

# India

## Sustainable Development Goal 7.2: Energy Indicators (2016)

Renewable energy (% of TFEC)	34.0	Access to electricity (% of population)	89.6
Energy efficiency (MJ per \$1 of GDP)	4.5	Access to clean cooking (% of population)	44

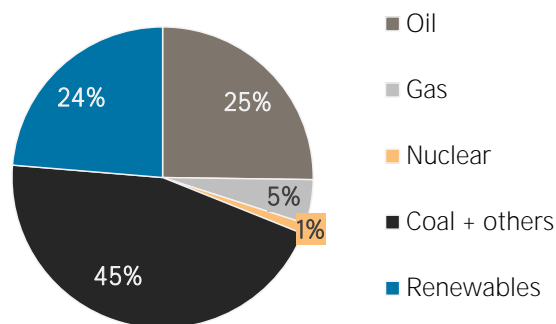
### TOTAL PRIMARY ENERGY SUPPLY (TPES)

TPES	2011	2016
Non-renewable (TJ)	21 931 966	28 209 481
Renewable (TJ)	9 091 102	8 757 155
Total (TJ)	31 023 068	36 966 636
Renewable share (%)	29	24

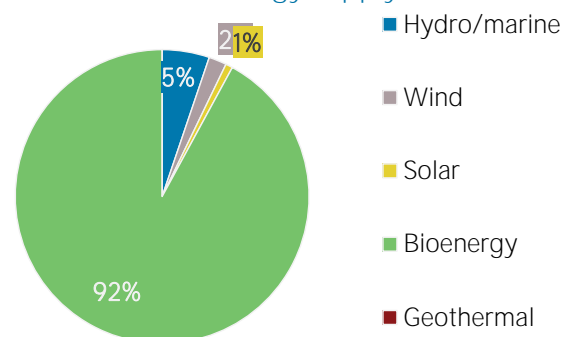
Growth in TPES	2011-16	2015-16
Non-renewable (%)	+28.6	+2.2
Renewable (%)	-3.7	+2.7
Total (%)	+19.2	+2.3

Primary energy trade	2011	2016
Imports (TJ)	10 668 412	16 517 398
Exports (TJ)	2 796 658	2 868 701
Net trade (TJ)	-7 871 754	-13 648 697
Imports (% of supply)	34	45
Exports (% of production)	12	12
Energy self-sufficiency (%)	76	63
Net trade (USD million)	n.a.	n.a.
Net trade (% of GDP)	n.a.	n.a.

Total primary energy supply in 2016



Renewable energy supply in 2016



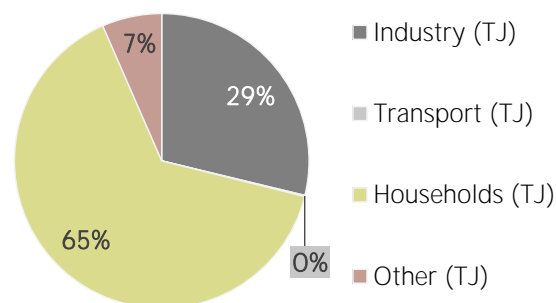
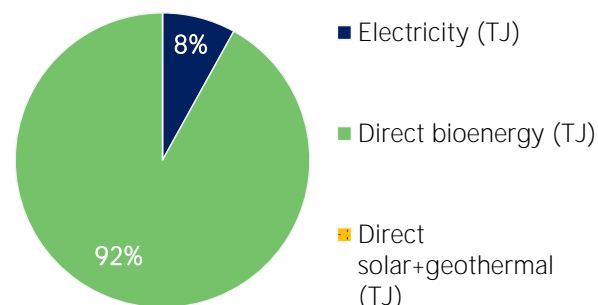
### RENEWABLE ENERGY CONSUMPTION

Consumption by source	2011	2016
Electricity (TJ)	484 531	612 837
Direct bioenergy (TJ)	8 072 774	7 006 924
Direct solar+geothermal (TJ)	0	0
<b>Total (TJ)</b>	<b>8 557 305</b>	<b>7 619 761</b>
Electricity share (%)	6	8

Consumption growth	2011-16	2015-16
Renewable electricity (%)	+26.5	+18.1
Other renewables (%)	-13.2	-3.4
<b>Total (%)</b>	<b>-11.0</b>	<b>-2.0</b>

Consumption by sector	2011	2016
Industry (TJ)	2 113 757	2 191 973
Transport (TJ)	8 985	9 895
Households (TJ)	6 009 063	4 918 445
Other (TJ)	425 500	499 447
Renewable share of TFEC	40.5	34.0

Renewable energy consumption in 2016

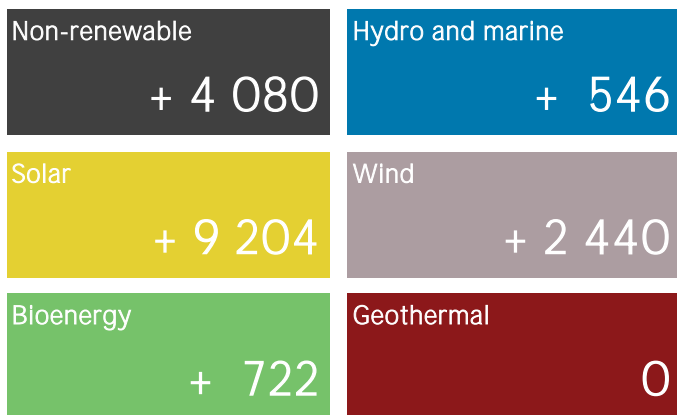


# ELECTRICITY CAPACITY AND GENERATION

Capacity in 2018	MW	%
<b>Non-renewable</b>	<b>288 137</b>	<b>71</b>
<b>Renewable</b>	<b>118 079</b>	<b>29</b>
Hydro/marine	45 296	11
Solar	27 355	7
Wind	35 288	9
Bioenergy	10 140	2
Geothermal	0	0
<b>Total</b>	<b>406 217</b>	<b>100</b>

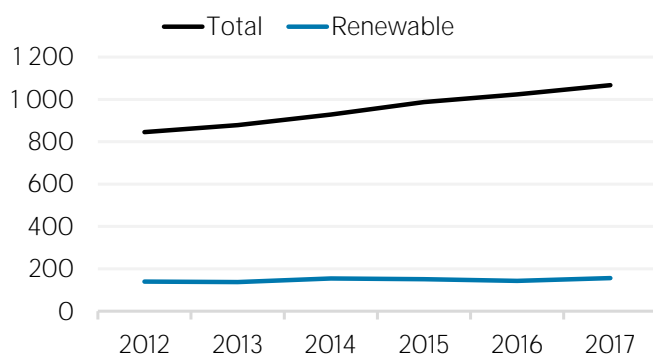
Capacity change (%)	2013-18	2017-18
<b>Non-renewable</b>	<b>+ 32</b>	<b>+ 1.4</b>
<b>Renewable</b>	<b>+ 86</b>	<b>+ 12.3</b>
Hydro/marine	+ 15	+ 1.2
Solar	+ 1 725	+ 50.7
Wind	+ 92	+ 7.4
Bioenergy	+ 143	+ 7.7
Geothermal	0	0.0
<b>Total</b>	<b>+ 44</b>	<b>+ 4.4</b>

## Net capacity change in 2018 (MW)

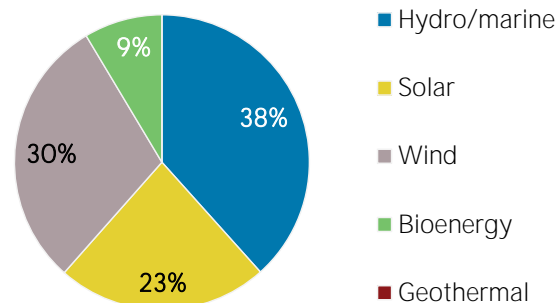


Generation in 2017	GWh	%
<b>Non-renewable</b>	<b>1 219 834</b>	<b>85</b>
<b>Renewable</b>	<b>209 181</b>	<b>15</b>
Hydro and marine	126 411	9
Solar	18 128	1
Wind	47 670	3
Bioenergy	16 972	1
Geothermal	0	0
<b>Total</b>	<b>1 429 015</b>	<b>100</b>

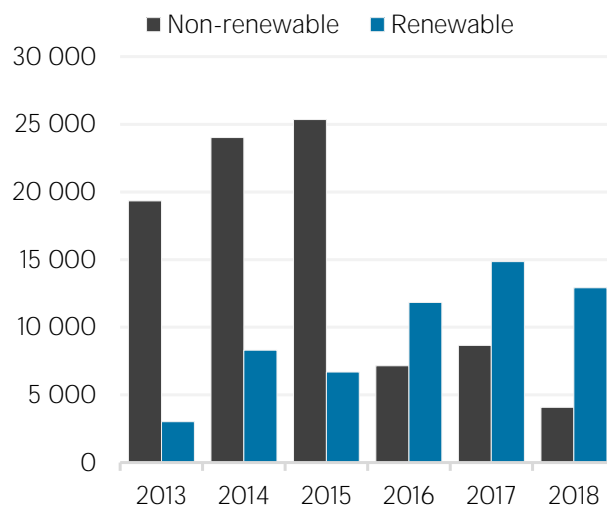
## Per capita electricity generation (kWh)



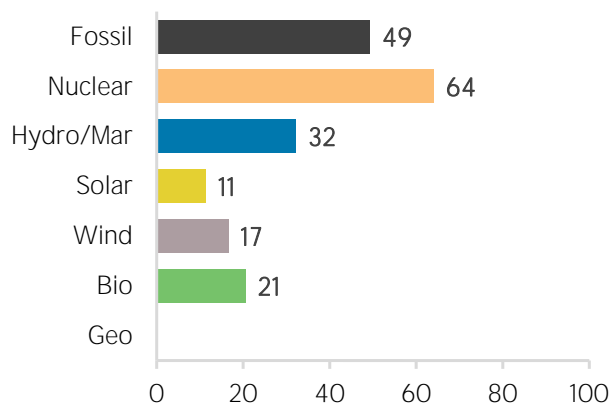
## Renewable capacity in 2018



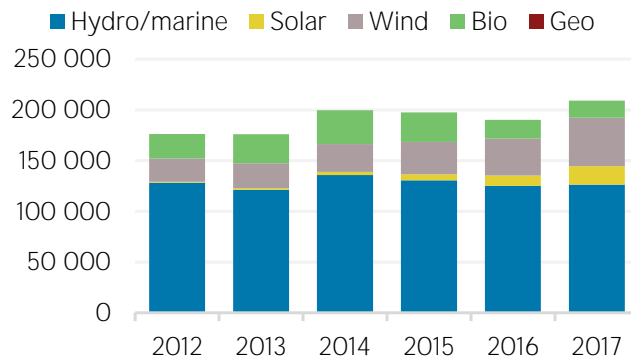
## Net capacity change (MW)



## Capacity utilisation in 2017 (%)



## Renewable generation (GWh)



Most immediate clean energy targets & NDCs

	year	target	unit
<b>Renewable energy:</b>	2030	40	%
Renewable electricity:	2012	3	GW
Renewable capacity:			
Renewable transport:			
Liquid Biofuel blending mandate:			
Other transport targets:			
Renewable heating/cooling:			
Renewable Hydropower			
Off-grid renewable technologies:			

Energy efficiency (Energy):

Energy efficiency (Electricity):

Latest policies, programmes and legislation

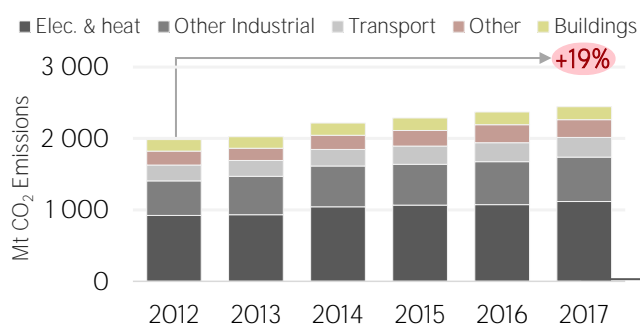
1	Capital Grants for Off-Grid and Decentralized Concentrated Solar Thermal (CST) Technologies for Community Cooking, Process Heat and Space Heating & Cooling Applications - Extension	2018
2	National Wind-Solar Hybrid Policy	2018
3	Scheme to Support Promotion Of Biomass-Based Cogeneration In Sugar Mills And Other Industries In The Country (Up To March 2020)	2018
4	The Uttar Pradesh Solar Power Policy 2017	2018
5	India national onshore wind capacity auction (2nd round)	2017

References to sustainable energy in Nationally Determined Contribution (NDC)

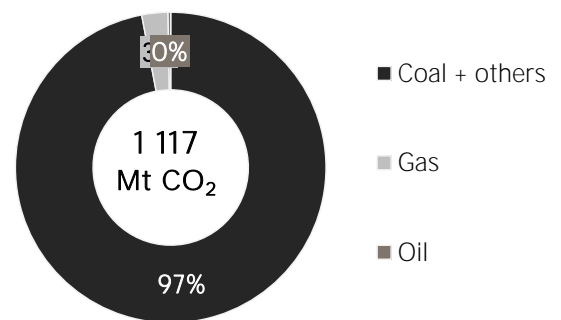
- |                           | Conditional | Unconditional | unit |
|---------------------------|-------------|---------------|------|
| - <b>Renewable energy</b> |             |               |      |
| - electricity             |             |               |      |
| - transport               |             |               |      |
| - heating/cooling         |             |               |      |
| - Energy efficiency       |             |               |      |

ENERGY AND EMISSIONS

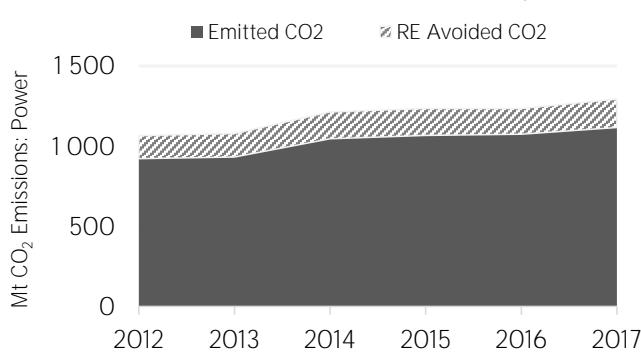
Energy-related CO<sub>2</sub> emissions by sector



Elec. & heat generation CO<sub>2</sub> emissions in 2017

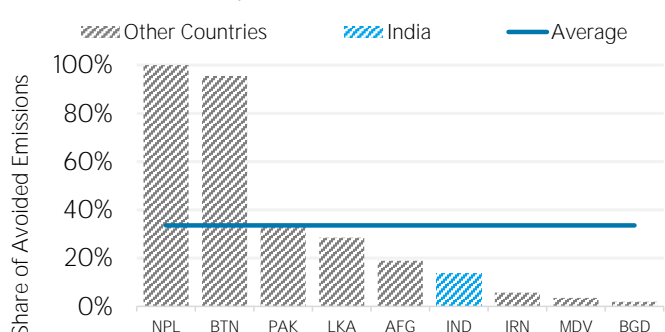


Avoided emissions from renewable power



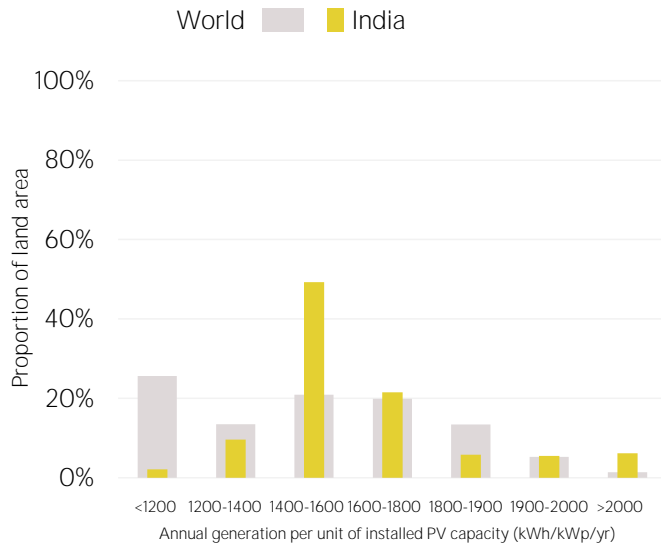
Avoided emissions based on fossil fuel mix used for power

Reduction in power emissions due to RE in 2017

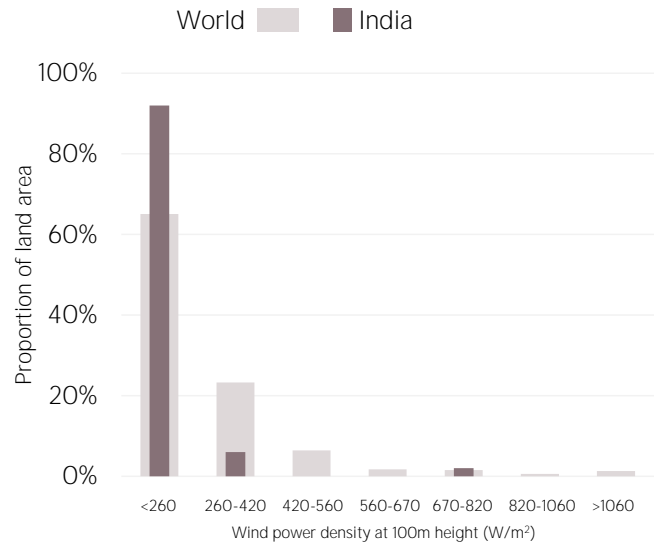


Reduction is RE Avoided divided by sum of avoided and emitted

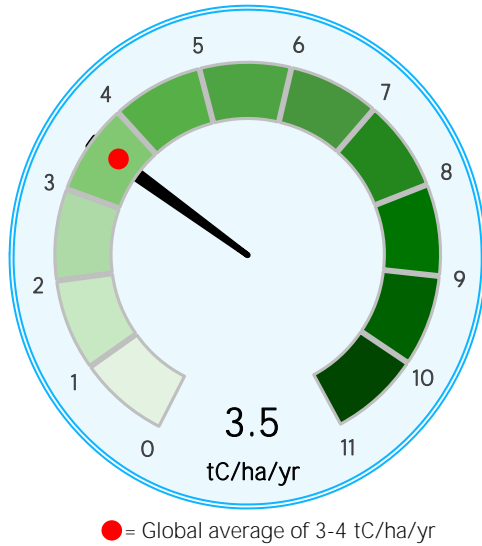
Distribution of solar potential



Distribution of wind potential



Biomass potential: net primary production



Indicators of renewable resource potential

**Solar PV:** Solar resource potential has been divided into seven classes, each representing a range of annual PV output per unit of capacity (kWh/kWp/yr). The bar chart shows the proportion of a country's land area in each of these classes and the global distribution of land area across the classes (for comparison).

**Onshore wind:** Potential wind power density (W/m<sup>2</sup>) is shown in the seven classes used by NREL, measured at a height of 100m. The bar chart shows the distribution of the country's land area in each of these classes compared to the global distribution of wind resources. Areas in the third class or above are considered to be a good wind resource.

**Biomass:** Net primary production (NPP) is the amount of carbon fixed by plants and accumulated as biomass each year. It is a basic measure of biomass productivity. The chart shows the average NPP in the country (tC/ha/yr), compared to the global average NPP of 3-4 tonnes of carbon per year.

**Sources:** IRENA statistics, plus data from the following sources: UN SDG Indicators Database (original sources: WHO; World Bank; IEA; IRENA; and UNSD); UNSD Energy Balances; UN COMTRADE; World Bank World Development Indicators; EDGAR; REN21 Global Status Report; IEA-IRENA Joint Policies and Measures Database; IRENA Global Atlas; and World Bank Global Solar Atlas and Global Wind Atlas.

**Additional notes:** Energy self-sufficiency has been defined as total primary energy production divided by total primary energy supply. The value of energy trade has been defined as including all commodities in Chapter 27 of the Harmonised System (HS). Capacity utilisation has been calculated as annual generation divided by capacity x 8,760. Avoided emissions from renewable power have been calculated as renewable generation divided by fossil fuel generation multiplied by reported emissions from the power sector. This assumes that, if renewable power did not exist, fossil fuels would be used in its place to generate the same amount of power and using the same mix of fossil fuels. In countries and years where no fossil fuel generation occurs, an average fossil fuel emission factor has been used to calculate the avoided emissions.

This note has been produced to provide policy makers with a brief overview of developments in renewable energy in a country. The IRENA statistics team would welcome comments and feedback on its structure and content, which can be sent to [statistics@irena.org](mailto:statistics@irena.org).

Last updated on: 26th May, 2020



IRENA Headquarters  
 Masdar City  
 P.O. Box 236, Abu Dhabi  
 United Arab Emirates  
[www.irena.org](http://www.irena.org)