

SOUTH ASIA

# India

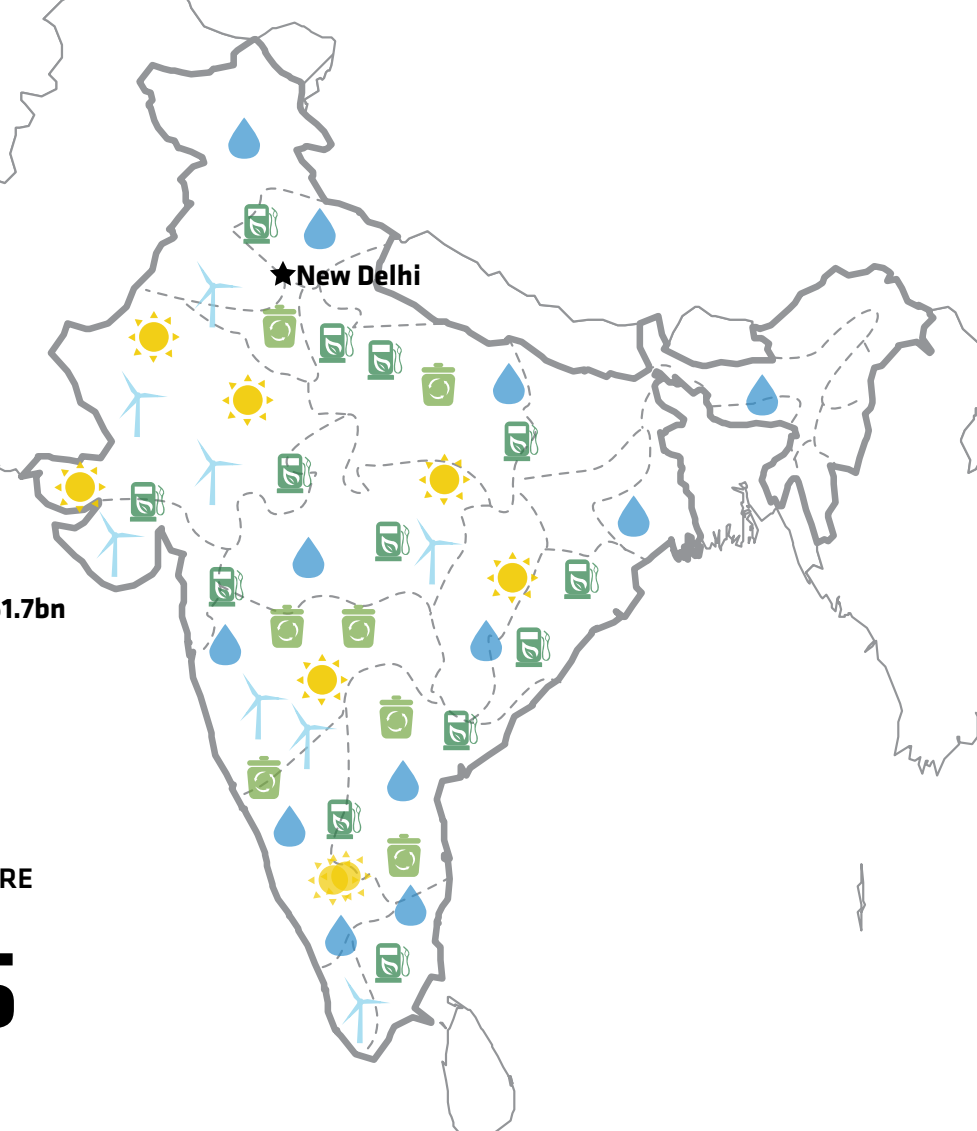
GDP: **\$1,876.8bn**  
 Five-year economic growth rate: **7%**  
 Population: **1.2bn**  
 Total clean energy investments, 2006-2013: **\$61.7bn**  
 Installed power capacity: **235.4GW**  
 Renewable share: **14.2%**  
 Total clean energy generation: **59,511GWh**  
 Top energy authority: **Ministry of Power**

OVERALL RANKING  
2014

**4**

OVERALL SCORE  
2014

**1.85**



PARAMETER	RANKING	SCORE
I. Enabling Framework	07	1.46
II. Clean Energy Investment & Climate Financing	15	0.85
III. Low-Carbon Business & Clean Energy Value Chains	05	4.10
IV. Greenhouse Gas Management Activities	07	2.68

## SUMMARY

India was ranked 4<sup>th</sup> out of 55 with a score of 1.85 on *Climatescope* 2014. It had its best performance on Low Carbon Business and Clean Energy Value Chain Parameter III, achieving high marks on indicators related to financial institutions, developed clean energy value chains and service providers.

India is the world's second-most populous country and among its fastest growing economies, with a 2013 GDP of \$1.9 trillion. Steadily rising power demand, good-to-excellent renewable resources and often-impaired fossil fuel supply chains make India

a growth market for clean energy. The country received \$6bn in clean energy investment in 2013, out of a total of \$62bn from 2006 to 2013. Wind is the largest renewable energy sector, with 60% of capacity and 53% of all investment from 2006 to 2013.

Coal is still the backbone of the country's power system, providing 71% of its 1,088TWh of total generation in 2013. However, renewable power is an important and growing part of the country's energy matrix: at 33GW it comprised 14% of installed capacity but only 5.5% of generation in 2013.

For further information, access [www.global-climatescope.org/india](http://www.global-climatescope.org/india)

## I. ENABLING FRAMEWORK

### Ranking 7 / Score 1.46

India placed 7<sup>th</sup> on Enabling Framework Parameter I. It performed well on the clean energy rural electrification, clean energy policy and power sector structure indicators.

India's power sector is regulated, with separate ownership of generation, transmission and distribution entities. Transmission is consolidated within one government-owned, publicly-listed utility. State-owned distribution companies provide the bulk of distribution, with some privatization thanks to power sector reforms. Generation is the most open to private participation, with IPPs owning a third of the country's capacity.

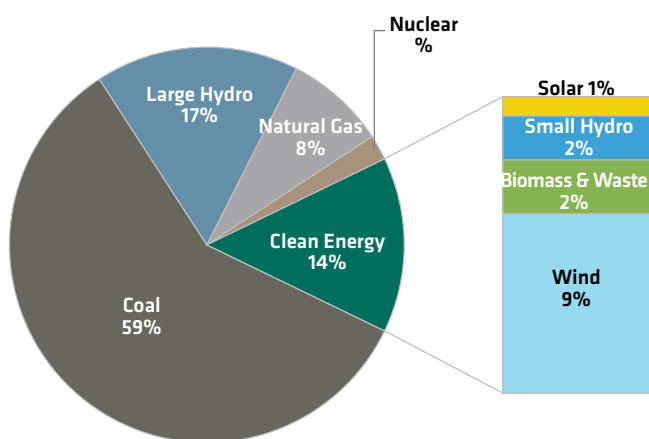
National generation capacity reached 235GW in 2013. Coal constituted the biggest part of this with 58% (137GW), followed by large hydro with 16% (39GW). Wind is the largest renewable generation source, with 20GW and 60% of total renewables capacity. There is also 6GW of small hydro, accounting for 18% of capacity, while biomass and solar make up most of the remainder.

Favorable policies and incentives spurred development of 22GW of renewable energy capacity from 2006-13. Feed-in tariffs and long-term power purchase agreements, which provide revenue clarity and the promise of long-term returns, have been largely successful. Additional incentives such as the tax-based accelerated depreciation and INR 500/MWh (\$8.2/MWh) cash incentive for wind have accelerated investments in the sector.

The power market is partially distorted by subsidized tariffs for certain consumer groups such as farmers. Bilateral trade among private parties is constrained, owing to variation in power delivery charges. Although India has power exchanges, they account for

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

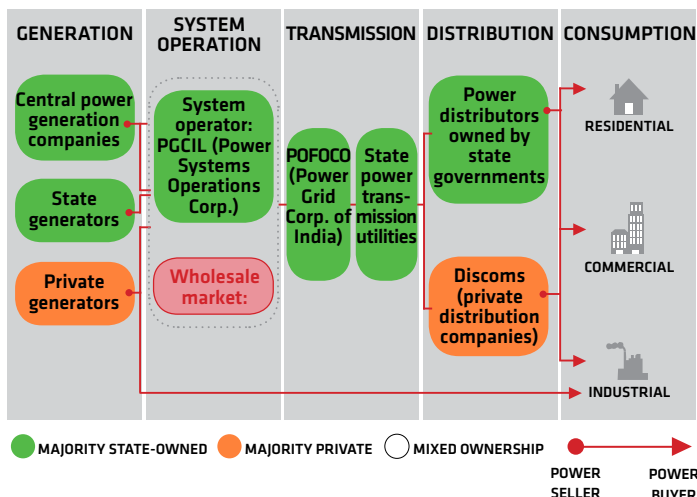
235.4GW total installed capacity



Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy  
 Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

## POWER SECTOR STRUCTURE

Regulator: Central Electricity Regulatory Commission and State Regulatory Commissions



Source: Bloomberg New Energy Finance

less than 3% of the country's power needs. These factors, along with insufficient transmission in many parts of the country, hold back wider deployment of large-scale renewables. Rural electrification efforts have increased the number of villages with power, but roughly 400 million people lack reliable access to electricity.

## KEY POLICIES

<b>Auctions</b>	The Jawaharlal Nehru National Solar Mission is targeting development of 20GW of solar power by 2022. Phase II Batch I (750MW) was awarded in February 2012. Phase I allotted 446MW of PV and 470MW of solar thermal.
<b>Biofuel Blending Mandate</b>	There is an overarching national target to achieve 20% biofuel content for both petrol and diesel by 2017. In January 2013, a directive was issued mandating the blending of 5% ethanol with petrol by 30 June 2013.
<b>Debt-Equity Incentives</b>	Various grants and capital subsidies have been made by central government to develop small-scale biogas, biomass & waste-based systems, solar lighting and rural electrification.
<b>Energy Targets</b>	The 2008 National Action Plan for Climate Change encompasses eight different 'national missions' with key targets running through to 2017 that are state-mandated, and include a 15% renewable purchase obligation.
<b>Feed-in-Tariffs</b>	State-level electricity regulations mandate FiTs that are applicable for a set period of time, for each energy source.
<b>Net Metering</b>	The states of Tamil Nadu (2013) and Rajasthan (2014) have net metering for rooftop solar projects. The latter also provides a 20% capital subsidy for projects under the scheme.
<b>Tax Incentives</b>	From April 1962, accelerated depreciation of 80% was claimable by renewable energy developers in the first year of installation. As of 30 March 2012, the depreciation benefit was lowered to 15%.

Source: Bloomberg New Energy Finance Policy Library

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

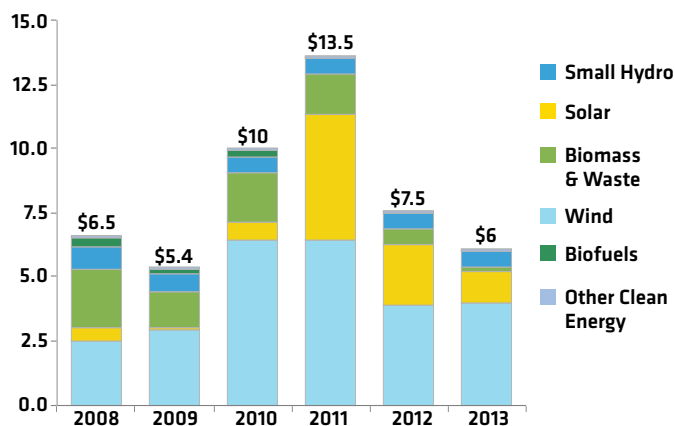
### Ranking 15 / Score 0.85

India placed 15<sup>th</sup> on Clean Energy Investment Parameter II. It scored well on the asset finance and corporate finance indicators.

Clean energy investment has varied year to year due to changes in renewable energy policy, but also because of macroeconomic factors. From \$5bn in 2009, investment peaked at \$13.5bn in 2011 due to solar tenders and accelerated deprecia-

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 (\$bn)

\$49bn total cumulative investment



Source: Bloomberg New Energy Finance

Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital/Private Equity Commitments.

### LEAGUE TABLE

2013 Total Investors **\$6,020m**

#### Top Financier, 2013 (\$m)

1st	State Bank of India	\$188m
2nd	Central Bank of India	\$173m
3rd	PTC India Ltd	\$67m

#### Top Three Asset Finance Deals, 2013 (\$m)

Rank	Sector	Project (MW)	Developer	Value
1st	Wind	Jath Wind Farm (130MW)	CLP Power India	\$295m
2nd	Solar	Neemuch PV Plant (130MW)	Wespun Urja India	\$221m
3rd	Wind	Savalsung and Burgula Wind Portfolio (138MW)	Mytrah Energy India	\$146m

Source: Bloomberg New Energy Finance

Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

tion policies for wind. Investment bottomed at \$4.2bn in 2009, largely due to the global financial crisis. Levels are expected to rise in 2015 owing to an increasingly favorable policy environment. Solar in particular is forecast to expand rapidly, to nearly 4GW per year by 2016, and wind to surpass 3GW of annual installations.

### III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

#### Ranking 5 / Score 4.10






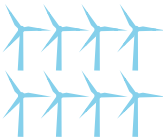
India took 5<sup>th</sup> on Clean Energy Value Chain Parameter III. It performed well in the value chains by clean energy sector and clean energy service providers indicators, given its well-developed renewable energy equipment manufacturing industry.

India's wind value chain is extensive, with many components made in-country and several companies that have full assembly and integration capabilities. Its 10GW of wind turbine manufacturing capacity is three times the domestic demand, giving India a healthy export capability. The Center for Wind Energy Technology (C-WET), a government-owned certifying agency, ascertains the technical performance of turbines and manufacturers' capabilities which increases their bankability.

The country also has more than 2GW of solar module manufacturing capacity, but almost no wafer or polysilicon production. Cell and module manufacturers have faced stiff competition from imports which has affected their viability and output. Domestic content rules are in place to spur local manufacturing, but they also complicate developer planning and sometimes increase costs.

The small hydro and biomass value chains are the most complete value chains, though smaller than wind or solar in gigawatt terms. The country also has a full array of clean energy service providers which offer services ranging from operations and maintenance to consulting and legal services.

#### CLEAN ENERGY VALUE CHAINS BY SECTOR

Sector / Quantity	Available Sub-Sector, Unavailable Sub-Sector
<b>Biofuels</b> 	<b>Producers ; Engineering ; O&amp;M ; Equipment Manufacturing ; Distribution and Blending</b>
<b>Biomass &amp; Waste</b> 	<b>Project Development ; Engineering ; O&amp;M ; Equipment Manufacturing ; Feedstock Supply</b>
<b>Geothermal</b> 	<b>Project Development ; Engineering ; O&amp;M ; Resource Development ; Turbines ; Balance of Plant</b>
<b>Small Hydro</b> 	<b>Project Development ; Engineering ; O&amp;M ; Turbines ; Balance of Plant</b>
<b>Solar</b> 	<b>Project Development ; Engineering ; O&amp;M ; Polysilicon/ingots ; Wafers ; Cells ; Modules ; Inverters ; Balance of Plant</b>
<b>Wind</b> 	<b>Project Development ; Engineering ; O&amp;M ; Turbines ; Blades ; Gearboxes ; Towers ; Balance of Plant</b>

Source: Bloomberg New Energy Finance

Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

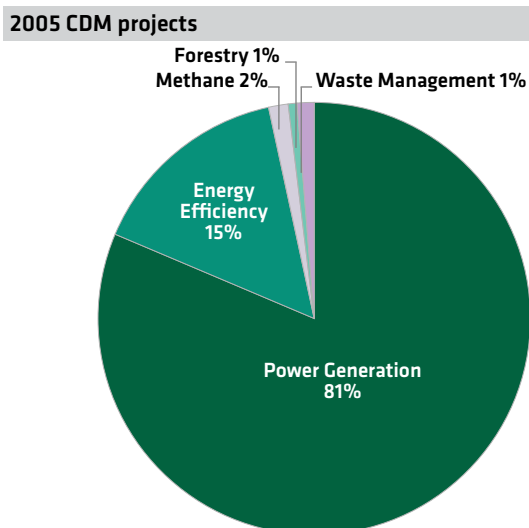
### IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

#### Ranking 7 / Score 2.68

India placed 7<sup>th</sup> on Greenhouse Gas Management Activities Parameter IV. It performed well on the carbon offsets historical activity indicator, due to its large number of CDM and renewable energy projects. However, India lags in corporate voluntary GHG management and disclosure activities.

India has no legally binding GHG emissions reduction target, but aims to reduce its carbon intensity by 20–25% from 2005 levels by 2020. It has opposed any international commitments which might impact its economic growth and development, and thus it prioritizes both energy efficiency and renewable energy, while also expanding its fossil plant fleet. In July 2012, the country launched an energy efficiency certificates program for its most energy-intensive industries. Trading via the Perform Achieve and Trade program is expected to begin in 2015.

#### CDM OFFSET PROJECTS BY SECTOR



Source: UNEP Risoe, Bloomberg New Energy Finance

## INDIA - PERFORMANCE BY STATE

India's diverse geography and diverse state economies led to different ranking outcomes for the 10 states examined in *Climatescope*.

Clean energy deployment rates differed substantially, thanks to available resources but also protected land status in some regions which might otherwise be promising for large-scale renewables deployment as well as infrastructure constraints. Like China, India has a relatively complete value chain at a national level, which separates out into distinct strengths state by state.

Indian states fall into three cohorts: skilled Southern states, resource-rich western states, and crowded, constrained states in the north and east.

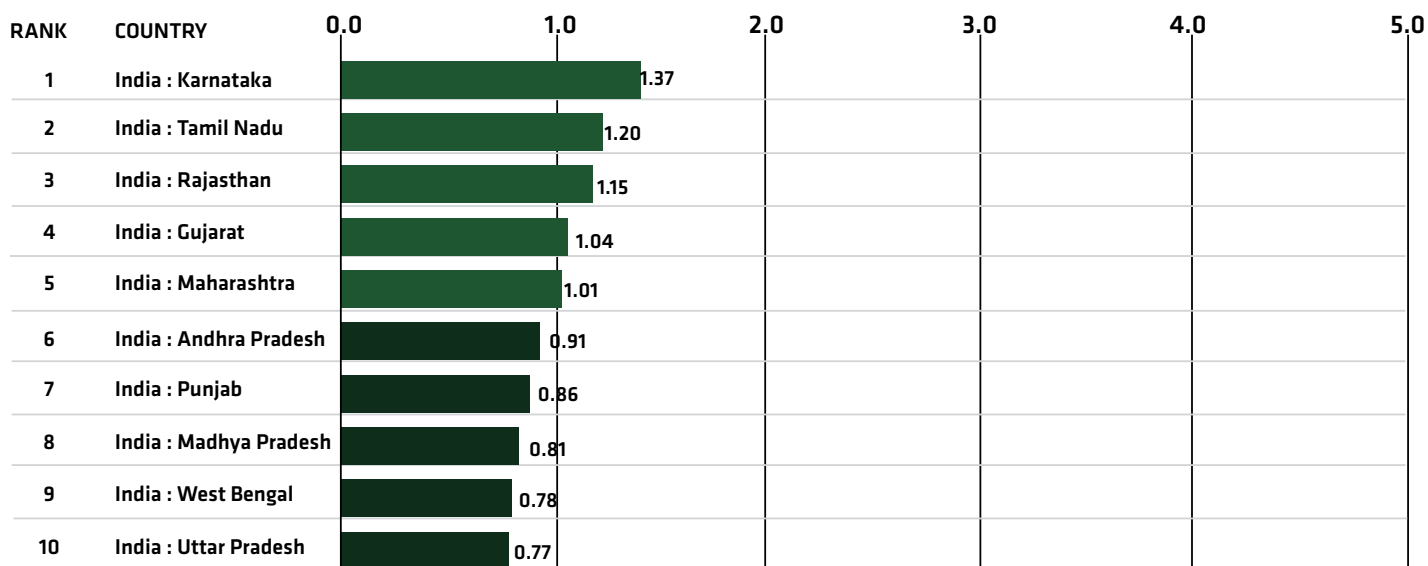
India's two best performing states, Karnataka and Tamil Nadu, are in India's far south and performed best on Parameter III thanks to their strong value chains for wind, solar, hydro, and biomass value chains. Karnataka has held its own tenders for more solar energy deployment, and Tamil Nadu is one of India's most industrialized states.

The western states of Maharashtra, Gujarat, and Rajasthan form the next cohort. Maharashtra benefits from the financial strength of its capital, Mumbai, as well as its bioenergy value chain. Gujarat and Rajasthan have excellent wind and solar resources, and Gujarat in particular has a sound history of successful deployment of wind and solar through its own tenders.

Northern and eastern states are the final cohort in India. West Bengal, Uttar Pradesh, and Madhya Pradesh have the lowest performances in India. These regions, densely populated and not as blessed with wind and solar resources as the emptier western states, are challenging markets for wide-scale deployment of clean energy. While new policies in support of distributed solar are emerging in West Bengal, it remains a physically crowded area for deploying clean energy in substantial volume.

### 2014 Global Climatescope scores

#### India states ranking



Colors show range for overall score

