



Japan

Asia & Pacific

Ease of doing Solar classification



Achiever

Electricity Consumption in kWh/capita (2020)

7324.3

Average PVout in kWh/kWp/day (2020)

3.4

Cumulative Solar Capacity in MW (2021)

74191.0

Getting Electricity Score (2020)

93.2

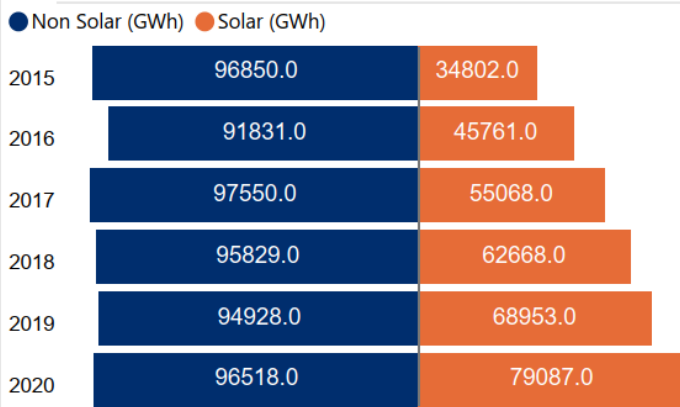
NDC Target by 2030 in % (base year 2013)

46.0

Human Development Index (2021)

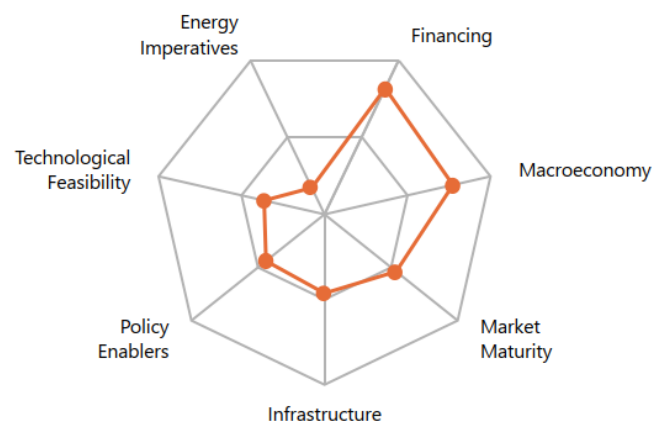
0.9

Renewable Energy Generation by Source

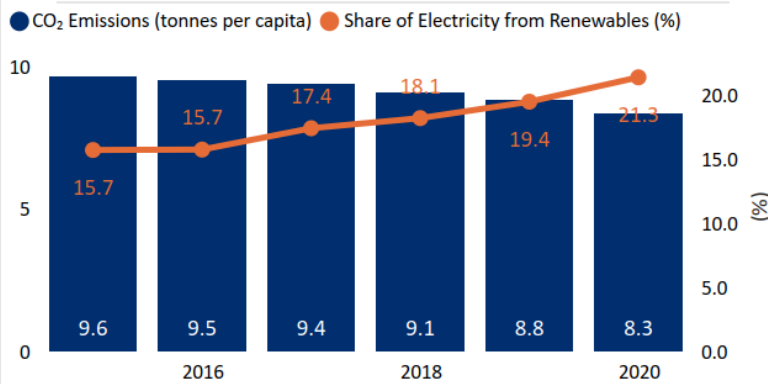


Non Solar RE includes Wind and Hydro;

Performance against 7 Drivers



CO₂ Emissions vs Electricity share from Renewables

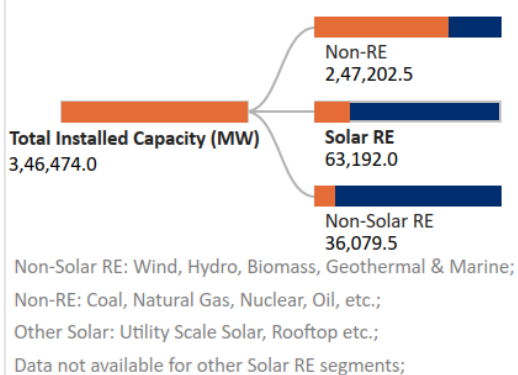


Fiscal Incentives & Public Financing for Renewables (2020)

Investment or production tax credits?
No

Public investment, loans, grants, capital subsidies or rebates?
Yes

Installed Capacity by Source (2019)



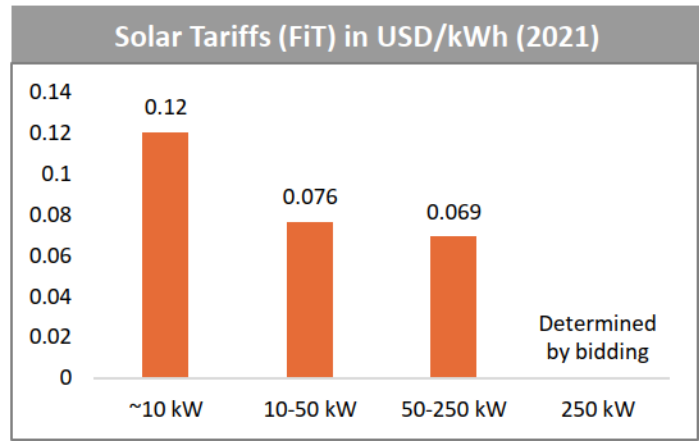
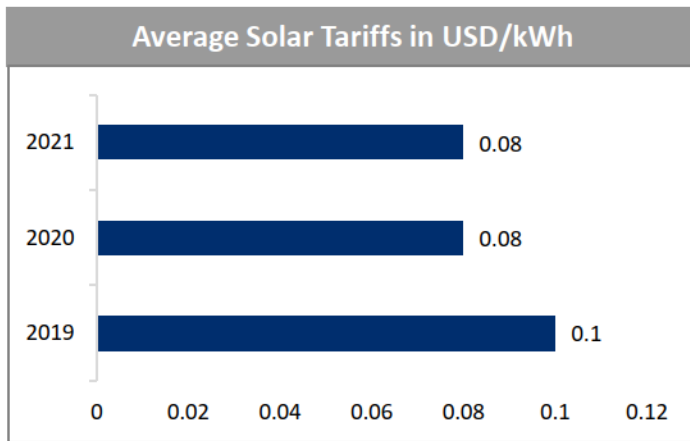
Support for Renewables (2020)

Feed-in-Tariffs for renewable energy supply to the grid? Yes	Net metering/Gross metering policies and regulations? No
Renewable Energy Certificates? Yes	Renewable Purchase Obligation? No

Threshold for licensing Solar Power in MW (2021)
< 1.0

Solar PV Project Capital Cost in USD/MW (2021)
1.7 Million

Daylight hours/day
5.0



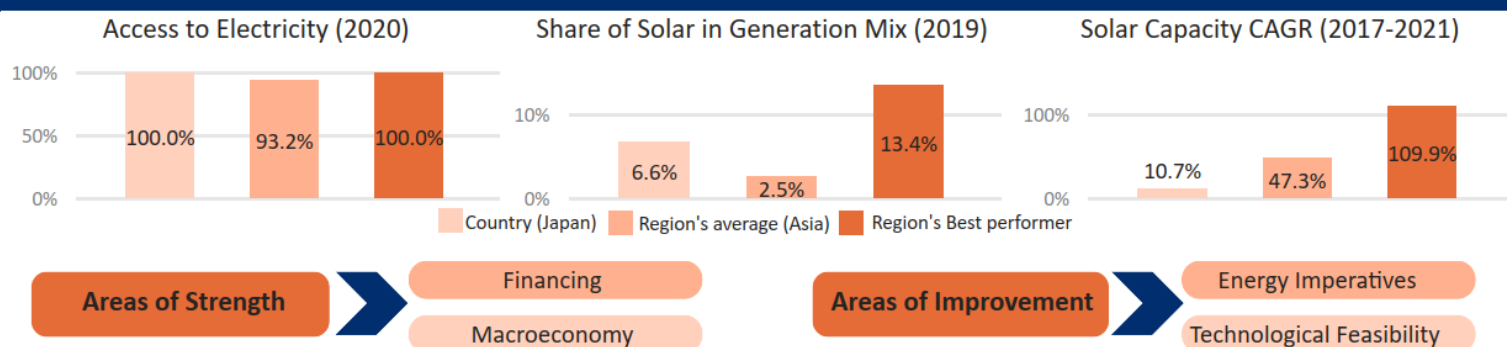
Financial Support Mechanisms (2021)	
Duty waivers to solar developers for importing/procuring material from foreign land	No
Tax waivers for manufacturers of raw materials (modules, off grid appliances, etc.)	No
Credit facilitation for solar energy from financial institutions (FIs)	Yes
Viability Gap Funding (VGF) i.e. Grant to support RE projects that are economically justified but fall short of financial viability	No
Accelerated Depreciation benefit for Industrial/commercial users of Solar Power	Yes
Generation based incentives for Renewable energy generation	Yes
Revenue Based Incentives for Renewable energy generation	No

Policies/Schemes for Solar Segments (2021)		
Rooftop Solar	Utility scale solar	Battery waste management
Yes	Yes	No

Support for Renewables (2021)	
Renewable Generation Obligations (RGO)	No
Manufacturing facility for solar equipment (inverters and balance of systems)	Yes
Government Trainings/certifications for Human Resource focusing on Solar industry	No

Emerging Technologies/Innovative Models (2021)	
Hybrid technologies - combination of two or more technologies to achieve efficient systems (Example: wind + solar PV hybrid systems, solar + storage systems)	Yes

Country's regional performance and characteristics



Key Insights

Drivers

Insights



Macroeconomy

- Japan is a high-income country with a GDP per capita (PPP) of USD 42,140 in 2021.^{1,2}
- Due to COVID-19 Pandemic, the GDP (Real) had declined by 4.6% in 2020. However, in 2021, the GDP has bounced back recording an annual growth rate of 1.7%.³
- The inflation rate (CPI) of Japan has decreased by 0.2% in 2021 from 0% levels in 2020.³
- The general government gross debt to GDP has reached 262.5% in 2021 from 259.4% levels in 2020.⁴



Policy enablers

- According to Japan's country report 2021, renewable energy contributes to 6% of its total energy supply.⁵
- Japan has set a target to achieve an energy mix by 2030 with 36%-38% share from RE, 1% from hydrogen, 20-22% from nuclear (no change), 20% from LNG (down from 26%), and 2% from oil (down from 3%).⁶
- Japan aims to move towards hydrogen economy. It is one of the key factors for decarbonization and is listed as one of the 14 key sectors of Japan's Green Growth Strategy.⁷



Technological Feasibility

- Japan receives moderate solar irradiation (GHI) of 3.6 kWh/m²/day and specific yield 3.4 kWh/kWp/day indicating a moderate technical feasibility for solar in the country.⁸
- Japan has shown significant momentum in the EV charging space with more than 29,885 charging stations.¹⁰
- The Nishi-Sendai Substation Battery Energy Storage System (BESS) is a 40 MWh energy storage project located in Sendai, Miyagi and is based on lithium-ion storage technology.¹¹



Market Maturity

- 100% of the population in Japan is having access to electricity since 2020.¹³
- The Ministry of Economy, Trade, and Industry (METI) is responsible for developing and enforcing Japan's renewable energy laws and regulations, including the Feed-in Tariff system (FIT) to encourage RE development.¹⁴
- Japan Electric Power Exchange (JEPX) provides three types of markets, i.e., a spot day-ahead market, a forward fixed-form market to trade electricity and a forward bulletin board market as a place for free transactions.¹⁵
- TEPCO Power Grid is responsible for handling nearly one-third of all the power supplied in Japan.¹⁶
- In 2020, a cabinet decision was taken in the Electricity Business Act for procurement of electricity from RE.²⁹



Infrastructure

- Japan's transmission network comprises about 38,315 km of transmission lines ranging between the 110 kV to 500 kV and 250 kV DC voltage levels.¹⁷
- Japan operates at two frequency that is 50 Hz and 60 Hz in eastern and western Japan respectively.¹⁸
- The Japanese government has partnered with the Japan International Cooperation Agency (JICA) to implement a USD 200 Mn electricity transmission expansion programme in Lagos and Ogun states.¹⁹
- Fujitsu and Chugoku Electric Power T&D has done a joint trial to expand the use of RE and improve maintenance of power transmission infrastructure.²⁰



Financing

- Renewable Energy Investment Japan is the investment agency for renewables in the country.²¹
- Shinsei Bank is among the licensed financial institutions in Japan for arranging finance in solar power generation.²²
- The Asian Development Bank (ADB) and Japan's Ministry of Economy, Trade, and Industry (METI) have signed a Memorandum of Cooperation (MOC) to enhance their joint efforts to promote clean energy in Southeast Asia.²³



Energy Imperatives

- In 2020, Japan's per capita consumption stood at 7.32 MWh which is more than 2 times higher in comparison to the global average of 3.31 MWh.²⁴
- The total installed capacity of Solar PV witnessed a CAGR of 10.7% between 2017-2021 reaching 74,191 MW in 2021 from 49,500 MW in 2017.²⁵
- In 2021, the total installed capacity stood at 360 GW with a significant share coming from coal (32.77%), gas (35.40%), nuclear (6.02%), hydro (8.32%), solar (8.98%) and wind (0.94%).^{26, 27}