



# Norway

Europe and others

Ease of doing Solar classification



## Influencer

Electricity Consumption in kWh/capita (2020)

### 28237.3

Average PVout in kWh/kWp/day (2020)

### 2.8

Cumulative Solar Capacity in MW (2021)

### 224.8

Getting Electricity Score (2020)

### 84.3

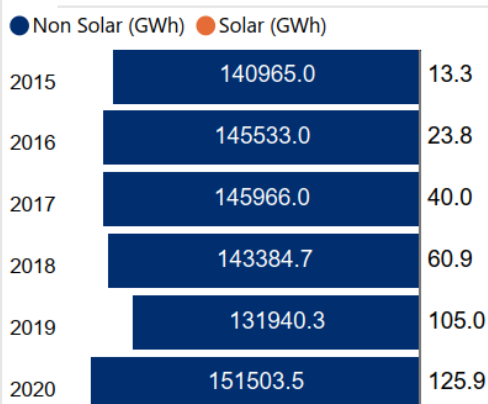
NDC Target by 2030 in % (base year 1990)

### 55.0

Human Development Index (2021)

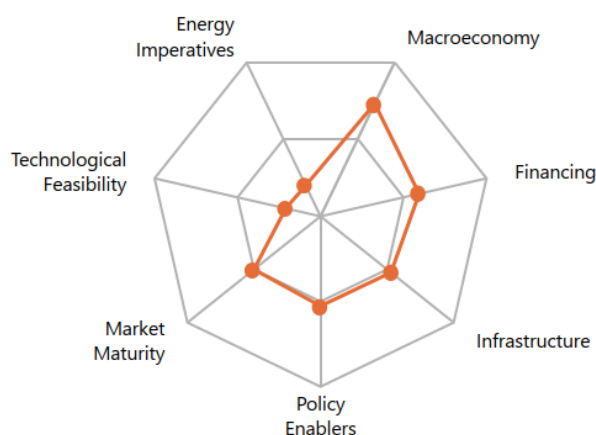
### 1.0

### Renewable Energy Generation by Source

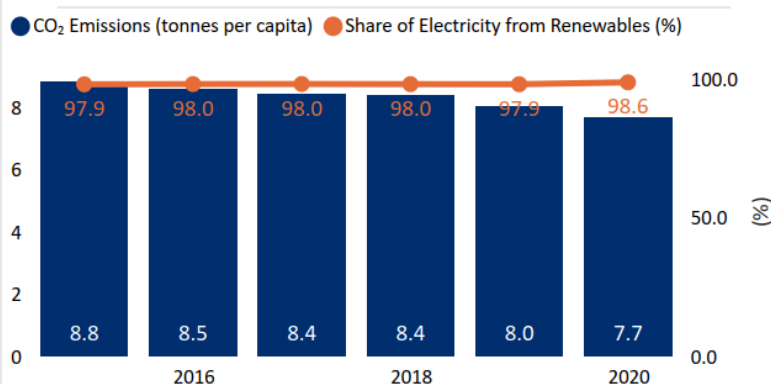


Non Solar RE includes Wind and Hydro;

### Performance against 7 Drivers



### CO<sub>2</sub> Emissions vs Electricity share from Renewables



### Fiscal Incentives & Public Financing for Renewables (2020)

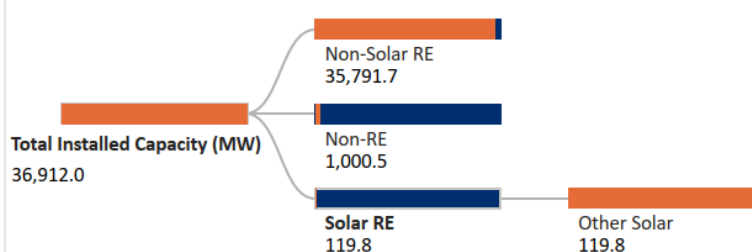
Investment or production tax credits?

## No

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

## Yes

### Installed Capacity by Source (2019)



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

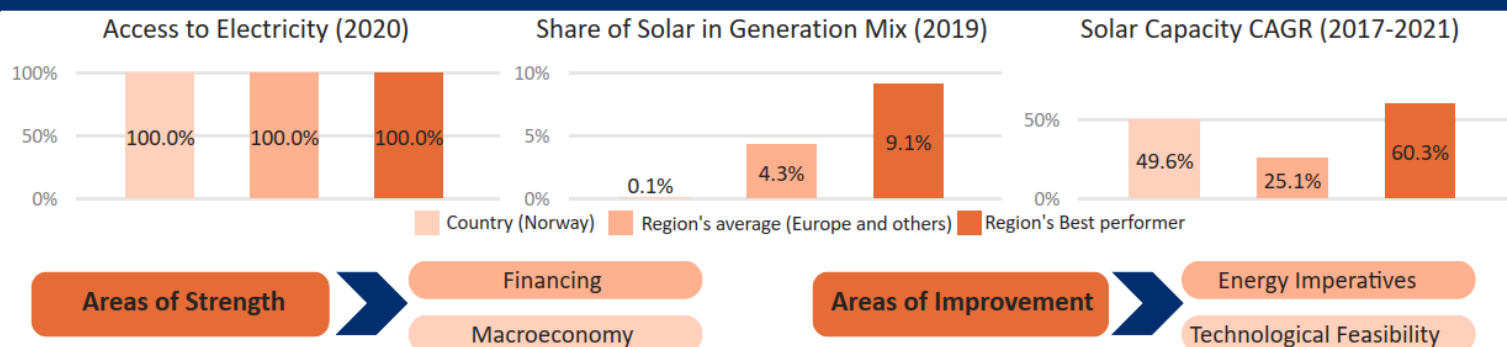
Renewable Energy Certificates?

## Yes

Renewable Purchase Obligation?

## Yes

## Country's regional performance and characteristics



## Key Insights

### Drivers

### Insights



Macroeconomy

- Norway is a high-income country with a GDP per capita (PPP) of USD 80,535 in 2021.<sup>1,2</sup>
- Due to COVID-19 Pandemic, the GDP (Real) had declined to 0.7% in 2020. However, in 2021 the GDP bounced back growing at rate of 3.9%.<sup>3</sup>
- The inflation rate (CPI) of Norway has increased to 3.5% in 2021 from 1.3% levels in 2020.<sup>4</sup>
- The general government gross debt to GDP has reduced to 43.4% in 2021 from 46.8% levels in 2020.<sup>5</sup>



Policy enablers

- Norway has set a target to cut down its carbon emissions by around 40% (from 1990 levels) by 2030.<sup>6</sup>
- Norway's Electricity Certificates Act, 2011 aims to increase generation of electrical energy from RE sources.<sup>7</sup>
- The Government of Norway has taken an initiative to promote and develop offshore wind power at par with the total amount of electricity currently produced in Norway.<sup>9</sup>



Technological Feasibility

- Norway receives low solar irradiation (GHI) of 2.6 kWh/m<sup>2</sup>/day and specific yield 2.8 kWh/kWp/day indicating a low technical feasibility for solar in the country.<sup>10</sup>
- In 2021, almost 100% of the country's power demand was met through RE sources.<sup>11</sup>
- Norway has installed ~220 MW solar PV capacity of installations as of 2021.<sup>12</sup>



Market Maturity

- 100% of the population in Norway had access to electricity as of 2020.<sup>2</sup>
- Norwegian Energy regulatory Authority (NVE-RME) is the national regulator for the Norwegian electricity and downstream gas markets.<sup>13</sup>
- Statnett SF is the Transmission System Operator (TSO) operating through a license for system operation under regulation of Norwegian Energy Act of 1990.<sup>13</sup>
- In Norway, EPEX SPOT is the leading exchange that provides a platform to buy, sell, and trade electricity, secure transactions, and auctioning services.<sup>14</sup>



Infrastructure

- The Norwegian electricity network comprises of transmission part (132 kV to 400 kV) and distribution part (33 kV and below).<sup>13</sup>
- Statnett, the TSO is responsible for maintaining the instantaneous balance of the power supply system and ensuring the quality of electricity supply in the country.<sup>15</sup>
- Norway has cross border transmission lines with Denmark, Sweden, Lithuania, Netherlands and recently it also got connected with United Kingdom and Germany.<sup>15</sup>



Financing

- Norway has Norfund with a corpus of USD 967.75 Mn which invests in Clean Energy to increase energy access and supply in developing countries.<sup>16</sup>
- In 2022, the Government of Norway launched a large-scale investment plan aiming at sea areas to develop 30 GW of offshore wind capacity by 2040.<sup>17</sup>
- The Norwegian Agency for Development Cooperation has signed an agreement with the Green Climate Fund to contribute a corpus of USD 39 Mn for climate led ini a ves in the country.<sup>18</sup>



Energy Imperatives

- In 2020, Norway's per capita electricity consumption stood at 28.23 MWh, which is significantly higher in comparison to the global average of 3.31 MWh.<sup>19</sup>
- The total installed capacity of Solar PV witnessed a CAGR of 49.6% reaching 224.8 MW in 2021 from 44.9 MW levels in 2017.<sup>20</sup>
- In 2021, the total installed capacity in the country stood at 40.77 GW with a significant share coming from hydro (91.73%) followed by wind (6.46%), solar (0.02%) and other renewables (0.15%).<sup>21, 22</sup>
- The cost of electricity per kWh is US Cent 13.5 for households and US Cent 14.2 for business.<sup>23</sup>