Sweden

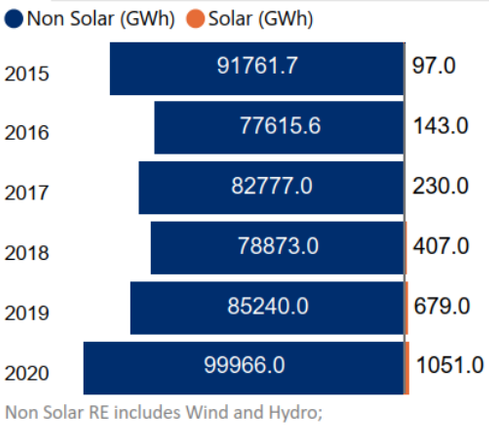
Europe and others

Ease of doing Solar classification

Achiever

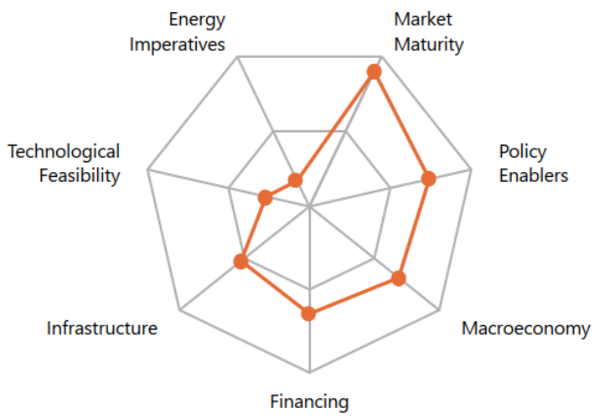
Electricity Consumption in kWh/capita (2020)	Average PVout in kWh/ kWp/day (2020)	Cumulative Solar Capacity in MW (2021)
16281.1	**2.8**	**1610.4**
Getting Electricity Score (2020)	**NDC Target by 2030 in % (base year 1990)**	**Human Development Index (2021)**
96.2	**55.0**	**0.9**

Renewable Energy Generation by Source

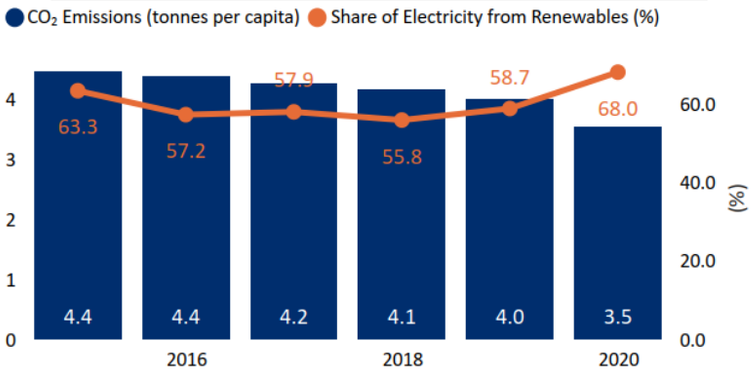


Non Solar RE includes Wind and Hydro;

Performance against 7 Drivers



CO_2 Emissions vs Electricity share from Renewables



Fiscal Incentives & Public Financing for Renewables (2020)

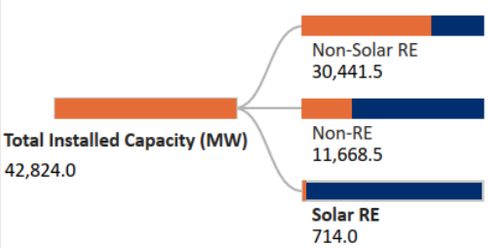
Investment or production tax credits?

Yes

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

Yes

Installed Capacity by Source (2019)



Non-Solar RE: Wind, Hydro, Biomass, Geothermal & Marine;

Non-RE: Coal, Natural Gas, Nuclear, Oil, etc.;

Other Solar: Utility Scale Solar, Rooftop etc.;

Data not available for other Solar RE segments;

Support for Renewables (2020)

Feed-in-Tariffs for renewable energy supply to the grid?

No

Net metering/Gross metering policies and regulations?

No

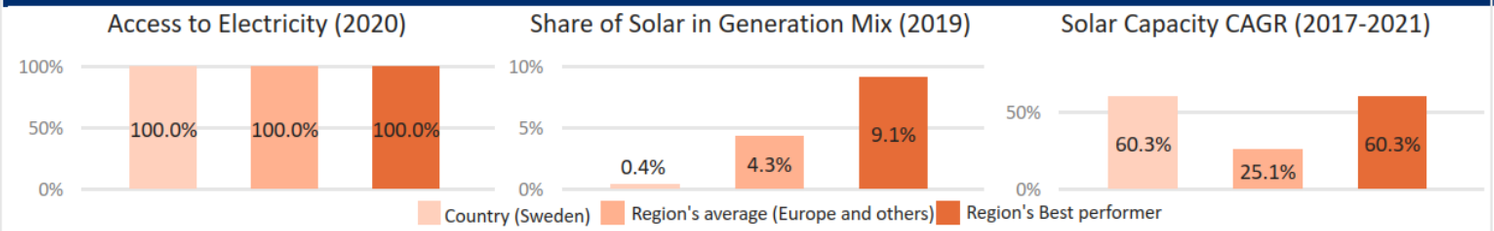
Renewable Energy Certificates?

Yes

Renewable Purchase Obligation?

Yes

Country's regional performance and characteristics



Areas of Strength → Market Maturity; Policy Enablers

Areas of Improvement → Energy Imperatives; Technological Feasibility

Key Insights

Drivers	Insights
Macro-economy	• Sweden is a high-income country[1] with a GDP per capita (PPP) of USD 59,223 in 2021.[2] • Due to COVID-19 Pandemic, the GDP (Real) had declined by 2.2% in 2020. However, in 2021, the GDP has bounced back recording an annual growth rate of 5.1%.[3] • The inflation rate (CPI) of Sweden has increased to 2.7% in 2021 from 0.7% levels in 2020.[4] • The general government gross debt to GDP has reduced to 36.8% in 2021 from 39.2% levels in 2020.[5]
Policy enablers	• Sweden has set a target to reduce its GHG emissions 59% by 2030 from 2005 levels and to have a net-zero carbon economy by 2045.[6] • Sweden has targeted to generate 100% of its electricity from RE sources by 2040.[7] • Sweden's Feed-in tariff policy provides access for small independent generators to be connected to the grid and mandates utilities to purchase electricity from small generators at agreed prices.[8] • Sweden's Guaranteed Power Purchase Contract, 1997 policy mandates local distribution companies to purchase electricity from projects having less than 1,500 kW capacity within their territories.[9]
Technological Feasibility	• Sweden receives low solar irradiation (GHI) of 2.7 kWh/m^2/day and specific yield 2.8 kWh/kWp/day indicating a low technical feasibility for solar in the country.[9] • Sweden has set plans to operationalise battery energy storage system (BESS) of 70 MW/70 MWh by 2024.[10] • Sweden has planned to build a 500 MW solar park which would cater to the demands of ~32,000 households.[11]
Market Maturity	• 100% of the population in Sweden had access to electricity as of 2020.[2] • The Electricity Act, 1997:857 regulates the connection of renewable electricity plants, the distribution of electricity from renewable sources and the obligation to expand the grid.[15] • The Swedish Energy Agency (SEA) is the government agency responsible for matters related to the electricity supply and use of energy in Sweden.[12] • The Swedish government has assigned Svenska kraftnät as the TSO that owns and operates the national electricity grid.[13] • In Sweden, EPEX SPOT is the leading exchange for providing market spot to buy, sell, and trade electricity, secure transactions, and auctioning services.[14]
Infrastructure	• Sweden's national grid for electricity comprises of approximately 17,000 km of power lines and about 200 substations and switching stations.[16] • Sweden's transmission network operates at 400 kV, 275 kV and 220 kV voltage levels.[16] • Sweden has 16 cross border transmission lines with Denmark, Finland, and Norway (known as the Nordic Market).[17]
Financing	• The Swedish Government has invested USD 790.03 Mn towards renewable energy, efficient energy use and energy and climate advisory services in 2018 followed by additional funding in 2019 and 2020.[18] • Sweden's largest municipal funding agency, Kommuninvest, has issued green bonds to institutional investors to fund green loans for investment projects undertaken by local and regional governments and about USD 1.1 Bn towards RE projects.[19]
Energy Imperatives	• In 2020, Sweden's per capita electricity consumption stood at 16.28 MWh, which is significantly higher in comparison to the global average of 3.31 MWh.[20] • The total installed capacity of solar PV witnessed a CAGR of 60.3% reaching 1,610.43 MW in 2021 from 244 MW levels in 2017.[21] • In 2021, the total installed capacity in the country stood at 45.2 GW[22] with a significant share coming from hydro (42.96%) followed by nuclear (31.24%), wind (15.97%), bioenergy (7.79%), solar (0.61%) and gas (0.06%).[23]