



CLIMATE SCOPE 2017

**The Clean Energy Country
Competitiveness Index**



**Bloomberg
New Energy Finance**

Overview

Each year, Climatescope takes stock of clean energy activities across the world's developing nations. This year, the survey has been expanded to cover 71 nations. Among them, this group accounts for 32.5% of global GDP and 72.4% of global population.

Collectively, developing nations represent both the greatest challenge and greatest hope in addressing global warming. On the one hand, these countries will account for virtually all future CO2 emissions growth thanks to their rapidly expanding economies. They also stand to suffer disproportionately from major weather events and temperature rises as they often lack infrastructure and resources to adapt. On the other hand, they offer some of the best opportunities for clean energy development. Many are home to outstanding natural resources, high prices for incumbent energy, and millions of citizens justifiably seeking improved energy access.

Since first being published in 2012, Climatescope has generally chronicled how hope and clean energy opportunities are triumphing over pessimism and challenges in developing countries. Trends decidedly in renewables' favor have included: low interest rates in OECD countries and wide capital flows; rapidly falling clean energy equipment costs and the associated improving economics; and the strengthening of national and local policy frameworks.

Climatescope 2017, however, includes some troubling results highlighting serious obstacles to clean energy scale-up in developing nations. These come just two years after the historic agreement in Paris where no less than 200 nations pledged to address climate change, and eight years after Copenhagen where the world's wealthiest nations promised to deliver \$100 billion per year by 2020 to assist poorer countries address climate change. Specifically, Climatescope's high-level findings include:

- Total new clean energy asset (project) investment in non-OECD countries fell by \$40.2 billion, or 27% in 2016 from the year prior to \$111.4 billion. While China accounted for three quarters of the decline, new clean energy investment in all other non-OECD countries fell by a similar 25% from 2015 levels.
- Clean energy investment is concentrated in a relatively small number of nations. Only 16 countries in the survey saw total investment rise year-on-year; 18 saw investment fall. 37 countries saw no clean energy investment at all in 2016.
- Foreign capital continues to play a critical role in the emerging markets clean energy scale-up but wealthier nations scaled back their support in 2016. After growing from \$2.7 billion in 2007 to \$13.5 billion in 2015, OECD to non-OECD funding for clean energy fell by 26% to \$10 billion in 2016. Funds awarded specifically from development banks have essentially stagnated at approximately \$4 billion since 2014.
- Total new capacity built in 2016 fell from the prior year as well but at a less precipitous rate. A total of 60.7GW of wind, solar, small hydro, geothermal, and biomass projects were commissioned in Climatescope countries in 2016, down from 67.4GW in 2015. Excluding China, however, total capacity additions rose in Climatescope countries to a record 16.8GW in 2016 from 12.3GW in 2015.
- For the first time ever, Climatescope nations installed more solar than wind capacity. Solar capacity additions jumped 50%, from 22GW in 2015 to 34GW in 2016. However, wind installs fell by half, from 38GW in 2015 to 19GW in 2016.

- Nearly every Climatescope country was a Paris signatory. Fourteen pledged to cut emissions in absolute terms, seven to reduce them in terms of intensity, and 33 to allow them to rise but at a slower pace than under a business-as-usual scenario. Seventeen made no emissions-specific promises at all.
- Ten countries offered single commitments they promised to meet unconditionally. 19 said their commitments were conditional on wealthier nations providing financial assistance. 25 offered both unconditional and conditional promises. But two years since Paris, just 13 nations surveyed have actually implemented any domestic laws to limit emissions.

Climatescope is a detailed, country-by-country quantitative assessment of clean energy market conditions and opportunities in 71 nations in South America, Europe, Africa, the Mideast, and Asia. Based on 43 data indicators and 179 sub-indicators, Bloomberg New Energy Finance determines scores for each nation in the survey on a 0-5 basis. All countries are then ranked. (For more on how the scores are derived, please see the complete methodology and results in Excel format). Key country-score findings:

- For the first time since Climatescope was launched four years ago, the average country score fell year-on-year. Nations sampled collectively scored 1.35 in last year's survey (out of 5). That average fell to 1.19 this year, though the figure was skewed somewhat with the addition to the survey of 13 new nations from Central Asia and Europe. All but two of the 13 new countries are former states of the Soviet Union with aging energy infrastructure and little renewables activity to date.
- Comparing the same 58 nations sampled last year with those from this year still produced a drop in the average score, to 1.25. Just 12 countries from this smaller group saw their scores rise year-on-year while 44 saw declines (two were unchanged).
- As in years past, no country managed a score higher than a 2.5. Even among the best-performing countries, scores declined. Seven of the top 10 ranked nations scored lower this year than in the prior survey. At the other end of the spectrum, the lowest single score in the survey fell from 0.3 in the last survey to 0.2 this year. A total of just four countries scored over 2.0 this year, down from 10 nations the year prior.
- China topped the survey again with a score of 2.5, almost the same as last year. The country remains the world's single largest market for clean energy development, but saw new asset (project) investment fall by \$36.6 billion year-on-year. As 2015 was the end of the 13th Five-year plan, project developers slowed new investment in 2016 as they awaited changes to clean energy policies, including significant reductions in feed-in tariffs, adjustments to land-use and other mechanisms. Meanwhile, China's current fleet of wind and solar projects faces serious curtailment issues.
- The top 10 highest scoring nations this year consist of three from Asia (China, India, and Vietnam), four from the Latin America/Caribbean region (Brazil, Mexico, Chile, and Uruguay), two from Africa (South Africa and Kenya), and one from the Middle East (Jordan).
- Despite the overall downward trend in the scores, there were some notable achievements.
 - Senegal's score jumped 0.59 to 1.68 after successfully executing a tender for clean energy supply contracts in 2016 and improving the credit-worthiness of its utility.
 - Egypt made key changes to its existing feed-in tariff scheme and has set clear clean energy goals which boosted the country's Climatescope score 0.44 from last year and moving it up 23 slots to 19th in the survey.

- Argentina, under a new president, is actively seeking to rebuild foreign investor trust through the establishment of a new Trust Fund for renewables and by setting short-term goals for adding capacity. The country rose six spots in the 2017 Climatescope rankings.

There is no single reason why investment dropped, deployment levels slipped, and Climatescope scores overall have declined in this latest edition of the survey. Clearly, there has been some stagnation in the creation and implementation of new state-level policies. But in addition, a confluence of factors appear to be at play.

To examine these in a bit greater depth, it is worth considering this group of 71 developing nations in three categories:

- The *Slow-Starters*: These are countries that have done relatively little to encourage clean energy development to date for any number of reasons. These might include the availability of local fossil resources, a lack of awareness or funds and general political instability. Many of the 26 nations that scored below 1.0 in the survey this year fall into this category. All signed the Paris Agreement; few have done anything to carry out the pledges they made through active domestic policy-making in support of clean energy. This year, the list includes Zimbabwe, Malawi, Venezuela, and Paraguay, among others.
- The *Capacity-Builders*: These nations have been actively building policy frameworks or otherwise attempting to roll regulations that either are showing results or could soon do so. In some cases, these countries have seen mini-booms of clean energy activity already. Generally, they score in the 1-1.5 range. Among the 28 nations in this bucket this year are Argentina, Barbados, and Ethiopia. Each is poised potentially to see its score rise in coming years.
- The *Ceiling-Hitters*: These nations have taken many of the correct policy steps to attract investment successfully. Most are among the 10 nations that scored 1.75 or higher in this year's survey. A meaningful number of countries in this group have seen activity actually stall due to larger structural issues related to their power sectors. This group includes Uruguay, South Africa, and Tanzania.

The first two groups above have been common in prior Climatescope surveys. The *Ceiling-Hitters* represent a somewhat new phenomenon, however. Ironically, their very existence reflects the successes clean energy has achieved to date. The greater scale the industry achieves, the more it encounters (and in some cases, compounds) inherent risks in power markets.

Some of the most basic risks involve markets that have simply been overbuilt, at least in the short run. Given its massive size, China is the most noteworthy example of this. The country's fleet of power generators is by far the largest on earth and capable of producing far more power than even China's rapidly growing economy can consume today. The result: the average output (capacity factor) of power plants in China has been declining. For renewables, that has meant that substantial portions of wind and solar generation have recently gone un-consumed due to transmission constraints or because they have been de-prioritized compared to rival coal plants. Chile and most recently India have seen somewhat similar stories.

Clean energy faces other risks associated with scale as well. Reverse auctions, or tenders, specifically held to solicit new clean energy delivery contracts have been a boon for wind and solar developers, allowing them to demonstrate the cost-competitiveness of these technologies. Such contracts typically are de facto government-mandated marriages between developers and state-owned utilities who are required to buy power at winning bid prices.

The PPAs generally require developers to bring projects on line at some future date, typically 2-5 years from signing. In the interim, the developer must secure financing and equipment at sufficiently low cost to ensure the project can earn an appropriate rate of return. But developers face exogenous risks as well associated with the utilities they intend to sell their power to.

These "off-taker risks" take a variety of forms and are inherently tied to larger political risks in any country. This is because the credit-worthiness of state-owned utilities is generally tied to the stability and creditworthiness of the governments who back them. In some cases, the risk posed by the off-taker can be as simple as the utility delaying actual signing of a PPA, despite essentially being directed to do so by the government. In others, the utility's ability to pay its bills may be so in doubt that a project developer cannot secure the requisite project financing.

Other risks associated with achieving scale have become more prevalent as well. In Western Europe and some parts of the U.S., developers regularly encounter not-in-my-backyard opposition from local citizens. But NIMBY-ism is hardly unique to wealthy nations. As developers seek to develop ever larger wind and solar projects requiring larger swathes of land, they are increasingly facing local objections in places such as Mexico, Kenya, and elsewhere.

Some of these risks have been prevalent for years but have become larger obstacles in the past few years. Others are essentially new. Most have been exacerbated by the fact that energy is starting to achieve real scale, a fact reflected in this year's Climatescope tally. No less than seven of the 10 highest scoring nations in the survey saw their scores decline from last year. In last year's version of the survey, each member of the top 10 boosted its score from the year prior.

What is perhaps most disconcerting about the obstacles that are confronting clean energy in the *ceiling-hitter* nations is that these are by no means unique to renewables. Rather, they are emblematic of more fundamental challenges to building large-scale infrastructure of nearly any sort in less developed nations. This suggests that fixes to these obstacles may not come easily.

Still, there are signs that some of these nations are taking important steps to address issues that have served to slow development. In China, which has seen some of the most severe wind/solar curtailment, regulators are designing various mechanisms to reduce renewable curtailment and rapidly spending billions to expand high-voltage transmission capacity, for instance. We now anticipate a bumper year of 2017 new energy investment and 2016's decline may ultimately be remembered as the result of short-term policy uncertainty. More such efforts will doubt be required in coming months if clean energy's momentum from 2010-2015 is to be regained.

Important Progress Off the Grid

While large-scale renewables are encountering some growing pains, the opportunities for smaller-scale clean energy applications widened in 2016. Indeed, the potential for clean distributed sources to expand energy access to millions, potentially even billions, is becoming more apparent every day.

Specifically, the use of solar technologies in micro-grids, pay-as-you-go battery/lantern systems, water pumps, and even mobile phone towers continues to proliferate. Often, these deployments flourish organically, unencumbered by government oversight and supported by impact and venture capitalists rather than by traditional funding sources such as development finance institutions. Instead, a wave of socially-oriented entrepreneurs have taken the lead, securing financing from private sources and forging partnerships with large corporates such as telecom providers.

At the most basic level, sales of solar-powered lanterns and similar devices intended for use in huts and other small dwellings have been surging. The Global Off-Grid Lighting Alliance (GOGLA), Lighting Global and Berenschot track the sale of portable solar equipment and found approximately 510,000 such units were sold in 2011. By 2014, that had risen to 5.7 million and in 2016 it topped 8 million. The actual volume of such solar equipment sold could be larger yet as much of what gets distributed today is not tracked.

In India, the number of solar irrigation pumps installed more than doubled from the country's 2015 fiscal year to more than 43,000 units in 2016. Strong mobile network coverage, improving education/training and access to digital supply chains have helped some of the larger emerging markets nations secure substantial venture capital investment. Specifically, Indonesia attracted \$1.9 billion and Nigeria \$839 million in 2016. Finally, there are signs that electrification rates are creeping up with countries such as Peru, Nepal, Indonesia, and Sri Lanka all leading the way.

Even independent off-grid power sector players encounter hindrances, however. State-run utilities are not necessarily enthusiastic about their activities and in the worst cases can regard them as rivals to potential expansions of the hub-and-spoke grid. Governments regularly complain that micro-grid power tariffs do not match those offered by the state-run utility.

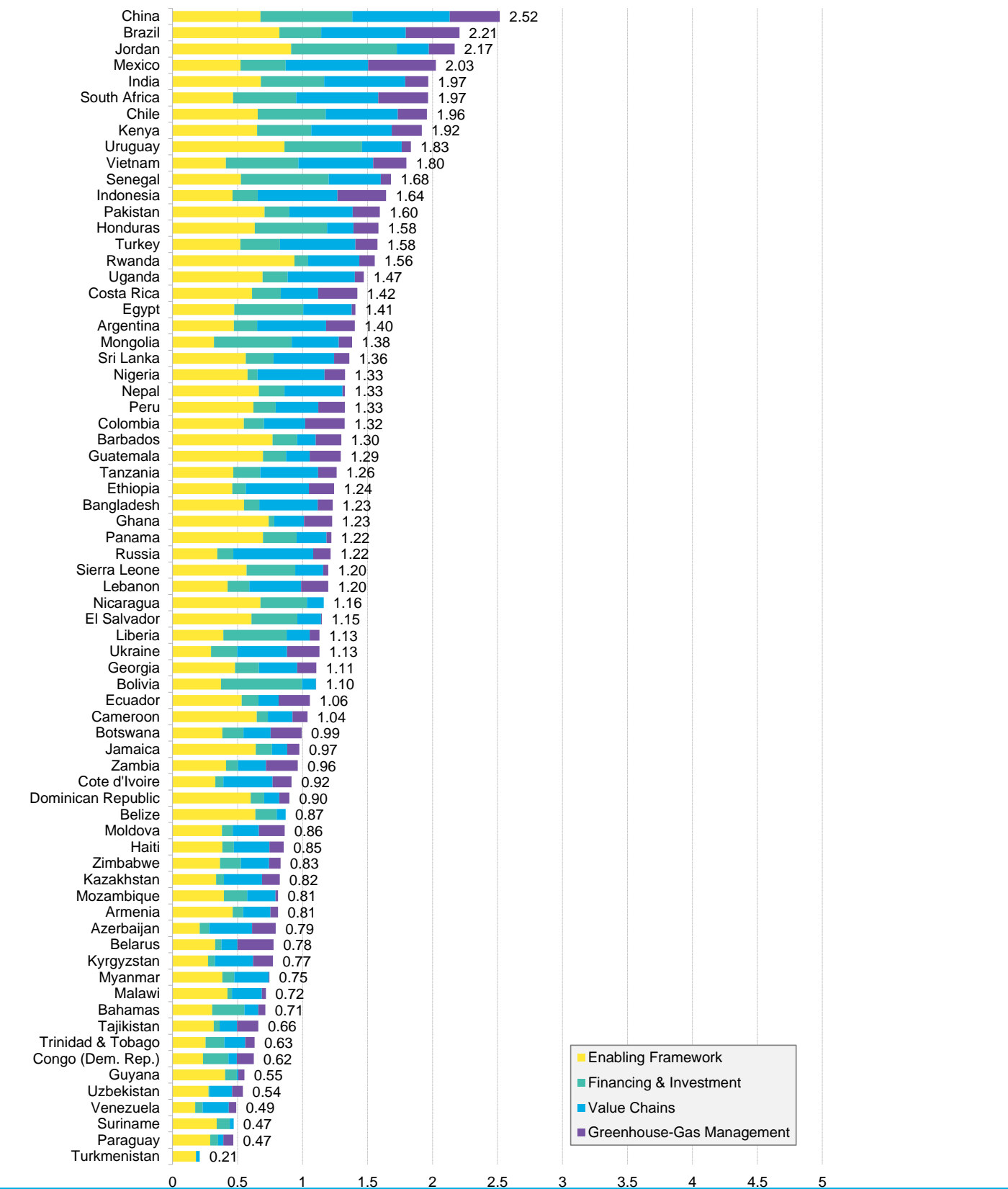
None of these issues stands to be resolved entirely in the short-term but there have been recent positive examples of policy-makers seeking to foster organized growth of off-grid supplied power. Rwanda's Electricity Access Rollout Program (EARP), for instance, seeks to dramatically boost electricity access in the country to 70% by June 2018 from just 30% as of May 2017. While that ambitious target will likely be difficult to achieve, the program already has shown results; Rwanda's electrification rate jumped from 20% in 2015 to 30% in 2016. The government now plans to hold a tender to contract a single firm to distribute PV systems en masse to the country's poorest citizens.

Navigating Climatescope

This Climatescope website is intended to be the most in-depth public resource for understanding clean energy conditions in emerging nations. Users are invited to:

- Watch a short video explaining high-level trends.
- Learn about all non-OECD clean energy finance flows.
- Understand developing nation climate policies in the context of the Paris Agreement.
- Discover the lessons learned for energy transition policies in emerging markets.
- Understand strategies to mitigate the risks of operating in developing countries.
- Assess clean energy policies in Climatescope nations at a high level then drill down through the policy library.
- See how individual countries scored in the Climatescope survey, then learn more about each by clicking on an interactive map, or compare nations.
- Analyze country-level conditions for off-grid clean energy development through a new data hub.
- And explore more insights, tools and regular updates at www.Global-Climatescope.org

Figure 1: Climatescope 2017 results



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