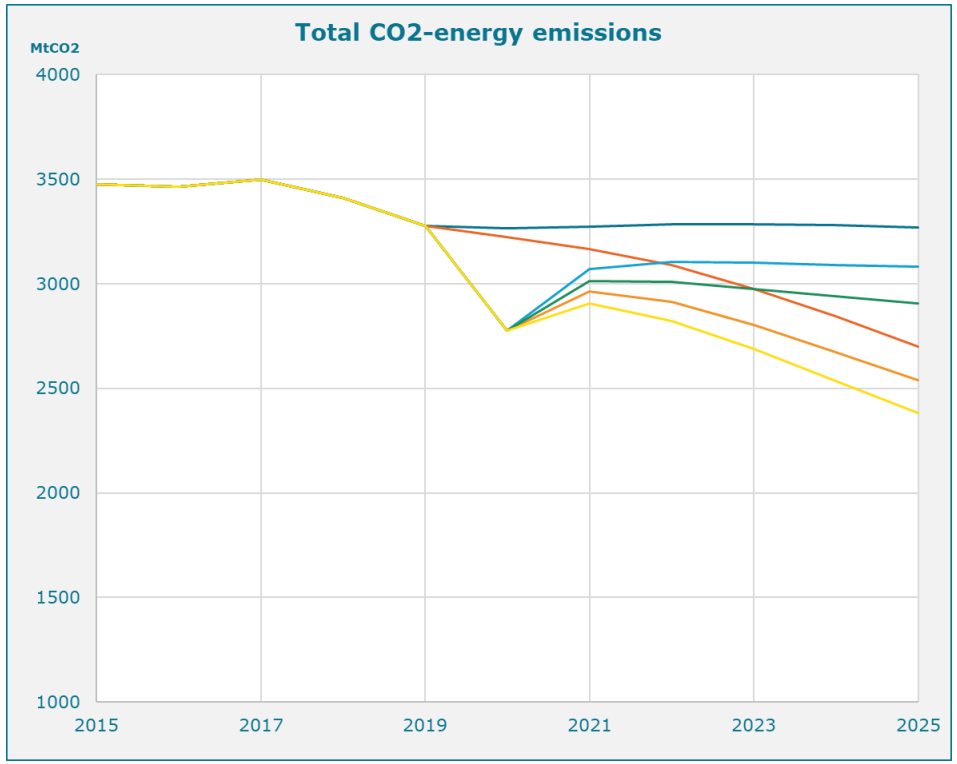


Source: Enerdata based on Oxford Economics



Source: Enerdata estimates based on EU28 – May 2020



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