STATISTICAL PROFILE

Brazil

Sustainable Development Goal 7.2: Energy Indicators (2016)

Renewable energy (% of TFEC)	45.5	Access to electricity (% of population)	99.7
Energy efficiency (MJ per $1 of GDP)	4.1	Access to clean cooking (% of population)	>95

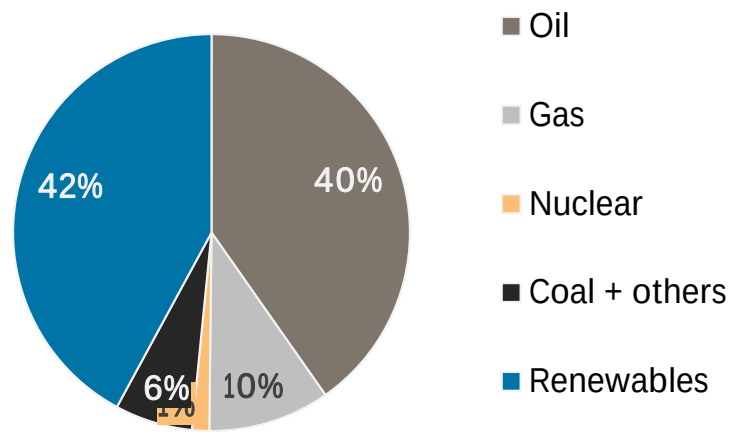
TOTAL PRIMARY ENERGY SUPPLY (TPES)

TPES	2011	2016
Non-renewable (TJ)	6 367 128	7 061 271
Renewable (TJ)	4 766 277	5 131 931
Total (TJ)	11 133 405	12 193 202
Renewable share (%)	43	42

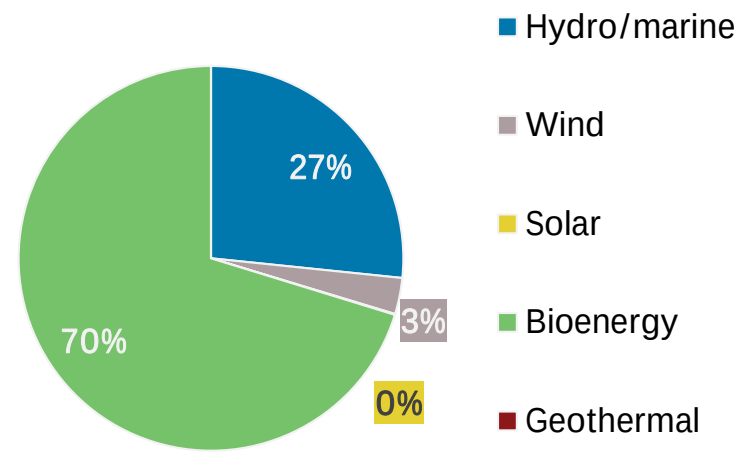
Growth in TPES	2011-16	2015-16
Non-renewable (%)	+10.9	-7.6
Renewable (%)	+7.7	-0.1
Total (%)	+9.5	-4.6

Primary energy trade	2011	2016
Imports (TJ)	2 889 540	2 527 968
Exports (TJ)	1 611 176	2 245 495
Net trade (TJ)	-1 278 364	- 282 473
Imports (% of supply)	26	21
Exports (% of production)	16	18
Energy self-sufficiency (%)	91	100
Net trade (USD million)	- 10 349	- 3 561
Net trade (% of GDP)	-0.4	-0.2

Total primary energy supply in 2016



Renewable energy supply in 2016



RENEWABLE ENERGY CONSUMPTION

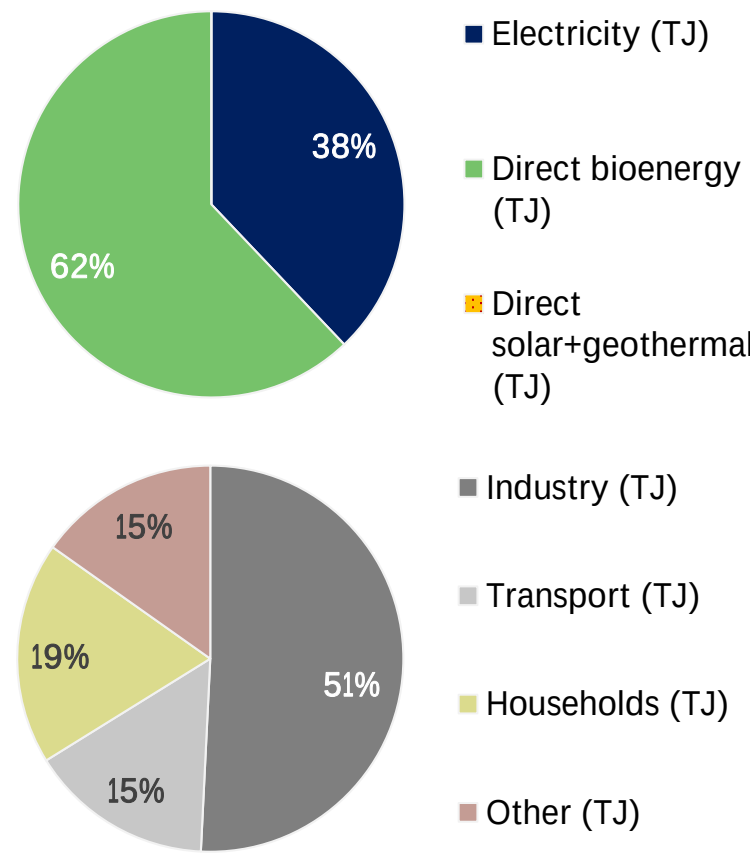
Consumption by source	2011	2016
Electricity (TJ)	1 408 275	1 427 443
Direct bioenergy (TJ)	2 241 256	2 337 121
Direct solar+geothermal (TJ)	0	0
Total (TJ)	**3 649 531**	**3 764 564**
Electricity share (%)	39	38

Consumption growth	2011-16	2015-16
Renewable electricity (%)	+1.4	-0.6
Other renewables (%)	+4.3	-1.3
Total (%)	**+3.2**	**-1.0**

Consumption by sector	2011	2016
Industry (TJ)	2 003 236	1 911 578
Transport (TJ)	448 916	579 240
Households (TJ)	684 862	701 496
Other (TJ)	512 517	572 250

Renewable share of TFEC	45.5	45.5

Renewable energy consumption in 2016



ELECTRICITY CAPACITY AND GENERATION

Capacity in 2018	MW	%
Non-renewable	**27 641**	**17**
Renewable	**136 156**	**83**
Hydro/marine	104 463	64
Solar	2 078	1
Wind	14 833	9
Bioenergy	14 782	9
Geothermal	0	0
Total	**163 797**	**100**

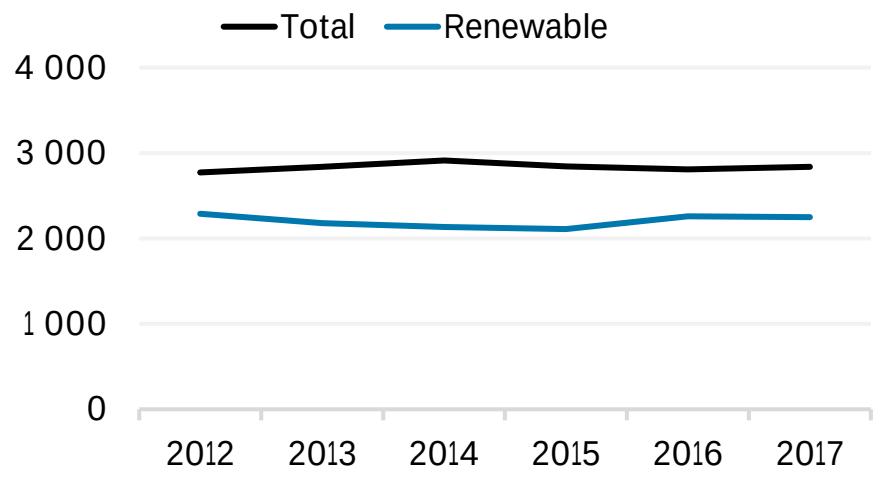
Capacity change (%)	2013-18	2017-18
Non-renewable	**+ 3**	**- 5.7**
Renewable	**+ 36**	**+ 6.1**
Hydro/marine	+ 21	+ 4.1
Solar	+ 36 222	+ 88.2
Wind	+ 574	+ 20.7
Bioenergy	+ 27	+ 1.5
Geothermal	0	0.0
Total	**+ 29**	**+ 3.9**

Net capacity change in 2018 (MW)

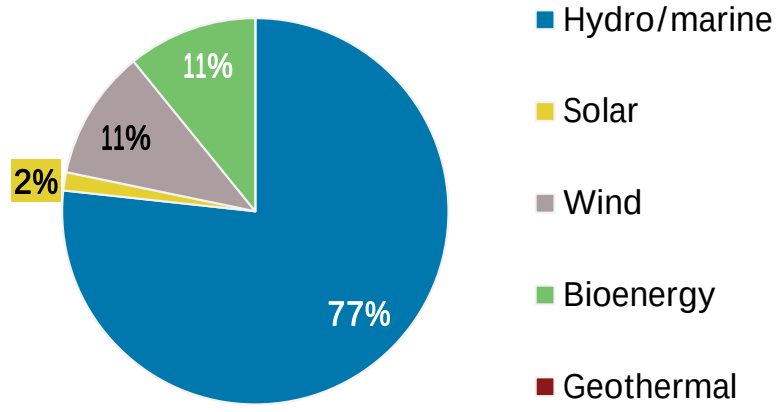
Non-renewable: - 1 670	Hydro and marine: + 4 144
Solar: + 974	Wind: + 2 539
Bioenergy: + 223	Geothermal: 0

Generation in 2017	GWh	%
Non-renewable	**122 313**	**21**
Renewable	**467 289**	**79**
Hydro and marine	370 906	63
Solar	998	0
Wind	42 391	7
Bioenergy	52 994	9
Geothermal	0	0
Total	**589 602**	**100**

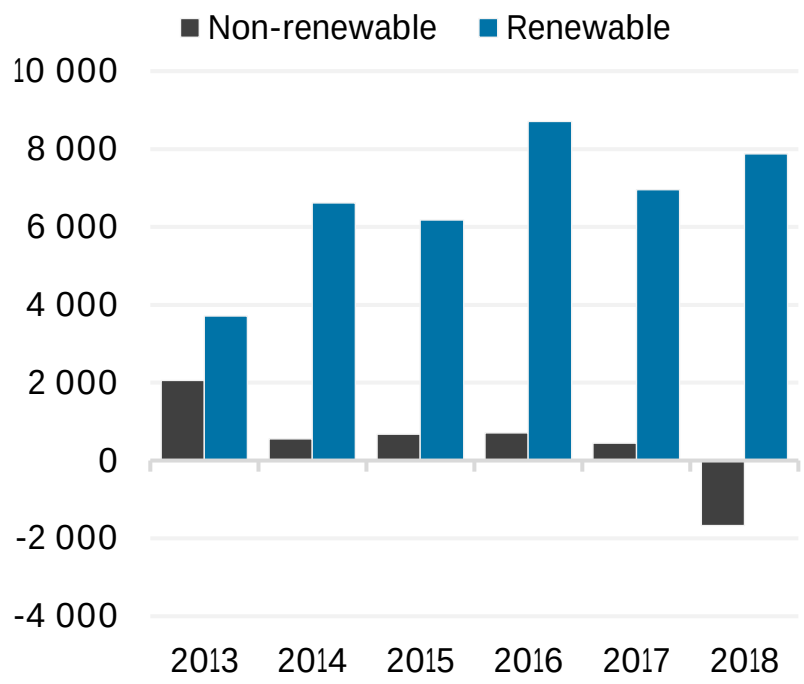
Per capita electricity generation (kWh)



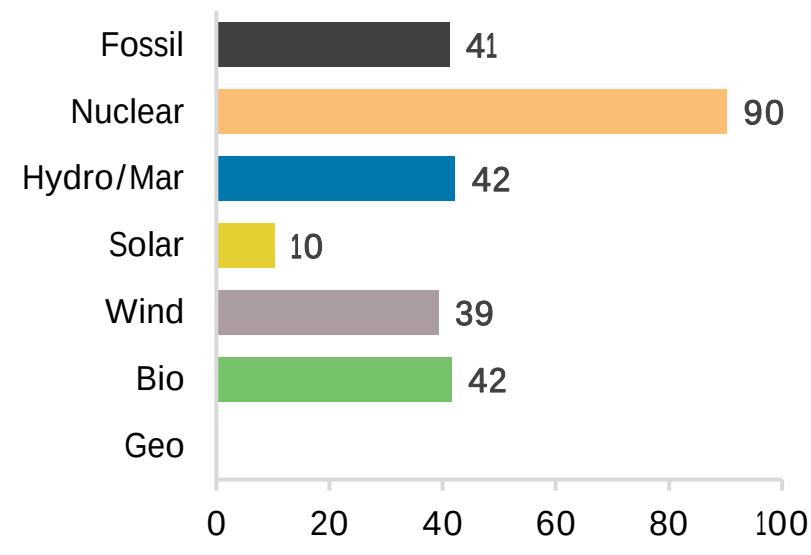
Renewable capacity in 2018



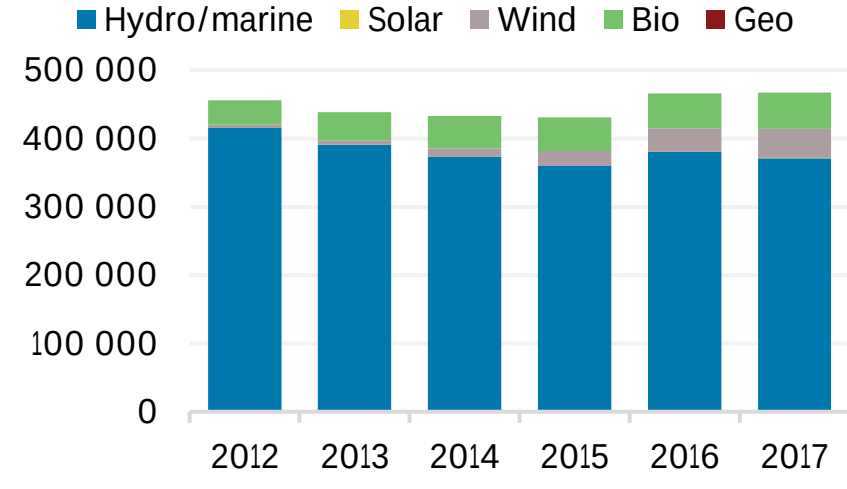
Net capacity change (MW)



Capacity utilisation in 2017 (%)



Renewable generation (GWh)



TARGETS, POLICIES AND MEASURES

Most immediate clean energy targets & NDCs

	year	target	unit
Renewable energy:	2025	49	%
Renewable electricity:	2021	146 974	MW
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

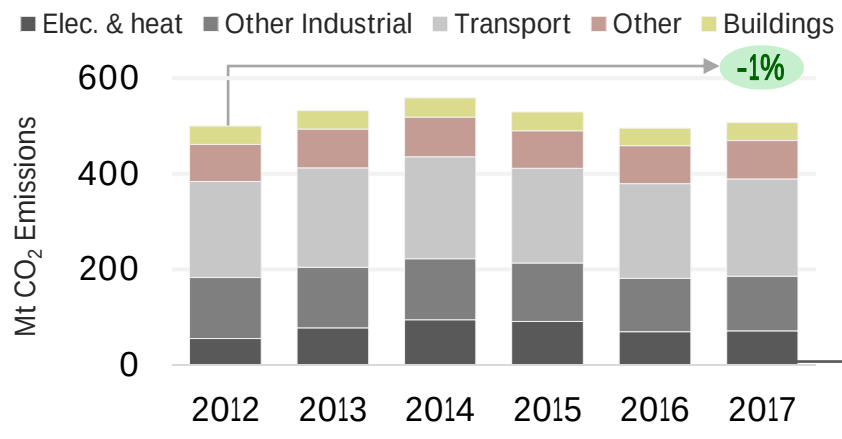
1	Wind Turbine Component Tax Exemption (Executive Decree 656)	2014
2	Brazil Inova Energia Program	2013
3	Brazil Net Metering for Distributed Generation	2012
4	Ethanol export tax credit - Regime Especial de Reintegração de Valores Tributários para as Empresas Exportadoras - REINTEGRA	2011
5	2010-2019 Plan for Energy Expansion	2010

References to sustainable energy in Nationally Determined Contribution (NDC)

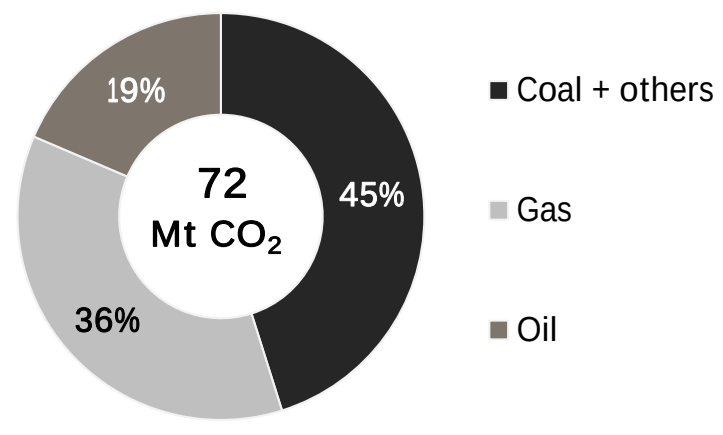
	Conditional	Unconditional	unit
- **Renewable energy**		**45**	**%**
- electricity			
- transport			
- heating/cooling			
- Energy efficiency			

ENERGY AND EMISSIONS

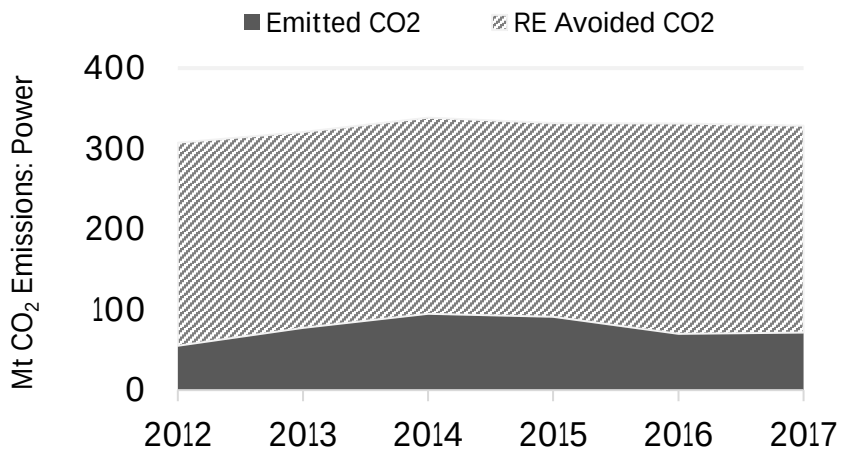
Energy-related CO_2 emissions by sector



Elec. & heat generation CO_2 emissions in 2017

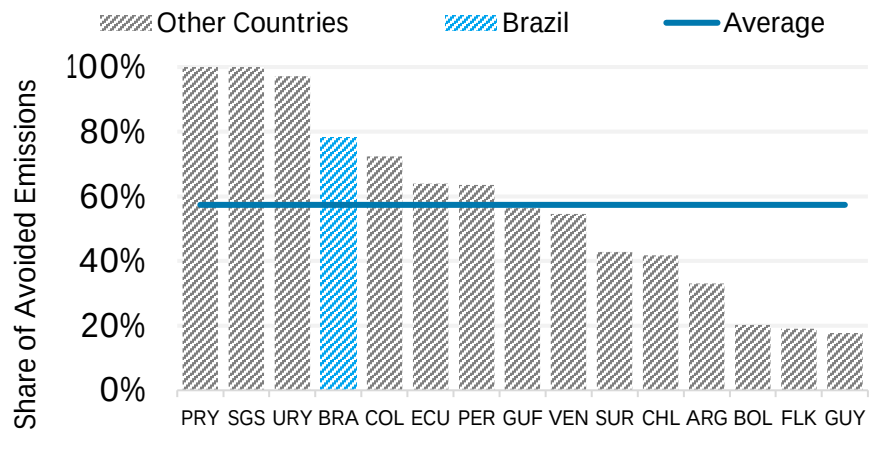


Avoided emissions from renewable power



Avoided emissions based on fossil fuel mix used for power

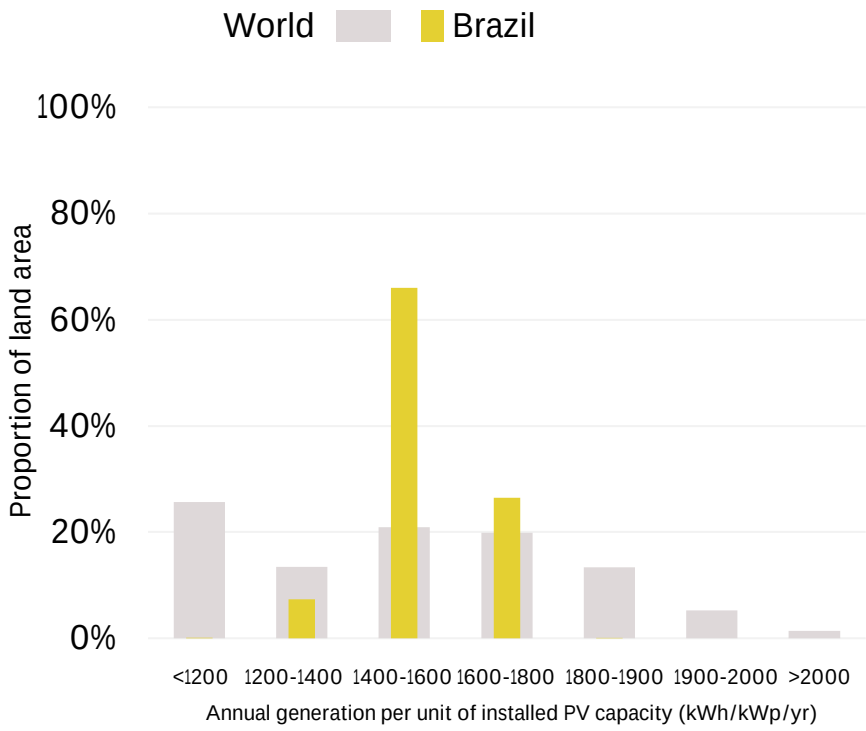
Reduction in power emissions due to RE in 2017



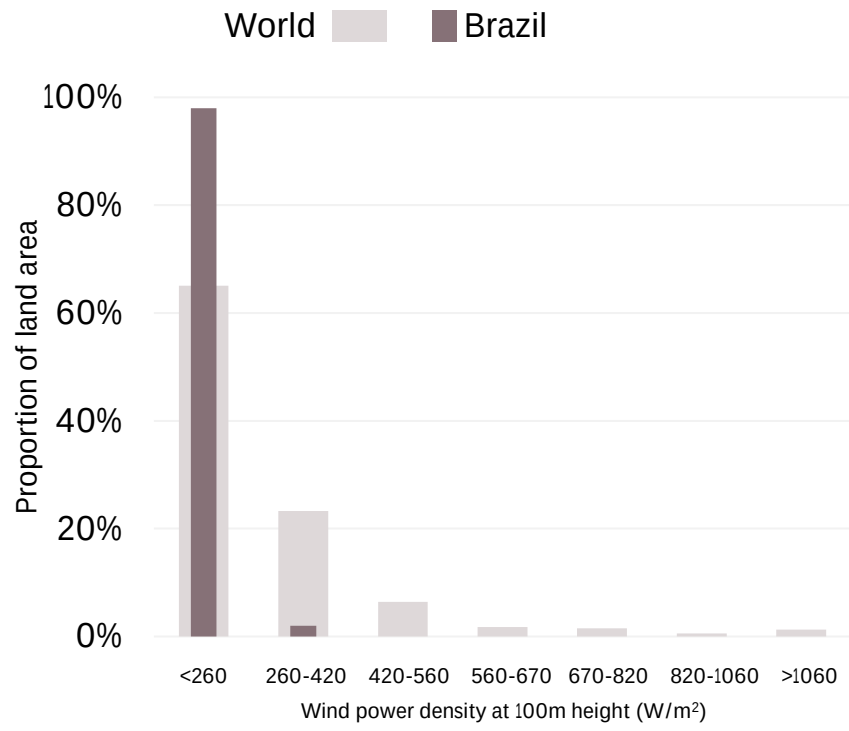
Reduction is RE Avoided divided by sum of avoided and emitted

RENEWABLE RESOURCE POTENTIAL

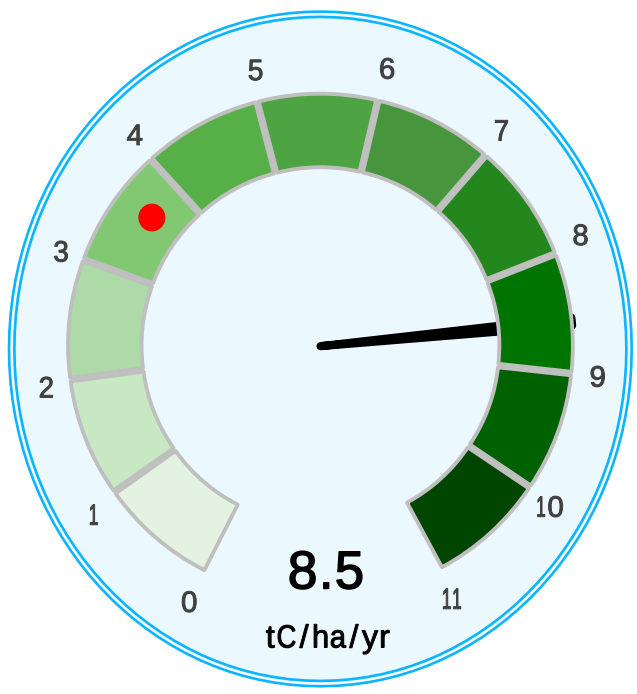
Distribution of solar potential



Distribution of wind potential



Biomass potential: net primary production



= Global average of 3-4 tC/ha/yr

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^2) 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 secrtor. 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.

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