

COUNTRY FACTSHEET: Australia



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 7,741,000 square kilometers. About 32 times the area of the UK.
- **Climate:** The center of the country is a hot desert. Coastal regions have more rainfall. The north is much hotter than the south.
- **Land use:** Agriculture 53%, Forest 16%, Urban 0%, Grassland 16%, Other 15%.
- **Fossil fuel reserves:** Large coal, oil and gas reserves.
- **Mountain regions:** The Great Dividing Range (Eastern Australia). There are mountain ranges with little rainfall in central and western Australia.

HUMAN GEOGRAPHY

- **Population:** 26,000,000 (3 people per km² – very low density)
- **Country type:** Developed
- **Electricity use:** 9.6 MWh per person, per year. (EU mean: 6.1 MWh)



Australia is currently **very dependent on fossil fuels, especially coal**. It is **behind** many other countries with renewable energy resources.

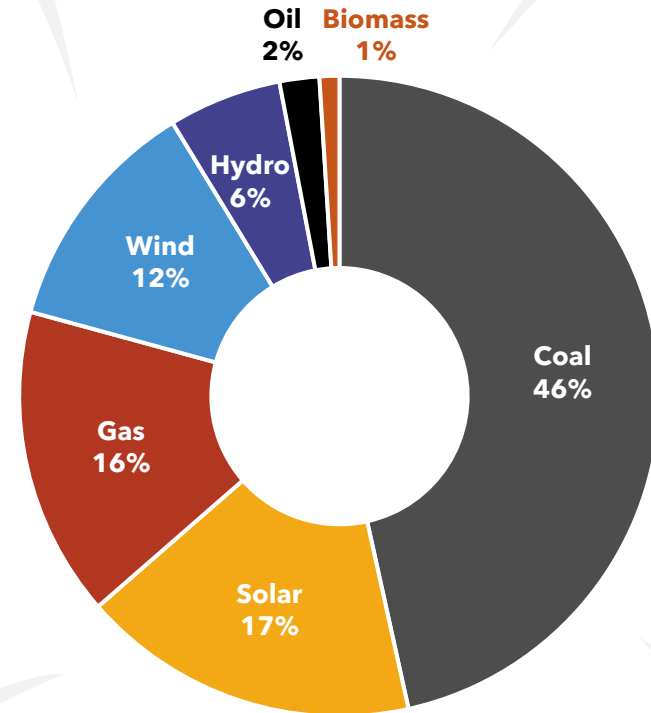
41 POWER 32 IMPACT 23 COST



SEE AUSTRALIA'S
GRID IN MEGAWATT



AUSTRALIA'S ELECTRICITY MIX



RATIONALE

- Australia has large **COAL**, **OIL** and **GAS** reserves.
- Australia has no **NUCLEAR** power. Although it has large uranium deposits, nuclear power is banned in every state.
- The east has high rainfall and mountains which supports the deployment of **HYDRO**.
- Coastal regions are windy and so **WIND** power is increasing.
- The center and north-west are very sunny and good for **SOLAR** energy.

COUNTRY FACTSHEET: France



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 552,000 square kilometers. Just over twice the area of the UK.
- **Climate:** France is generally warmer and sunnier than the UK. Rainfall and wind are quite high in the north and west.
- **Land use:** Agriculture 52%, Forest 31%, Urban 6%, Other 11%.
- **Fossil fuel reserves:** Almost none.
- **Mountain regions:** Extensive mountain regions in the Alps and Pyrenees.

HUMAN GEOGRAPHY

- **Population:** 66,000,000. (120 people per km² - high density)
- **Country type:** Developed
- **Electricity use:** 7.3 MWh per person, per year. (EU mean: 6.1 MWh)



A nuclear disaster in France might mean France would have to **close down its nuclear reactors** for safety reasons. France would then lose **over half its electricity generation**.

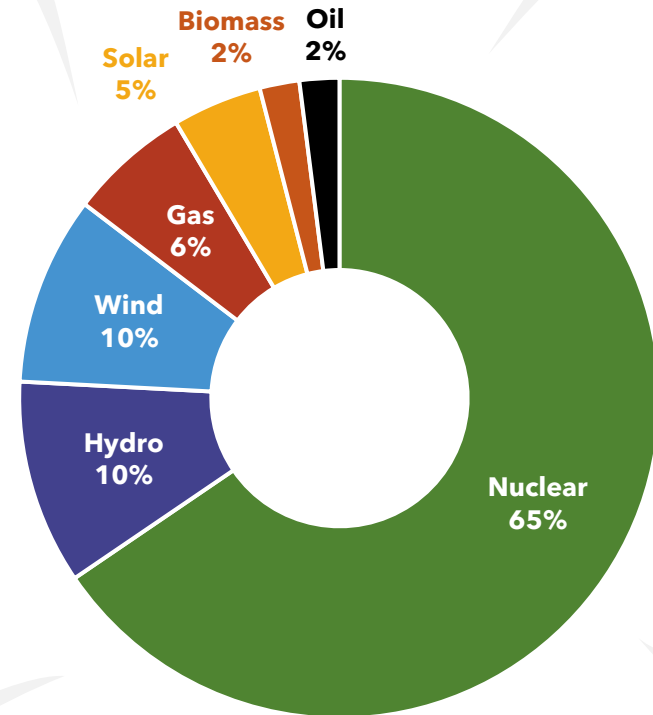
46 POWER 14 IMPACT 39 COST



SEE FRANCE'S
GRID IN MEGAWATT



FRANCE'S ELECTRICITY MIX



RATIONALE

- France has virtually no **COAL**, **OIL** or **GAS** reserves.
- After the oil crisis in the 1970's, France developed and built over 50 **NUCLEAR** power stations between 1980 and 2000.
- France has mountainous areas with good rainfall for **HYDRO** power.
- France is investing more in **SOLAR** energy, and onshore and offshore **WIND** to reduce its dependence on **NUCLEAR** power.

COUNTRY FACTSHEET: China



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 9,597,000 square kilometers. About 40 times the area of the UK.
- **Climate:** Western China has vast areas of cold desert and tundra. Northern China is dry with limited rainfall, while the south gets high amounts of rainfall during the monsoon.
- **Land use:** Agriculture 56%, Forest 22%, Urban 4%, Other 18%.
- **Fossil fuel reserves:** Large coal and gas deposits.
- **Mountain regions:** High mountain ranges such as the Himalayas separate China from many other countries.

HUMAN GEOGRAPHY

- **Population:** 1,416,000,000. (145 people per km² - high density)
- **Country type:** Developing
- **Electricity use:** 6.2 MWh per person, per year. (EU mean: 6.1 MWh)



China must **phase out coal-fired power stations** to meet **emissions targets**. The scale of this task is **enormous**.

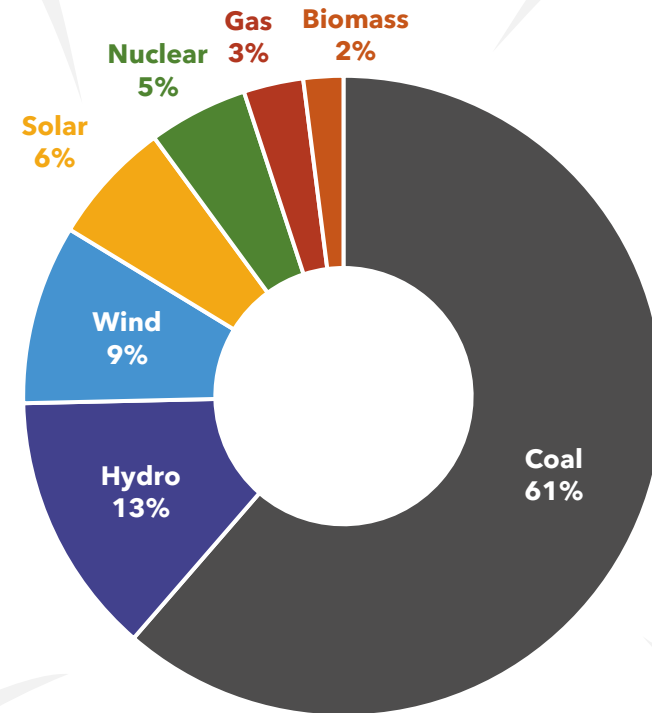
59 POWER 44 IMPACT 37 COST



SEE CHINA'S
GRID IN MEGAWATT



CHINA'S ELECTRICITY MIX



RATIONALE

- China is the largest **COAL** producer in the world. Coal is a reliable energy resource for powering China's enormous manufacturing industry.
- China has invested heavily in **HYDRO** by using huge rivers that flow hundreds of miles from the mountains to the China Sea.
- China has windy coastal areas and high plains. **WIND** power is set to grow much bigger in China.
- **NUCLEAR** power is set to double every ten years for several decades.

COUNTRY FACTSHEET: United Kingdom



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 243,000 square kilometers.
- **Climate:** The UK has high rainfall in the north and west. Coastal and hilly regions are often very windy. Sunshine is variable.
- **Land use:** Agriculture 71%, Forest 13%, Urban 7%, Other 9%.
- **Fossil fuel reserves:** Coal, and some oil and gas.
- **Mountain regions:** Scotland, Wales, the Pennines in the north of England.

HUMAN GEOGRAPHY

- **Population:** 68,000,000 (280 people per km² - very high density)
- **Country type:** Developed
- **Electricity use:** 4.8 MWh per person, per year. (EU mean: 6.1 MWh)



The UK could be short of electricity during **calm weather** in the **winter months when demand for electricity is highest**. Natural gas will need to be **phased out to meet emission targets**.

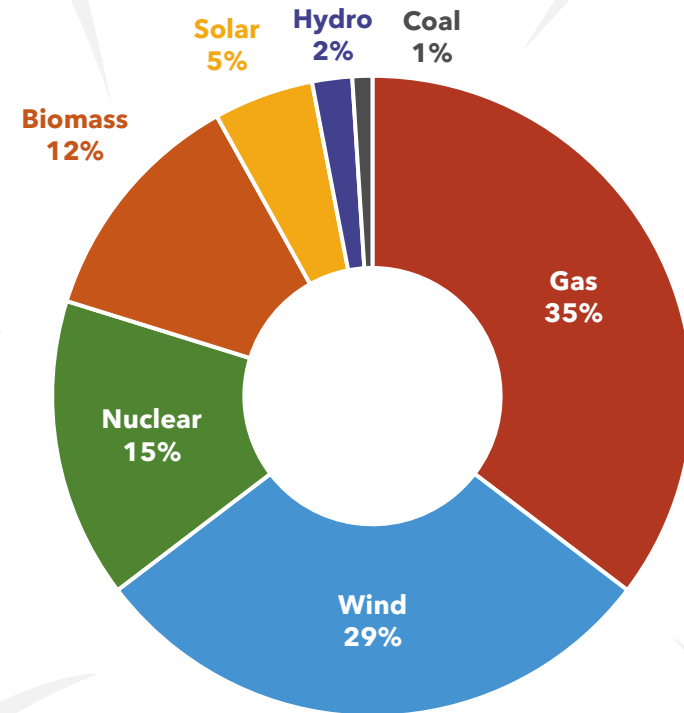
43 POWER 23 IMPACT 25 COST



SEE THE UK'S
GRID IN MEGAWATT



UNITED KINGDOM'S ELECTRICITY MIX



RATIONALE

- **COAL** has been rapidly phased out of the UK's energy mix. In 2012, it generated 40% of the UK's electricity.
- Some old **COAL** fired power stations have been converted to burn biomass pellets, increasing **BIOMASS** electricity to 12%.
- **NUCLEAR** power has dropped from about 28% in 1998 to 15% as old power stations are shut down. Four of the five remaining nuclear power stations are set to close by 2028.
- The UK is windy and so has invested in onshore and offshore **WIND** energy. Offshore wind is planned to generate about 40% of UK electricity.

COUNTRY FACTFILE: United States



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 9,150,000 square kilometers. About 38 times the area of the UK.
- **Climate:** The US stretches from 25° from the Equator to beyond the Arctic Circle. Climate varies from hot desert to arctic, with virtually everything in between.
- **Land use:** Agriculture 44%, Forest 33%, Urban 3%, Other 19%.
- **Fossil fuel reserves:** Large reserves of coal, oil and gas.
- **Mountain regions:** The Rocky Mountains stretch over 1,200 miles from the Canadian border in the north to New Mexico in the south.

HUMAN GEOGRAPHY

- **Population:** 340,000,000 (36 people per km² - low density)
- **Country type:** Developed
- **Electricity use:** 11.5 MWh per person per year.



Aging infrastructure and increasing **weather extremes** can lead to damage to electricity transmission, **potentially causing disruptions and blackouts** that impact energy security.

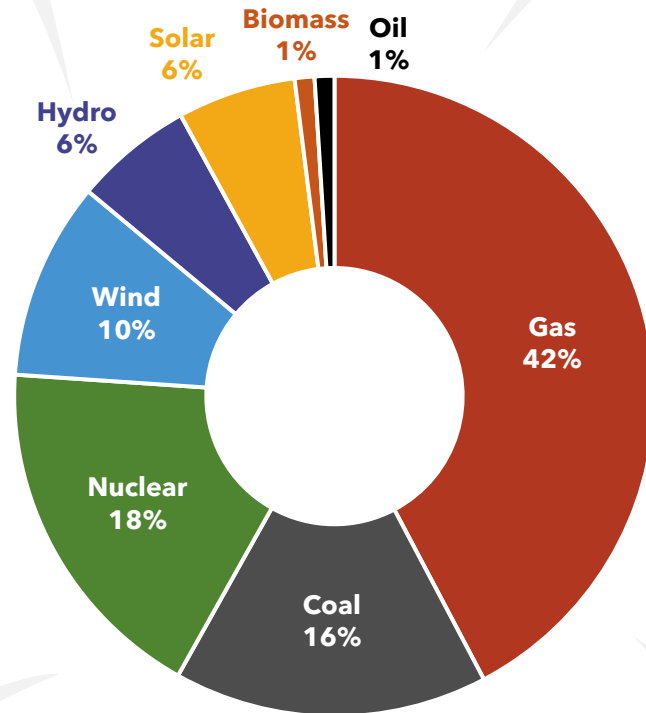
45 POWER 28 IMPACT 31 COST



**SEE THE U.S.
GRID IN MEGAWATT**



UNITED STATES' ELECTRICITY MIX



RATIONALE

- Fossil fuels are plentiful in the United States leading to a large proportion (58%) of electricity generated from **GAS** and **COAL**.
- **NUCLEAR** power development mostly halted after the Three Mile Island accident of 1980. The accident led to public pressure to halt development.
- Electricity generation from **SOLAR** and **WIND** is now growing quickly. The United States was slow to move to renewable energy resources because of a strong influence from fossil fuel producers on government policy.

COUNTRY FACTFILE: Canada



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 9,090,000 square kilometers. About 38 times the area of the UK.
- **Climate:** Mostly long, cold winters and short, hot summers. The far north endures a polar climate.
- **Land use:** Agriculture 7%, Forest 34%, Urban 1%, Barren 19%, Other 39%.
- **Fossil fuel reserves:** Abundant reserves of oil and natural gas.
- **Mountain regions:** Canada is a mountainous country. The Canadian Rockies dominate the west. The Appalachians rise in the east, and the Arctic Cordillera stretches across the north.

HUMAN GEOGRAPHY

- **Population:** 38,000,000 (4 people per km² - very low density)
- **Country type:** Developed
- **Electricity use:** 15.1 MWh per person per year (one of the highest in the world)



The **vast size** of Canada presents challenges in **maintaining a secure electricity grid**, especially for integrating **renewable energy sources built in remote regions**.

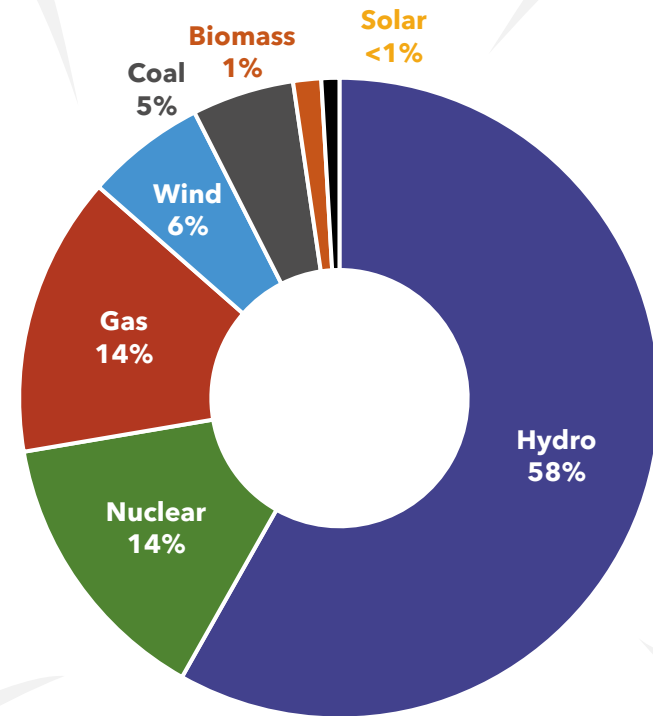
35 POWER 13 IMPACT 24 COST



SEE CANADA'S
GRID IN MEGAWATT



CANADA'S ELECTRICITY MIX



RATIONALE

- Abundant fossil fuel resources and vast mountain ranges have significantly influenced the energy mix in Canada.
- Vast geography creates regional variations in energy sources. **HYDRO** dominates in Quebec and Manitoba, **COAL** and **GAS** are more prominent in Alberta and Saskatchewan, while **NUCLEAR** is focused in the Ontario province.
- **SOLAR** potential in Canada is limited due to its climate and latitude, but **WIND** power is steadily growing.

COUNTRY FACTFILE: Mexico



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 1,950,000 square kilometers. About 8 times the area of the UK.
- **Climate:** South is hot and tropical due to proximity to the Equator. Temperate central plateau with cool nights. Arid or semi-arid north.
- **Land use:** Agriculture 55%, Forest 34%, Urban 1%, Other 10%.
- **Fossil fuels:** Significant oil and natural gas reserves.
- **Mountains:** Mexico is a mountainous country, with the Sierra Madre Occidental in the west, the Sierra Madre Oriental in the east, and the Trans-Mexican Volcanic Belt crossing the central plateau.

HUMAN GEOGRAPHY

- **Population:** 132,000,000 (66 people per km² - medium density)
- **Country type:** Developing
- **Electricity use:** Moderate (5.2 MWh per person per year)



Reliance on gas for a large portion of electricity generation could leave Mexico **vulnerable to price fluctuations and supply disruptions**.

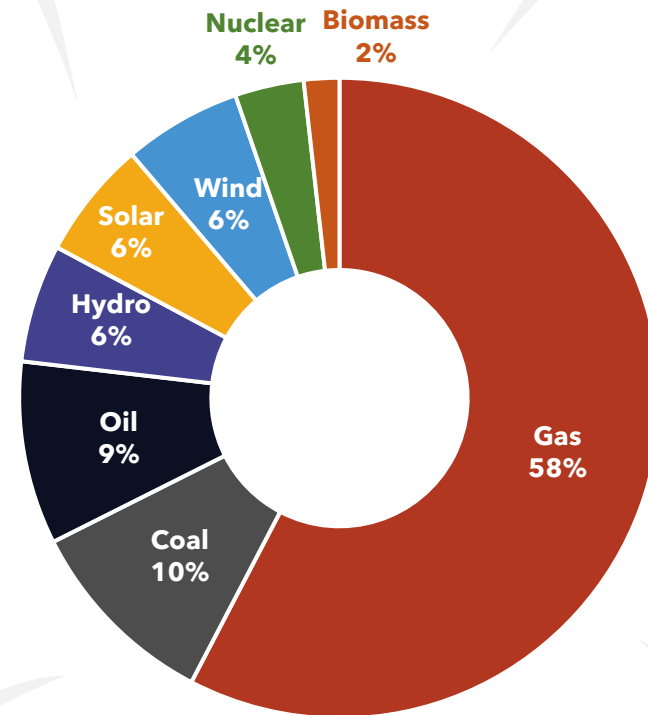
42 POWER 34 IMPACT 25 COST



SEE MEXICO'S
GRID IN MEGAWATT



MEXICO'S ELECTRICITY MIX



RATIONALE

- Large **OIL** and **GAS** reserves make fossil fuels a dominant energy source.
- **HYDRO** remains a largely untapped potential for clean energy in Mexico, with lots of mountains and extensive river systems.
- There is a growing emphasis on renewable energy sources like **WIND** and **SOLAR** to meet rising electricity demand and reduce reliance on fossil fuels.

COUNTRY FACTFILE: Germany



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 357,000 square kilometres. About 1.5 times the area of the UK.
- **Climate:** Temperate, with cool winters and warm summers. Humid winds from the North Atlantic bring rainfall year-round.
- **Land use:** Agriculture 48%, Forest 33%, Urban 8%, Other 11%.
- **Fossil fuel reserves:** Modest coal reserves, little oil and gas.
- **Mountain regions:** Low mountains in the centre (Harz, Rothaargebirge), higher ranges in the south (Alps, Black Forest).

HUMAN GEOGRAPHY

- **Population:** 83,000,000 (233 people per km² - very high density)
- **Country type:** Developed
- **Electricity use:** 7.0 MWh per person, per year (EU mean: 6.1 MWh)



Germany's **reliance on wind and solar** makes its **vulnerable to the weather**. During periods of low wind and sunlight, the country may need **to import more electricity or rely on fossil fuels**, increasing costs and emissions.

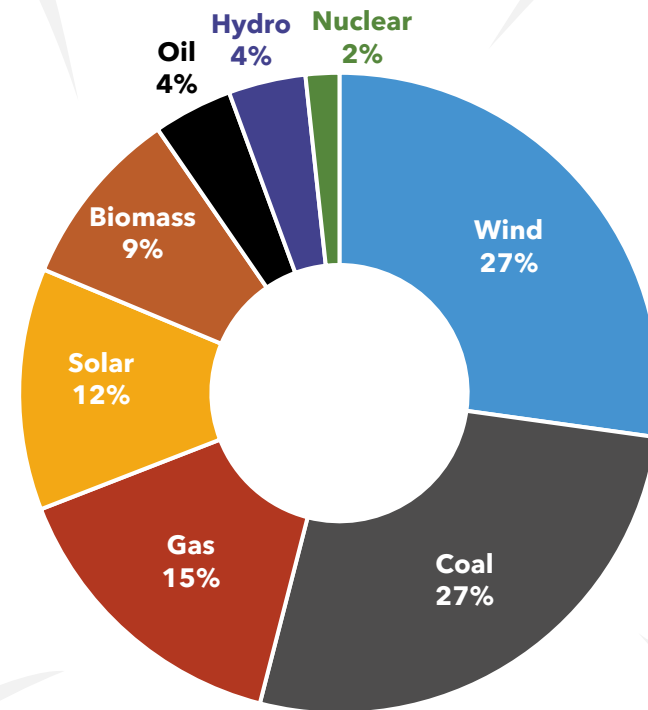
49 POWER 34 IMPACT 27 COST



SEE GERMANY'S
GRID IN MEGAWATT



GERMANY'S ELECTRICITY MIX



RATIONALE

- Germany began phasing out **NUCLEAR** after the 2011 Fukushima disaster in Japan, with the last plants closing in 2023.
- **COAL** still plays a significant role in Germany's electricity mix, despite attempts to reduce its use as part of the "Energiewende" (energy transition) policy to combat climate change.
- Germany has invested heavily in **WIND** and **SOLAR**, which now account for a substantial portion of electricity generation.

COUNTRY FACTFILE: Brazil



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 8,516,000 square kilometres. About 35 times the area of the UK.
- **Climate:** Mostly tropical and subtropical with temperate zones in the south. The Amazon basin is hot and humid.
- **Land use:** Forest 59%, Agriculture 31%, Urban 1%, Other 9%.
- **Fossil fuel reserves:** Large offshore oil reserves, some gas reserves.
- **Mountain regions:** Andes mountains on the western border, with highlands in the east.

HUMAN GEOGRAPHY

- **Population:** 212,000,000 (25 people per km² - low density)
- **Country type:** Developing
- **Electricity use:** 2.7 MWh per person, per year (EU mean: 6.1 MWh)



Brazil's **high dependence on hydro** makes its **vulnerable to droughts**. Extended dry periods could force the country to rely more on **fossil fuels or face electricity shortages**.

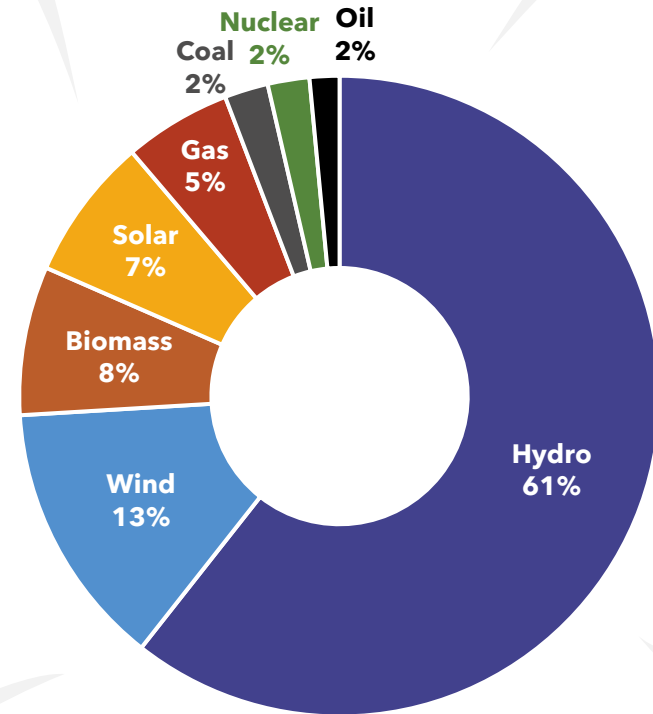
40 POWER 17 IMPACT 24 COST



SEE BRAZIL'S
GRID IN MEGAWATT



BRAZIL'S ELECTRICITY MIX



RATIONALE

- Brazil's electricity mix is dominated by **HYDRO** power, thanks to its extensive river systems and favourable geography.
- **BIOMASS** in Brazil comes mainly from sugarcane, playing a significant role in generating electricity as well as in transport.
- Brazil has been increasing its investment in **WIND** energy, especially in the northeast region where wind speeds are high.
- Despite having significant fossil fuel reserves, Brazil's use of **OIL** and **GAS** is relatively limited compared to other large countries.

COUNTRY FACTFILE: Japan



AN OVERVIEW

PHYSICAL GEOGRAPHY

- **Area:** 378,000 square kilometres. About 1.5 times the area of the UK.
- **Climate:** Varied between continental and maritime influences. Hot, humid summers and cold winters.
- **Land use:** Forest 68%, Agriculture 12%, Urban 4%, Other 16%.
- **Fossil fuel reserves:** Very limited oil, coal and gas reserves.
- **Mountain regions:** Mountainous islands with volcanic peaks like Mount Fuji.

HUMAN GEOGRAPHY

- **Population:** 126,000,000 (334 people per km² - extremely high density)
- **Country type:** Developed
- **Electricity use:** 8.0 MWh per person, per year (EU mean: 6.1 MWh)



Japan relies on **imported fossil fuels** which are **vulnerable to price changes** and supply disruptions. Natural disasters, like **earthquakes or tsunamis**, pose risks to all types of power plants, **particularly nuclear facilities**.

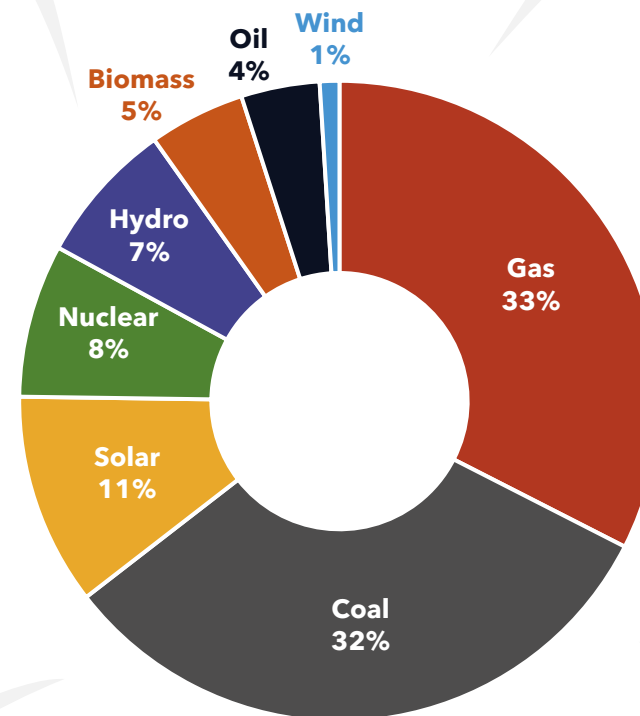
48 POWER 34 IMPACT 29 COST



SEE JAPAN'S
GRID IN MEGAWATT



JAPAN'S ELECTRICITY MIX



RATIONALE

- The 2011 Fukushima disaster led Japan to temporarily shut down all its **NUCLEAR** plants. While some have since reopened, **NUCLEAR**'s share of electricity remains much lower than its peak of 29% in 2009.
- Japan has limited fossil fuel resources, making it very reliant on imported **COAL**, **OIL**, and **GAS** for energy security.
- Despite its high population density and extensive forests, Japan has been investing in renewable energy like **SOLAR** and offshore **WIND** to diversify its energy mix and reduce carbon emissions.