

June 2017

# Allianz Climate and Energy Monitor 2017

Assessing the needs and attractiveness of low-carbon investments in G20 countries



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## Allianz Climate Solutions

Thomas Liesch, Simone Ruiz-Vergote

Allianz Climate Solutions is the competence center of Allianz Group for climate change and renewable energy. We offer insurance and advisory services on financing issues for renewable energy projects to both external clients and Allianz entities. Furthermore, we are responsible for climate-related advisory, business and strategy development for Allianz.

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# Foreword



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At the Paris Climate Conference in 2015, in the strongest ever showing of collective cooperation on climate change, 195 countries came forward with national plans to cut their greenhouse gas (GHG) emissions and enhance adaptation capacities. From expanded forest coverage, to drought resistant seeds, to reduced reliance on fossil fuels and investments in renewables, countries declared their individual contributions to the shared goals of limiting global temperature rise, building resilience, and transitioning toward a zero-carbon future.

Since then, we have seen signs of remarkable progress. Many countries have stepped up their commitments and are on track to raise ambitions. Germany, for instance, intends to reach 100 percent renewable energy by 2050 and has launched the Nationally Determined Contributions (NDC) Partnership to coordinate and facilitate efforts by others. Sweden has committed to completely phase out greenhouse gas emissions by 2045. Norway, meanwhile, is already powered by almost 100 percent renewable energy today.

In addition, from the Philippines to Kenya to Fiji and many more, a significant number of developing countries have signalled their intention to reach 100 percent renewable energy as rapidly as possible, and by 2050 at the latest. It is smart policy, as it is increasingly accepted that *sustainable* development is only achievable through a zero-carbon pathway.

Yet, while ambitions are high and political support substantial, major challenges persist, the most fundamental of which is access to climate financing and resources. Securing sufficient and reliable climate finance will require a full range of stakeholders, public and private, national and international financial resources. Financial flows must be consistent with a pathway towards climate-resilient development.

At the United Nations Development Programme (UNDP), we believe that two elements are essential to unlocking climate finance in favour of climate action: the removal of real or perceived **risks to investment**, and **incentives to accelerate** and attract financing.

First, in terms of risks, a meaningful scale-up of renewables will require unlocking significant volumes of private capital. As such, barriers to private investment in climate initiatives need to be addressed, including building a favourable policy environment that reduces the real or perceived risk of investment. Whether barriers constitute rigid legislation, lack of policies that enable foreign direct investment, or simply difficulty in understanding how best to access local markets, removing these obstacles is important for all countries with ambitious energy goals.

Second, financial incentives to accelerate private sector investment and leverage existing markets can play a critical role in promoting renewable energy. Some countries are familiar with green investing, while others are still exploring the impacts of tools like feed-in tariffs, cross-subsidization for rural electrification, and carbon taxes. By developing these incentives, countries can not only drive investment but also build the right environment where those investments can be scaled-up and thrive over time.

G20 members have committed to take collective action to build well-functioning, open, sustainable and transparent energy markets, and develop energy strategies to increase substantially the share of renewables in the global energy mix. For UNDP and partners, we must build on our work with countries to identify climate commitments – the NDCs of the Paris Agreement – and help translate this into real action on the ground. Enabling and securing investment in renewable energies and climate resilience is a clear and critical step in that regard.

**Achim Steiner, UNDP Administrator and Chair of the UN Development Group**



Despite the US announcing its exit, there remains strong momentum behind the Paris Climate Agreement – worldwide. Further advancing climate action this year is crucial with a view to peaking global emissions by 2020.

All G20 nations have room to further improve the environment for financing renewable energy. This year's Allianz Climate & Energy Monitor shows that emerging economies increasingly take on a leadership role and are credibly enhancing their renewable energy financing frameworks – out of self-interest. China added more solar installations than the rest of the G20 combined in the past year. The increasing cost competitiveness of renewable energy shows that this strategy pays off.

G20 nations now must put forward their plans for a full decarbonization of their power infrastructure in the second half of the century. This will also require carefully adjusting the market design to accommodate for a larger share of renewable energy. With renewables already accounting for the larger share of global power capacity additions, they are the new normal.

**Simone Ruiz-Vergote, Managing Director,  
Allianz Climate Solutions**



The second edition of the Allianz Climate and Energy Monitor shows that many G20 countries took the necessary steps towards reducing climate risks. We, as a responsible investor for our insurance clients, see attractive opportunities in Europe and in the US. We also looked into the Emerging Markets and explored potential opportunities for investing there in the mid-term.

Allianz started supporting the transition to a low-carbon economy with various activities years ago. Besides our divestment of 225 million euro in equity and run-off of 3.9 billion euro in fixed income from coal-based business models, we are a leading investor in renewable energy. In 2016 we further invested in new debt and equity investments in renewable energy, bringing the total to 4.6 billion euro. We aim to further increase our investments here in the mid-term.

As a long-term investor, we believe effective regulatory frameworks are important for supporting low-carbon investing. Reliable and stable regulation enables access to larger pools of capital at lower cost. Hence, an integrated approach can help reduce the costs associated with the shift to a low-carbon economy. We actively promote the development of an appropriate regulatory framework through political dialogue, industry-wide initiatives and by supporting research. Facilitating such a global, transparent and supportive investment environment has the potential to significantly improve the quality of life for an increasing world population and their need for clean energy.

**Axel Zehren, CFO,  
Allianz Investment Management SE**

# Summary and highlights

The Allianz Climate and Energy Monitor ranks G20 member states on their current attractiveness as potential destinations for investments in low-carbon electricity infrastructure. It further considers their current and future investment needs in line with a trajectory compatible with the 2°C/1.5°C temperature limits of the Paris Agreement.

## Renewable energy gusto in emerging markets ...

2016 was a year of impressive solar photovoltaic (PV) installations in the G20. On average, G20 countries installed 50% more solar PV last year than in 2015. New installations for wind decreased by 24%, although from a high level.

Renewable energy expansion was notable in emerging markets in China, India, South Africa, Mexico and Turkey. Growing electricity demand, combined with declining technology costs underpins this boom. Brazil was an exception among these emerging economies, with almost no new solar PV uptake and a modest increase in total wind capacities (23% increase over 2015), the lowest in a decade.

## ...but OECD countries remain the most attractive destinations for investments due to strong policy frameworks, market experience and positive macroeconomic factors

Germany, UK and France maintain their top positions in the 2017 Monitor. They combine a largely stable and supportive policy environment with highest experience of renewable energies (i.e. market maturity) in the G20 and adequate general investing environment.

France and Germany are the only EU countries to submit long-term greenhouse-gas emission development strategies to the UN so far (until May 2017). A similar long-term policy certainty is lacking in the UK. The UK saw the largest drop in policy attractiveness scores this year, although it maintained its overall attractiveness rank due to continued interest in the renewables industry. UK's binding renewable energy target ends in 2020 (30% power using renewables) and it is unclear if the government will throw its weight behind renewables and climate change in general after Brexit.

China continues to hold its place in this 'best-performers club', maintaining rank four in offering an attractive environment for renewables uptake. With roaring renewable energy markets and consistent policy push, China further improved its renewables track record this year. In fact, it installed more solar PV than the rest of the G20 combined in 2016. It is also taking first steps to adjust its power systems and market design for integrating large shares of variable renewables and avoid the huge curtailments seen in the last years.

Turkey, Saudi Arabia and Russia remain at the end of the scale with support for renewables in infancy. Russia and Turkey are the only two G20 countries who have not ratified the Paris Agreement yet, the US has decided to pursue steps to exit the Paris Agreement in June 2017.

## High investment needs in the G20, especially in emerging economies

The G20 countries need to roughly double their annual investments to align their power infrastructure with the 2°C pathway set out in the Paris Agreement. The absolute investment needs stand at USD<sub>2012</sub> 709 billion per year between 2014-2035<sup>1</sup>.

The 2016 results highlight again the need for higher investments in emerging economies in the medium term for creating a Paris-Agreement compatible and climate-resilient power infrastructure. Brazil, India, South Africa and Indonesia emerge as high-need hotspots. They ranked high on all three factors defining investment needs in the Allianz Monitor: increasing demand for energy, sheer size of the country and vulnerability of the existing electricity system to a changing climate.

Countries with currently high emissions in the power sector are projected to have the highest absolute investment needs to be in line with the 2°C goal. These are China, followed by the US and India.

<sup>1</sup> Author's own calculations based on (IEA, 2014)

## G20 governments are adjusting renewable energy support in response to the renewables boom

Renewables have grown on average at 24% annually in the last five years. In response to expanding renewable energy capacities beyond hydro and falling technology costs, G20 countries are adjusting their support for deployment of renewables-based electricity generation. The general tendency is to move away from fixed fees ("feed-in tariffs") to auctioning or tendering renewable energy project support.

Over half of the G20 countries are using or announced auctioning in 2016. Yet, care needs to be taken in designing such policies to maintain investor interest. Good practice elements, inter alia, transparent procedures, clear auction frequencies, policy bundling (e.g. with tax breaks etc.), and nesting auctions under long-term renewable energy targets or plans can raise investor confidence on return planning and future demand. Further, economic health and general ease of doing business in a country are critical contributors to successful tendering. These continue to be areas of improvement for many developing and emerging G20 member states, as seen in this year's assessment.

## Almost all G20 countries are pushing climate and renewable action gradually

Many G20 countries took gradual steps for the low-carbon transition of their power sector in 2016. Some countries hold an optimistic outlook for renewables despite lower scores this year. Argentina, ranking 16<sup>th</sup> this year, is expected to release a new climate strategy towards fulfilling its commitments to the Paris Agreement. Argentina witnessed oversubscribed renewable energy auctions in 2016 but no deployment yet. Both Turkey (rank 18) and Saudi Arabia (rank 19) are expected to go full-steam for meeting their renewable energy targets in 2017 and have announced tenders for large scale wind and solar PV. In a similar way, the Indonesian government is tweaking its renewable energy support policies to ensure procurement by cash-stripped utilities (rank 14).

## Falling technology costs will be the tipping point for further renewables growth

2016 also saw renewables growing due to falling technology costs despite cumbersome policy environments in some countries. Most striking example has been the US. Favorable general investment conditions and a ready market mask the increasingly unsupportive federal policy environment and pulled the US up by two ranks this year (rank 7). Wind and solar alone contributed to 60% of the 27 GW new power installations in the US in 2016, natural gas adding another third (US EIA, 2017). Existing coal power infrastructure is phasing-down in parallel (and due) to the rise of cheaper low-carbon technologies. The US has already announced to pull out of the Paris Agreement and processes have been set in motion to dismantle policies such as the Clean Power Plan (CPP). Investors remain nevertheless positive about future renewables growth in the US as they are becoming increasingly cost-competitive on their own.

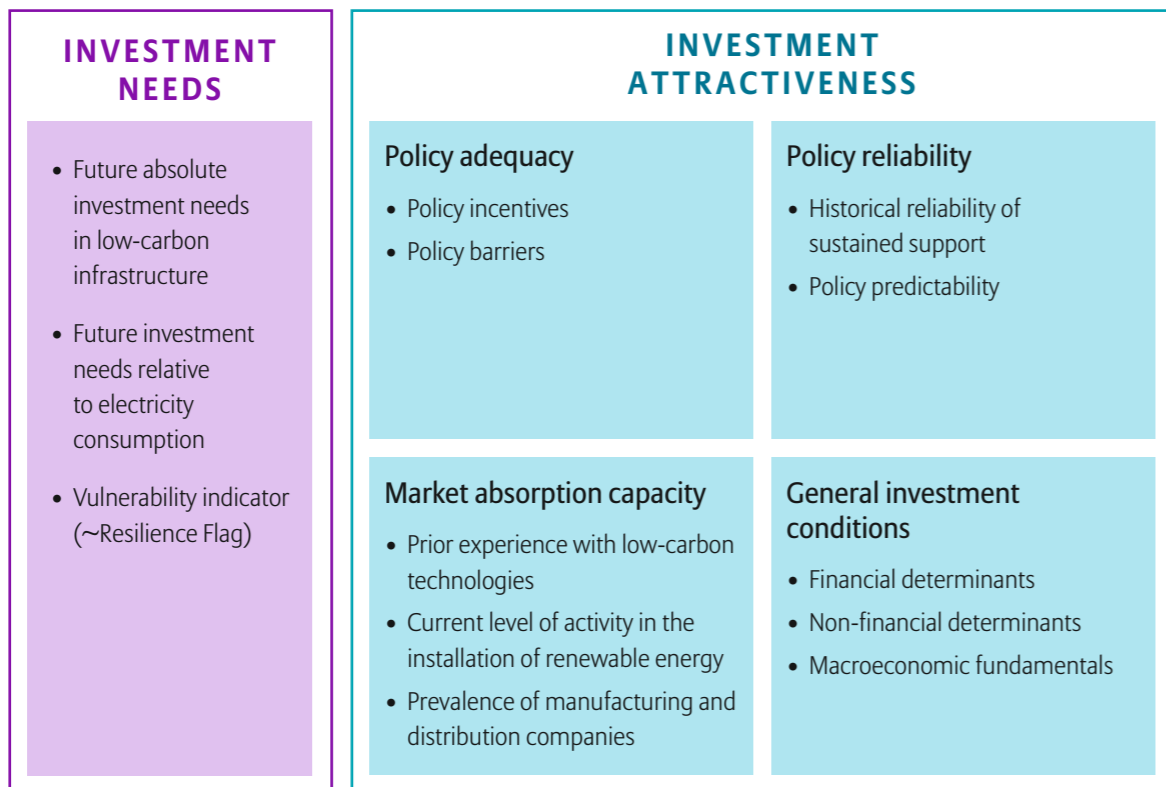
## Governments need to start planning for a new power system

As renewables grow, the next wave of policy intervention by governments needs to move beyond targeting low-carbon electricity generation towards system design. With higher shares of variable power generation, electricity grids need to be able to balance weather-related peaks. Otherwise, generation needs to be curtailed and potential power supply is lost. The transformation of the power sector requires long-term planning that enhances flexibility in system operations and market design. This will potentially shift trillions in investments and lead to the creation of new market structures. The G20 countries are at the very beginning of this journey.

The discussions around system change are most advanced in Germany, the UK and France. Yet important decisions on long-term expansion of renewables and market structure are still to be taken. The group of countries with no concrete strategy up to 2050 for deep decarbonization of the electricity system and integration of renewables are Argentina, Australia, Indonesia, Russia, Saudi Arabia, South Africa and Turkey.

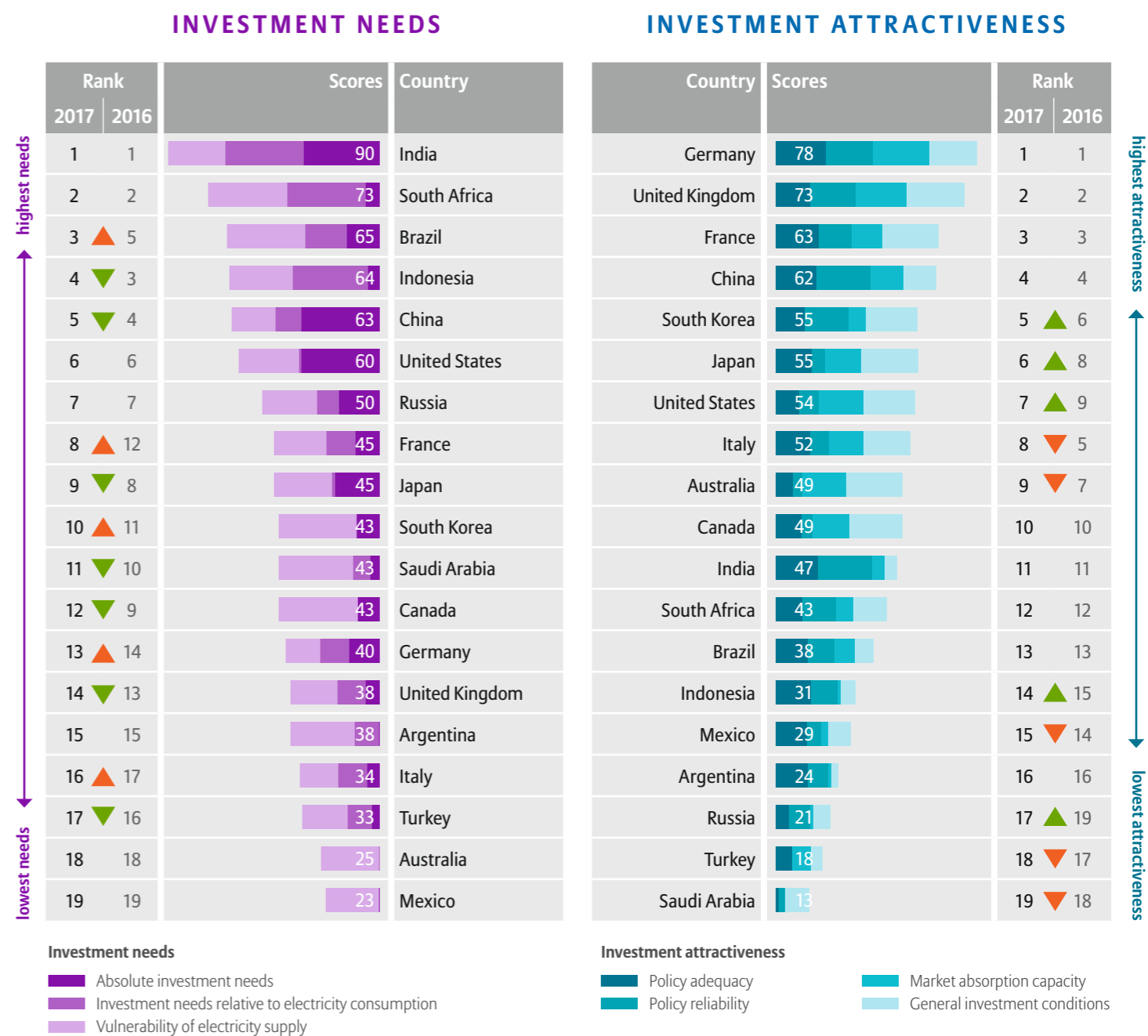
Without adopting a holistic approach to develop power systems that are flexible for absorbing increasing shares of renewables (through infrastructure development, improved system operations and market design), the ceiling for how much power can be generated from variable renewables will remain. This will affect the speed of the transition and investor confidence in the market.

FIGURE 1: Graphic representation of the Allianz Climate and Energy Monitor



Further details on the composition of the pillars and the categories beneath them are given in section 1.2, while comprehensive information on the methodology as well as data and literature is available from the accompanying Technical Note, available at [allianz.com/en/monitor](http://allianz.com/en/monitor).

FIGURE 2: Overview of results of the 2017 Allianz Climate and Energy Monitor



# 1 About the Monitor

**2** Power production from large hydro and nuclear are excluded from the assessment to reflect concerns related to the sustainability of these technologies. Transportation and storage infrastructure is also outside the assessment scope.

**3** Please refer to the accompanying Technical Note for detailed methodology of the Monitor. <https://allianz.com/en/monitor>

The Allianz Climate and Energy Monitor aims to support communication between the investor community and policy-makers. Using a composite index, the Monitor ranks both developed and developing G20 countries according to their potential in closing the financing gap in a low-carbon, climate-resilient energy infrastructure.

**The Monitor's assessment concentrates on two major elements crucial to understand country potentials:**

- **Attractiveness of various 'in-country' circumstances** to potential renewable energy investors, including policy variables such as adequacy of climate and renewable energy policies (policy adequacy); reliability of sustained support for renewables; and current market dynamics like the maturity of the renewable energy market (market absorption capacity) and general macroeconomic investment conditions. The investment attractiveness pillar also identifies areas of improvement for facilitating future investments in renewables in G20 countries.
- **General investment needs in the power sector through to 2035** in light of the 2°C climate target, including annual absolute and relative investment requirements for the electricity infrastructure, and the vulnerability of the existing electricity infrastructure to the effects of climate change. This pillar outlines investments needed for scaling-up low-carbon technologies and building climate resilience in the power sector.

Ranking tools like the Monitor have a wide applicability, providing a better understanding of where countries stand in relation to one another on multi-dimensional policy issues.

The Monitor is an annual publication, developed jointly by Allianz Climate Solutions, NewClimate Institute and Germanwatch. It examines the electricity infrastructure of the G20 countries, i.e. the physical infrastructure required for producing power from different sources. The focus is on power production from renewables<sup>2</sup> as future solutions for decarbonization of the power infrastructure. The EU, as a supranational body, is excluded from the assessment.

Figure 3 provides a glimpse of the Monitor's structure<sup>3</sup>.

Absolute scores for all indicators under each element are normalized for each indicator to derive ratings between the best (100) and the worst (0) scores in the sample. Therefore, any given country is scored in relation to the performance of its fellow G20 countries. Countries are ranked and their scores rated between very low-very high, the ratings being relative to one another.

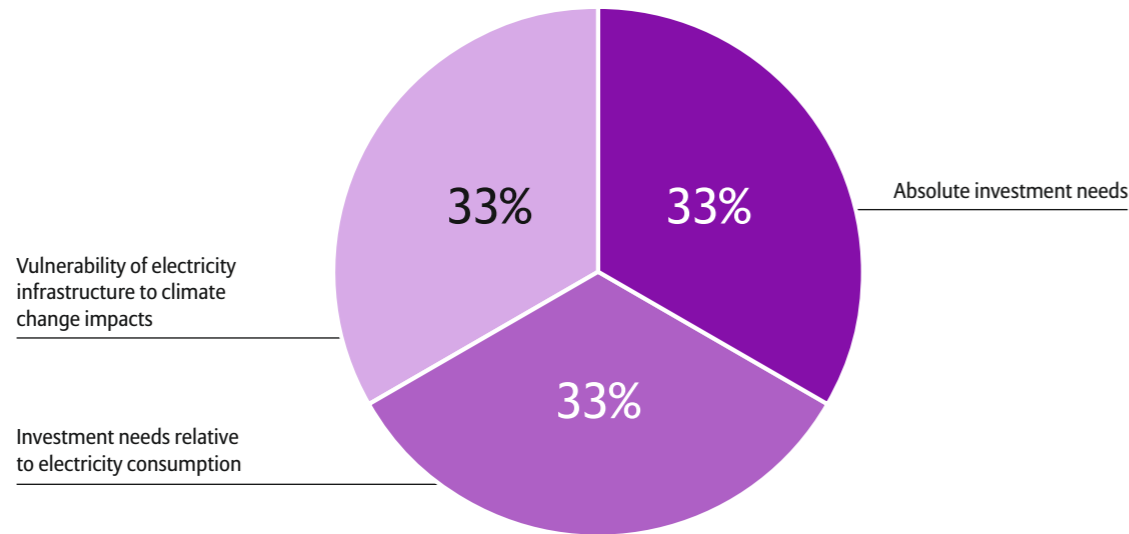
Arrows depict the movement in rank in countries compared to last year's assessment and whether the movement is good or bad.

For investment needs, fall in rank = good (▼); improvement in rank = bad (▲)

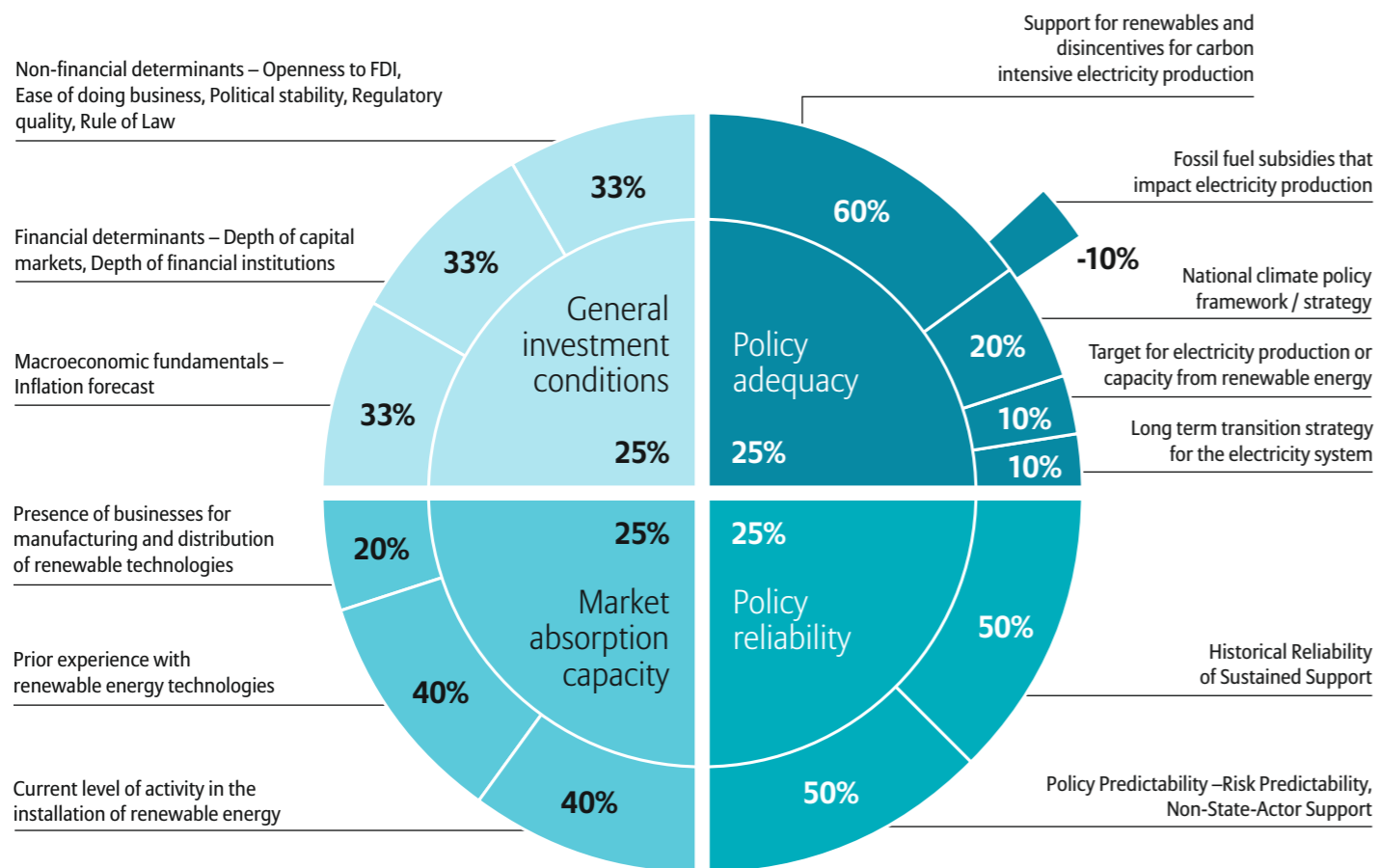
For investment attractiveness, fall in rank = bad (▼); improvement in rank = good (▲)

FIGURE 3: Overview of the composition of the Monitor

### INVESTMENT NEEDS



### INVESTMENT ATTRACTIVENESS



Note: The weights are rounded to one decimal digit

# 2 Results

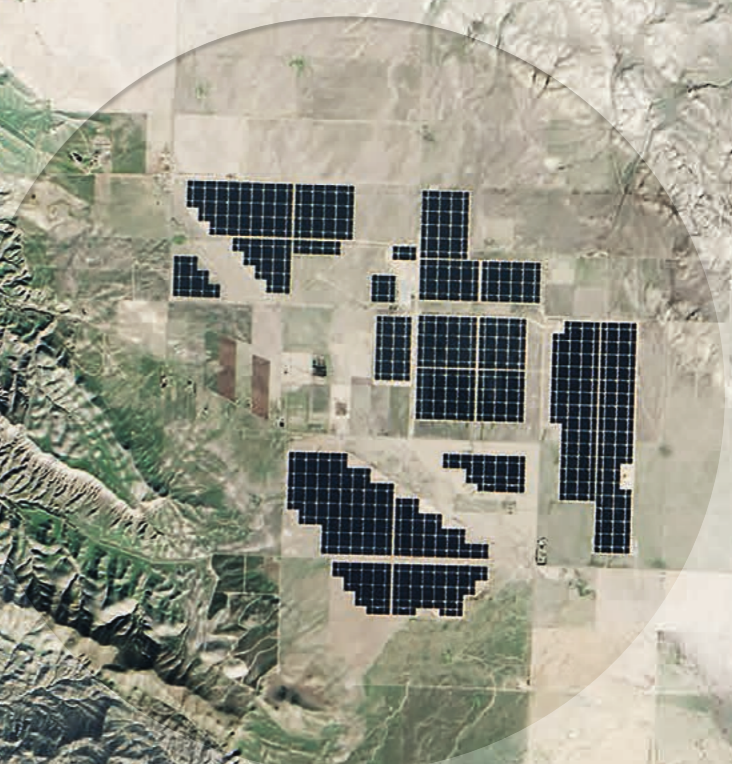
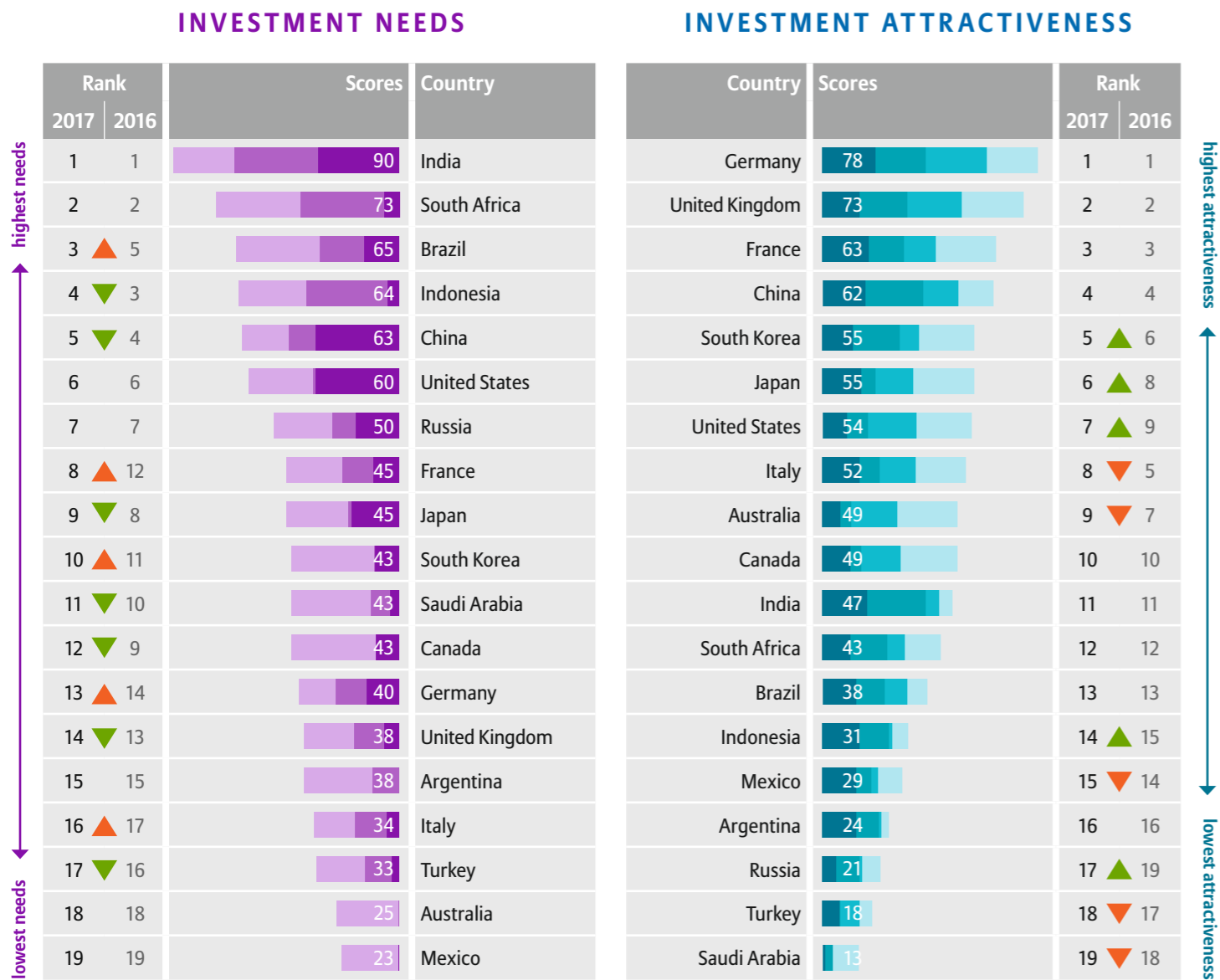




Figure 4 and Figure 5 present the results from the two central pillars of the Allianz Climate and Energy Monitor 2017. Countries are scored on a relative scale of 0 to 100 based on a compilation of scores from multiple sub-categories and indicators that make up the Monitor. A score of 100 would equate to an optimal-performing G20 country.

FIGURE 4: Overview of results of the 2017 Allianz Climate and Energy Monitor and rank changes



**Investment needs**

- Absolute investment needs
- Investment needs relative to electricity consumption
- Vulnerability of electricity supply

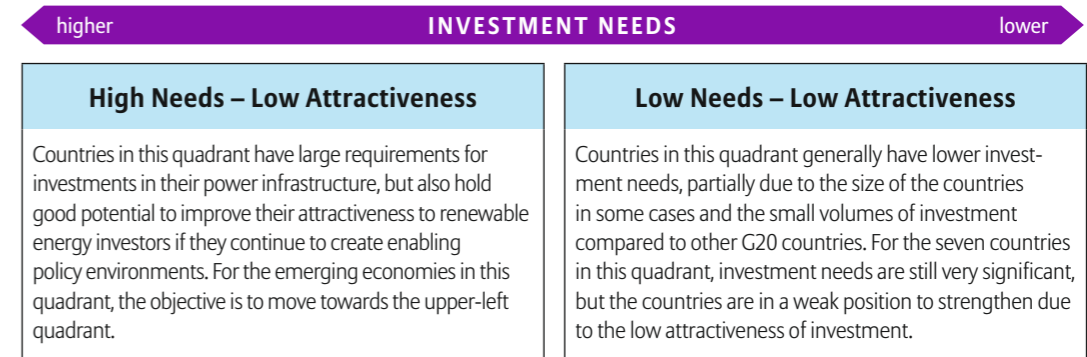
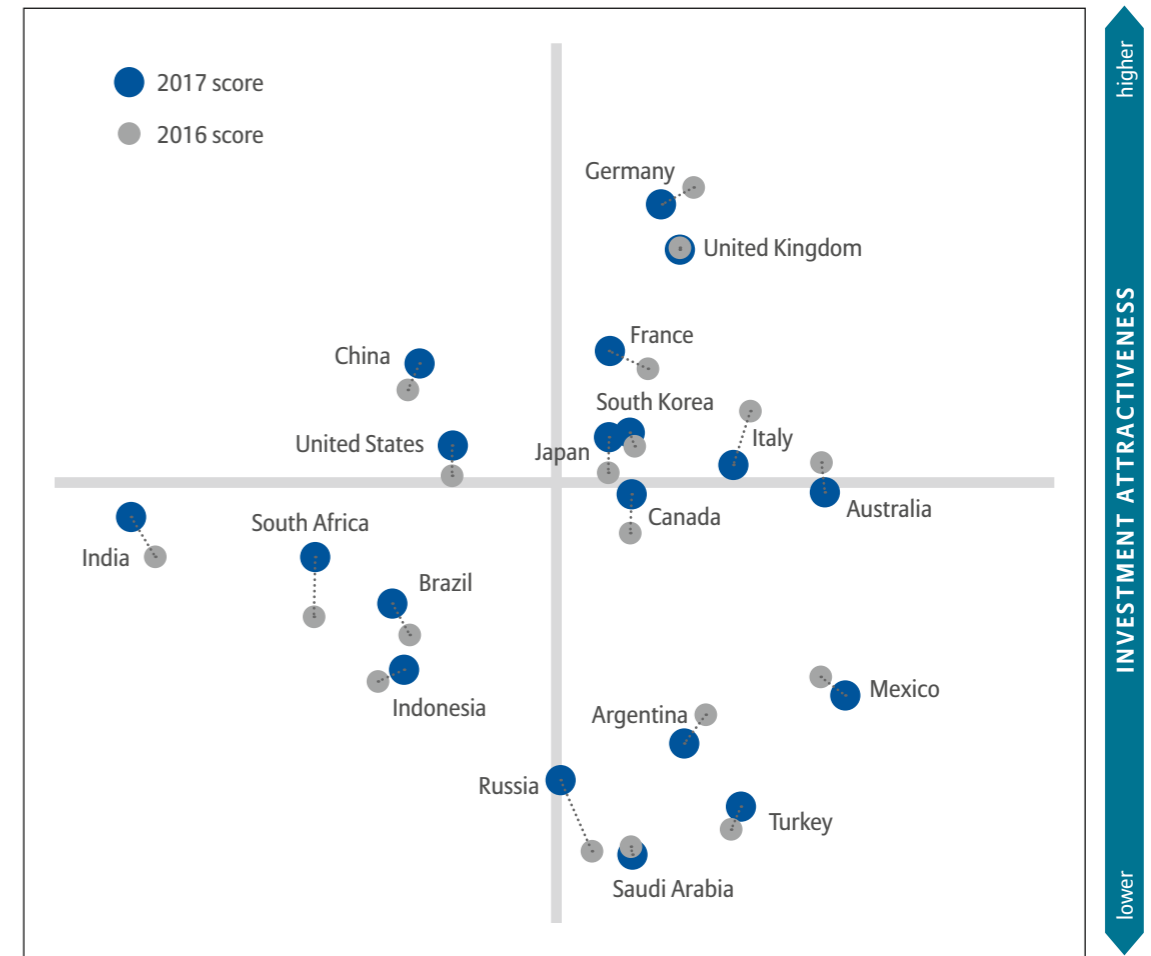
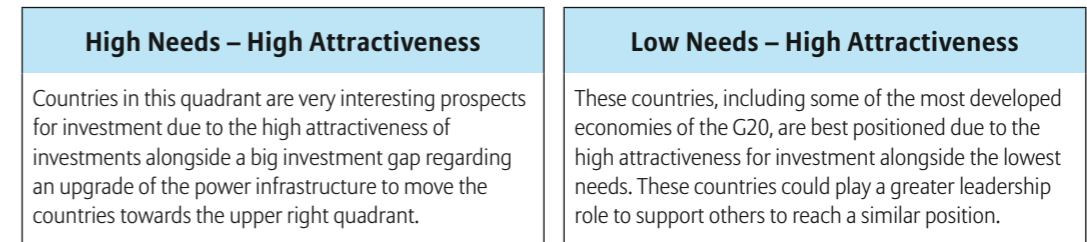
**Investment attractiveness**

- Policy adequacy
- Policy reliability
- Market absorption capacity
- General investment conditions

Note: The scores are rounded to the nearest whole number.

FIGURE 5: Quadrant analysis of the results of Allianz Climate and Energy Monitor 2017 – illustration of scores relative to other G20 countries

The four quadrants show the different situations that countries are in according to their investment needs and attractiveness. Generally, countries should aim to move to the upper right quadrant of lower needs and higher attractiveness.



## Key movements in 2017

- **China** inched closer to the 'Low Needs – High attractiveness' quadrant with a sustained policy push to raise installed renewables capacity (including hydro) to 680 GW by 2020, from 493 GW in 2015. Renewable energy is the centerpiece of China's efforts towards the Paris Agreement. Power sector will be a key contributor to China's plans to raise the share of non-fossil fuels in primary energy mix to 20% by 2030. USD 361 billion is announced to be invested in renewables by 2020, a multiple of current investments in fossil fuels based power (USD 45 billion in 2015).
- **Canada** moved towards the upper quadrants of high attractiveness as positive signals on climate action started emerging from the Trudeau administration. Canada submitted a 'mid-century long-term low-GHG development strategy' to the UNFCCC in November 2016. The strategy pushes for a pan-Canadian framework for climate action, supporting coal power phase-out by 2030, ratcheting up renewables and putting a carbon tax in place. Yet, Canada's policy support for renewables has been volatile in the past.
- **Australia** dropped in the 'Low needs – Low attractiveness' quadrant as the investment attractiveness of the country decreased owing to poor scores in all indicators in 2016. Renewables were installed at a lower rate in 2016 – 42% less new solar PV and 64% less wind compared to 2015. Australia has only a 2020 target for renewables, aimed at generating 23.5% electricity from renewables by 2020. The target includes hydro, which already makes up for nearly half of the total renewable energy generated in the country. Country experts see a lack of federal leadership in driving renewable energy and a continued interest in supporting coal and gas.
- **Italy** moved towards the 'Low needs – Low attractiveness' quadrant due to a three-rank drop in its investment attractiveness rank. Fewer new renewables were installed last year – 4.7 GW of solar PV and wind, compared to 7.5 GW in 2015. Italy has already surpassed its renewable energy targets for 2020 and no revised targets were announced in 2016.
- The **UK** and the **US** maintained their attractiveness this year as market momentum continued irrespective of a prevailing uncertainty for the federal policy environment. The UK witnessed the largest decrease in scores for policy adequacy this year.
- **India** moved closer to the upper left quadrant of higher attractiveness by continuing to enhance in its policy environment and installing renewables. India aims to install 60 GW wind and 100 GW solar by 2022. The country has been improving its policy support to accelerate large-scale deployment of these technologies, especially of solar PV. Different auctioning models were tested for solar in 2016 and auctions were piloted for wind power which has been traditionally supported through feed in tariffs. With market forces set into action by a clear policy intent, optimizing policy design of auctions soon is critical for India to maintain and scale-up this momentum.
- The four countries in the lower left quadrant viz. **India, South Africa, Brazil** and **Indonesia** all improved their renewable energy attractiveness scores in 2016. These countries present good prospects for renewable energy investing, if policy support and market capacities are maintained. They also have the largest investment needs in the power infrastructure.

## 2.1 Policy adequacy

- Germany retains its 1<sup>st</sup> position, France gains the 2<sup>nd</sup> position as the UK falls back to 7<sup>th</sup> rank due to uncertainties about continued support for renewables.
- India and China rank 3<sup>rd</sup> and 4<sup>th</sup>, showcasing sustained leadership from emerging economies.
- Saudi Arabia, Russia and Turkey rank last for the second year in a row due to their insufficient climate-related goals and weak policy support for renewable energies.
- As the cost of renewables continues to fall, G20 countries are increasingly moving from feed-in tariffs to competitive bidding to support large-scale installations. Over half of the G20 countries are using or announced auctioning in 2016.
- Few countries raised their renewable energy targets in 2016. Four countries – Australia, Canada, Italy and the UK – still have no national renewable energy targets for the power sector beyond 2020.
- While most G20 countries have policy frameworks for the uptake of renewables, most are yet to define long-term plans for decarbonizing their electricity infrastructure and phase out fossil fuel subsidies for power generation and upstream activities.
- Without clear policy pathways in place, G20 policies will remain insufficient to meet the Paris agreement's objectives.

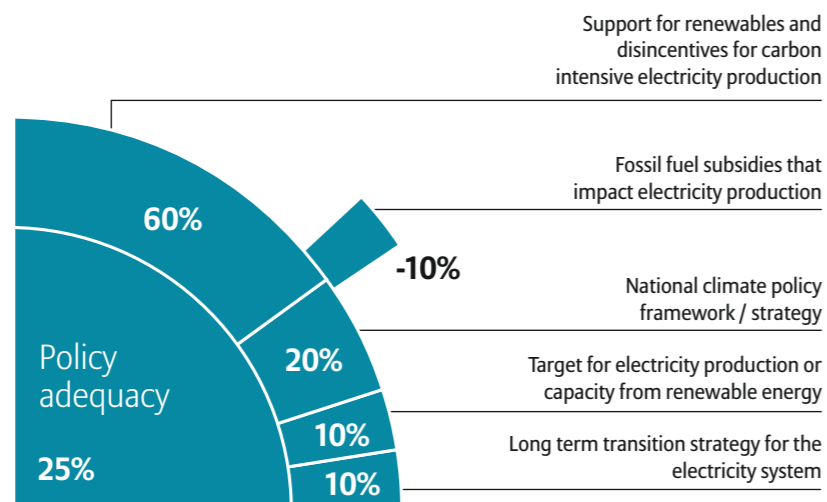
<sup>4</sup> Russia and Turkey have signed but not yet ratified the Paris Agreement.

All but two G20 countries had ratified the Paris Agreement as of May 2017.<sup>4</sup> Despite this, none of the countries have yet enacted clear, holistic and long-term plans that would set them on course to limiting the global temperature increase to well below 2°C and aiming for 1.5°C.

All countries have by now submitted plans to comply with the Paris Agreement goals (Nationally Determined Contributions or NDCs). But **four G20 countries still have no concrete national climate strategy or action plan in place** for achieving these. These include the United States, where the Trump administration announced a rollback of all climate-related measures passed under the Obama administration, including the Climate Action Plan (CAP) and Clean Power Plan (CPP). In a recent decision, the US also announced to leave the Paris Agreement. Argentina, Russia and Saudi Arabia also have no comprehensive national climate strategy beyond their NDCs.

As the cost of renewable energy technologies continues to drop, **an increasing number of G20 countries are now moving from price-based support policies** (e.g. feed-in tariffs) **to quantity-based policies** (e.g. competitive auctioning), particularly for large-scale installations. Argentina, Mexico and Turkey awarded their first gigawatt-scale renewable energy tenders in 2016. The EU countries – France, Germany, Italy and the UK – are also all switching to competitive bidding for large-scale renewables to comply with new EU legislation that came into effect in 2017. In Asia, Japan and Indonesia have also made similar announcements, while India successfully undertook its first wind power auction. As countries turn to large-scale renewable energy auctioning, good policy design will be critical. Good practice takes care of transparent procedures, clear auction frequencies, policy bundling (e.g. with tax breaks), and nesting auctions under long-term renewable energy plans. This will also raise investor confidence of returns planning and future demand.

FIGURE 6: Composition of the category 'policy adequacy'



The **only G20 country with no policy in place to support renewables is Saudi Arabia**. The country has however announced its first large-scale auction for wind and solar energy, which is set to take place in the second half of the year 2017.

Despite renewable electricity becoming increasingly competitive compared to fossil-based alternatives, **few countries raised their renewable energy targets in 2016**. One G20 country – Saudi Arabia – even issued a lower target in 2016: it now foresees to install 9.5 GW of renewable energy by 2023 instead of the previously announced 54 GW by 2032. Only Argentina, India and Germany have targets to significantly increase the share of renewable energy generation relative to current levels in their electricity mix over the next decade. Four countries – Australia, Canada, Italy and the UK – still have no national renewable energy targets for the electricity sector beyond 2020.

**Most countries also still fail to give long-term clarity on their measures to decarbonize the electricity grid and integrate variable renewables.** Only France, Germany and the UK have set out clear plans to transition to a decarbonized grid by 2050. Doubts remain, however, around the UK's long-term climate and energy policies in light of recent backslides on solar support schemes and the Brexit negotiations. The exit from the EU Emission Trading Scheme in particular raises uncertainty for the continued commitment to renewables in the power sector and heavy industries. As renewables achieve higher market shares, issues due to their variable nature will arise unless a system-wide approach is taken. For instance, China faced this issue of renewable energy curtailment in 2016. To avoid these losses, China issued a strategy and target in 2016 to reduce wind energy curtailment down to 5% by 2020 from close to 30% in some provinces at present. Six countries in the G20 still have neither a long-term plan to decarbonize the grid nor a clear action plan to integrate variable renewables into the system (Argentina, Australia, Indonesia, Saudi Arabia, South Africa and Turkey).

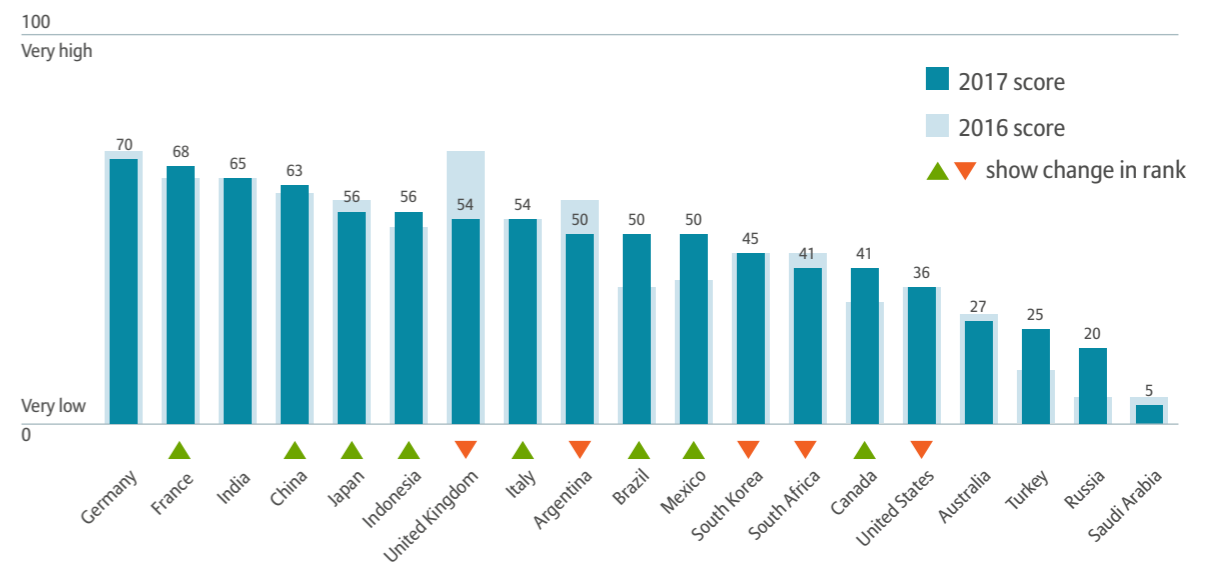
Further, **all G20 countries still have direct and/or indirect fossil fuel subsidies in place**. While many G20 countries have implemented measures to reform fossil fuel subsidies, none has yet acted to fully phase out fossil fuel subsidies for electricity production and upstream activities.

### Key movements <sup>5</sup>

- ▲ **Canada** submitted a long-term transition strategy (up to 2050) to the UNFCCC under the Trudeau government, with talks on a pan-Canadian framework on clean growth and climate change. Overall Canada is performing relatively low in this category (rank 14<sup>th</sup>) with no concrete federal scheme or legislation supporting renewables and disincentivizing fossil fuels yet. However, recent improvements could indicate a larger change and improvement in the coming year, thereby supporting climate action in several Canadian provinces.
- ▼ The **US** has scrapped its climate strategy from the White House website and conveyed clear intent to constrain federal support to agencies working in the field. Additionally, recent executive orders are causing the US to backslide on previous policies under the Clean Power Plan. The US also pulled out of the Paris agreement in June 2017.

<sup>5</sup> Note: Movements in Brazil and Russia for 'policy adequacy' are attributed to slight recalibration in the methodology for the indicator 'support schemes'. For the change, please refer to the Technical Note accompanying Allianz Monitor 2017. <https://allianz.com/en/monitor>

FIGURE 7: Overview of results for 'policy adequacy' for Monitor-2017 and rank changes



## 2.2 Reliability of sustained support

- India and China continue to demonstrate highest reliability of support for a low-carbon power infrastructure – the former moving up to the first rank this year.
- Institutionalization of renewable energy lobbies is seen to be underway in many G20 states as renewables achieve grid parity. Yet, fossil fuel lobbies continue to decelerate the change.
- Climate policy reversal and implementation delays due to change in governments continues to be a critical risk factor for fast-paced green energy transition in countries. Seven G20 countries will have elections in 2017 and 2018.

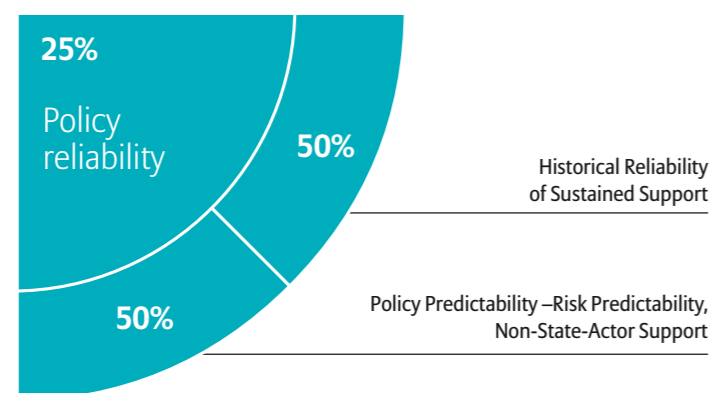
The policy environment must also be reliable and predictable. Only then do investors have confidence in the market and can calculate their returns. The reliability of policies demand a stable long term support for a low-carbon transition and transparent, plannable policy changes

All in all, there are no huge changes compared to last year in the overall ranking, as **almost all countries maintained their scores**. Nonetheless changes in the subcategories of this indicator occur.

**India makes its way up to the top rank from the third-place last year.** This is due to improved scoring in the “Policy Predictability” indicator and lead in the “Historic Reliability”. The risk that the current climate and energy policies will be changed by the next government continues to be low in India. China also maintained its scores from last year. Both the Asian economies are expected to maintain support predictability given strong policy commitment to renewables.

Among the worst-performing countries, **Saudi Arabia and Turkey are now at the bottom end of the ranking**, swapping places with Japan and Canada. Both countries continue to have influential fossil fuel lobbies.

FIGURE 8: Composition of the category ‘reliability of sustained support’



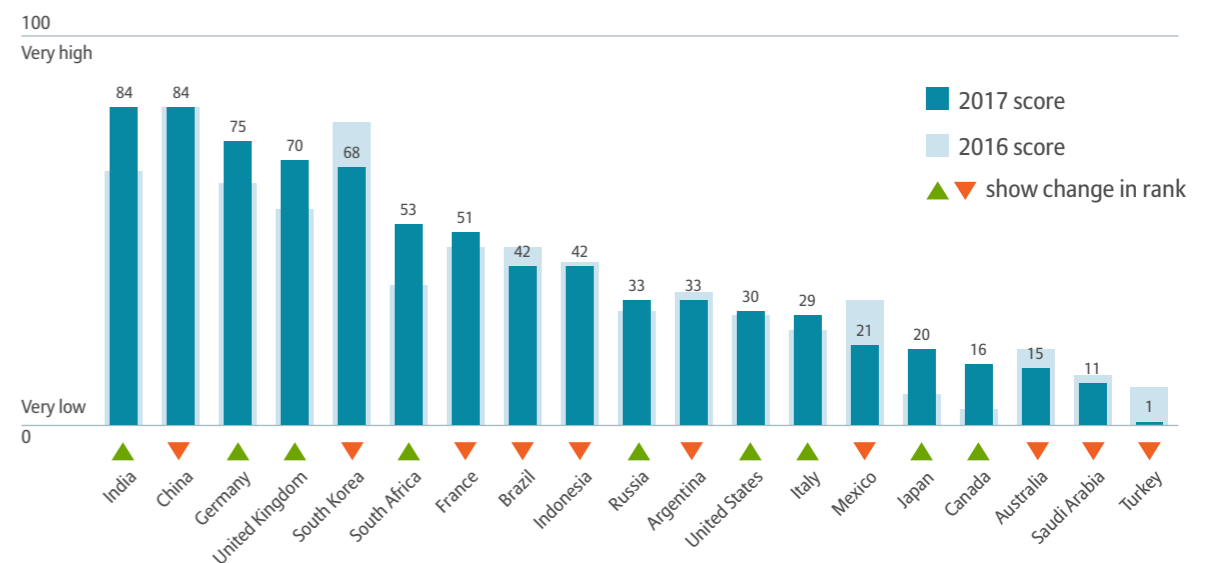
**2016 also saw a renewed interest and promise towards climate action and renewables in some G20 countries.** This is reflected in an upward trend in some countries in the category (e.g. Canada). Contrastingly, for Argentina, re-elected president Marci’s stance on climate action did not translate into better scores overall, because country experts gave a lower rating considering a risk of complete policy reversal.

Further, country experts point towards the risk of backtracking from current climate policy approach of future political appointees for some countries heading into federal elections in the next years (‘risk predictability’). The UK will vote in June, federal elections are due in Germany in September 2017. Mexico, Brazil, Russia, Japan and Italy will have elections in 2018.

### Key movements

- ▲ **Germany** moves up to the top three with improved scores for future predictability of sustained policy support, as the long-term transition strategy is – according to our experts – hard to weaken by the next government. Germany is a country to watch out for in 2017 as plans to move away from subsidies to auctioning are materialized.
- ▲ **India** moved three places up to occupy the first place for reliability of the federal government’s support to renewables this year. Both Singh and Modi governments have repeatedly voiced a strong role of renewables for meeting domestic energy needs and international commitments. The risk of change in current policies due to government change also continues to be low.
- ▼ **Mexico and South Korea** worsened their performance and lost three ranks each. South Korean experts pointed to influence of fossil fuel lobby groups. Mexico received lower scores for decreasing the influence of domestic green lobby-groups and risk that the next government may invalidate/ignore current climate policies.

FIGURE 9: Overview of results for ‘reliability of sustained support’ for Monitor-2017 and rank changes



## 2.3 Market absorption capacity

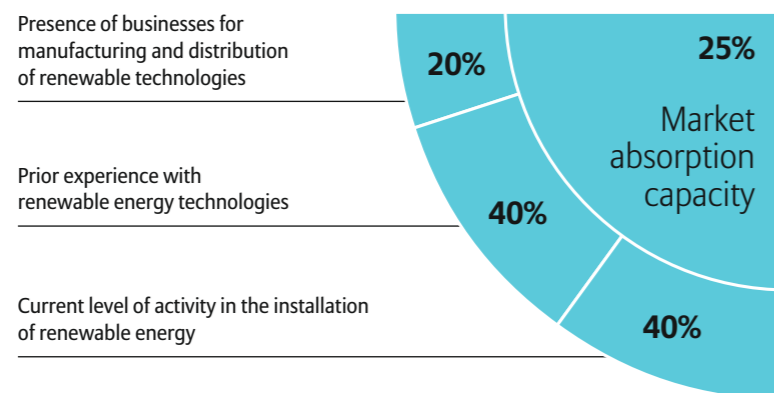
- OECD countries continue to outperform non-OECD G20 member states in the maturity of their markets for renewables – yet many emerging economies continued to improve their markets this year.
- High rates of renewable energy installations were registered in emerging economies in 2016, while developed country markets slowed down. This is most evident in Germany where new installed solar capacity has decreased by 84% from 2012-2016.
- China installed more solar PV (34 GW) than rest of the G20 combined in 2016, although its wind capacity uptake decreased.
- Solar PV took off in Indonesia installing its first 70 MW in 2016 and continued to be a priority in Turkey and Mexico.
- Saudi Arabia, Russia and Argentina's solar markets await to pick up speed.
- Over the past years there has been high fluctuation of newly installed wind capacity in the G20. Only few countries like India and France show an upward trend since 2014.

6 (UBA, 2017)

2016 was a year of massive renewable installations in the G20, particularly for solar PV. **On average, 50% more new solar capacity was installed in 2016 in the G20 compared to 2015**, while there were 24% fewer installations for wind year-on-year.

Strong experience with renewable energy technologies, new installations (albeit at slower rates) and presence of major businesses leads mature OECD economies to maintain their top positions in 2016. **Germany secures its leadership position with the highest share of renewables in the power grid in the G20** (over 28% excluding hydro in 2016<sup>6</sup>) and strong presence of global players in renewables. The UK maintained the second position, despite a policy cutback set in motion. The US also moved up two places, with a steady increase in solar and wind installations, driven by state-set Renewable Portfolio Standards (RPS), decline in capital costs, extension of federal tax credit schemes and rise in cost-competitiveness of renewables.

FIGURE 10: Composition of the category 'market absorption capacity'



**Many emerging markets deployed solar PV and wind at high rates in 2016.** These are Mexico and Turkey in the OECD, and China, India and South Africa in the non-OECD. Contrastingly, maturing markets in Japan, France, Germany, UK and Canada slowed new capacity additions.

**China continued to deploy renewables at a massive pace, outdoing other G20 members.** China's volume of new solar PV capacity installed in 2016 was more than all other G20 countries combined. Brazil and Turkey, also in the middle of the ranking this year as China, are leading the emerging economies for this category in 2016. Brazil's share of renewables (excl. large hydro) is the 4th highest at almost 10%, although its solar PV installations dipped in 2016. Turkey continued to increase its solar PV and wind capacities in 2016.

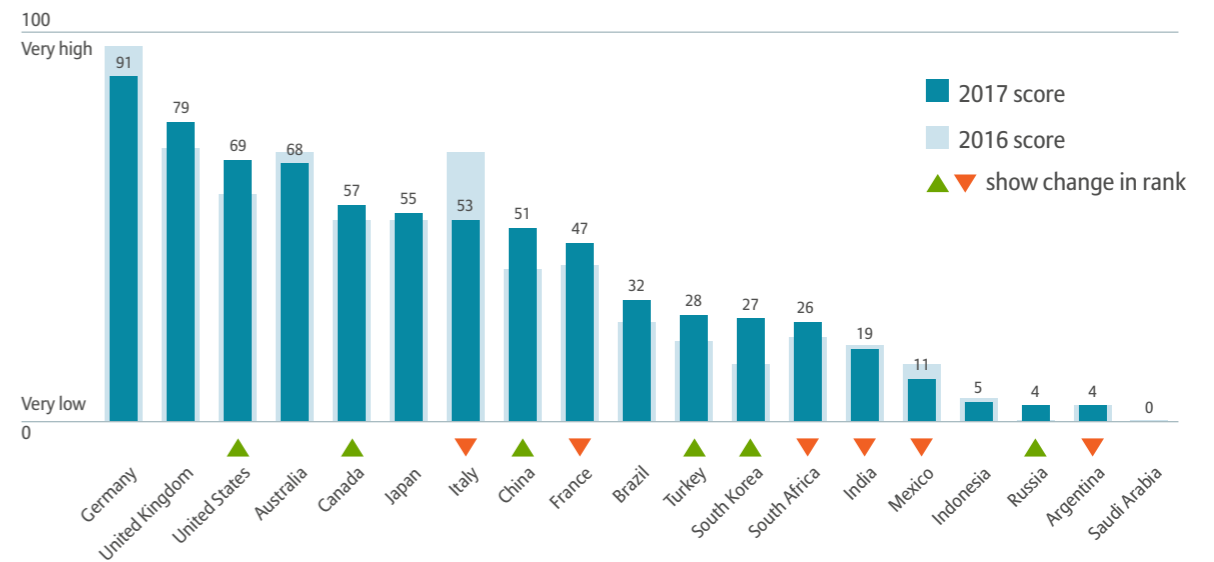
**Saudi Arabia, Russia and Argentina's market absorption capacity has not improved and they continue to occupy the last ranks among the G20.** With no significant new renewables installations, the installed capacity (excl. hydro) remains negligible in these countries. Also, there is almost no presence of the world's leading renewables companies. Only Argentina attracted a marginal presence in 2016.

Indonesia, despite being still positioned close to the bottom of the ranking, has shown a high uptake of new solar installations in 2016, which could be an outcome of the Indonesian government's ongoing efforts for providing a positive support environment.

### Key movements

- ▲ **South Korea** improved in all indicators and moved up three places, especially through high net additions in renewables capacity.
- ▼ Despite holding the 7th place in the ranking, **Italy** forfeited significantly in all sub-categories. Italy has seen materially lower net additions in recent years and reduction in presence of top global renewable energy companies after a spike in solar PV installations from 2010 to 2013. However, Italy continues to retain the second highest share of renewables in the grid at 22% in 2014.

FIGURE 11: Overview of results for 'market absorption capacity' for Monitor-2017 and rank changes



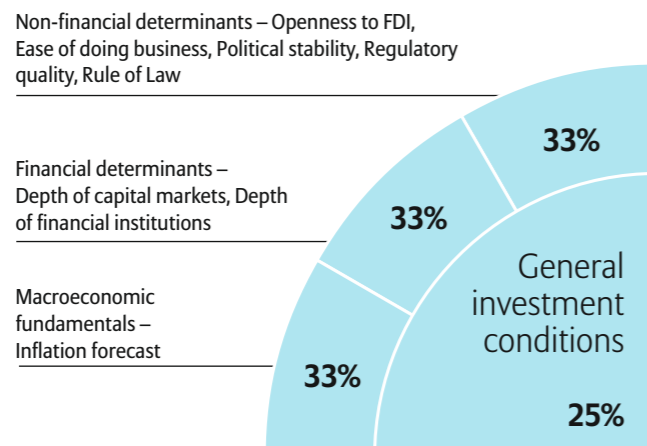
## 2.4 General investment conditions

- 2016 rankings resonate the uphill task ahead for the developing G20 member states to create optimal regulatory and macro-economic conditions for renewables growth.
- The large divergence between the G20 members' general investing conditions persists.

Only minor changes occurred in 2016 in general investing conditions of G20 member states compared to the last year, pointing towards the massive challenges that exist for countries to improve domestic regulatory, financial and social-economic conditions for facilitating investments in renewables. It is worth noting here that the change in rankings in 2016 are mostly relative and due to marginal changes in scores.

**The difference between the OECD and non-OECD countries continues to be striking in the 2016 rankings for 'general investing conditions'.** The OECD countries occupy the top rankings this year as well led by the UK, which maintained economic growth, also in the months after the Brexit referendum. Turkey and Mexico are exceptions as they continue to score low on all indicators. Non-OECD countries occupy the lower half. China and South Africa lead this segment owing to deeper financial sectors compared to other non-OECD countries.

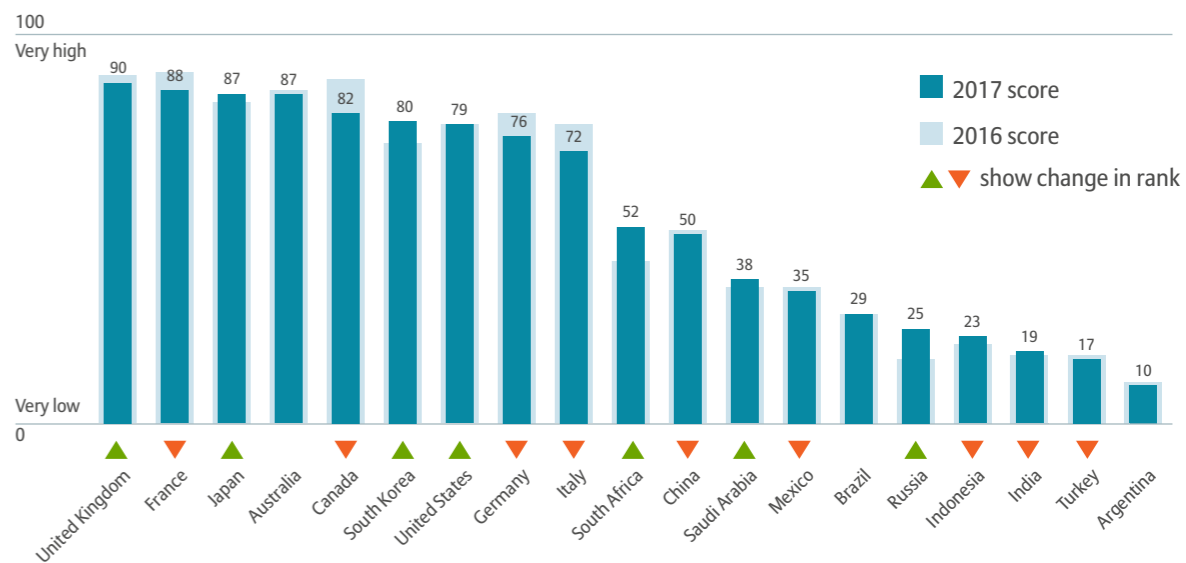
FIGURE 12: Composition of the category 'general investment conditions'



### Key movements

- ▲ **South Korea** moved three ranks up as it maintained its scores on all indicators, swapping places with the US and Germany. Russia also moved up in a similar manner, pushing Indonesia and India down.
- ▼ **Italy** moved two ranks down, mainly due to decrease in scores for financial depth, as the Italian banking sector is struggling with bad debt.

FIGURE 13: Overview of results for 'general investing conditions' for Monitor-2017 and rank changes



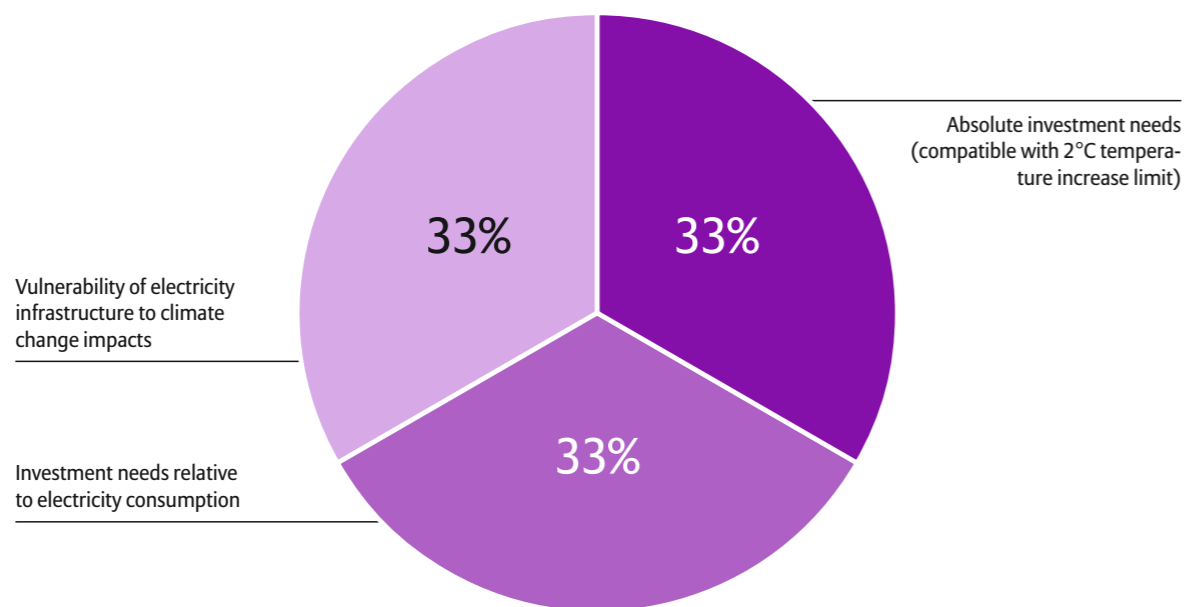
## 2.5 Future needs for investments in the electricity infrastructure

- Emerging economies in the G20 will need higher investments in the future compared to developed countries to cater for their increasing development needs and rising vulnerabilities to climate change.
- G20 countries will require to roughly double their investments to stay below the warming limit of the Paris Agreement.

2016 results highlight again **the need for higher investments in developing countries in the medium term for creating a Paris Agreement compatible and climate resilient power infrastructure**. Future investments needed in the power infrastructure is a composite of three distinct sources of 'need' for new investments: investment needs arising as energy demand increases to support development (captured by state of current consumption); investments needed due to specific climate vulnerabilities of the power sector; and investments made to be in line with the agreed limits for global temperature increase (2°C).

**The top and bottom ranks remain the same in 2016.** India and South Africa occupy the top two ranks (in the same order); and Australia and Mexico occupy the bottom.

FIGURE 14: Composition of the pillar 'future needs for investments in electricity infrastructure'

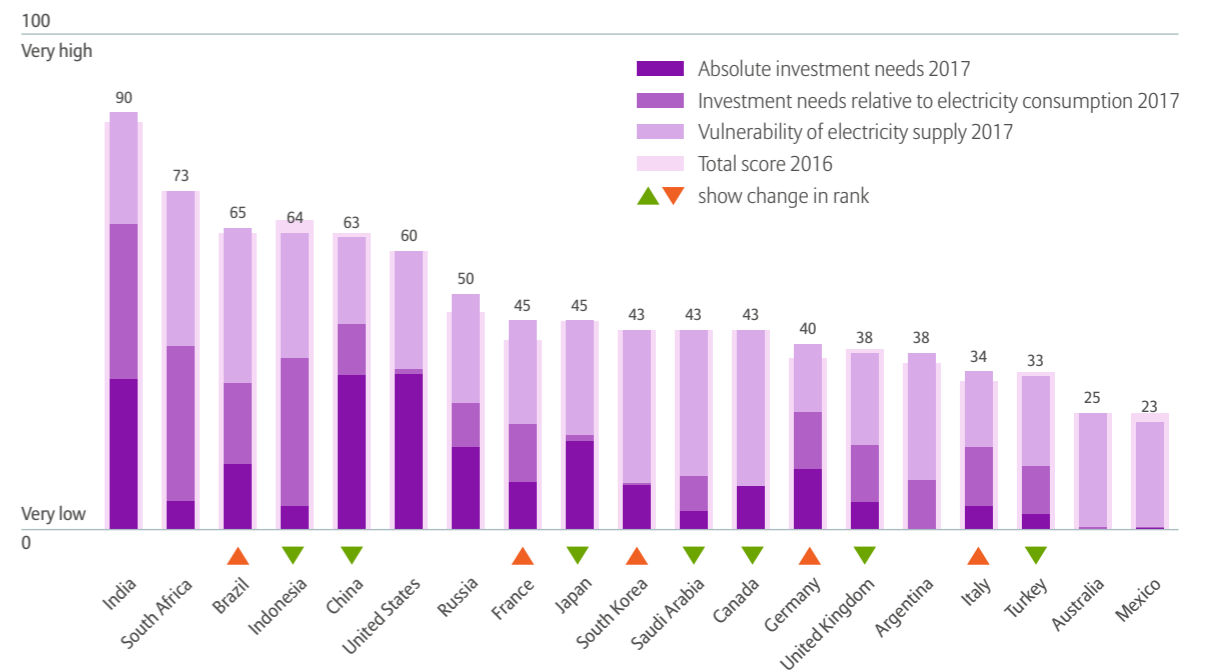


<sup>7</sup> Author's own calculations based on (IEA, 2014). A detailed estimation of absolute investment needs and investment gap for all the G20 is currently under development as part of the forthcoming Allianz Investment Gap tool and will be available in the next edition of the Monitor.

**Countries in the middle ranks swap places with each other due to minor changes in composition of their power mixes and power consumption.** For instance, Italy swapped places with Turkey and the UK with Germany due to minor changes in their power mixes.

**Annual investment needs in the power infrastructure in G20 countries to stay well below the warming limit of 2°C stands at USD<sub>2012</sub> 709 billion per year between 2014-2035<sup>7</sup>.** As a matter of comparison, global investments in power generation stood at USD 420 billion in 2015 (IEA, 2016). Countries with currently high emissions in the power sector are projected to have the highest absolute investment needs to be in line with the 2°C goal. These are China, followed by US and India.

FIGURE 15: Overview of results for 'future investment needs'



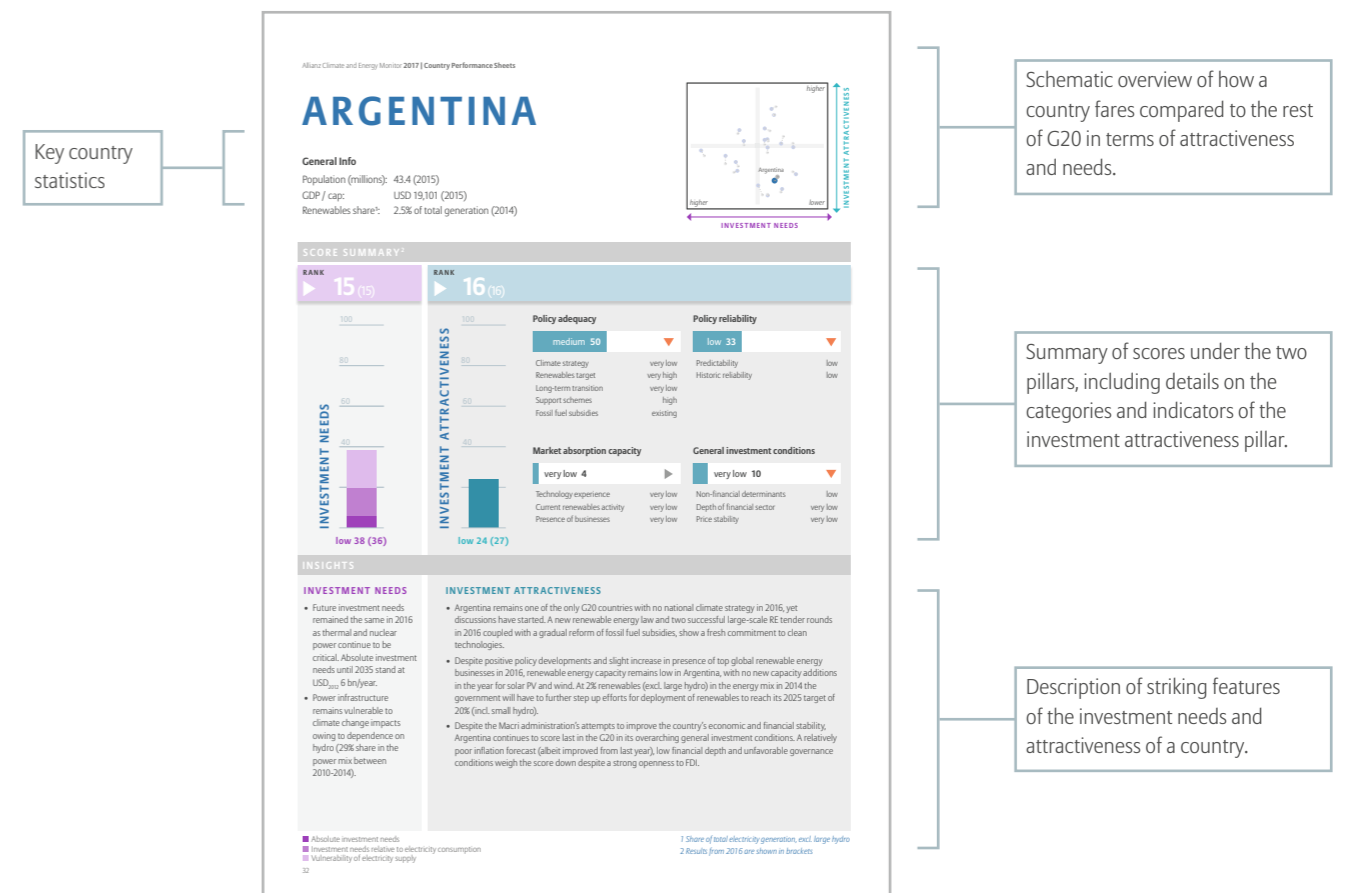
# 3 Country Performance Sheets

## Country Performance Sheets

The following pages present the results of the 2017 Allianz Climate and Energy Monitor for each of the G20 countries, excluding the European Union as a single entity.

Figure 16 presents a demonstrative overview of the country performance sheets, with guidance on how to interpret the information. As for all results of the Monitor, all scores in the performance sheets are relative to the scores of the other G20 countries analyzed, where 0 and 100 refer to lowest and highest scoring countries, rather than to absolute indications.

FIGURE 16: Interpretation of country performance sheets



**NOTE:**

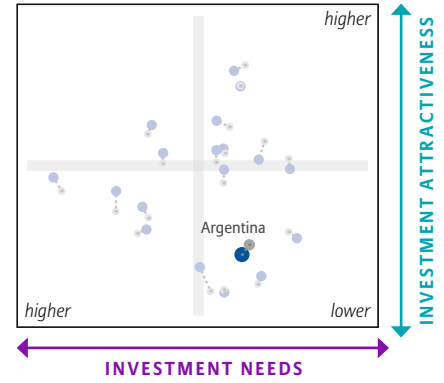
1. 'Policy adequacy' and 'Reliability of sustained support' categories evaluate 'green policies' of a country and not 'general policies'.
2. The final scores for each pillar were represented in five point ratings – very low (countries with a score between 0 up to 20), low (20-40), medium (40-60), high (60-80), very high (80-100). Countries are ranked for each pillar based on their final scores in each pillar.
3. 'Very low' scores for 'inflation forecast' suggest high future inflation, and 'very high' scores suggest low future inflation.
4. All countries with fossil fuel subsidies are equally regardless of the scale of subsidies provided in each country, meaning all countries with some form of direct or indirect subsidy get a 'very low' score.



# ARGENTINA

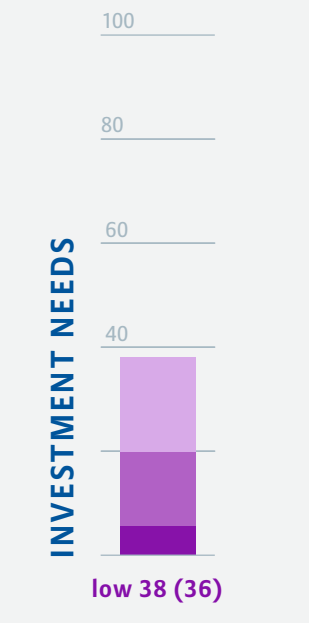
## General Info

Population (millions): 43.4 (2015)  
 GDP / cap: USD 19,101 (2015)  
 Renewables share<sup>1</sup>: 2.5% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **15** (15)



**RANK**  
 ▶ **16** (16)

**INVESTMENT ATTRACTIVENESS**

A vertical bar chart with 'INVESTMENT ATTRACTIVENESS' on the y-axis (0 to 100). The bar for Argentina reaches 24. Below the bar, it says 'low 24 (27)'. The bar is dark teal.

Category	Score	Rank	Indicator
<b>Policy adequacy</b>	medium 50		▼
Climate strategy	very low		
Renewables target	very high		
Long-term transition	very low		
Support schemes	high		
Fossil fuel subsidies	existing		
<b>Policy reliability</b>	low 33		▼
Predictability	low		
Historic reliability	low		
<b>Market absorption capacity</b>	very low 4		▼
Technology experience	very low		
Current renewables activity	very low		
Presence of businesses	very low		
<b>General investment conditions</b>	very low 10		▶
Non-financial determinants	low		
Depth of financial sector	very low		
Price stability	very low		

## INSIGHTS

### INVESTMENT NEEDS

- Future investment needs remained the same in 2016 as thermal and nuclear power continue to be critical. Absolute investment needs until 2035 stand at USD<sub>2012</sub> 6 bn/year.
- Power infrastructure remains vulnerable to climate change impacts owing to dependence on hydro (29% share in the power mix between 2010-2014).

### INVESTMENT ATTRACTIVENESS

- Argentina remains one of the only G20 countries with no national climate strategy in 2016, yet discussions have started. A new renewable energy law and two successful large-scale RE tender rounds in 2016 coupled with a gradual reform of fossil fuel subsidies, show a fresh commitment to clean technologies.
- Despite positive policy developments and slight increase in presence of top global renewable energy businesses in 2016, renewable energy capacity remains low in Argentina, with no new capacity additions in the year for solar PV and wind. At 2% renewables (excl. large hydro) in the energy mix in 2014 the government will have to further step up efforts for deployment of renewables to reach its 2025 target of 20% (incl. small hydro).
- Despite the Macri administration's attempts to improve the country's economic and financial stability, Argentina continues to score last in the G20 in its overarching general investment conditions. A relatively poor inflation forecast (albeit improved from last year), low financial depth and unfavorable governance conditions weigh the score down despite a strong openness to FDI.

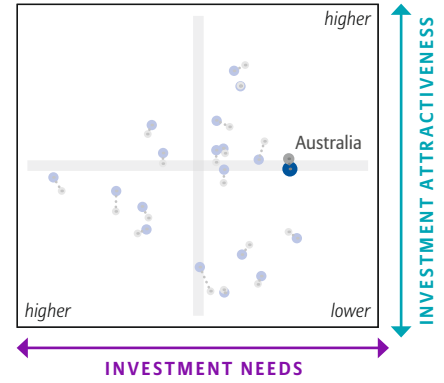
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# AUSTRALIA

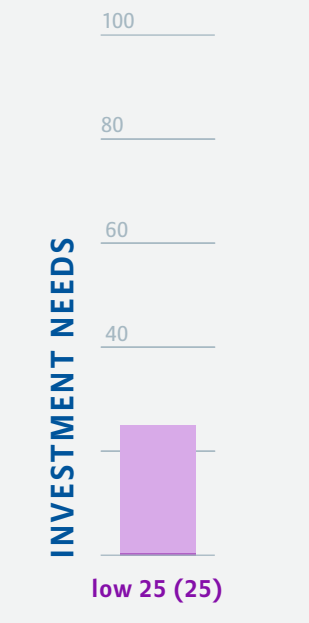
## General Info

Population (millions): 23.8 (2015)  
 GDP / cap: USD 43,613 (2015)  
 Renewables share<sup>1</sup>: 7.5% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **18** (18)



**RANK**  
 ▼ **9** (7)

Category	Score	Rank
Policy adequacy	low 27	▶
Policy reliability	very low 15	▼
Market absorption capacity	high 68	▶
General investment conditions	very high 87	▶

**Policy adequacy**  
 Climate strategy: medium  
 Renewables target: medium  
 Long-term transition: very low  
 Support schemes: low  
 Fossil fuel subsidies: existing

**Policy reliability**  
 Predictability: low  
 Historic reliability: very low

**Market absorption capacity**  
 Technology experience: medium  
 Current renewables activity: high  
 Presence of businesses: high

**General investment conditions**  
 Non-financial determinants: very high  
 Depth of financial sector: very high  
 Price stability: high

## INSIGHTS

### INVESTMENT NEEDS

- Australia retained its rank in 2016, with the second lowest absolute investment needs until 2035 of USD<sub>2012</sub> 8 bn annually.
- Australian power sector is vulnerable to climate change impacts due to high dependence on thermal and nuclear (73% of the electricity mix in 2014)

### INVESTMENT ATTRACTIVENESS

- Australia loses two places in the attractiveness ranking compared to 2016, ending up 9th in the G20. Lack of long-term certainty and clarity in Australia's federal policies towards climate change and renewable energy has continued. Australia still lacks of a comprehensive national plan for renewable energy development beyond its 2020 target of 23% share of renewables and has no long-term plan in place to transform the power infrastructure towards low-carbon.
- While a number of the world's leading renewables businesses are present in Australia, the renewables market shrunk over the past few years. In 2016, Australia installed almost 50% less new solar PV and wind plants compared to the previous year.
- The country has strong general investment conditions (4th among G20 countries, due to a robust financial sector and good non-financial determinants of investing conditions).

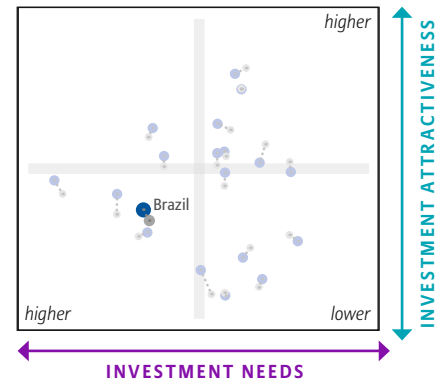
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# BRAZIL

## General Info

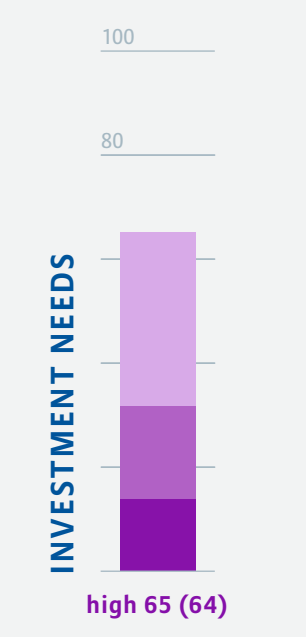
Population (millions): 207.8 (2015)  
 GDP / cap: USD 14,538 (2015)  
 Renewables share<sup>1</sup>: 9.9% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**3** (5)

**RANK**  
**13** (13)



**INVESTMENT ATTRACTIVENESS**  
 low 38 (35)

Policy adequacy		Policy reliability	
medium 50		medium 42	
Climate strategy	high	Predictability	medium
Renewables target	medium	Historic reliability	medium
Long-term transition	medium		
Support schemes	medium		
Fossil fuel subsidies	existing		
Market absorption capacity		General investment conditions	
low 32		low 29	
Technology experience	low	Non-financial determinants	low
Current renewables activity	low	Depth of financial sector	low
Presence of businesses	medium	Price stability	low

## INSIGHTS

### INVESTMENT NEEDS

- Brazil moved up two ranks for investment needs, both absolute and relative, in the G20 with investment needs of USD<sub>2012</sub> 25 bn/year until 2035.
- Brazil's high dependence on hydro increases its power infrastructure vulnerability to future climate variabilities.

### INVESTMENT ATTRACTIVENESS

- Brazil has a medium-term national plan on climate change and an emission reduction target of medium ambition. There is a consensus on decarbonization and climate action across the political spectrum.
- Brazil has demonstrated strong support for renewable energy technologies through a system of national auctions. Over the past 3 years, Brazil installed a significant amount of wind power but only marginal solar PV capacity. The electricity system remains mostly based on hydro (73% of electricity mix, average generation between 2010-2014).
- Postponed reserve auctions for wind and solar in December 2016 sent mixed messages about the country's continued commitment to renewables and its ability to meet its 2030 targets of 23% non-hydro renewables in the electricity grid. The government expected a possible oversupply based on projections for a decreasing GDP and correlated electricity consumption growth rates. Yet, there is strong opposition in the industry to the government's calculations, which additionally question the future long-term planning reliability for investors.
- Brazil scores in the bottom half among G20 countries (14th) for its general investment conditions owing to a poor inflation forecast and underdeveloped financial markets.

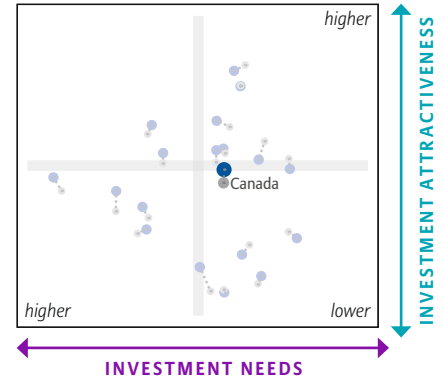
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# CANADA

## General Info

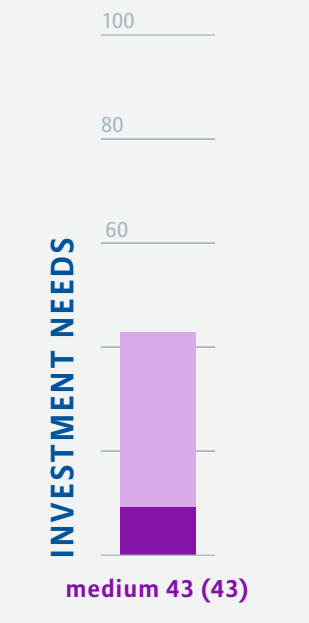
Population (millions): 35.9 (2015)  
 GDP / cap: USD 42,925 (2015)  
 Renewables share<sup>1</sup>: 4.5% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**12** (9)

**RANK**  
**10** (10)



**INVESTMENT ATTRACTIVENESS**

medium 49 (45)

<p><b>Policy adequacy</b></p> <p>medium 41 </p> <ul style="list-style-type: none"> <li>Climate strategy: medium</li> <li>Renewables target: very low</li> <li>Long-term transition: medium</li> <li>Support schemes: medium</li> <li>Fossil fuel subsidies: existing</li> </ul>	<p><b>Policy reliability</b></p> <p>very low 16 </p> <ul style="list-style-type: none"> <li>Predictability: low</li> <li>Historic reliability: very low</li> </ul>
<p><b>Market absorption capacity</b></p> <p>medium 57 </p> <ul style="list-style-type: none"> <li>Technology experience: medium</li> <li>Current renewables activity: high</li> <li>Presence of businesses: high</li> </ul>	<p><b>General investment conditions</b></p> <p>very high 82 </p> <ul style="list-style-type: none"> <li>Non-financial determinants: very high</li> <li>Depth of financial sector: high</li> <li>Price stability: very high</li> </ul>

## INSIGHTS

### INVESTMENT NEEDS

- Absolute needs stand at USD<sub>2012</sub> 18 bn/year until 2035. Canada has moved down in the ranking, portraying an increase in investment needs.
- High dependence on hydro, thermal and nuclear power makes the power sector vulnerable to future climate change impacts.

### INVESTMENT ATTRACTIVENESS

- Canada maintained its attractiveness rank among the G20 this year owing to improvements in the policy landscape under the Trudeau government. A new long-term climate strategy was submitted to the UNFCCC last November, breaking away from the previous government's inaction. Federal support and signal for renewable energies remain weak, though, with still no national renewable energy targets and mostly sub-national support filling the void. Fossil fuel industry also remains influential.
- Canada's power sector is dominated by hydropower (60% share in the power generation mix between 2010-2014), the share of other renewables remains low compared to other OECD G20 countries. There has been a downward trend in newly installed capacity over the last few years, although Canada still has the second-highest rate of activity in new installations of wind per capita across the G20 countries.
- Canada scores 5th among G20 countries for its good general investment conditions.

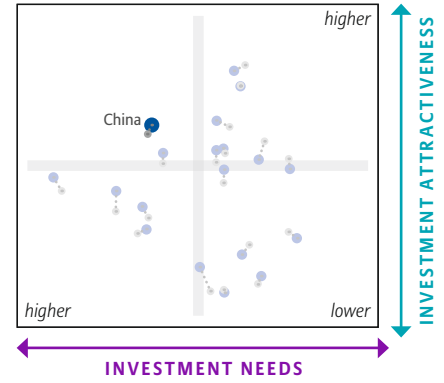
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# CHINA

## General Info

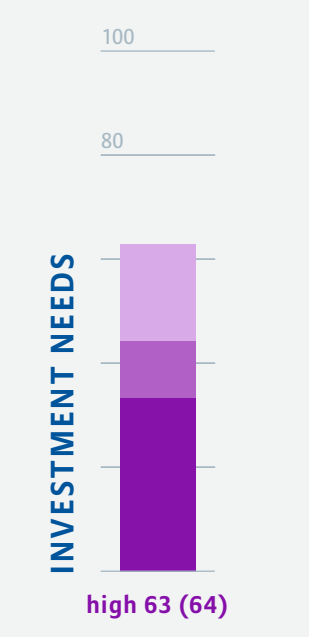
Population (millions): 1,371.2 (2015)  
 GDP / cap: USD 13,572 (2015)  
 Renewables share<sup>1</sup>: 4.1% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**5** (4)

**RANK**  
**4** (4)



**INVESTMENT ATTRACTIVENESS**  
 high 62 (59)

<b>Policy adequacy</b> high 63		<b>Policy reliability</b> very high 84	
Climate strategy	high	Predictability	high
Renewables target	medium	Historic reliability	very high
Long-term transition	medium		
Support schemes	high		
Fossil fuel subsidies	existing		
<b>Market absorption capacity</b> medium 51		<b>General investment conditions</b> medium 50	
Technology experience	low	Non-financial determinants	low
Current renewables activity	medium	Depth of financial sector	medium
Presence of businesses	very high	Price stability	high

## INSIGHTS

### INVESTMENT NEEDS

- China continues to have the highest absolute investment needs among the G20 – USD<sub>2012</sub> 208 bn per year until 2035. But, overall needs decreased due to large investments made in 2016.
- Power sector is vulnerable to climate change impacts due to high dependence on thermal and some nuclear power.

### INVESTMENT ATTRACTIVENESS

- China continues to maintain its 4th rank this year with strong effectiveness and reliability of policy support for renewables and climate change mitigation. China has ambitious plans for renewables scale-up under a five-year development planning mode and a history of surpassing prior targets. Ramping-up renewables is also an important input for China's efforts towards its contribution to the Paris Agreement and to tackle local air pollution problems.
- China achieved record-high installations for both wind and solar PV over the past few years and has a good presence of renewable energy businesses, improving scores for its 'market absorption capacity' in 2016.
- While providing great short- to medium-term planning reliability through its five-year-plans, China needs to define a long-term plan for integration of large-scale renewables in the grid. The share of renewables in the power mix has increased relatively slowly. The power sector remains dominated by fossil fuels (75% of the electricity mix in 2014). China has recently taken some steps to address the issue of renewable energy curtailment and indicated mandatory use of a renewables credit scheme from 2018 to ensure renewable energy procurement by utilities, showing commitment to improve regulatory frameworks for uptake of renewables.

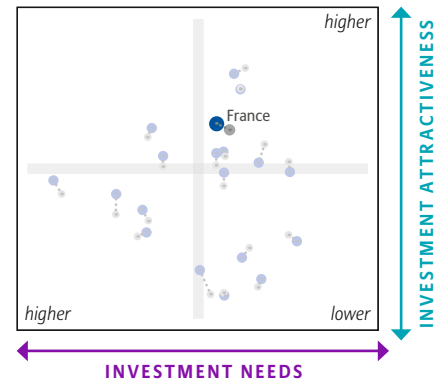
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# FRANCE

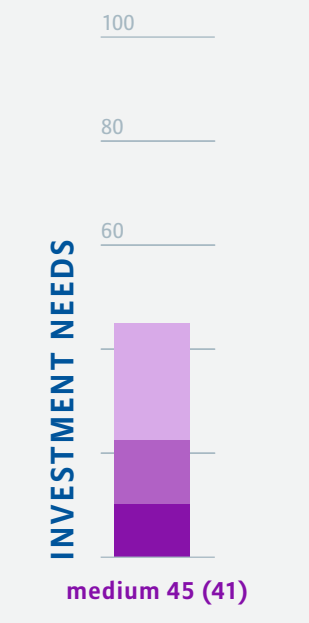
## General Info

Population (millions): 66.8 (2015)  
 GDP / cap: USD 37,620 (2015)  
 Renewables share<sup>1</sup>: 5.1% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▲ **8** (12)



**RANK**  
 ▶ **3** (3)

**INVESTMENT ATTRACTIVENESS**  
 high 63 (61)

<b>Policy adequacy</b> high 68 ▲ Climate strategy: high Renewables target: medium Long-term transition: very high Support schemes: high Fossil fuel subsidies: existing	<b>Policy reliability</b> medium 51 ▼ Predictability: medium Historic reliability: medium
<b>Market absorption capacity</b> medium 47 ▼ Technology experience: low Current renewables activity: medium Presence of businesses: high	<b>General investment conditions</b> very high 88 ▼ Non-financial determinants: high Depth of financial sector: very high Price stability: very high

## INSIGHTS

### INVESTMENT NEEDS

- Absolute investment needs stand at USD<sub>2012</sub> 19 bn/year until 2035, overall needs increased in 2016 due to marginal increases in relative needs and higher vulnerability.
- High vulnerability of the power infrastructure to climate change impacts due to dependence on thermal and nuclear energy (82% of the power mix in 2014).

### INVESTMENT ATTRACTIVENESS

- France's Energy Transition Act sets a strong, long-term climate policy framework backed up by a National Low-Carbon Strategy outlining strategic medium-term action across all key sectors.
- President Macron has given full support to the Paris Agreement and France's long-term decarbonization and renewable energy commitments.
- By 2050, France aims for a decarbonization of its electricity sector. Yet, in contrast, the country's renewable energy target remains relatively unambitious. France has installed a fair amount of wind energy capacity over the past years, however, developments in other renewable energy sources has been sluggish.
- France now supports large-scale renewable installations mostly via competitive auctioning coupled with a feed-in premium. A clear renewable energy tender schedule has helped to reduce some of the uncertainty in the move from feed-in tariffs to this new regime.
- France drops from first to second position this year for general investment conditions, maintaining strong domestic economic and governance conditions relative to other G20 countries.

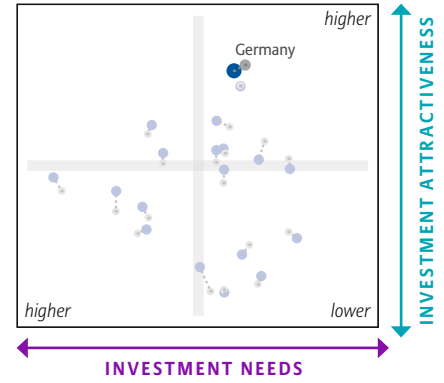
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# GERMANY

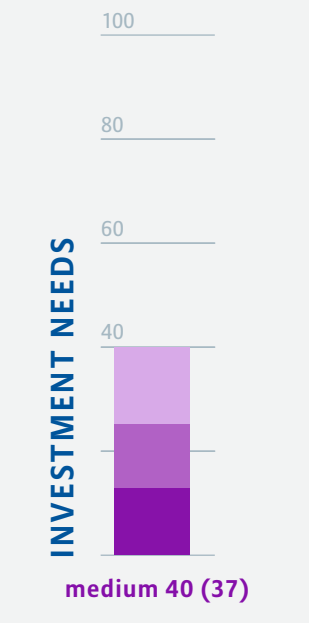
## General Info

Population (millions): 81.4 (2015)  
 GDP / cap: USD 43,943 (2015)  
 Renewables share<sup>1</sup>: 23.0% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**13** (14)



**RANK**  
**1** (1)

**INVESTMENT ATTRACTIVENESS**  
 high 78 (80)

<p><b>Policy adequacy</b>                  high 70 </p> <ul style="list-style-type: none"> <li>Climate strategy: high</li> <li>Renewables target: high</li> <li>Long-term transition: very high</li> <li>Support schemes: high</li> <li>Fossil fuel subsidies: existing</li> </ul>	<p><b>Policy reliability</b>                  high 75 </p> <ul style="list-style-type: none"> <li>Predictability: high</li> <li>Historic reliability: high</li> </ul>
<p><b>Market absorption capacity</b>                  very high 91 </p> <ul style="list-style-type: none"> <li>Technology experience: very high</li> <li>Current renewables activity: high</li> <li>Presence of businesses: very high</li> </ul>	<p><b>General investment conditions</b>                  high 76 </p> <ul style="list-style-type: none"> <li>Non-financial determinants: very high</li> <li>Depth of financial sector: medium</li> <li>Price stability: very high</li> </ul>

## INSIGHTS

### INVESTMENT NEEDS

- Germany's relative investment needs increased marginally this year, leading to a small deterioration in its rank. Absolute investment needs until 2035 are USD<sub>2012</sub> 23 bn/year.
- Power infrastructure is vulnerable to climate change impacts due to dependence on thermal and nuclear (72% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- Germany has a robust, long-term climate strategy with an ambitious renewable energy target and a relatively strong GHG-emissions reduction target.
- Following changes in EU state-aid rules in 2017, Germany moved from a support policy based on feed-in tariffs to competitive auctioning for large-scale renewables. Germany's broad political support for the energy transition and strong track record with renewables help to alleviate some of the uncertainties raised by this policy change.
- Germany has installed most wind and solar energy in per capita terms. There is however a clear downward trend in new capacity additions for solar PV. The high past additions of renewables capacity are leading to technical and economic challenges in the grid network and subsequent curtailment of renewable electricity.
- Germany ranks 8th among G20 members for its general investment conditions, obtaining strong scores for its inflation forecast and non-financial determinants. Germany however obtains a lower score for the depth of its financial sector compared to other OECD G20 nations.

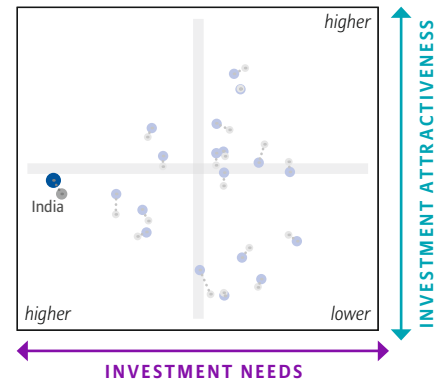
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# INDIA

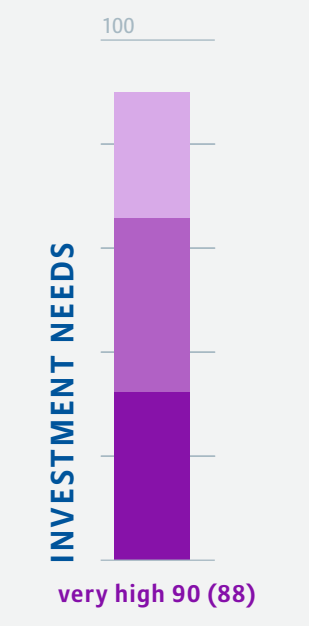
## General Info

Population (millions): 1,311.1 (2015)  
 GDP / cap: USD 5,733 (2015)  
 Renewables share<sup>1</sup>: 5.2% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **1** (1)



**RANK**  
 ▶ **11** (11)

**INVESTMENT ATTRACTIVENESS**  
 medium 47 (43)

<p><b>Policy adequacy</b>                  high 65 ▶</p> <ul style="list-style-type: none"> <li>Climate strategy: high</li> <li>Renewables target: high</li> <li>Long-term transition: medium</li> <li>Support schemes: high</li> <li>Fossil fuel subsidies: existing</li> </ul>	<p><b>Policy reliability</b>                  very high 84 ▲</p> <ul style="list-style-type: none"> <li>Predictability: high</li> <li>Historic reliability: very high</li> </ul>
<p><b>Market absorption capacity</b>                  very low 19 ▼</p> <ul style="list-style-type: none"> <li>Technology experience: very low</li> <li>Current renewables activity: very low</li> <li>Presence of businesses: medium</li> </ul>	<p><b>General investment conditions</b>                  very low 19 ▼</p> <ul style="list-style-type: none"> <li>Non-financial determinants: low</li> <li>Depth of financial sector: very low</li> <li>Price stability: very low</li> </ul>

## INSIGHTS

### INVESTMENT NEEDS

- India continues to have the highest overall investment needs in power infrastructure among the G20 as absolute needs are high (USD<sub>2012</sub> 95 bn/ year until 2035) and electricity access is relatively low.
- Power sector is vulnerable to climate change impacts due to high dependence on thermal and some nuclear power.

### INVESTMENT ATTRACTIVENESS

- India maintains its 11th rank among the G20 for investment attractiveness this year.
- It continues to demonstrate strong political commitment to climate action and renewables. A positive policy environment exists having ambitious renewable energy targets and strong support schemes in place.
- The current focus is on procuring renewables cost-effectively. To drive this development, India is trying out different auctioning models to increase solar cost competitiveness and piloted auctions for wind power in the beginning of 2017.
- Positive policy signals have translated into enhanced uptake of renewables in the last year, particularly for solar PV, which registered an 83% increase in 2016. However, capacity additions in per capita terms are still low compared to other G20 countries; fossil fuels continue to have a major share in the generation mix (82% in 2014).
- An enabling policy framework is needed to support grid integration of large scale renewables in India. Among others, challenges with regards to the grid system, lack of transmission corridors to transport surpluses from one state to another and compensation for curtailment need to be addressed.

■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

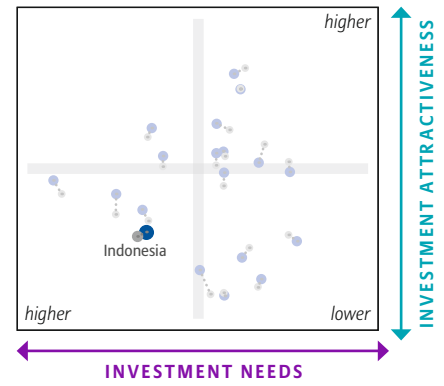
<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets



# INDONESIA

## General Info

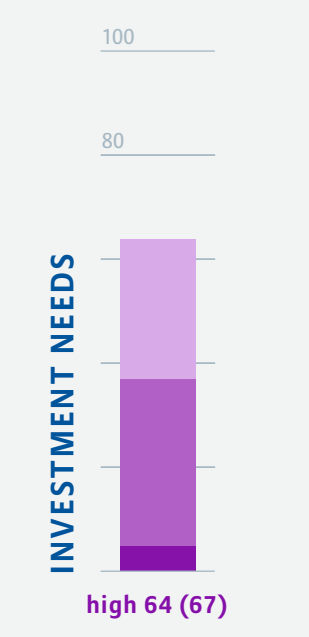
Population (millions): 257.6 (2015)  
 GDP / cap: USD 10,384 (2015)  
 Renewables share<sup>1</sup>: 4.8% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**4** (3)

**RANK**  
**14** (15)



**low 31 (30)**

<b>Policy adequacy</b>		<b>Policy reliability</b>	
medium 56		medium 42	
Climate strategy	high	Predictability	low
Renewables target	low	Historic reliability	medium
Long-term transition	very low		
Support schemes	high		
Fossil fuel subsidies	existing		
<b>Market absorption capacity</b>		<b>General investment conditions</b>	
very low 5		low 23	
Technology experience	very low	Non-financial determinants	low
Current renewables activity	very low	Depth of financial sector	very low
Presence of businesses	very low	Price stability	low

## INSIGHTS

### INVESTMENT NEEDS

- Investment needs relative to electricity demand remain high. USD<sub>2012</sub> 13 bn/year absolute investment needed until 2035.
- The power sector is vulnerable to climate change impacts due to high dependence on thermal and nuclear energy (89% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- Policies exist for encouraging uptake of renewables to meet the target of supplying 23% of the country's energy needs in 2025 through renewables (including hydro and biofuels). Still, Indonesia struggles to envision a long-term decarbonization strategy with renewables. The state electricity company, PLN, has indicated the high costs of renewables as a key barrier for procurement. Policy changes have been announced to address this situation (e.g. by reducing rates of subsidies), but their impact on its rank will be fully visible only in the coming year.
- 2016 saw some increase in solar PV installed capacities in Indonesia after a period of negligible activity. Yet, there is a long path ahead as Indonesia currently lags behind other G20 countries in installed wind and solar PV capacities, and in attracting major global RE businesses. Also the experience with renewables is limited.

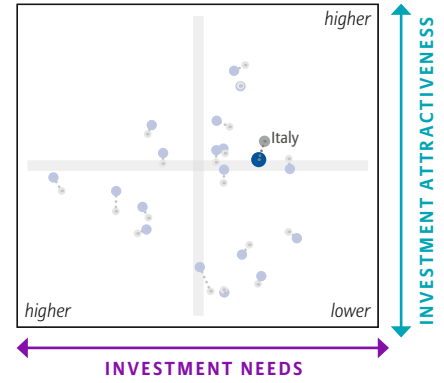
■ Absolute investment needs  
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<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# ITALY

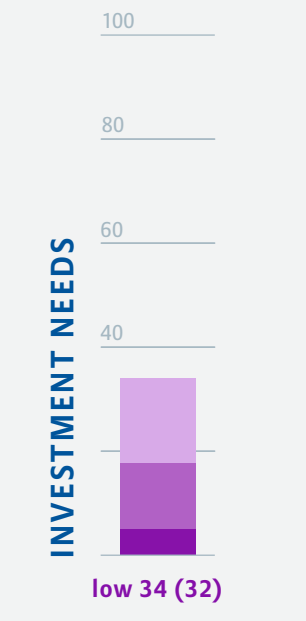
## General Info

Population (millions): 60.8 (2015)  
 GDP / cap: USD 34,178 (2015)  
 Renewables share<sup>1</sup>: 22.3% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▲ **16** (17)



**RANK**  
 ▼ **8** (5)

<b>INVESTMENT ATTRACTIVENESS</b>	<b>Policy adequacy</b>	<b>Policy reliability</b>
	medium 54	low 29
	Climate strategy: medium Renewables target: very low Long-term transition: medium Support schemes: high Fossil fuel subsidies: existing	Predictability: medium Historic reliability: very low
	<b>Market absorption capacity</b>	<b>General investment conditions</b>
	medium 53	high 72
	Technology experience: very high Current renewables activity: very low Presence of businesses: medium	Non-financial determinants: high Depth of financial sector: medium Price stability: very high
<b>INVESTMENT ATTRACTIVENESS</b>	medium 52 (57)	

## INSIGHTS

### INVESTMENT NEEDS

- Italy continues to be in the lower end of investment needs among the G20. Annual absolute investment needs are USD<sub>2012</sub> 13 bn until 2035.
- Power infrastructure is vulnerable to climate change impacts due to medium dependence on both hydro (18%), as well as thermal and nuclear power (55%)

### INVESTMENT ATTRACTIVENESS

- Italy slipped three ranks this year, coming 8th in the G20 for its renewable energy investment attractiveness.
- Italy has already surpassed its 2020 target for renewable energy and the country has no medium-term target (a new 2030 Energy Strategy is under preparation). Further clarity will also be needed as to how the country plans to implement the EU-wide move to an auction-based system for large-scale renewables, creating uncertainty amongst investors, which were already surprised by retroactive cuts for solar PV in 2014.
- Italy's market absorption capacity has significantly decreased from last year. While annual solar PV capacity installations were high in 2010-2013, since then there have been few net additions in renewable energy capacity. Italy has also seen several large-scale renewable energy businesses leave the country in 2016.
- It is the only EU country among G20 members with no long-term GHG emissions target. Italy's climate policies have also proven to be more volatile than those of its European peers and there is no cross-party consensus on the issue of climate action.
- Italy ranks 9th among G20 countries and last among EU G20 members for national investment conditions. Despite a stable inflation forecast, Italy scores relatively poorly for the depth of its financial sector.

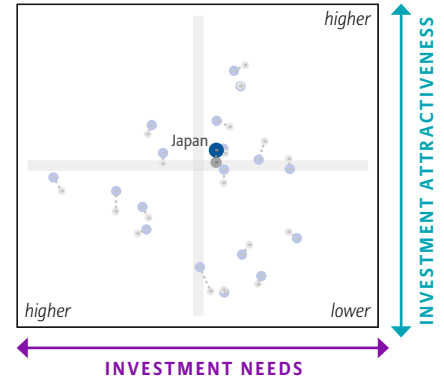
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# JAPAN

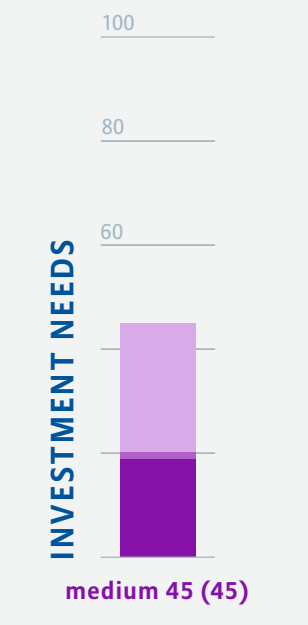
## General Info

Population (millions): 127.0 (2015)  
 GDP / cap: USD 37,858 (2015)  
 Renewables share<sup>1</sup>: 6.1% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
**9** (8)



**RANK**  
**6** (8)

**INVESTMENT ATTRACTIVENESS**

medium 55 (51)

<p><b>Policy adequacy</b></p> <p>medium 56 </p> <ul style="list-style-type: none"> <li>Climate strategy: medium</li> <li>Renewables target: low</li> <li>Long-term transition: medium</li> <li>Support schemes: high</li> <li>Fossil fuel subsidies: existing</li> </ul>	<p><b>Policy reliability</b></p> <p>low 20 </p> <ul style="list-style-type: none"> <li>Predictability: medium</li> <li>Historic reliability: very low</li> </ul>
<p><b>Market absorption capacity</b></p> <p>medium 55 </p> <ul style="list-style-type: none"> <li>Technology experience: medium</li> <li>Current renewables activity: medium</li> <li>Presence of businesses: very high</li> </ul>	<p><b>General investment conditions</b></p> <p>very high 87 </p> <ul style="list-style-type: none"> <li>Non-financial determinants: very high</li> <li>Depth of financial sector: high</li> <li>Price stability: very high</li> </ul>

## INSIGHTS

### INVESTMENT NEEDS

- Japan's absolute investment needs until 2035 are USD<sub>2012</sub> 36 bn/ year.
- Power infrastructure is vulnerable to climate change impacts due to high dependence on thermal and nuclear power (85% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- Japan continues to demonstrate medium ambition for both climate action and development of renewable energies. There has been limited cross-party consensus on these issues. Similar to many other G20 countries, Japan has recently replaced its feed-in-tariff for large-scale solar PV with an auctioning system.
- Japan's market absorption capacity has remained stable, remaining in the upper half of G20 countries thanks to a high presence of renewable energy businesses and a relatively large share of renewables in the power generation. Japan has installed a significant amount of solar PV capacity in the past year.
- Japan ranks third among G20 countries for general investment conditions. This can be particularly attributed to the country's stable inflation forecast and strong non-financial determinants.

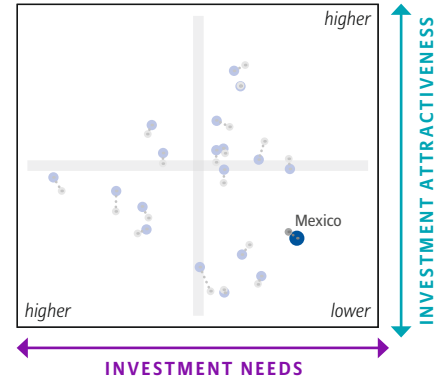
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# MEXICO

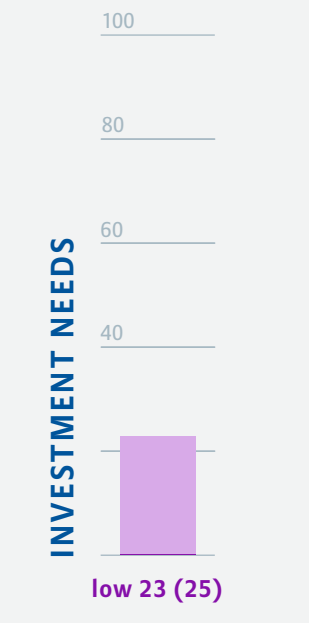
## General Info

Population (millions): 127.0 (2015)  
 GDP / cap: USD 16,496 (2015)  
 Renewables share<sup>1</sup>: 1.1% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **19** (19)



**RANK**  
 ▼ **15** (14)

<b>INVESTMENT ATTRACTIVENESS</b>	<b>Policy adequacy</b>	<b>medium 50</b> ▲	<b>Policy reliability</b>	<b>low 21</b> ▼
	Climate strategy	high	Predictability	low
	Renewables target	medium	Historic reliability	very low
	Long-term transition	medium		
	Support schemes	medium		
	Fossil fuel subsidies	existing		
	<b>Market absorption capacity</b>	<b>very low 11</b> ▼	<b>General investment conditions</b>	<b>low 35</b> ▼
	Technology experience	very low	Non-financial determinants	medium
	Current renewables activity	very low	Depth of financial sector	very low
	Presence of businesses	low	Price stability	high

## INSIGHTS

### INVESTMENT NEEDS

- Mexico continued to have the lowest needs in the G20 of USD<sub>2012</sub> 9 bn/year absolute needs until 2035.
- Vulnerability reduced slightly as renewables added more power to the grid compared to last year. Yet, overall vulnerability remains high due to high dependence on thermal and nuclear (82% of the power mix in 2014).

### INVESTMENT ATTRACTIVENESS

- Mexico has a robust Energy Transition Law. In 2016 the country submitted a long-term strategy to reach its mid-century climate and clean energy goals to the UNFCCC.
- Mexico ranks in the lower half of G20 countries in terms of its market absorption capacity for renewables. Despite significantly increasing the amount of renewable energy capacity installed in 2016 compared to previous years, the overall installed capacity and the share of renewables in power generation remain marginal.
- The country has recently improved its support policy for renewable energy by moving to a competitive bidding system for large-scale installations, retaining net-metering only for small-scale RE. In 2016, Mexico saw two large-scale tender rounds for several gigawatts of new solar and wind capacity.
- Mexico ranks in the bottom half of G20 countries for general investment conditions owing particularly to limited depth of capital markets and financial institutions.

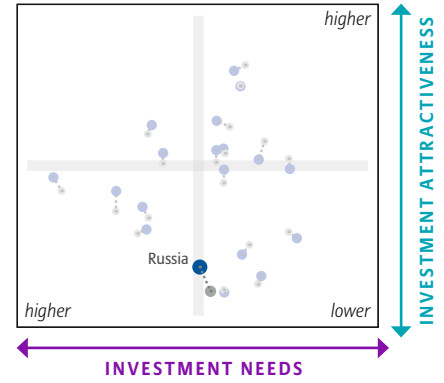
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# RUSSIA

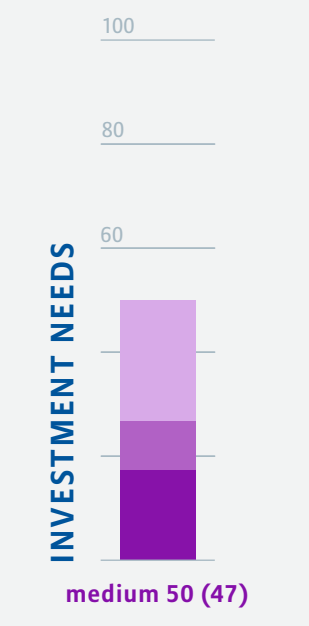
## General Info

Population (millions): 144.1 (2015)  
 GDP / cap: USD 24,511 (2015)  
 Renewables share<sup>1</sup>: 4.6% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **7** (7)



**RANK**  
 ▲ **17** (19)

**INVESTMENT ATTRACTIVENESS**  
 low 21 (13)

Policy adequacy		Policy reliability	
low 20	▶	low 33	▲
Climate strategy	very low	Predictability	low
Renewables target	low	Historic reliability	low
Long-term transition	medium		
Support schemes	low		
Fossil fuel subsidies	existing		
Market absorption capacity		General investment conditions	
very low 4	▲	low 25	▲
Technology experience	very low	Non-financial determinants	low
Current renewables activity	very low	Depth of financial sector	very low
Presence of businesses	very low	Price stability	low

## INSIGHTS

### INVESTMENT NEEDS

- Russia maintained its overall investment needs rank. USD<sub>2012</sub> 32 bn/year absolute investments are needed until 2035.
- Power infrastructure is vulnerable to climate change impacts due to heavy dependence on thermal and nuclear power (83% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- Russia continues to occupy a low rank in the G20 on its overall attractiveness for renewables. The two place upward movement is due to relative changes in other countries.
- Russia, is one of the only two G20 countries who have not ratified the Paris Agreement yet. The Climate Doctrine of the Russian Federation lacks clarity and ambition; and the renewable energy target is low (2.5% share of power generation by 2020). Although, the 2030 Energy Strategy indicates an interest in a low-carbon transition, support schemes to facilitate renewables have been relatively unsuccessful, resulting e.g. in undersubscribed solar tenders in 2016. The fossil fuel industry remains a strong influencer, keeping the overall reliability of policies low.
- Russia continues to have a negligible amount of installed renewables capacity, low new solar and wind installations in 2016 and a very low presence of the world's leading RE businesses. Russia ranks 17th in our assessment for 'market absorption capacity'.
- Russia moves from 18th to 15th position for its general investing conditions, with an overall under-developed financial sector.

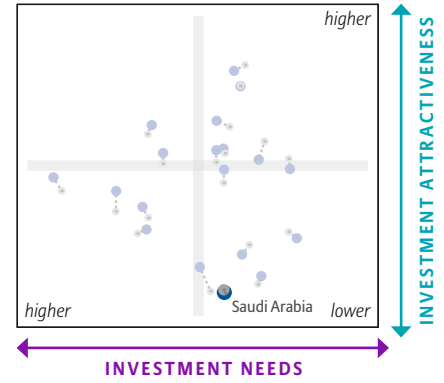
■ Absolute investment needs  
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 ■ Vulnerability of electricity supply

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<sup>2</sup> Results from 2016 are shown in brackets

# SAUDI ARABIA

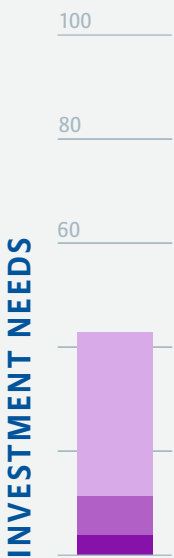
## General Info

Population (millions): 31.5 (2015)  
 GDP / cap: USD 50,349 (2015)  
 Renewables share<sup>1</sup>: 0.1% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▼ **11** (10)



**RANK**  
 ▼ **19** (18)



### Policy adequacy

<b>very low 5</b> ▼	
Climate strategy	very low
Renewables target	medium
Long-term transition	very low
Support schemes	very low
Fossil fuel subsidies	existing

### Policy reliability

<b>very low 11</b> ▼	
Predictability	low
Historic reliability	very low

### Market absorption capacity

<b>very low 0</b> ▶	
Technology experience	very low
Current renewables activity	very low
Presence of businesses	very low

### General investment conditions

<b>low 38</b> ▲	
Non-financial determinants	low
Depth of financial sector	very low
Price stability	high

## INSIGHTS

### INVESTMENT NEEDS

- Saudi Arabia continues to have medium-level investment needs compared to the G20 countries. USD<sub>2012</sub> 11 bn annual investments are needed until 2035.
- Power infrastructure is vulnerable to climate change impacts due to the complete dependence on fossil fuels.

### INVESTMENT ATTRACTIVENESS

- Saudi Arabia is one of the few G20 countries with no national climate change strategy and its emissions reduction target remains inadequate to meet the objectives of the Paris Agreement.
- In 2016, Saudi Arabia issued a new, less ambitious renewable energy target as part of its 'Vision 2030' economic strategy (9.5 GW by 2023 compared to 54 GW by 2032 previously). Doubts remain about the country's ability to reach this lower target.
- Saudi Arabia ranks at the bottom of G20 countries in terms of market absorption capacity: it installed no renewable energy capacity in 2016 nor has it secured the presence of any of the world's leading renewable energy companies.
- Despite a stable inflation forecast, Saudi Arabia ranks in the bottom half of the G20 countries for its general investment conditions - owing primarily to a low depth of capital markets.

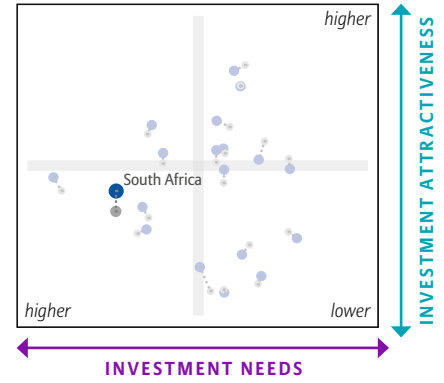
■ Absolute investment needs  
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 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# SOUTH AFRICA

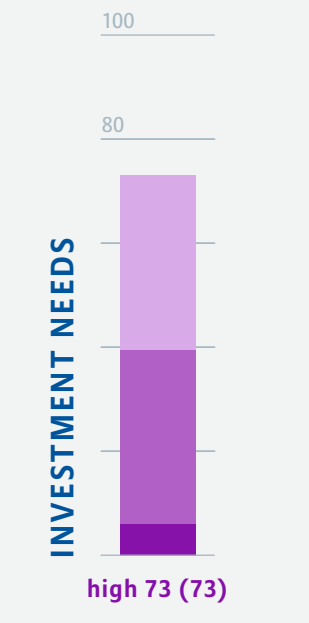
## General Info

Population (millions): 54.5 (2015)  
 GDP / cap: USD 12,514 (2015)  
 Renewables share<sup>1</sup>: 0.0% of total generation (2014)

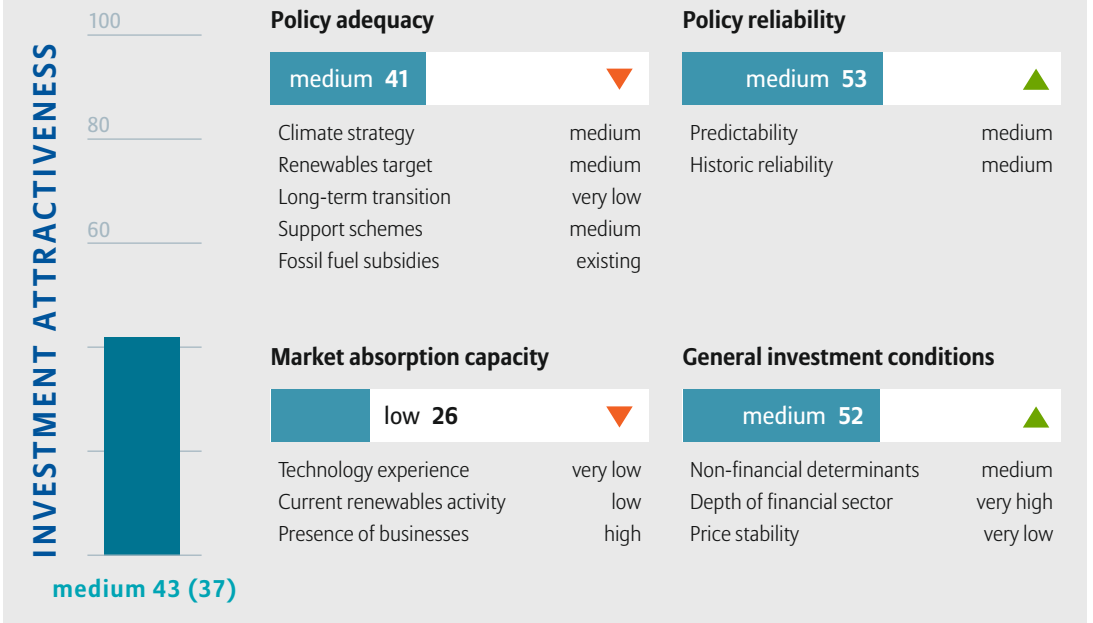


## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **2** (2)



**RANK**  
 ▶ **12** (12)



## INSIGHTS

### INVESTMENT NEEDS

- USD<sub>2012</sub> 14 bn absolute investments are needed per year until 2035.
- Power infrastructure is vulnerable to climate change impacts due to near-complete dependence on thermal and nuclear power (97% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- South Africa has a national strategy to tackle climate change but the ambition level is relatively low and there is no existing plan to decarbonize the electricity sector. The current auctioning system is insufficient to create a level-playing field for renewables compared to fossil-fuel electricity infrastructure.
- South Africa has steadily increased its renewables capacity in the last years and the country has a relatively high presence of leading RE businesses operating in the country.
- South Africa ranks 10th among G20 countries for its general investment conditions. The country scores strong for its depth of capital markets but a high inflation forecast brings down the overall score.

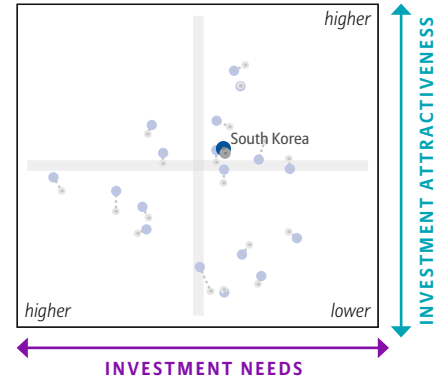
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<sup>2</sup> Results from 2016 are shown in brackets

# SOUTH KOREA

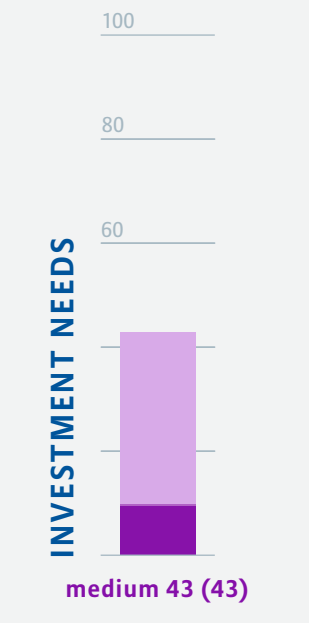
## General Info

Population (millions): 50.6 (2015)  
 GDP / cap: USD 34,407 (2015)  
 Renewables share<sup>1</sup>: 1.0% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
▲ **10** (11)



**RANK**  
▲ **5** (6)

**INVESTMENT ATTRACTIVENESS**  
 medium 55 (54)

<b>Policy adequacy</b> medium 45 <span style="color: orange;">▼</span> Climate strategy: medium Renewables target: medium Long-term transition: medium Support schemes: medium Fossil fuel subsidies: existing	<b>Policy reliability</b> high 68 <span style="color: orange;">▼</span> Predictability: medium Historic reliability: very high
<b>Market absorption capacity</b> low 27 <span style="color: green;">▲</span> Technology experience: very low Current renewables activity: low Presence of businesses: low	<b>General investment conditions</b> very high 80 <span style="color: green;">▲</span> Non-financial determinants: high Depth of financial sector: very high Price stability: very high

## INSIGHTS

### INVESTMENT NEEDS

- South Korea maintained medium-level investment needs among the G20. Annual absolute needs stand at USD<sub>2012</sub> 18 bn until 2035.
- Power infrastructure is vulnerable to climate change impacts due to heavy dependence on thermal and nuclear power (97% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- South Korea's climate and renewable energy policy landscape has remained unchanged since last year. Competitive auctions for renewables are in the pipeline to pave the way for its renewables target of 11.7% share in generation mix by 2029. The country fares well among the G20 in terms of policy reliability and consensus amongst parties on climate policy, yet influence of the fossil fuel industry could decelerate progress.
- Promising improvements have been made in the market absorption capacity of South Korea in 2016 as total wind and solar PV capacity increased. Despite these, South Korea still ranks in the lower half among G20 countries for its market capacity and maturity for renewables, with marginal share of renewables in the generation mix and low presence of top renewables businesses.
- South Korea ranks 6th among G20 members for its general investment conditions, owing to a strong financial sector and a stable inflation forecast.

■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

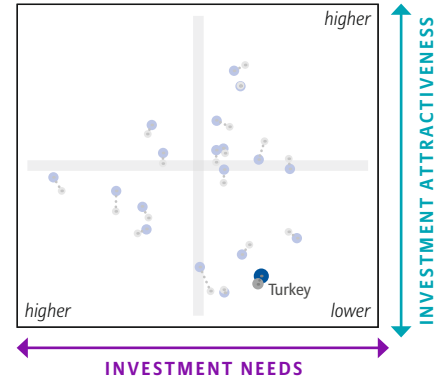
<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets



# TURKEY

## General Info

Population (millions): 78.7 (2015)  
 GDP / cap: USD 19,454 (2015)  
 Renewables share<sup>1</sup>: 4.8% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▼ **17** (16)



**RANK**  
 ▼ **18** (17)



### Policy adequacy

<b>low 25</b>	▶
Climate strategy	medium
Renewables target	low
Long-term transition	very low
Support schemes	low
Fossil fuel subsidies	existing

### Policy reliability

<b>very low 1</b>	▼
Predictability	very low
Historic reliability	very low

### Market absorption capacity

<b>low 28</b>	▲
Technology experience	very low
Current renewables activity	low
Presence of businesses	medium

### General investment conditions

<b>very low 17</b>	▼
Non-financial determinants	medium
Depth of financial sector	very low
Price stability	very low

## INSIGHTS

### INVESTMENT NEEDS

- Turkey continues to have low investment needs compared to other G20 members. Annual absolute needs are USD<sub>2012</sub> 9 bn until 2035.
- Power infrastructure is vulnerable to climate change due to high dependence on thermal and hydro power (22% of the generation mix between 2010-2014).

### INVESTMENT ATTRACTIVENESS

- Turkey has a national climate strategy but there is still a lack of long-term clarity on how to comply with the Paris Agreement and to move towards a decarbonized electricity sector.
- There has been strong volatility in Turkey's climate policy over the years and political support for climate action has recently waned. Turkey is one of the only two countries who has not yet ratified the Paris Agreement.
- In 2016, Turkey increased its solar PV capacity (mostly in the form of small-scale installations) and maintained relatively high installations for wind energy. Despite awarding a 1 GW tender for large-scale solar PV in early 2017 and further tenders in the pipeline, uncertainties remain about the sustained support for renewables – notably due to fresh subsidies to the coal industry. Coal-based power had a 79% share in Turkey's electricity mix in 2014.
- Turkey ranks second to last in our assessment of general investment conditions owing to high political instability and low depth of its financial sector.

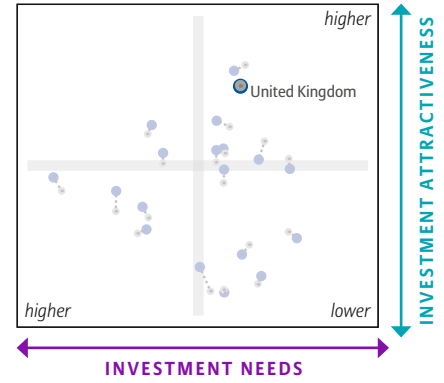
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# UNITED KINGDOM

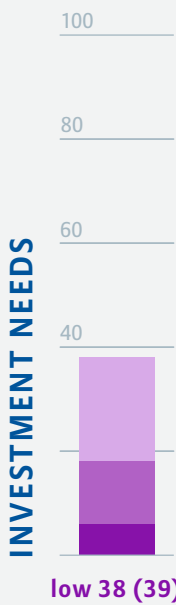
## General Info

Population (millions): 65.1 (2015)  
 GDP / cap: USD 38,525 (2015)  
 Renewables share<sup>1</sup>: 17.7% of total generation (2014)

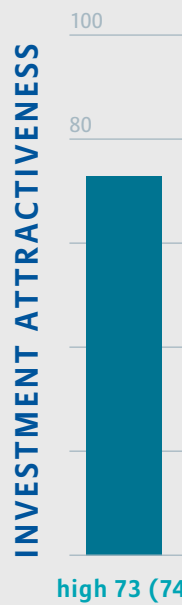


## SCORE SUMMARY<sup>2</sup>

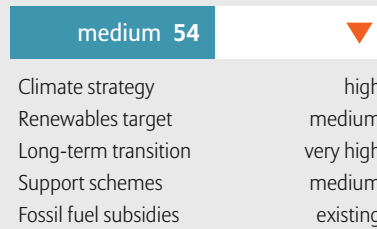
**RANK**  
 ▼ **14** (13)



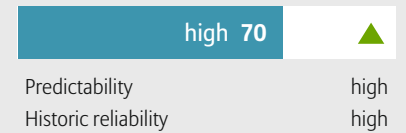
**RANK**  
 ▶ **2** (2)



### Policy adequacy



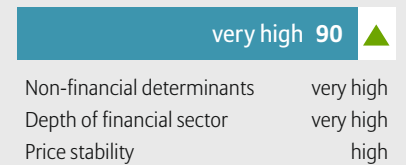
### Policy reliability



### Market absorption capacity



### General investment conditions



## INSIGHTS

### INVESTMENT NEEDS

- Investment needs in the UK are towards the lower end compared to other G20 countries. Absolute needs are USD<sub>2012</sub> 14 bn per year until 2035.
- Vulnerability of power infrastructure to climate change impacts exists due to dependence on thermal and nuclear power (79% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- The UK has a stronger climate strategy than most G20 countries and aims for a decarbonization of the electricity system by 2050.
- There is broad cross-party support for climate policy. The Brexit negotiations however raise uncertainty for the country's future climate and renewable energy policies.
- Recent back-rolling of the feed-in tariffs for solar installations could lead to the UK missing its 2020 renewable energy targets. The UK is also one of the few G20 countries with no renewable energy target beyond 2020.
- While the recent cuts have not yet had a major impact on the growth of renewables, future capacity additions can be expected to shrink. Auctions for large-scale installations have also been delayed.
- The UK climbs up to the first position for general investment conditions among G20 countries (from 2nd position last year).

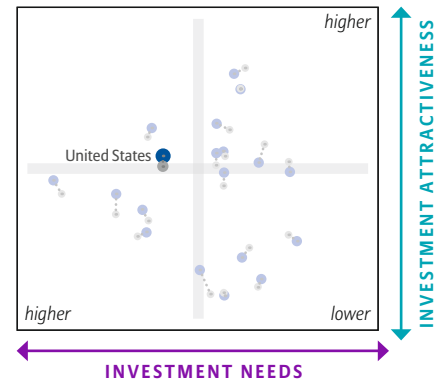
■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

# UNITED STATES

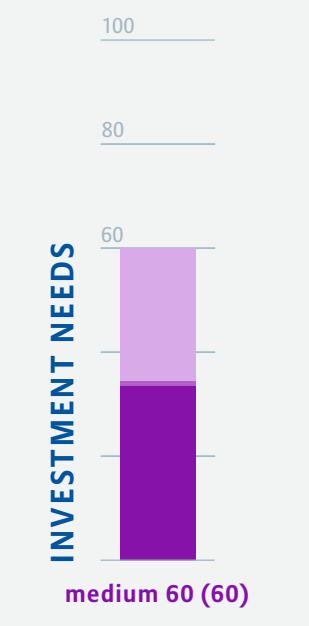
## General Info

Population (millions): 321.4 (2015)  
 GDP / cap: USD 52,707 (2015)  
 Renewables share<sup>1</sup>: 6.9% of total generation (2014)



## SCORE SUMMARY<sup>2</sup>

**RANK**  
 ▶ **6** (6)



**RANK**  
 ▲ **7** (9)

**INVESTMENT ATTRACTIVENESS**  
 medium 54 (51)

<b>Policy adequacy</b> low 36 ▼ Climate strategy: very low Renewables target: medium Long-term transition: medium Support schemes: medium Fossil fuel subsidies: existing	<b>Policy reliability</b> low 30 ▲ Predictability: low Historic reliability: low
<b>Market absorption capacity</b> high 69 ▲ Technology experience: medium Current renewables activity: high Presence of businesses: very high	<b>General investment conditions</b> high 79 ▶ Non-financial determinants: high Depth of financial sector: very high Price stability: high

## INSIGHTS

### INVESTMENT NEEDS

- Absolute investment needs in the US continue to be the second-largest in the G20 (USD<sub>2012</sub> 141 bn/ year, until 2035).
- Power sector remains vulnerable to climate change impacts due to a high dependence on thermal and nuclear power (86% of the electricity mix in 2014).

### INVESTMENT ATTRACTIVENESS

- There is currently a high degree of uncertainty regarding climate and energy policy in the US, which has led to a decrease in the country's ranks in policy adequacy this year. With a federal policy roll-back ongoing, much of the drive for a clean energy transition in the country now rests in the hand of individual states, which have shown commitment to continue developing renewables. After the withdrawal from the Paris Agreement by the government, California has just signed an agreement with China to increase the trade of green technologies.
- As federal ambition rock-bottoms, renewables deployment continued without hiccups in 2016. Much of this development has been driven by the ambitious Renewable Portfolio Standards (RPS) set by various US states, a decline in capital costs, multi-year extension of tax credits and rise in cost-competitiveness of renewables as opposed to old coal power infrastructure. The US is also one of the most mature markets for renewables among G20 countries and the country has the highest presence of major renewable energy businesses.
- Owing to continued favorable macroeconomic conditions and the relative nature of the Monitor's assessment, US moved up two ranks this year.

■ Absolute investment needs  
 ■ Investment needs relative to electricity consumption  
 ■ Vulnerability of electricity supply

<sup>1</sup> Share of total electricity generation, excl. large hydro  
<sup>2</sup> Results from 2016 are shown in brackets

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