# JAPAN

Climate Transparency

CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION TOWARDS NET ZERO 2021

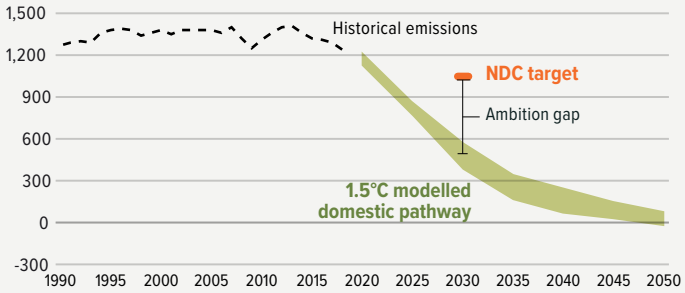
## NOT ON TRACK FOR A 1.5°C WORLD

1.5°C

Japan's NDC target is to reduce emissions 17% below 2010 levels, or to approximately 1,079 $MtCO_2e$, by 2030. To keep below the 1.5˚C temperature limit, Japan's 2030 emissions would need to be around 491 $MtCO_2e$ (or 62% below 2010 levels), leaving an ambition gap of 588 $MtCO_2e$. All figures exclude land use emissions.

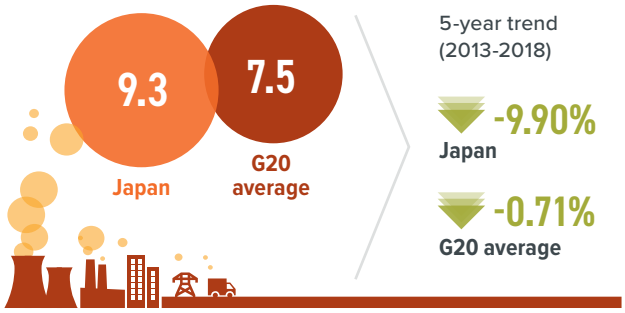
*Gütschow et al., 2021; Climate Analytics, 2021*

1.5°C compatible emissions pathway ($MtCO_2e$/year)[1]




## PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

GHG emissions (incl. land use) per capita ($tCO_2e$/capita)[2] in 2018




Japan's per capita emissions are 1.24 times the G20 average. Total per capita emissions have decreased by 9.9% between 2013 and 2018.

*Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2019*

## KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION

Japan has proposed a new 2030 emissions reduction target of 46% below 2013 levels, with continuous strenuous efforts to meet a goal of a 50% reduction. While this is a significant step, **a 1.5°C compatible pathway would necessitate a reduction of over 60% below 2013 levels.**

**Promotion of renewable energy capabilities, in particular offshore wind is essential**, to facilitate the production of green hydrogen and ammonia.

**Decarbonising transport requires a rapid transition from fossil fuel** to electric vehicles (EVs) powered by renewable energy and the use of hydrogen for heavy-duty transport.

*Climate Action Tracker, 2021a; METI, 2020b; MFA, 2021*

## RECENT DEVELOPMENTS

- **In October 2020 Japan announced a 2050 carbon neutrality goal** and, in April 2021, a new 2030 target of 46% below 2013 levels. Draft Strategic Energy and National Climate Action plans, which provide a framework for achieving these goals, followed**.**
- Despite announcing the retirement of inefficient domestic coal plants and making overseas funding conditional on decarbonisation strategies of the host countries, t**he government still promotes "abated" fossil fuels** and sees coal and LNG playing significant roles in the post-2030 power mix.
- In early 2021, the Bank of Japan **launched a new scheme to support projects addressing climate change**, which includes the provision of no-interest loans to financial institutions undertaking climate-related disclosure initiatives.

*Kumagai, 2021; Nicholas, 2021; The Government of Japan, 2020b; Bank of Japan, 2021a*

## CORONAVIRUS RESPONSE AND RECOVERY

In Japan, self-restraint measures taken in response to COVID-19 led to a reduction in overall $CO_2$ emissions during the first half of 2020. While reduced car traffic resulted in lower emissions from the transportation sector, household emissions (from e.g., gas consumption) increased. In its most recent stimulus package, the Japanese government established a Green Innovation Fund (JPY 2tn or USD 18bn) to support companies engaged in research, development, demonstration and implementation of decarbonisation technologies, with the goal of achieving the 2050 carbon neutrality target.

*IEA, 2021b; Long et al., 2021; Osumi, 2020; Sugawara et al., 2021; The Government of Japan, 2020b*

## CONTENTS

We unpack Japan's progress and highlight key opportunities to enhance climate action across:

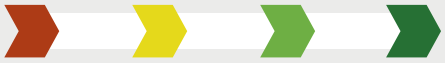


## LEGEND

**Trends** show developments over the past five years for which data are available. The colour-coded arrows indicate assessment from a climate protection perspective: Orange is bad, green is good.

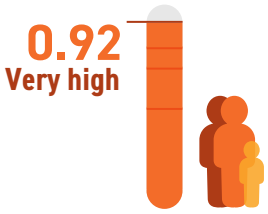
**Decarbonisation Ratings**[3] assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.


**Policy Ratings**[4] evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.




# SOCIO-ECONOMIC CONTEXT

## Human Development Index (HDI)

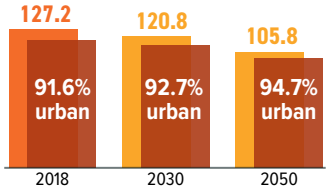



The HDI reflects life expectancy, level of education, and per capita income. Japan ranks very high.

*Data for 2019. UNDP, 2020*

## Population and urbanisation projections

(in millions)

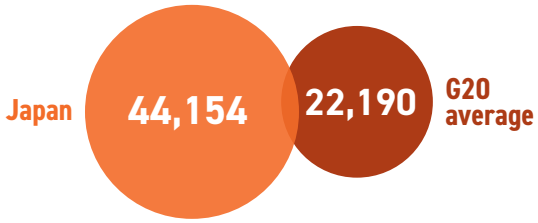



Japan's population is projected to decrease by 17% from 2018 levels by 2050, but still become more urbanised.

*United Nations, 2019; United Nations, 2018*

## Gross Domestic Product (GDP) per capita

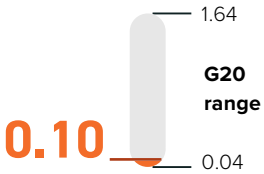
(PPP constant 2015 international $) in 2019




*World Bank, 2021; United Nations, 2019*

## Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised in 2019




42,600 people die in Japan every year as a result of outdoor air pollution due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this is still one of the lower levels in the G20.

*Institute for Health Metrics and Evaluation, 2020*

*This source differs from the source used in last year's profiles and, therefore, the data are not comparable.*

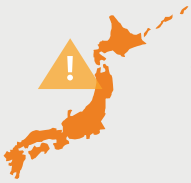
## A JUST TRANSITION

In its Long-Term Strategy (LTS), the Japanese government stated that vocational training would be provided, and other measures implemented to ensure a just transition to a decarbonised society. The details, however, remain vague. The recently-released draft outline of the new LTS is expected to regard just transition as one of six key pillars of transition toward carbon neutrality, and provide more detailed policy direction. Japan's policies should take into account that 1) the location of existing fossil fuel plants and those with the greatest renewable energy potential differ, and 2) due to urbanisation, the working age population in rural areas has declined, particularly in those areas with a large potential for renewable energy development. More importantly, Japan would need to set dates to reduce fossil fuel consumption, such as phasing-out all the country's coal-fired power plants by 2030, which provide policy predictability and, in turn, encourage smooth job transition.

*Environmental NGOs, 2021; Kumagai, 2021; Kuriyama, 2019; Nicholas, 2021; Quitzow et al., 2021; The Government of Japan, 2019b*

# ADAPTATION | ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE

**PARIS AGREEMENT** **Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.**



Japan is increasingly exposed to **heavy rain and snowfall, typhoons, and extreme heat,** resulting in the emergence of multiple risks from health hazards such as infectious diseases.

Climate change **undermines the quality and quantity of agriculture, fisheries, and forestry** in conjunction with damage to the ecosystem.

**Extreme weather increases the vulnerability of infrastructure,** including disruption of transportation networks, power generation and water sanitation systems, which also has a negative impact on the economy of Japan.

## ADAPTATION NEEDS

### Climate Risk Index

Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities

**139 Deaths** **0.11 PER 100,000 INHABITANTS**

**RANKING: 10th in the G20**

High — **Death rate** — Low

*Based on Germanwatch, 2019*

Annual average losses (US$ millions PPP)

**4,018** **0.09 PER UNIT GDP (%)**

**RANKING: 11th in the G20**

High — **Losses** — Low

*Based on Germanwatch, 2019*

### Exposure to future impacts at 1.5°C, 2°C and 3°C

Impact ranking scale: Very low | Low | Medium | High | Very high

| | | | 1.5°C | 2°C | 3°C |
|---|---|---|---|---|---|
| WATER | | % of area with increase in water scarcity | | | |
| | | % of time in drought conditions | | | |
| HEAT AND HEALTH | | Heatwave frequency | | | |
| | | Days above 35°C | | | |
| AGRICULTURE | Rice | Reduction in crop duration | | | |
| | | Reduction in rainfall | | | |

*Water, Heat and Health: own research; Agriculture: Arnell et al., 2019*

*Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.*

### CORONAVIRUS RESPONSE AND RECOVERY

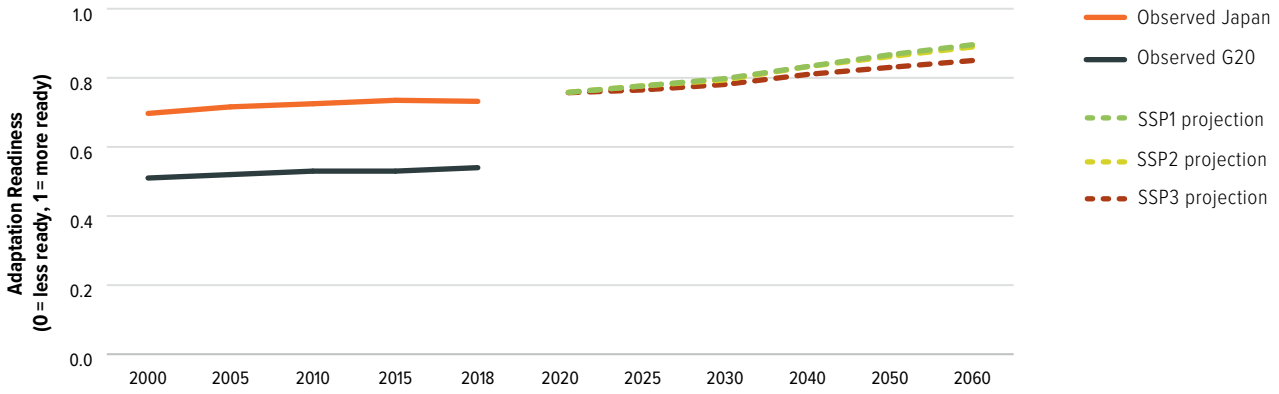
Prior to the Coronavirus pandemic, the Japanese government had recognised the urgency of implementing strong climate change adaptation policies and measures. A National Adaptation Plan was released in 2015, and the Climate Change Adaptation Act was passed in 2018. The 2019 Annual Report on the Environment included a chapter dedicated to adaptation, and the 2020 report listed “disaster-resilient city planning” as key to realising decarbonisation and the Sustainable Development Goals. However, the government’s recent pandemic responses, including the Green Growth Strategy, have focused on supply chain resiliency rather than overall adaptation.

*The Government of Japan, 2015, 2019a, 2020a, 2020b*

## Adaptation Readiness

The figure shows 2000-2018 observed data from the Notre Dame Global Adaptation Initiative (ND-GAIN) Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2020 to 2060.

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index




**Japan exhibits a high average readiness and is well above the G20 average trend from 2000 to 2018.** As Japan's governance structures and adaptation readiness are very advanced, it makes little difference whether it follows an SSP1 or SSP2 compatible projection. Other choices in relation to socio-economic development, as represented by SSP3, represent a slightly slower rate of adaptation readiness improvement.

The readiness component of the Index created by the ND-GAIN encompasses social (social inequality, information and communications technology infrastructure, education and innovation), economic, and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of projections of future governance and, therefore, of possible adaptation readiness. The three scenarios shown here in dotted lines are described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2), and a 'Regional Rivalry' (SSP3) scenario.

*Based on Andrijevic et al., 2020; ND-Gain Index, 2021*

# ADAPTATION POLICIES

## National Adaptation Strategies

| Document name | Publication year | Fields of action (sectors) | | | | | | | | | | | | Monitoring & evaluation process |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agriculture | Biodiversity | Coastal areas and fishing | Education and research | Energy and industry | Finance and insurance | Forestry | Health | Infrastructure | Tourism | Transport | Urbanism | Water | |
| National Plan for Adaptation to the Impacts of Climate Change | 2015 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | The Climate Change Adaptation Act, passed in 2018, prescribes that the government shall amend the Plan once every five years. |

## Nationally Determined Contribution (NDC): Adaptation

**TARGETS**

Not mentioned

**ACTIONS**

Not mentioned

# MITIGATION | REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE

**PARIS AGREEMENT** **Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.**

## EMISSIONS OVERVIEW

Japan's GHG emissions, excluding LULUCF, have dropped by only 2.4% (1990-2018), and the government's newly-announced climate targets for 2030 (46% below 2013 levels) and 2050 (carbon neutrality) are **not in line with a 1.5°C pathway.**

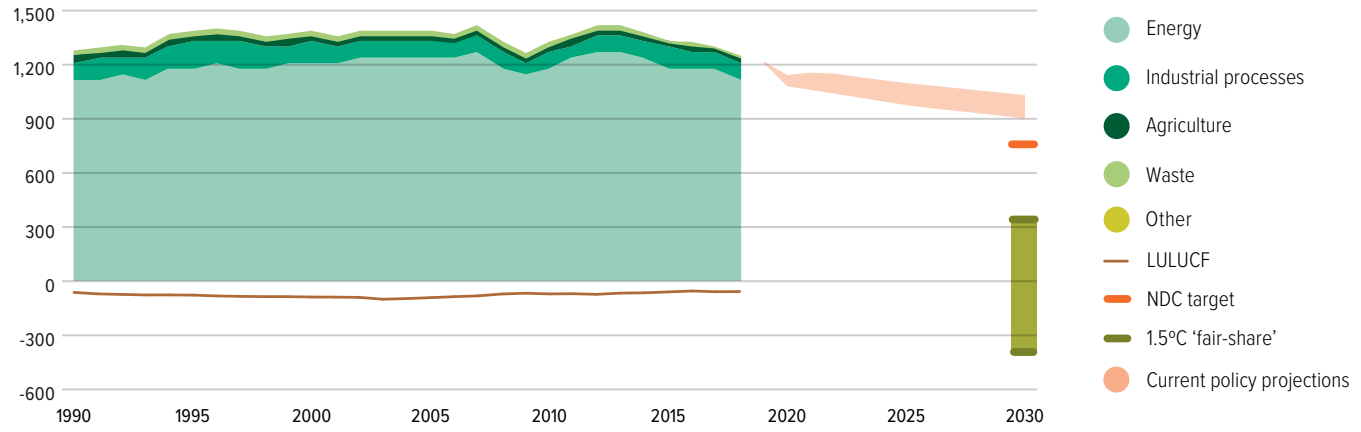
1.5°C COMPATIBILITY

**In 2030, global $CO_2$ emissions need to be 45% below 2010 levels and reach net zero by 2050.** Global energy-related $CO_2$ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

*Rogelj et al., 2018*

## GHG emissions across sectors and CAT 1.5°C 'fair-share' range ($MtCO_2e$/year)[5]

Total GHG emissions across sectors ($MtCO_2e$/year)



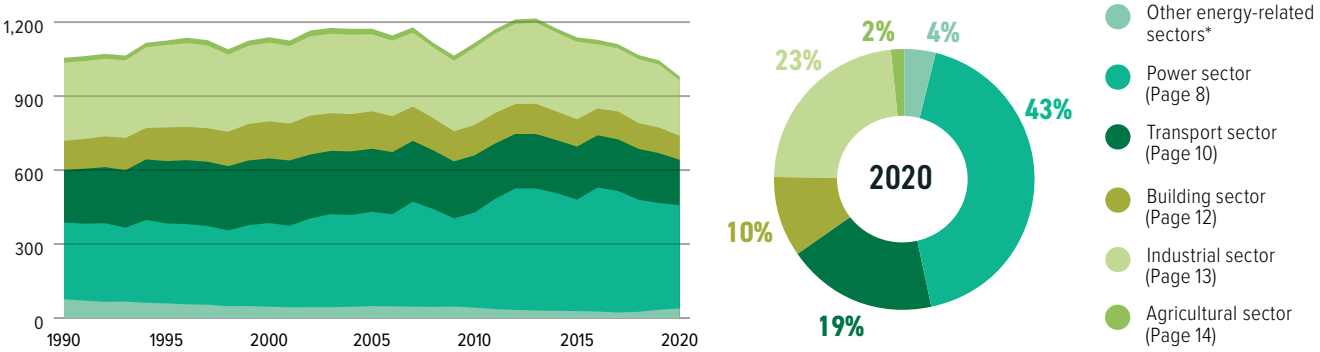

Japan's emissions (excl. land use) decreased by 2.4% between 1990 and 2018 to 1,240 $MtCO_2e$. In those years, emissions from the energy sector have consistently accounted for around 87% of the total. Most sectors have seen emissions fall since total emissions peaked in 2013.

Japan's 2030 target is not 1.5°C 'fair-share' compatible. To be 1.5°C 'fair-share' compatible, Japan would need to strengthen its domestic emissions target and increase its international financial support.

*Gütschow et al., 2021; Climate Action Tracker, 2020a, 2021*

## Energy-related $CO_2$ emissions by sector

Annual $CO_2$ emissions from fuel combustion ($MtCO_2$/year)




**In Japan, the largest driver of overall GHG emissions are $CO_2$ emissions from fuel combustion.** These emissions have been decreasing since 2013. Emissions from the power sector are, with a 43% share, the largest contributor, followed by those from industry and transport with 23% and 19%, respectively.

*Enerdata, 2021*

*Due to rounding, some graphs may sum to slightly above or below 100%*

**'Other energy-related sectors' covers energy-related $CO_2$ emissions from extracting and processing fossil fuels.*

# ENERGY OVERVIEW

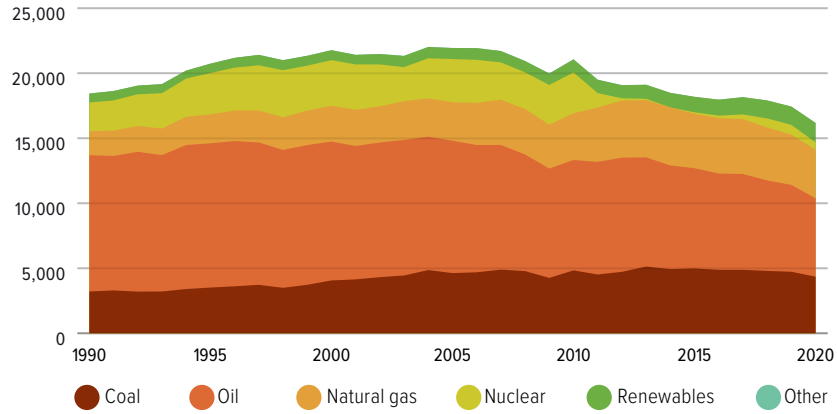

**Fossil fuels make up 87% of Japan's energy mix,** a share which remains greater than it was before 2011. The carbon intensity of energy supply observed over the past decade has been around 15% greater than that observed in the decade prior. Renewable energy supply, however, particularly solar and biomass, is increasing.

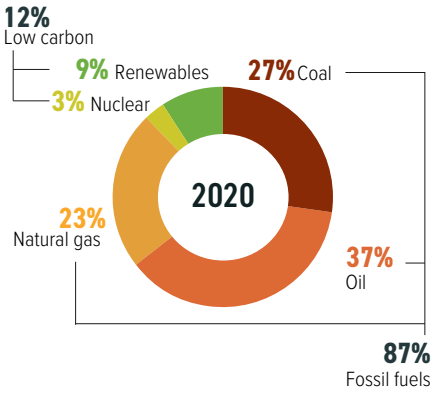

The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050, and to substantially lower levels without carbon capture and storage (CCS).

*Rogelj et al., 2018*

## Energy mix

Total primary energy supply (TPES) (PJ)



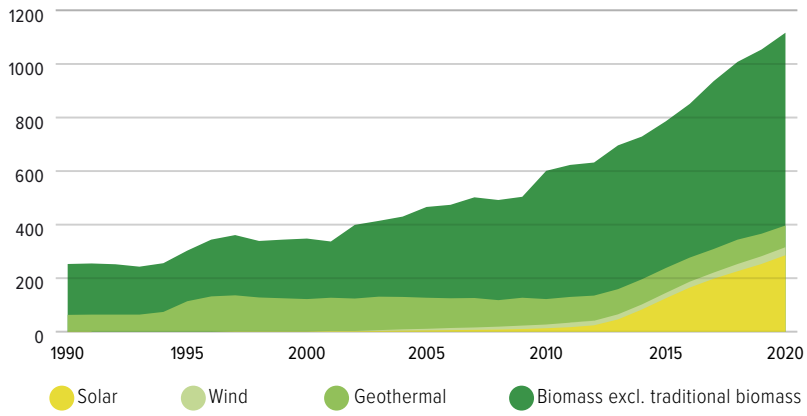



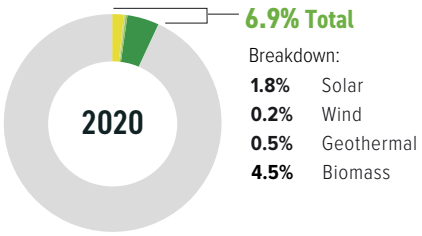

This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal and gas) make up 87% of the Japan energy mix, which is slightly above the G20 average of 81%. However, since 2017, annual energy supplied from coal, oil, and gas has fallen consistently (at an average of -3%, -5%, and -3% per annum, respectively) while that from renewables has increased at an average of 5% per annum.

*Enerdata, 2021* *Due to rounding, some graphs may sum to slightly above or below 100%*

## Solar, wind, geothermal, and biomass development

TPES from solar, wind, geothermal and biomass (PJ)



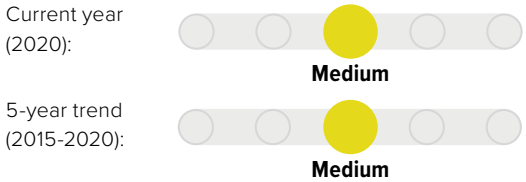




Solar, wind, geothermal and biomass account for 7% of Japan's energy supply – the G20 average is 7.1%. The share in total energy supply has increased by around 59% in the last five years (2015-2020). Bioenergy (for electricity and heat) makes up the largest share. However, solar has seen the largest increase in recent years, with average year-on-year growth of 39% between 2012 and 2020.

*Enerdata, 2021* *Due to rounding, some graphs may sum to slightly above or below 100%*

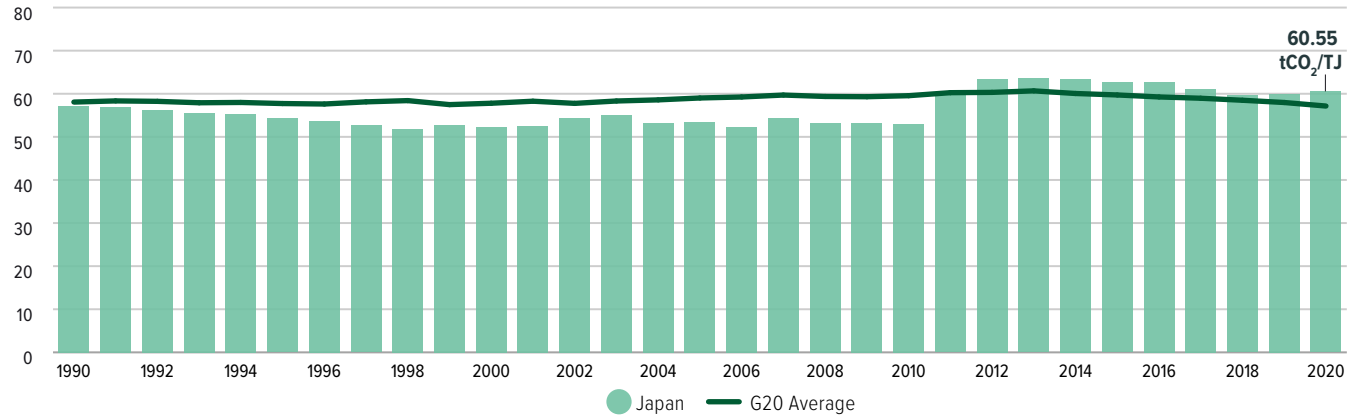
*Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.*

Decarbonisation rating: renewable energy share of TPES compared to other G20 countries



## Carbon intensity of the energy sector

Tonnes of $CO_2$ per unit of TPES ($tCO_2/TJ$)




Carbon intensity is a measure of how much $CO_2$ is emitted per unit of energy supply.

Due to structural changes in Japan's energy mix following the 2011 Fukushima nuclear accident, carbon intensity in the last decade has been around 15% greater than what was observed the decade prior. While increases in the share of renewables in the energy mix may have helped to reduce carbon intensity in the last five years, the use of natural gas is likely a larger driver of changes in this metric. Japan's carbon intensity is greater than the G20 average and is declining at a slower rate.

*Enerdata, 2021*

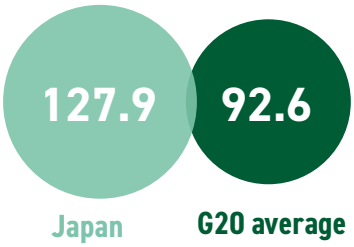
Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries

Current year (2020): **Medium**

5-year trend (2015-2020): **Medium**

## Energy supply per capita

TPES per capita (GJ/capita) in 2020




Energy intensity of the economy: 5-year trend (2015-2020)

**-8.26%**
**Japan**

**-0.12%**
**G20 average**

Decarbonisation rating: energy supply per capita compared to other G20 countries

Current year (2020): **Medium**

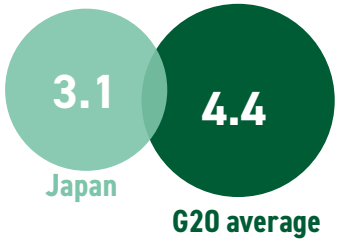
5-year trend (2015-2020): **High**

The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy. Energy use per capita in Japan is, with 127.88 GJ/capita in 2020, well above the G20 average, but is decreasing faster at -8.3% between 2015 and 2020 in contrast to the decreasing G20 average of -0.12% over the same period.

*Enerdata 2021, United Nations, 2019*

## Energy intensity of the economy

(TJ/million US$2015 GDP) in 2019




Energy intensity of the economy: 5-year trend (2014-2019)

**-9.26%**
**Japan**

**-10.56%**
**G20 average**

Decarbonisation rating: energy intensity compared to other G20 countries

Current year (2019): **High**

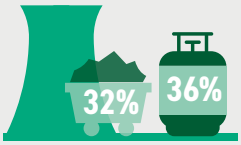
5-year trend (2014-2019): **Medium**

This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. Japan's energy intensity is lower than the G20 average and has been decreasing at a slightly lower rate of -9.26% (2014-2019) as compared to the G20.

*Enerdata, 2021; World Bank, 2021*

# POWER SECTOR

**Emissions from energy used to make electricity and heat**




In 2020, Japan produced 32% of its electricity from coal, and another 36% from natural gas. While the country is planning to phase out old, inefficient coal-fired power plants by 2030, it also plans to build at least 10 GW of new coal-fired generation capacity, equal to about 22% of existing capacity, in the coming years. There will still be 50 units with a total capacity of 33 GW in 2030.

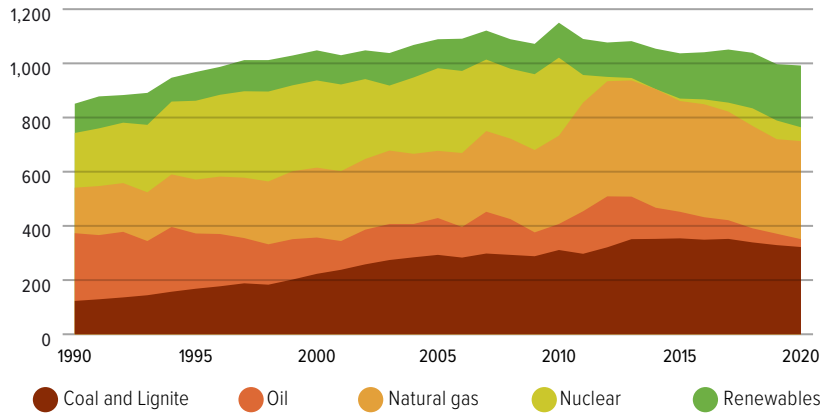

Share of energy-related $CO_2$ emissions from electricity and heat production in 2020.

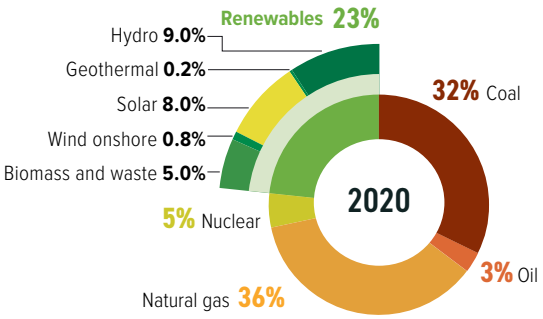

**Worldwide, coal use for power generation needs to peak by 2020,** and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

*Rogelj et al., 2018; Climate Action Tracker, 2020b*

## Electricity generation mix

Gross power generation (TWh)



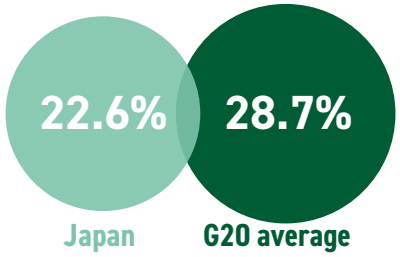




**Japan generated 72% of its electricity from fossil fuels in 2020**. The share of renewable energy (including biomass and hydro) in Japan's power sector has been increasing, particularly since 2013, and accounted for approximately 23% of the power mix in 2020. Note that an increase in the share from fossil fuels immediately followed the 2011 Fukushima accident. While the decrease in oil's share observed prior to the accident has recommenced, that of coal and natural gas are still above what they were before 2011.

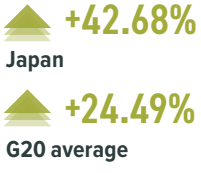
*Enerdata, 2021* *Due to rounding, some graphs may sum to slightly above or below 100%*

## Share of renewables in power generation

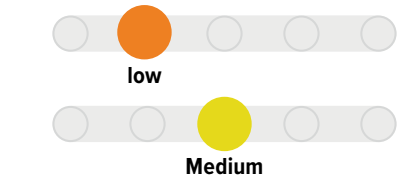
(incl. large hydro) in 2020




Share of renewables in power generation: 5-year trend (2015-2020)



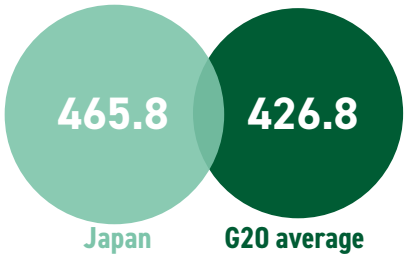

Decarbonisation rating: share of renewables compared to other G20 countries




*Enerdata, 2021*

## Emissions intensity of the power sector

($gCO_2$/kWh) in 2020




Emissions intensity of the power sector:
5-year trend (2015-2020)

-13.13%
Japan

-11.18%
G20 average

Decarbonisation rating: emissions intensity compared to other G20 countries

Current year (2020):


5-year trend (2015-2020):


For each kilowatt hour of electricity, 465.8 g of $CO_2$ are emitted in Japan. **Emissions intensity has decreased over the last five years** as the share of renewable energy in power has risen, that of oil has decreased, and some nuclear reactors have been brought back online. It should be noted, however, that prior to the decreasing trend observed over the last five years, emissions intensity increased by 31% between 2010 and 2013.

*Enerdata, 2021*

# POLICY ASSESSMENT

## Renewable energy in the power sector


Japan has identified offshore wind as a key area of focus under its Green Growth Strategy. As such, the government has set capacity targets for this electricity source of 10 GW by 2030 and up to 45 GW by 2040. The strategy also seeks to increase the use of home solar panels and battery storage. Moreover, a recently released draft Strategic Energy Plan forecasts a 2030 share of renewables in power generation of 36-38%, up from the 22-24% estimate given in the country's current NDC.

*Shimizu et al., 2021; The Government of Japan, 2020b*

## Coal phase-out in the power sector


In July of 2020, Japan announced it would phase out inefficient coal-fired power plants by 2030. Details are still forthcoming, but the announcement will likely not affect the 10 GW of coal-fired generation planned or currently under construction. It remains to be seen how this aligns with the government's recently-released draft energy plan that forecasts a 19% share of coal in the 2030 power mix (down from the 26% in Japan's current NDC).

*Climate Action Tracker, 2020; IEA, 2021a; Shimizu et al., 2021*

## CORONAVIRUS RESPONSE AND RECOVERY

The Japanese government's first two stimulus packages allocated some small amounts towards climate change mitigation-related activities, such as solar power generation equipment and storage batteries for domestic businesses. The third stimulus, announced in December 2020, had a much larger mitigation focus and allocated JPY 2tn towards a Green Innovation Fund, details of which are outlined in the government's Green Growth Strategy. The Fund opened for applications in April 2021.

*IEA, 2021b; IMF, 2021; The Government of Japan, 2020a, 2020b; Vivid Economics, 2021*

# TRANSPORT SECTOR

**Emissions from energy used to transport goods and people**

Transport emissions have steadily decreased since a 2001 peak. In 2018, passengers travelled twice as much by road than by rail, and 11 times more freight was shipped by road than rail. **Transport energy use is dominated by fossil fuels.** The EV share in new car sales, which has been decreasing since 2017, is only 0.6%.



**1%** Indirect emissions

**19%** Direct emissions

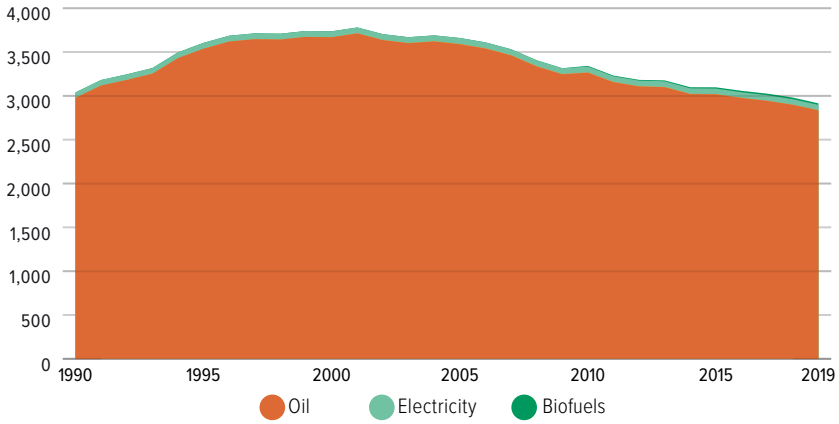
Share of transport in energy-related $CO_2$ emissions

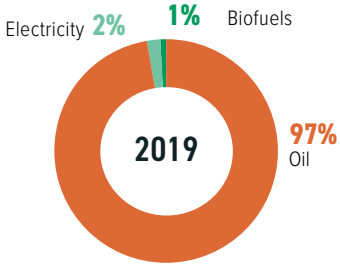

**The share of low-carbon fuels in the transport fuel mix globally must increase to between 40% and 60% by 2040 and 70% to 95% by 2050.**

*Rogelj et al., 2018; Climate Action Tracker, 2020b*

## Transport energy mix

Final energy consumption of transport by source (PJ/year)



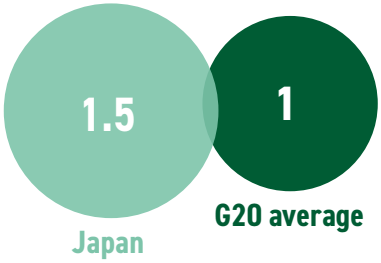




Electricity and biofuels make up only 3% of the energy mix in transport.

*Enerdata, 2021* *Due to rounding, some graphs may sum to slightly above or below 100%*

## Transport emissions per capita

excl. aviation ($tCO_2$/capita) in 2020

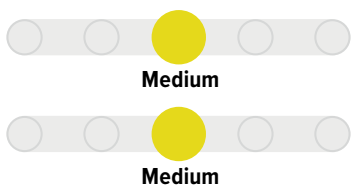



Transport emissions: 5-year trend (2015-2020)

**-11.5%** Japan

**-4.3%** G20 average

Decarbonisation rating: transport emissions compared to other G20 countries

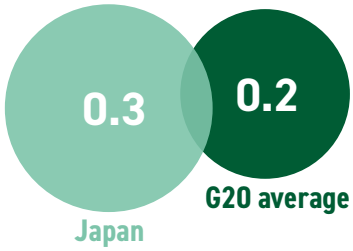



Reductions in transport emissions per capita in 2020, and concomitant changes in the 5-year trends and decarbonisation ratings, reflect widespread economic slowdowns and transport restrictions imposed in response to the COVID-19 pandemic. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2021, please see the Highlights Report at www.climate-transparency.org

*Enerdata, 2021; United Nations, 2019*

## Aviation emissions per capita[6]

($tCO_2$/capita) in 2018




Aviation emissions: 5-year trend (2013-2018)

+7.53%
Japan

+21.25%
G20 average

Decarbonisation rating: aviation emissions compared to other G20 countries

Current year (2018): Medium

5-year trend (2013-2018): High

*Enerdata, 2021; International Energy Agency, 2020; United Nations, 2019*

## Motorisation rate

**489 VEHICLES**
**per 1,000 inhabitants in 2019 in Japan***

Note that while the motorisation rate has increased only slightly since 2015, this has occurred while the country's overall population has decreased.

*Enerdata, 2021*

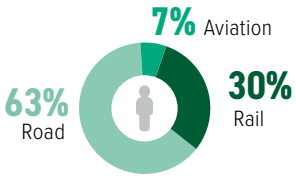
## Market share of electric vehicles in new car sales (%)

Share of EV sales in 2020 was 0.6%


*IEA, 2021*

## Passenger transport

(modal split in % of passenger-km) in 2018*




*Enerdata, 2021*

## Freight transport

(modal split in % of tonne-km) in 2018*


*Freight transport by air, pipelines and waterways are excluded due to lack of data.*

*Enerdata, 2021*

**Owing to the variety of sources and data years available, these data are not comparable across G20 countries.*

# POLICY ASSESSMENT

## Phase out fossil fuel cars

High

The Japanese government aims to have EVs (including non-plug-in hybrids) make up 100% of new car sales by 2035. This target, announced in December 2020, is backed up by an action plan, detailed in the government's Green Growth Strategy, to reduce the costs of automotive battery packs. Japan could achieve 1.5°C compatibility in this benchmark by excluding non-plug-in hybrids from their 2035 sales. However, the idea of a fully electric vehicle fleet is highly contentious in Japan, given the automotive industry's significance to Japan's economy.

*Dooley and Ueno, 2021; Kuramochi et al., 2017; Suga, 2021; The Government of Japan, 2020*

## Phase out fossil fuel heavy-duty vehicles

Medium

The Japanese government last updated its efficiency standards for heavy-duty vehicles in 2019. Currently, standards require manufacturers to improve fuel efficiency of trucks and buses by 13.4% and 14.3%, respectively, from 2015 levels by 2030. While the government is making efforts to decarbonise maritime shipping through the use of hydrogen fuel, it does not have a long-term strategy in place for the phase-out of fossil fuel heavy-duty road vehicles.

*METI, 2019; The Government of Japan, 2020*

## Modal shift in (ground) transport

Medium

The Green Growth Strategy includes an action plan for the promotion of a modal shift in logistics. This includes a shift from truck transportation to other means with "smaller specific $CO_2$ emissions" as well as efficiency improvements along the supply chain, such as improved traffic flow measurement. While the share of rail in transport has increased over the last decade, this has been largely due to passenger transport. Previous government efforts to increase freight transport by rail have had mixed results.

*IEA and UIC, 2017; Mizutani and Fukuda, 2020; The Government of Japan, 2020*

# BUILDING SECTOR

**Emissions from energy used to build, heat and cool buildings**

Direct emissions and indirect emissions from the building sector in Japan account for 9.14% and 23.92% of total energy-related $CO_2$ emissions, respectively. Direct emissions steadily decreased over the past two decades, while indirect emissions generally increased and have only begun to decline in the last five years. Currently, **per capita emissions from the building sector are almost twice the G20 average.**

**9%** Direct emissions

**24%** Indirect emissions

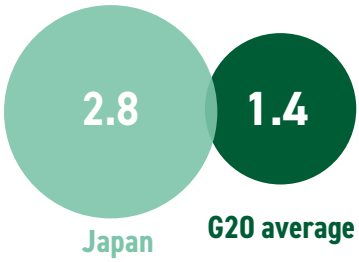
Share of buildings in energy-related $CO_2$ emissions. Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)


**By 2040, global emissions from buildings need to be reduced by 90% from 2015 levels,** and be 95-100% below 2015 levels by 2050, mostly through increased efficiency, reduced energy demand, and electrification in conjunction with complete decarbonisation of the power sector.

*Rogelj et al., 2018; Climate Action Tracker, 2020b*

## Building emissions per capita

(incl. indirect emissions) ($tCO_2$/capita) in 2020

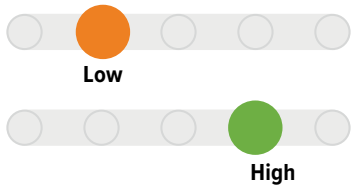



Building emissions: 5-year trend (2015-2020)

**-11.82%** Japan

**-2.91%** G20 average

Decarbonisation rating: building emissions compared to other G20 countries




Building-related emissions per capita are nearly twice that of the G20 average as of 2020. This reflects the high fossil fuel share in the country's electricity mix. However, compared to the G20 average, Japan has managed to decrease per capita building emissions faster, with an almost 12% reduction between 2015 and 2020 (about four times the G20 average).

*Enerdata, 2021; United Nations, 2019*

# POLICY ASSESSMENT

## Near zero energy new buildings


Zero energy buildings and houses feature as key efficiency strategies in Japan's recent Basic Energy Plans. The 2014 plan set a goal to reduce the average net primary energy consumption of newly constructed buildings and houses to zero by 2030, and thereby achieve average zero emissions in newly constructed houses by 2030. These goals were reiterated in the 2018 plan.

*Climate Action Tracker, 2020; METI, 2018*

## Renovation of existing buildings


Japan's Long-term Strategy includes, as part of its vision for carbon-neutral living, provisions for retrofitting existing buildings to increase energy efficiency. The Green Growth Strategy goes further and includes an "action plan" for retrofitting buildings. The retrofitting is part of the larger move towards zero energy buildings and houses and includes the installation of rooftop solar and battery systems, energy efficient renovation with high-performance heat insulating materials, and energy management using optimal control systems.

*The Government of Japan, 2019b, 2020b*

# INDUSTRY SECTOR

**Emissions from energy use in industry**

Direct emissions and indirect emissions from Japan's industry make up 23.0% and 15.2% of energy-related $CO_2$ emissions, respectively. In absolute terms, **direct emissions from industry have decreased by 29%** from the relatively stable historical average observed between 1990 and 2015, while indirect emissions have decreased only slightly, by 2.5%, from its historical average.



**23%**
Direct emissions

**15%**
Indirect emissions

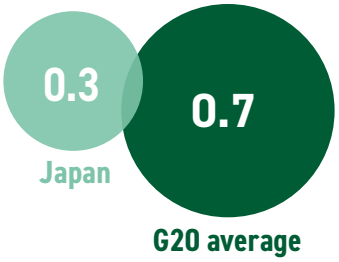
Share of industry in energy-related $CO_2$ emissions.


**Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.**

*Rogelj et al., 2018*

## Industry emissions intensity[7]

($tCO_2e$/USD2015 GVA) in 2017

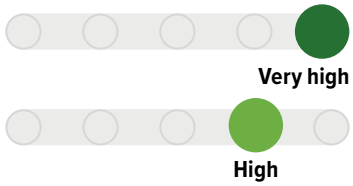



Industry emissions intensity: 5-year trend (2012-2017)

**-24.06%**
**Japan**

**-16.45%**
**G20 average**

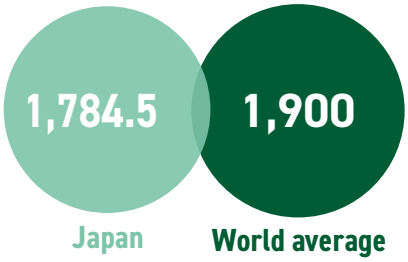
Decarbonisation rating: industry emissions intensity compared to other G20 countries




*Enerdata, 2021; World Bank, 2021*

## Carbon intensity of steel production[8]

($kgCO_2$/tonne product) in 2016

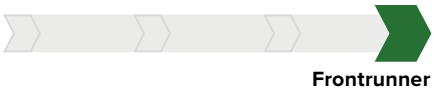



Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise.

*World Steel Association, 2018; Climate Action Tracker, 2020c*

# POLICY ASSESSMENT

## Energy efficiency




Japan first established its Act on the Rational Use of Energy in 1979 and has regularly revised this law since then, most recently in 2020. The law covers around 90% of the industrial sector, as well as buildings and transportation. Factories and workplaces covered under the law are required to submit regular reports to the Ministry of Economy, Trade and Industry and reduce energy consumption by 1%, on average, each annual reporting period.

Japan has focussed on improving energy efficiency rather than decarbonising energy supply.

*Grantham Research Institute on Climate Change and the Environment, 2021; IEA, 2021; Nagata, 2013; Kuriyama, A. et al., 2019*

# LAND USE SECTOR

**Emissions from changes in the use of the land**

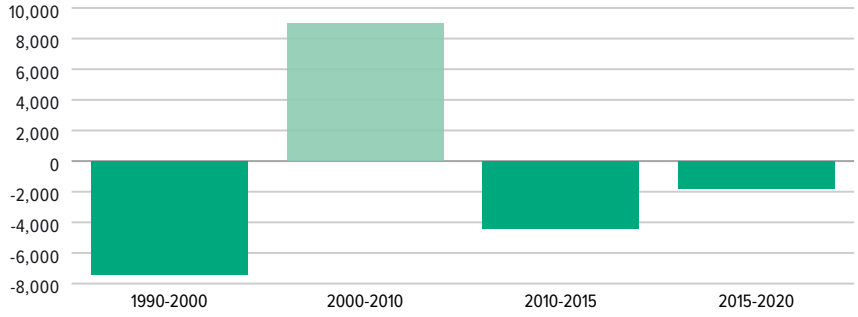

To stay within the 1.5°C limit, **Japan would need to ensure the land use and forest sector remains a net emissions sink.** Annual LULUCF removals have decreased steadily, at an average rate of about -3.5% per annum, since peaking at around -100 $MtCO_2$ in 2003. While Japan's NDC assumes 37 $MtCO_2$ annual removal from the LULUCF sector in 2030 (including 27.8 $MtCO_2$ from forest management), the draft new NDC assumes 48 $MtCO_2$ annual removal from the LULUCF sector in 2030.


**Global deforestation needs to be halted and changed to net $CO_2$ removals by around 2030.**

*Rogelj et al., 2018*

## Annual forest expansion, deforestation and net change

Net change in forest area (1,000 ha/yr)




*Global Forest Resources Assessment, 2020*

*Note: There is a change of source and methodology for measuring this indicator from last year's profiles, which means the two years may not be directly comparable.*

## POLICY ASSESSMENT

### Target for net zero deforestation


Japan, as part of its efforts towards the UN's strategic plan for forests, implemented a Basic Plan for Forest and Forestry in 2016. The plan calls for the country to maintain a forest area of 25 Mha (covering about 70% of the country) and increase forest stock. More recently, it has introduced a Forest Management Act and established a Forest Environment Tax. While Japan has made efforts to reverse loss of forest cover domestically, it remains one of the largest importers of logs from tropical rainforests, thus exacerbating the global issues of deforestation.

*Forestry Agency of Japan, 2019; Japan Forest Information Review, 2020; Sekiguchi and Ochi, 2021*

# AGRICULTURE SECTOR

**Emissions from agriculture**

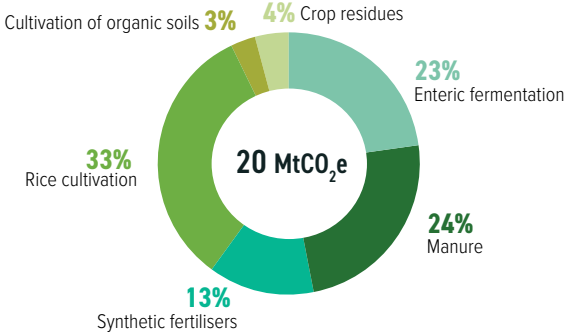
**Japan's agricultural emissions are mainly from rice cultivation, digestive processes of livestock (mainly cattle), and manure management.** A 1.5°C compatible pathway requires behavioural and dietary shifts and less fertiliser use.


**Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030** and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

*Rogelj et al., 2018*

## Emissions from agriculture (excluding energy)

Emissions from the agriculture sector in 2018




In Japan, the largest sources of GHG emissions in the agriculture sector are rice cultivation (33%), manure management (25%), and enteric fermentation (23%). While emissions from agriculture showed a decreasing trend of around -8% between 2010 and 2018, there has been little change to the sector's emissions breakdown during this time. Dietary changes and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector.

*FAO, 2021*

*Due to rounding, some graphs may sum to slightly above or below 100%*

# MITIGATION: TARGETS AND AMBITION


The combined mitigation effect of Nationally Determined Contributions (NDCs) assessed by April 2021 is **not sufficient and will lead to a warming of 2.4°C by the end of the century.** This highlights the urgent need for all countries to submit more ambitious targets by COP26, as they agreed to do in 2015, and to **urgently strengthen their climate action to align to the Paris Agreement's temperature goal.**

*Climate Analytics, 2021a*

## AMBITION: 2030 TARGETS

### Nationally Determined Contribution (NDC): Mitigation

**TARGETS**

The draft of Japan's new NDC set a target of 46% emissions reduction below 2013 by 2030.

**ACTIONS**

Japan bases its NDC calculation on planned actions to be undertaken in the industrial, building, transport, energy, and LULUCF sectors.

### Climate Action Tracker (CAT) evaluation of targets and actions

**JAPAN'S OVERALL RATING**

- 1.5°C Paris Agreement compatible
- Almost sufficient
- **INSUFFICIENT**
- Highly insufficient
- Critically insufficient

This CAT evaluation is a **new, overall rating**, that combines the several, separately rated elements, of policies and actions, domestic and internationally supported targets, 'fair-share target' and the country's contribution to climate finance. The "Insufficient" rating indicates that Japan's climate policies and commitments need substantial improvements to be consistent with the Paris Agreement's 1.5°C temperature limit.

We rate Japan's recently proposed 2030 domestic emissions reduction target as "Almost sufficient", and inconsistent with 2°C of warming when compared to modelled domestic emissions pathways. Although the proposed target represents a significant improvement on its first NDC, Japan's new target is not stringent enough to limit warming to 1.5°C. We rate Japan's overall 'fair-share' contribution as "Insufficient" as its domestic target is not 1.5°C compatible and its contribution to mitigation abroad through climate finance is highly insufficient. Japan should both increase its emissions reduction targets and provide additional, predictable finance to others to meet its 'fair-share' contribution. For the full assessment of the country's target and actions, and the explication of the methodology see www.climateactiontracker.org

*Climate Action Tracker, 2021*

## TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability. The NDC Transparency Check has been developed in response to Paris Agreement decision 1/CP.21 and the Annex to decision 4/CMA.1, which sets out the "information to facilitate clarity, transparency and understanding" as crucial elements of NDCs.

### NDC Transparency Check recommendations

Japan's INDC was submitted to the UNFCCC on 6 November 2016 and its first NDC on 30 December 2020. To ensure clarity, transparency, and understanding, it is recommended that Japan provides additional detailed information in its next NDC or NDC update, including:

- Provide information on the circumstances under which Japan may update the values of the reference indicators, their sources, and how they were constructed.
- Detail the planning process, including domestic institutional arrangements, public participation, stakeholder engagement, and gender responsiveness.
- Explicitly state the assumptions and methodological approaches for accounting for the land-use sector and non-GHG gas components.
- Provide information on considerations of fairness and ambition of the NDC and grounds to substantiate Japan's NDC target as more stringent than its previous target.

*For more visit www.climate-transparency.org/ndc-transparency-check*

## AMBITION: LONG-TERM STRATEGIES

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net zero emissions and climate-resilient economies.

| | |
|---|---|
| Status | Submitted to UNFCCC, last update in 2019 |
| Interim steps | No |
| Sectoral targets | Yes |
| Net zero target | Aim to decarbonise society "as soon as possible in the second half of this century" 80% reduction, base year not specified. |

# FINANCE

## MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS

PARIS AGREEMENT

**Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.**

In 2019, Japan spent almost USD 2bn on fossil fuel subsidies, including around USD 10bn of public financing for the oil and gas sectors. As such, **Japan is the G20's largest provider of public funding for fossil fuels**, funding that surpassed the USD 6bn in revenue generated from Japan's carbon tax in 2019.

1.5°C COMPATIBILITY

**Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2025.**

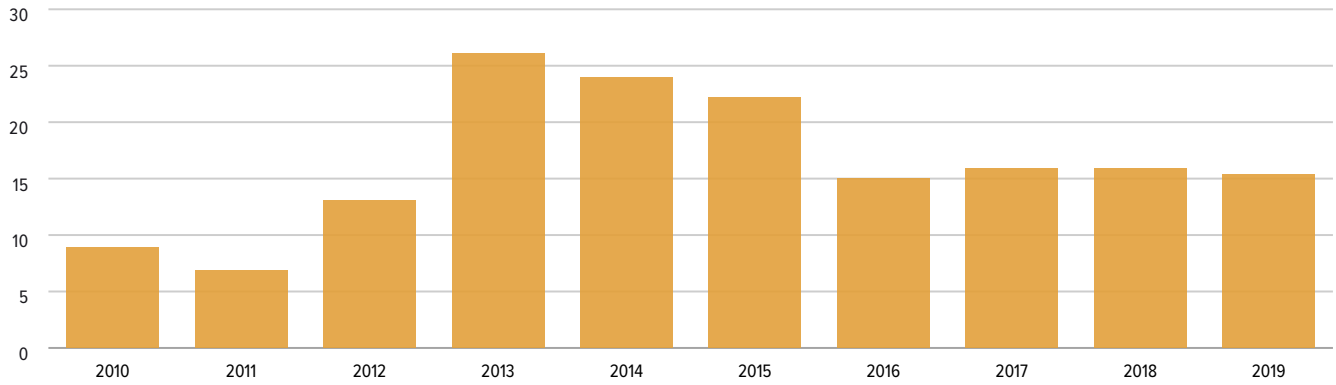
*Rogelj et al., 2018*

## FISCAL POLICY LEVERS

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

### Fossil fuel subsidies

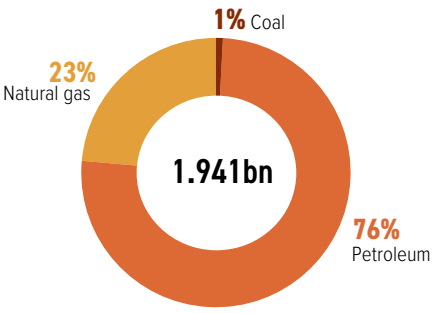
USD billions




*OECD-IEA Fossil Fuel Support database, 2020*

### Fossil fuel subsidies by fuel type

USD in 2019




Over the past decade (2010-2019), Japan's fossil fuel subsidies have oscillated considerably, reaching a value of USD 1.9bn in 2019. Over this period, most of the subsidies were directed to support the production and consumption of petroleum and natural gas.

Comparable data is not yet available for 2020. However, according to the Energy Policy Tracker data, during 2020 Japan has pledged at least USD 1.6bn to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. The recorded government support has been pledged in the form of loan guarantees issued by the Japan Bank for International Cooperation (JBIC) in favour of the two national airlines, All Nippon Airways (ANA) and Japan Airlines (JAL), to purchase new aircrafts.

*Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020*

*Due to rounding, some graphs may sum to slightly above or below 100%*

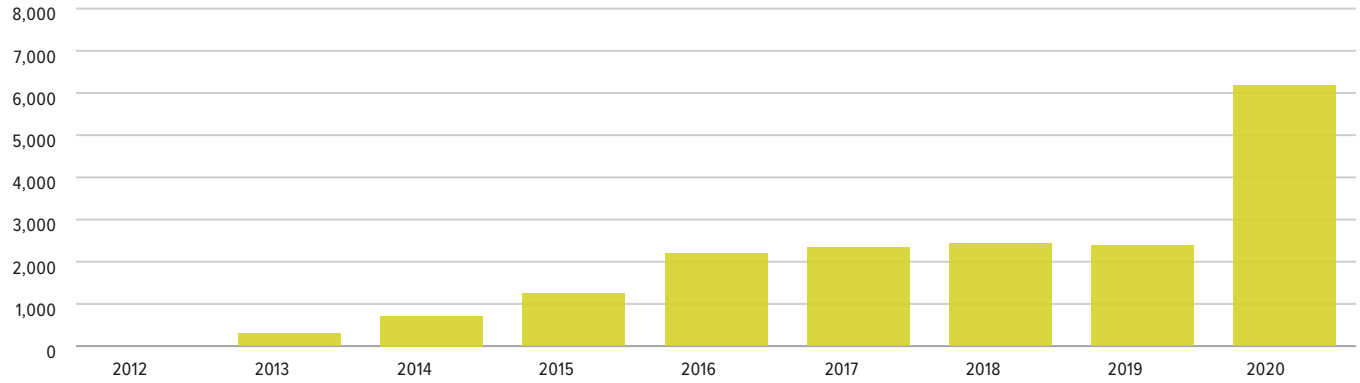
### CORONAVIRUS RESPONSE AND RECOVERY

Japan's first two stimulus packages, passed in April and May of 2020, provided a total of JPY 234tn but focused little on green measures. In December 2020, Japan announced a new economic stimulus package of around JPY 74tn for post-COVID recovery. Included in the package is a JPY 2tn Green Innovation Fund, the details of which are outlined in the government's Green Growth Strategy. More recently, the Bank of Japan announced that it will provide low-cost loans to financial institutions with a view to combating climate change.

*Aylward-Mills et al., 2021; IMF, 2021; Kajimoto and Kihara, 2021; Kihara and Kajimoto, 2020; METI, 2020b*

## Carbon pricing and revenue

(USD millions)




Japan's 2012 national carbon tax covers 68% of domestic emissions and generated USD 6.2bn in 2020. Emissions cover all fossil fuels but were priced at a very low nominal price for 2020 (USD 2.65/$tCO_2e$). Moreover, subnational emissions trading schemes have been in place since 2010 and 2011 for the Tokyo and Saitama Prefectures, respectively. Under these schemes, 18-20% of total emissions are covered and priced at around USD 5/$tCO_2e$. No consistent revenue estimates are available for the subnational schemes.

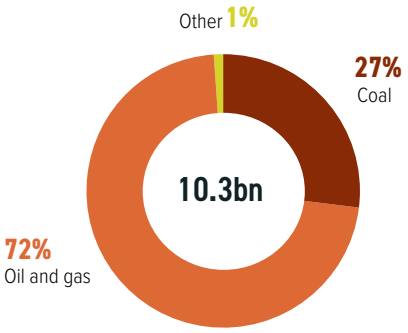
*I4CE, 2021; Energy Policy Tracker, 2021*

# PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

## Public finance for fossil fuels

USD, per annum (2016-18 average)




Between 2018 and 2019, Japan was the G20's largest provider of public finance for fossil fuels, with an average of USD 2.8bn per year and USD 7.5bn per year in public finance support to the coal and the oil and gas sectors, respectively. This amounted to a total average public finance support for fossil fuels of USD 10.3bn. However, based on the Carbis Bay G7 Summit Communique, the Japanese government revised the Strategy for Infrastructure Exports to stop public support for exports of unabated coal-fired power plants by the end of 2021. On the other hand, Japan is currently planning to add nine new coal-fired power plants domestically.

*Oil Change International, 2020*

*Due to rounding, some graphs may sum to slightly above or below 100%*

## Provision of international public support

USD millions, annual average 2017 and 2018

Japan's total climate finance contribution was the G20's largest in absolute value. It is also the highest contributor of bilateral climate finance relative to GDP. The country is seventh in the G20 with respect to multilateral finance in absolute terms, and eighth relative to GDP. Since the 2013/14 period, its bilateral and multilateral climate flows have increased, while core and general contributions continue to decrease slowly.

Most funding is delivered through bilateral channels, including the Japanese Bank for International Cooperation (JBIC) and JICA, and climate finance remains biased towards mitigation. Japan matched its previous contribution at the Green Climate Fund replenishment and, following the G7, the government committed to maintain its JPY 1.3tn (approximately USD 11.8bn) through to 2025 (particularly significant in combination with the commitment of the G7 to end the use of ODA for coal).

# FINANCIAL POLICY AND REGULATION

## Financial policy and regulation

Through policy and regulation, governments can overcome challenges to mobilising green finance, including real and perceived risks, insufficient returns on investment, capacity and information gaps.

**Japan has taken some commendable steps to green its financial system.** In April 2021, the Bank of Japan introduced a measure to provide funds to financial institutions for investment or loans aimed at addressing climate change issues.

The Bank of Japan also launched a new scheme to provide no-interest loans to financial institutions that are undertaking disclosure initiatives, for example, under the Task Force on Climate-Related Financial Disclosures, as well as to purchase green bonds in foreign currencies.

In December 2020, the Japanese Financial Services Agency (FSA) established the Expert Panel on Sustainable Finance, which is comprised of businesses, financial and academic experts, and observers from various ministries. The panel will focus on developing policy approaches for driving sustainable finance by financial institutions, providing investment opportunities for investors through financial and capital markets, and promoting disclosures of climate related information by private companies.

In December 2020, the FSA, along with Ministry of Economy, Trade and Industry (METI) and Ministry of Environment (MOE), also announced the Task Force for Preparation of Environment for Transition Finance. The task force published the final Basic Guidelines on Climate Transition Finance in May 2021. The guidelines will strengthen Japan's capacity for financing transitions, especially in hard-to-abate sectors, and introduce more funds towards achieving the 2050 carbon-neutral goals and the Paris Agreement.

In December 2020, the METI formulated a "Green Growth Strategy towards 2050 Carbon Neutrality", including policy tools such as a scheme for long-term funds with an interest subsidy to attract global ESG investment

*Bank of Japan, 2021; Financial Services Agency, 2021; METI, 2020.*

## Nationally Determined Contribution (NDC): Finance

| | |
|---|---|
| Conditionality | Not applicable |
| Investment needs | Not specified |
| Actions | Not mentioned |
| International market mechanisms | No contribution from international credits for the achievement of the target |

# ENDNOTES

**Where referenced, "Enerdata, 2021" refers to data provided in July 2021. For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2021**

1 The '1.5°C compatible pathway' is derived from global cost-effective pathways assessed by the IPCC's SR15, selected based on sustainability criteria and defined by the 5th-50th percentiles of the distributions of such pathways, achieving the long-term temperature goal of the Paris Agreement. Negative emissions from the land sector and novel negative emissions technologies are not included in the assessed models, which consider one primary negative emission technology (BECCS). In addition to domestic 1.5°C compatible emissions pathways, the 'fair-share' emissions reduction range would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emissions reduction contribution of that country down to the required 'fair-share' level.

2 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from LULUCF, which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

3 The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.

4 The selection of policies rated and the assessment of 1.5°C compatibility are primarily informed by the Paris Agreement and the IPCC's 2018 SR15. The table below displays the criteria used to assess a country's policy performance.

5 The 1.5°C 'fair-share' ranges for 2030 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges reaching below zero, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. In order to maintain comparability across all countries, this report harmonises all data with PRIMAP, 2021 dataset to 2018. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories. Where countries submitted updated NDC targets before August 2021, these have been analysed and included.

6 This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.

7 This indicator includes only direct energy related emissions and process emissions (Scope 1) but not indirect emissions from electricity.

8 This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

| On endnote 4. | Low | Medium | High | Frontrunner |
|---|---|---|---|---|
| Renewable energy in power sector | No policies to increase the share of renewables | Some policies | Policies and longer-term strategy/ target to significantly increase the share of renewables | Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place |
| Coal phase-out in power sector | No targets and policies in place for reducing coal | Some policies | Policies + coal phase-out decided | Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world) |
| Phase out fossil fuel cars | No policies for reducing emissions from light-duty vehicles | Some policies (e.g. energy/emissions performance standards or bonus/ malus support) | Policies + national target to phase out fossil fuel light-duty vehicles | Policies + ban on new fossil fuel-based light-duty vehicles by 2035 worldwide |
| Phase out fossil fuel heavy-duty vehicles | No policies | Some policies (e.g. energy/emissions performance standards or support) | Policies + strategy to reduce absolute emissions from freight transport | Policies + innovation strategy to phase out emissions from freight transport by 2050 |
| Modal shift in (ground) transport | No policies | Some policies (e.g. support programmes to shift to rail or non-motorised transport) | Policies + longer-term strategy | Policies + longer-term strategy consistent with 1.5°C pathway |
| Near zero energy new buildings | No policies | Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options) | Policies + national strategy for near zero energy new buildings | Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries) |
| Energy efficiency in industry | No policies | Mandatory energy efficiency policies cover more than 26-50% of industrial energy use | Mandatory energy efficiency policies cover 51–100% of industrial energy use | Policies + strategy to reduce industrial emissions by 75-90% from 2010 levels by 2050 |
| Retrofitting existing buildings | No policies | Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options) | Policies + retrofitting strategy | Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020 |
| Net zero deforestation | No policies or incentives to reduce deforestation in place | Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation/ reforestation in place) | Policies + national target for reaching net zero deforestation | Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage |

# BIBLIOGRAPHY


Andrijevic, M. et al. (2020). "Governance in Socioeconomic Pathways and its Role for Future Adaptive Capacity", *Nature Sustainability.* https://doi.org/10.1038/s41893-019-0405-0

Arnell, N. W. et al. (2019). "Global and Regional Impacts of Climate Change at Different Levels of Global Temperature Increase", *Climatic Change.* https://doi.org/10.1007/s10584-019-02464-z

Aylward-Mills, D., Payne, J., Sudirman, M., DeRidder, K., & Wei, J. (2021). *Promoting a Green Recovery in Asia.* https://asiafoundation.org

Bank of Japan. ( 2021a). *Bank of Japan's Strategy on Climate Change.* https://www.boj.or.jp/en/announcements/release_2021/rel210716b.pdf

———. (2021b). *Statement on Monetary Policy.* https://www.boj.or.jp/en/announcements/release_2021/k210618a.pdf

Climate Action Tracker (CAT). (2020a). *Climate Action Tracker Country Assessments.* Climate Analytics, NewClimate Institute. https://climateactiontracker.org/countries/

———. (2020b). *Paris Agreement Compatible Sectoral Benchmarks Study.* https://climateactiontracker.org/documents/753/CAT_2020-07-10_ParisAgreementBenchmarks_FullReport.pdf

———. (2020c). *CAT Decarbonisation Data Portal.* https://climateactiontracker.org/data-portal/

———. (2021). *CAT Climate Target Update Tracker.* https://climateactiontracker.org/climate-target-update-tracker/

———. (2021a). *Climate Summit Momentum: Paris Commitments Improved Warming Estimate to 2.4°C.* https://climateactiontracker.org/documents/853/CAT_2021-05-04_Briefing_Global-Update_Climate-Summit-Momentum.pdf

Climate Analytics. (2021). *1.5°C National Pathways Explorer.* http://1p5ndc-pathways.climateanalytics.org/

Enerdata. (2021). *Global Energy and $CO_2$ Data.* https://www.enerdata.net/research/energy-market-data-co2-emissions-database.html

Energy Policy Tracker. (2021). *G20 Countries.* https://www.energypolicytracker.org/

Environmental NGOs. (2021). *Japan under Pressure at G7 over Coal Addiction. No Coal Japan.* https://www.nocoaljapan.org/japan-under-pressure-at-g7-over-coal-addiction/

Financial Services Agency. (2020). *Establishment of the Expert Panel on Sustainable Finance.* https://www.fsa.go.jp/en/news/2020/20201225-2/20201225-2.html

———.(2021). *Basic Guidelines on Climate Transition Finance.* https://www.fsa.go.jp/news/r2/singi/20210507_2/04.pdf

Food and Agriculture Organisation (FAO). (2021). *Emissions Totals: Agriculture.* http://www.fao.org

Germanwatch. (2019). *Global Climate Risk Index 2020. Who Suffers Most from Extreme Weather Events?* http://www.germanwatch.org/

Global Forest Resources Assessment. (2020). *Annual Forest Expansion, Deforestation and Net Change Indicator.* Food and Agriculture Organisation. https://fra-data.fao.org/WO/fra2020/forestAreaChange/

Government of Japan. (2015). *National Plan for Adaptation to the Impacts of Climate Change.* https://www.env.go.jp/en/focus/docs/files/20151127-101.pdf

–––.(2019a). *Annual Report on the Environment in Japan 2019*. http://www.env.go.jp/en/wpaper/2019/

–––. (2019b). *The Long-term Strategy under the Paris Agreement*. https://unfccc.int/sites/default/files/resource/The Long-term Strategy under the Paris Agreement.pdf

–––. (2020a). *Annual Report on the Environment in Japan 2020*. http://www.env.go.jp/en/wpaper/2020/index.html

Grantham Research Institute on Climate Change and the Environment. (n.d.). *Law Concerning the Rational Use of Energy (Energy Conservation Act) (Law No.49 of 1979)*. https://climate-laws.org/geographies/japan/laws/law-concerning-the-rational-use-of-energy-energy-conservation-act-law-no-49-of-1979

Gütschow, J. et al. (2021). "The PRIMAP-hist National Historical Emissions Time Series (1850-2018)", *V.2.2. Zenodo open access repository*. https://doi.org/10.5281/zenodo.4479172

IEA. (2021a). *Japan 2021 - Energy Policy Review*. International Energy Agency. https://iea.blob.core.windows.net/assets/3470b395-cfdd-44a9-9184-0537cf069c3d/Japan2021_EnergyPolicyReview.pdf

–––. (2021b). *Sustainable Recovery Tracker*. https://www.iea.org/reports/sustainable-recovery-tracker

IMF. (2021). *Policy Responses to COVID-19*. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

Institute for Climate Economics (I4CE). (2021). *Global Carbon Accounts 2021*. https://www.i4ce.org/download/global-carbon-account-in-2021/

Institute for Health Metrics and Evaluation (IHME). (2020). *Global Burden of Disease Study 2020*. http://ghdx.healthdata.org/gbd-results-tool

International Energy Agency (IEA). (2021). *Global Electric Vehicle Outlook 2021*. https://www.iea.org/reports/global-ev-outlook-2021

Kajimoto, T., and Kihara, L. (2021). *BOJ to Launch New Scheme for Fighting Climate Change, Keeps Policy Steady*. https://www.reuters.com/world/asia-pacific/boj-may-extend-pandemic-relief-scheme-keep-stimulus-intact-2021-06-17/

Kihara, L., and Kajimoto, T. (2020). *Japan Unveils $708 Billion in Fresh Stimulus With Eye on Post-Covid Growth*. https://www.reuters.com/article/us-japan-economy-stimulus-idUSKBN28I02Y

Kumagai, T. (2021). *Interview: Japan to Remain Committed to Oil and Gas Development Projects*. https://www.spglobal.com/platts/en/market-insights/latest-news/coal/070921-interview-japan-to-remain-committed-to-oil-and-gas-development-projects

Kuriyama, A. (2019). *Transition Management with "Just Transition" in Japanese Power Sector*. https://www.jstor.org/stable/resrep21812

Kuriyama, A., Tamura, K. and Kuramochi, T. (2019). "Can Japan Enhance its 2030 Greenhouse Gas Emission Reduction Targets? Assessment of Economic and Energy-Related Assumptions in Japan's NDC", *Energy Policy*. https://doi.org/10.1016/j.enpol.2019.03.055

Long, Y. (2021). "Negligible Impacts of Early Covid-19 Confinement on Household Carbon Footprints in Japan", *One Earth*. https://doi.org/https://doi.org/10.1016/j.oneear.2021.03.003

Ministry of Economy, Trade and Industry (METI). (2018). *Japan's Fifth Strategic Energy Plan (provisional translation)*. https://www.enecho.meti.go.jp/en/category/others/basic_plan/5th/pdf/strategic_energy_plan.pdf

–––. (2020). *Climate Innovation Finance Strategy 2020*. https://www.meti.go.jp/english/press/2020/0916_001.html

–––. (2020b). *Green Growth Strategy Through Achieving Carbon Neutrality in 2050*. Ministry of Economy, Trade and Industry (METI) and Ministry of the Environment, Japan (MOEJ). https://www.meti.go.jp

Ministry of Foreign Affairs (MFA). (2021). *Leaders Summit on Climate; Remarks by H.E. Mr. Suga Yoshihide, Prime Minister of Japan*. https://www.mofa.go.jp/files/100181623.pdf

Nagata, T. (2013). *Japan's Policy on Energy Conservation*. https://unfccc.int/files/bodies/awg/application/pdf/2_japan.pdf

Nicholas, S. (2021). *Japan Still Seeking to Exploit Coal Power Loopholes*. https://ieefa.org/ieefa-japan-still-seeking-to-exploit-coal-power-loopholes/

Notre Dame Global Adaptation Initiative (ND-GAIN). (2021). *ND-GAIN Country Index*. University of Notre Dame. https://gain.nd.edu/our-work/country-index/

Osumi, M. (2020). COVID-19 Measures Helped Reduce Greenhouse Gas Emissions Over Tokyo, JAXA Data Show. *The Japan Times*. https://www.japantimes.co.jp/

OECD-IEA. (2020). *OECD Analysis of Budgetary Support and Tax Expenditures. Fossil Fuel Support Database*. http://www.oecd.org/fossil-fuels/data/

Oil Change International. (2020). *Shift the Subsidies Database*. http://priceofoil.org/shift-the-subsidies

Organisation for Economic Co-operation and Development (OECD). (2020). *Effective Carbon Rates 2020: Pricing Carbon Emissions Through Taxes and Emissions Trading*. https://doi.org/10.1787/9789264305304-en and country profile supplement; https://www.oecd.org/tax/tax-policy/effective-carbon-rates-all.pdf

Quitzow, R. et al. (2021). "The Covid-19 Crisis Deepens the Gulf between Leaders and Laggards in the Global Energy Transition", *Energy Research and Social Science*. https://doi.org/10.1016/j.erss.2021.101981

Rogelj, J. et al. (2018). "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development", in Masson-Delmotte, V. et al. (eds) *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C. IPCC*. https://www.ipcc.ch/

Shimizu, R. et al. (2021). *Japan Boosts Renewable Energy Target for 2030 Energy Mix*. https://www.reuters.com/business/energy/japan-boosts-renewable-energy-target-2030-energy-mix-2021-07-21/

Sugawara, H. et al. (2021). "Anthropogenic $CO_2$ Emissions Changes in an Urban Area of Tokyo, Japan, Due to the COVID-19 Pandemic: A Case Study During the State of Emergency in April-May 2020", *Geophysical Research Letters*. https://doi.org/10.1029/2021GL092600

Tamura, K., and Kuriyama, A. (2020). *Commentary on Japan's Policy Plan for "Phasing out Inefficient Coal-fired Power Plants": The Plan is not consistent with the Paris Agreement*. https://www.iges.or.jp/en/pub/phase-out-inefficient-coal/en

United Nations. (2018). *World Urbanisation Prospects*. UN Department of Economic and Social Affairs, Population Division. https://population.un.org/wup

–––. (2019). *World Population Prospects, 2019 Highlights*. UN Department of Economic and Social Affairs, Population Division. https://population.un.org/wpp

United Nations Development Programme (UNDP). (2020). *Human Development Index Database*. http://hdr.undp.org/en/data#

Vivid Economics. (2021). *Greenness of Stimulus Index*. https://www.vivideconomics.com/casestudy/greenness-for-stimulus-index/

World Bank. (2019). *Population, total*. Washington, DC: USA. https://data.worldbank.org/indicator/SP.POP.TOTL

–––. (2020). *GDP, PPP* (current international $). Washington, DC: USA. https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD

World Steel Association. (2018). *Steel's Contribution to a Low-Carbon Future and Climate-Resilient Societies*. https://www.worldsteel.org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