

EAST ASIA

# China

GDP: **\$9,240bn**  
 Five-year economic growth rate: **11%**  
 Population: **1.3bn**  
 Total clean energy investments, 2006-2013: **\$302.5bn**  
 Installed power capacity: **1,247GW**  
 Renewable share: **14%**  
 Total clean energy generation: **41,981GWh**  
 Top energy authority:  
**National Development and Reform Commission (NDRC)**

**OVERALL RANKING**  
2014

**1**

**OVERALL SCORE**  
2014

**2.23**

| PARAMETER  | RANKING | SCORE |
|--|---------|-------|
| I. Enabling Framework                                | 03      | 1.57  |
| II. Clean Energy Investment & Climate Financing      | 03      | 1.29  |
| III. Low-Carbon Business & Clean Energy Value Chains | 01      | 5.00  |
| IV. Greenhouse Gas Management Activities             | 03      | 3.12  |

## SUMMARY

China received the highest overall score in the 2014 *Climate-scope* with a 2.23. China had its best performance on Low-Carbon Business and Clean Energy Value Chain Parameter III, achieving its best marks on the following indicators: financial institutions in clean energy, value chains by clean sector and clean energy service providers.

The world's largest country by population also has the largest installed capacity, most generation, and highest total CO2 emissions of any country. China completed its electrification process a decade ago, but continues to add new power genera-

tion capacity at an extraordinary rate. It has been the world's largest wind power market for the past five years and in 2013 vaulted to becoming the largest solar photovoltaic market as well. In 2012, China added as much total power generation capacity (80GW) as the entire capacity of Mexico, a country of 120 million people.

China received a total of \$54bn in clean energy investment in 2013, out of a cumulative of \$302.2bn in the 2006-2013 period. Wind and solar energy are China's flagship sectors.

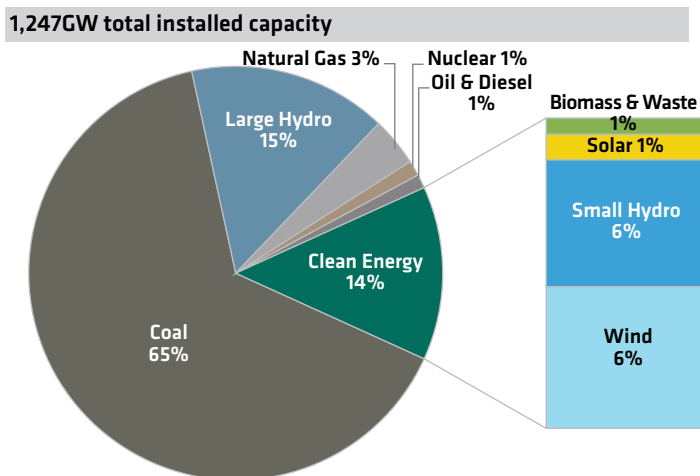
For further information, access [www.global-climatescope.org/china](http://www.global-climatescope.org/china)

## I. ENABLING FRAMEWORK

### Ranking 3 / Score 1.57

China obtained 3<sup>rd</sup> place on Enabling Framework Parameter I. It performed well in clean energy policies and power sector structure given its strong feed-in tariffs and high-level government support. However, China still lags behind in installed capacity and growth of clean energy generation as a proportion of its total power mix – even if it is the world’s biggest wind and solar market.

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



Source: Bloomberg New Energy Finance, Lawrence Berkeley National Lab, National Energy Administration  
 Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

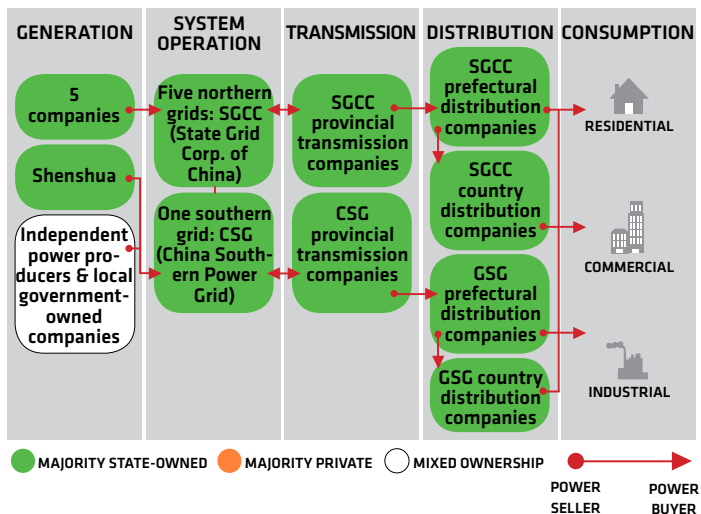
China’s power sector is highly regulated, and state-owned companies dominate, controlling 50% of generation and 100% of transmission, distribution, and retail. The government directly controls wholesale and retail prices. Electricity consumption has long increased at or above the rate overall real GDP growth, though these are now decoupling, with electricity demand growth forecast at 7.1% and GDP growth of 7.5%

China commissioned 103GW of power generation capacity in 2013, bringing its overall capacity to 1,247GW. Coal is the backbone of China’s power fleet, but it is decreasing as a percentage of new capacity getting added, to 42% last year from 61% in the past four years. Hydro and nuclear continue to grow and wind and solar added 16.1GW and 12.9GW respectively in 2013.

China offers feed-in tariffs for wind, solar, biomass, waste, and nuclear power generation. China’s wind industry has been the world’s largest for years, and after a relatively slow start, its PV market is now the world’s largest as well. China’s financial institutions also extend lines of credit to private companies enabling their growth.

## POWER SECTOR STRUCTURE

Regulator: National Energy Administration



Source: Bloomberg New Energy Finance

Electricity market reform now in development in China could have a profound impact on future clean energy development. Reform is a high priority of the current leadership, and could get rolled out gradually after 2015. Elements would include an unbundling of transmission and distribution from retail electricity sales that would effectively break up the grid companies. Another reform could be to allow more pricing contracts outside of the government’s fixed regime.

## KEY POLICIES

|                        |   |
|------------------------|---|
| Energy Targets         | Proposed minimum quota of electricity from renewable energy sources by 2015. Power companies have targets for non-hydro renewable electricity generation whereas grid corporations and provinces have targets for purchase and consumption. |
| Energy Targets         | 16% energy intensity reduction by 2015 from 2010 levels.  |
| Feed-in-Tariffs        | National feed-in tariffs of \$0.08-0.10/kWh for wind power, as of 2013.   |
| Feed-in-Tariffs        | National feed-in tariffs of \$0.15-0.16/kWh for solar power, as of 2013.  |
| Feed-in-Tariffs        | National feed-in tariffs of \$0.11/kWh for biomass power plants.  |
| Debt-Equity Incentives | State-owned developers of large wind and solar projects can borrow at preferential rates; China Development Bank extends billions of dollars in credit to manufacturers   |
| Tax Incentives         | Less-developed provinces pay lower taxes on new business income (including from renewable energy projects) than do eastern provinces.   |

Source: Bloomberg New Energy Finance Policy Library

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

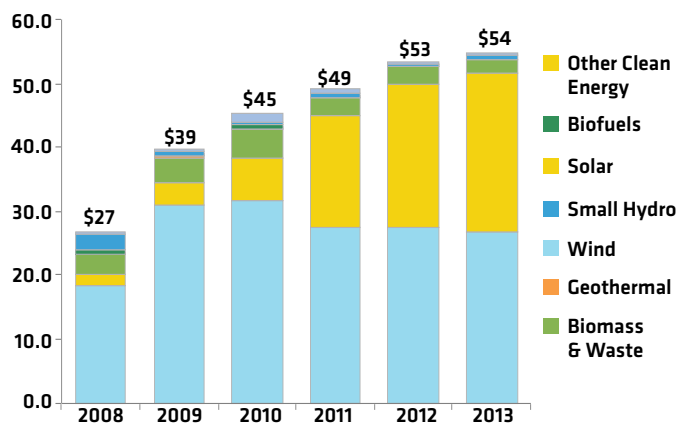
### Ranking 3 / Score 1.29

China obtained 3<sup>rd</sup> place on Clean Energy Investment Parameter II. It performed well in the following indicators: local investments and indicators corporate finance, PE/VC and asset finance investments given its commitment to building clean energy projects and financing manufacturers.

China's clean energy investment has grown six-fold since 2006, as it became the world's largest wind energy market and then the world's largest solar PV market last year. China has a well-evolved financial sector, so projects are funded by project equity, domestic debt, corporate balance sheets and credit extended to its state-owned enterprises.

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

**\$267bn total cumulative investment**



Source: Bloomberg New Energy Finance

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

China's largest projects financed in 2013 were wind and solar projects financed by the corporate balance sheets of their builders. In addition, China Development Bank extended more than \$150m in credit to two solar manufacturers, after extending many billions of dollars in credit in earlier years.

### LEAGUE TABLE

**2013 Total Investment** **\$54,494m**

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

**1st** **China Development Bank Corp.** **\$212m**

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

| Rank | Sector | Project (MW)                       | Developer                               | Value  |
|------|--------|------------------------------------|---|--------|
| 1st  | Wind   | Dafeng Offshore Wind Farm (200MW)  | China Longyuan Power Group              | \$570m |
| 2nd  | Solar  | Longyangxia PV Plant (320MW)       | Huanghe Hydropower Development Co       | \$566m |
| 3rd  | Wind   | Yumen Mahuangtan Wind Farm (400MW) | China Huadian New Energy Development Co | \$560m |

Source: Bloomberg New Energy Finance

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

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

#### Ranking 1 / Score 5.00

China obtained 1<sup>st</sup> place on Low-Carbon Business and Clean Energy Value Chain Parameter III. It performed well in indicators related to financial institutions, value chains and service providers in clean energy given the size and breadth of its clean energy manufacturing capacity and its financing capabilities.

China has robust clean energy value chains, particularly in PV and wind. Its PV industry is still oversupplied even with growing global demand. China supplies not only its own very large market, but 60-70% of global PV cell and module demand and 40% of polysilicon demand as well.

China has established an almost complete wind value chain, though it still relies on imports or licenses for some critical components. China also has a very full value chain of service providers, including financial and legal services supplying almost all of its local needs.





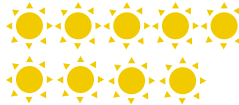
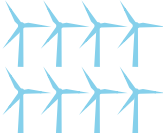
#### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

|   |                                  |   |                   |
|---|----------------------------------|---|-------------------|
| ✓ | Banks                            | ✓ | Corporate Finance |
| ✓ | Funds                            | ✓ | Impact Funds      |
| ✓ | Private Equity / Venture Capital |   |                   |

Source: Bloomberg New Energy Finance

Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

#### CLEAN ENERGY VALUE CHAINS BY SECTOR

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

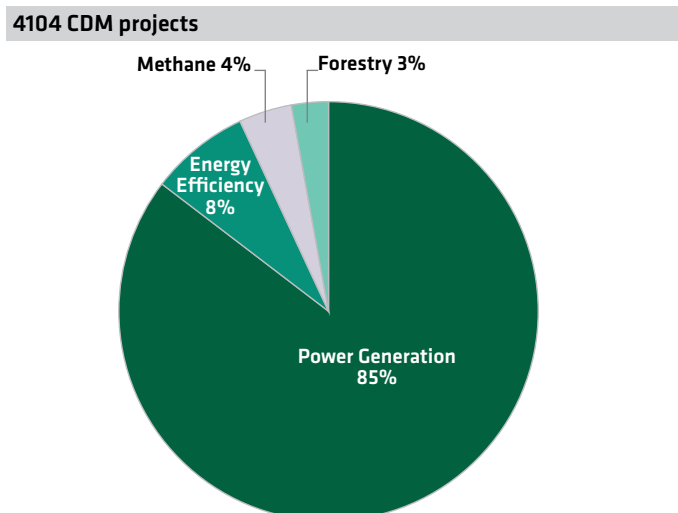
#### Ranking 3 / Score 3.12

China obtained 3<sup>rd</sup> place on Greenhouse Gas Management Activities Parameter IV. It performed well in most of the corporate awareness indicators and indicator GHG country registry as the country now has wide-reaching registries. However, China still lags behind in corporate efforts on GHGs.

China has set a number of CO<sub>2</sub> emissions reduction targets, which aim to improve air pollution and other environmental impacts. It set a goal of 17% reduction in carbon intensity by 2015 from 2010, and a GHG emissions per unit of GDP reduction target of 40-45% below 2005 levels by 2020.

China also has local emissions trading programs, now in pilot scale. A national scheme, based on the experiences of pilots, is scheduled to start sometime after 2015.

#### CDM OFFSET PROJECTS BY SECTOR



Source: UNEP Risoe, Bloomberg New Energy Finance

## CHINA – PERFORMANCE BY PROVINCE/REGION

China is a large, diverse country and as such, its provinces and autonomous regions (such as Tibet, Xinjiang, and Inner Mongolia) had correspondingly diverse *ClimateScope* performances.

Despite the well-publicized growth of coal capacity in China, the country also has a strong federal public policy framework supporting clean energy, with provinces and autonomous regions contributing their incentives (in particular tax code incentives) to attract manufacturing and deployment. As already noted, China was the world’s largest wind and solar market in 2013, and its deployment history – and prospects – are strong though relatively small in proportion to the size of its electricity system. The country also has an absolutely complete clean energy value chain, befitting its recent status as “workshop to the world” and its desire to supply its own demand.

Provinces and autonomous regions fall in to three cohorts: the resource-rich west, the manufacturing-heavy east, and the transmission-constrained far north and south. These cohorts describe three different patterns of development and of opportunity.

The country’s remote, resource-rich western provinces – Xinjiang, Qinghai, and Gansu – ranked highest in *ClimateScope*, thanks to strong performances on Parameters I and II, which

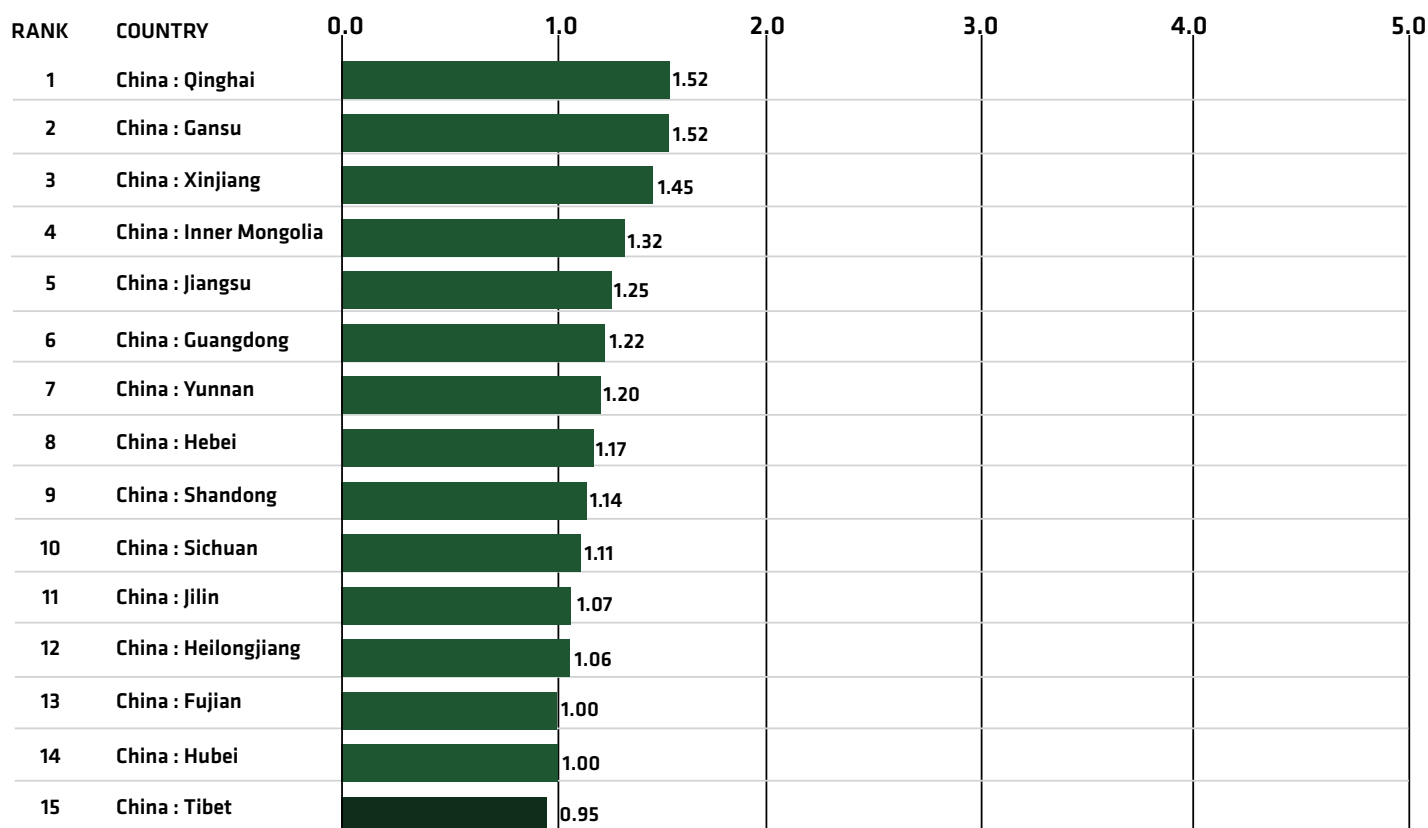
relate to clean energy deployment and investment. These areas have been expressly targeted for increased renewable energy build thanks to their optimal sites and high load factors. The government has also committed to expand transmission infrastructure and increase opportunities to export power to eastern load centers.

The next cohort are eastern and southern manufacturing-heavy provinces, including Jiangsu province surrounding Shanghai, Hebei surrounding Beijing, and Sichuan. These areas had stronger performances in value chain and GHG areas, and relatively weaker performances in deployment – but this is only natural considering that they are heavily urbanized.

The third cohort are the transmission-constrained provinces and regions: Heilongjiang, Jilin, and Tibet in particular. Heilongjiang and Jilin are in China’s far northeast and are home to some of its first commercial windfarms, but the region now experiences very heavy curtailment, lowering the value of its power generation projects. Tibet, which has superb solar and wind resources, is very remote and requires much more infrastructure before its opportunities can be fully realized.

### 2014 Global ClimateScope scores

#### China provinces ranking



Colors show range for overall score

