



Climate
Transparency



BROWN TO GREEN

Assessing the G20 transition
to a low-carbon economy

Authors and Acknowledgements

This report was prepared by Jan Burck (Germanwatch), Niklas Höhne (NewClimate Institute), Markus Hagemann (NewClimate Institute), Sofia Gonzales-Zuñiga (NewClimate Institute), Gerd Leipold (HUMBOLDT-VIADRINA Governance Platform), Franziska Marten (Germanwatch), Hannah Schindler (HUMBOLDT-VIADRINA Governance Platform), Sam Barnard (Overseas Development Institute) and Smita Nakhooda (Overseas Development Institute).

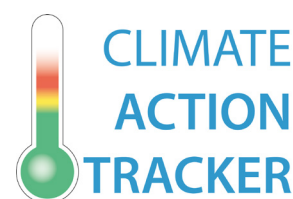
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Secretariat of Climate Transparency:
HUMBOLDT-VIADRINA Governance Platform
Pariser Platz 6 / 10117 Berlin / Germany
www.climate-transparency.org
info@climate-transparency.org

This “Brown to Green” report by Climate Transparency provides a comprehensive overview and assessment for the G20 countries, whether - and how well - they are doing on the journey to transition to a low-carbon economy. The report draws on publicly available information and makes use of the assessment work of the Climate Action Tracker (CAT) (operated by NewClimate Institute, Climate Analytics, Ecofys and the Potsdam Institute for Climate Impact Research), Germanwatch’s Climate Change Performance Index (CCPI) and the Overseas Development Institute (ODI). It summarises and compares the findings presented in each **G20 country profile**.

About Climate Transparency

Climate Transparency is an open global consortium with a shared mission to stimulate a ‘race to the top’ in climate action through enhanced transparency. For this purpose, comprehensive, comparable and credible information about government climate action is spread by bringing together the most important actors in assessing and communicating climate action for the benefit of key influencers and decision makers.

<http://www.climate-transparency.org>

About Germanwatch // Climate Change Performance Index

Germanwatch e.V. is a civil society organisation that actively promotes North-South equity and the preservation of livelihoods. The Climate Change Performance Index is jointly published by Germanwatch e.V. and Climate Action Network Europe (CAN). It evaluates, compares and ranks the climate protection performance of 58 countries which are responsible for 90% of global energy-related CO₂ emissions.

<http://www.germanwatch.org/en/ccpi>

About HUMBOLDT-VIADRINA Governance Platform

The HUMBOLDT-VIADRINA Governance Platform is a non-profit limited liability company (gGmbH) based in Berlin/Germany. It strengthens participation and transparency for practical and sustainable solutions to societal challenges by bringing together government, business and civil society.

<http://www.governance-platform.org>

About NewClimate Institute // Climate Action Tracker

NewClimate Institute is a limited liability non-profit company (gGmbH) that supports research and implementation of action against climate change around the globe. The Climate Action Tracker is a partnership of Climate Analytics, Ecofys, the Potsdam Institute for Climate Impact Studies and the NewClimate Institute. It provides an assessment of individual national pledges of 14 developing, 14 developed countries to reduce their greenhouse gas emissions based on 2020 or unilateral pledges, current policy projections and INDCs.

<http://www.newclimate.org> // <http://www.climateactiontracker.org>

About Overseas Development Institute // Climate Funds Update

The Overseas Development Institute (ODI) is the UK’s leading independent think tank on international development and humanitarian issues. The Climate Finance team at ODI conducts world-class research and delivers practical advice to support developing countries in their efforts to move towards low emission, climate resilient economies.

<http://www.odi.org> // <http://www.climatefundsupdate.org>

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MOVING FROM BROWN TO GREEN

Foreword by Alvaro Umaña and Peter Eigen

In a world full of crisis and catastrophes, the Paris Agreement of December 2015 was an unexpected gift to the world, where the global community showed it can work together to confront the climate challenge. Paris saw the first major step towards achieving the targets set by the Sustainable Development Goals – agreed by the international community just three months before.

The Paris Agreement is both bold and pragmatic. Bold, because it unambiguously states that global warming should be held well below 2°C, and, crucially, that the world needs to pursue efforts to reduce warming to 1.5°C. Pragmatic, because it defines the task at hand as one for the whole of society, not just government, and sketches out an ongoing learning and improvement process.

The bottom-up architecture of the agreement acknowledges the importance of local and regional government, of civil society and business – an approach to global governance that relies on the strength of the whole of society. It has two challenges, however. How do we know if each government is doing its fair share? How do we know whether the actions taken by many actors will keep global temperature increase well below 2°C, or even 1.5°C?

These challenges motivated us to bring together authoritative, independent organisations who assess governmental climate action with high scientific standards, from a wide geographical and stakeholder spectrum, to combine their knowledge and provide comprehensive, comparable and credible information about G20 climate action.

The G20 represents the majority of the world's population, the global economy and global greenhouse gas emissions. It has shown it can act fast and decisively on global matters, most prominently on financial stability. We believe the G20 is the right forum to lead the crucially important mainstreaming of climate in the economy.

BROWN TO GREEN

“Brown to Green,” the title of this report, describes the Paris Agreement's mission – and what we are doing to support it – in simple terms. The world must turn its back on destroying the climate through burning “brown” fossil fuels, and transition to a “green” low-carbon economy.

Climate Transparency is using the best information, thorough analysis and well-reasoned judgment, to tell the world how well we are doing. Our analysis shows some encouraging signs that decarbonisation is progressing, but also that progress often moves at a snail's pace, sideways, or even backwards.

“Brown to Green” is Climate Transparency's second report. We publish this on the eve of the G20 summit in China, the world's second biggest economic power that, ahead of hosting the G20, has stressed the importance of climate action. We hope that China will use the opportunity to drive the G20 climate agenda significantly forward.

IMPROVEMENTS ON LAST YEAR'S REPORT:

- We use more indicators to track de-carbonisation trends.
- We cover past and present performance, and here, we extrapolate this into the future, with indicators that signal whether the political and economic environment supports a transition to a low-carbon economy.
- We describe investment conditions, needs and opportunities.
- We give a concise overview of fossil fuel subsidies and carbon prices.
- We provide an overview of G20 country public climate finance, a key component of transformative partnerships between countries for climate protection and adaptation.
- Noting our analysis refers to the 2°C limit, for which numerous scenarios are available. We do not reflect the strengthened temperature limit of the Paris Agreement to keep warming “well below 2°C” and to “pursue efforts to limit the temperature increase to 1.5°C,” which will require even more ambitious emission reductions. This will be included in the future as more recent data becomes available.

RECOMMENDATIONS

The G20 must take the lead for more rapid and deeper climate action. We urge the G20 countries to agree on the following action:

- By 2018, all members must submit plans as to how they will de-carbonise by mid-century – in time for the first review of the ambition of current climate targets mandated in Paris.
- To commit to base infrastructure investment on the need to keep temperature increase well below 2°C, pursuing efforts to keep it below 1.5°C; to make that shift from brown to green investment. G20 countries are investing too little in energy in general, and far too little in renewable energy. This investment gap is reflected in the global levels of greenhouse gases. But it also means there is a wealth of potential investment in low-carbon infrastructure that would strengthen our societies and protect the climate.

- Make their repeated declared intention to end fossil fuel subsidies a reality, to ensure those fuels reflect true environmental costs.
- Introduce a price on carbon - be it through a tax, levy or emissions trading - with industrialised countries taking the lead.

Joint efforts and participation by all stakeholders - government, business, and civil society - working together to achieve sustainable solutions for a low-carbon economy, will allow for a prosperous low-carbon future.



Alvaro Umaña

Former Minister of Environment and Energy of Costa Rica, and former Ambassador of Costa Rica to the United Nations Copenhagen Climate Change Conference



Peter Eigen

Founder and Chair of the Advisory Council, Transparency International, and Co-Founder of the HUMBOLDT-VIADRINA Governance Platform

EXECUTIVE SUMMARY

Are G20 countries managing
the transition to
a low-carbon economy?



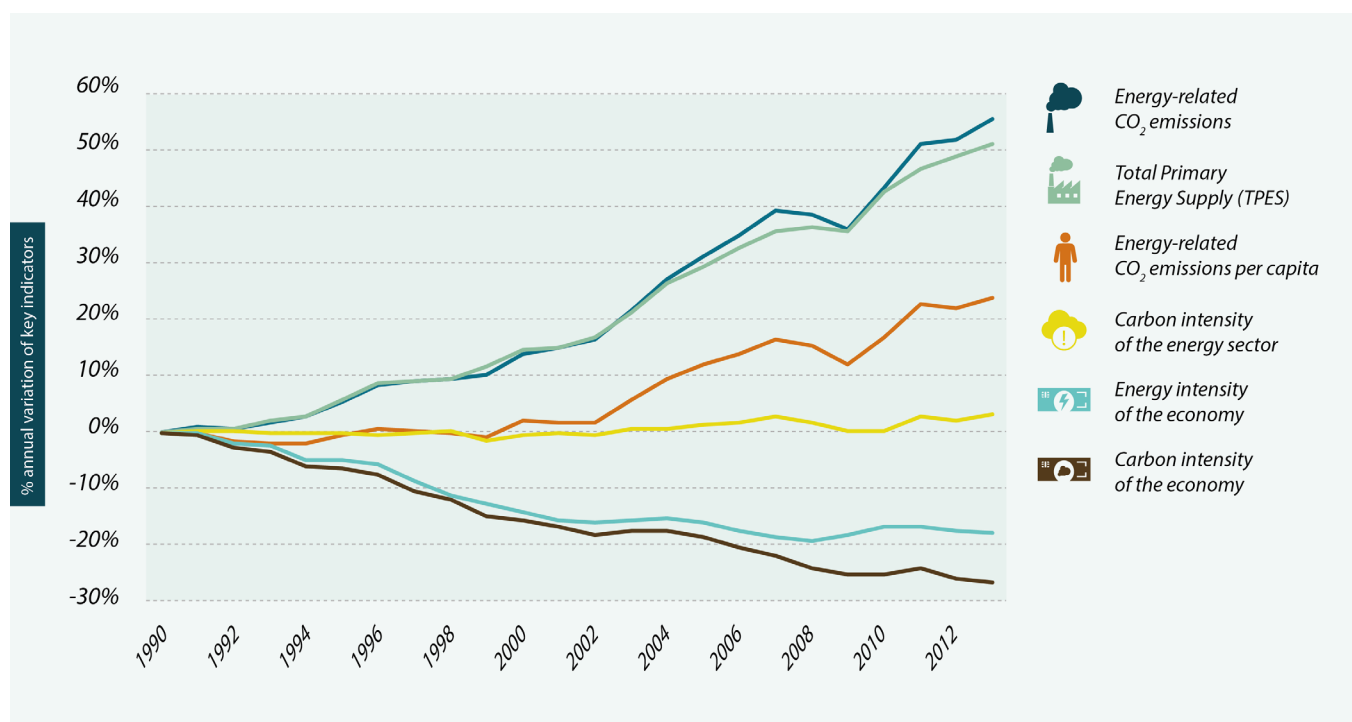
GREENHOUSE GAS EMISSIONS ARE NOT DECLINING

The effects of climate change, which we are already witnessing, are the consequence of rising concentrations of greenhouse gases (GHGs). At the moment, absolute emissions are still rising, caused by our overwhelmingly fossil fuel-based energy system (our “brown infrastructure”).

From 1990 to 2013, G20 energy-related CO₂ emissions - the most important GHG - increased by 56%. According to preliminary data from the International Energy Agency, global energy-related CO₂ emissions, for the first time, stalled in 2014 and 2015.¹ If global temperature increase is to be kept “well below 2°C, pursuing efforts to keep it below 1.5°C”, as the Paris Agreement mandates, then absolute G20 emissions must be drastically reduced in the near future.

A slightly more positive result is the trajectory of per capita emissions. The G20 average of energy-related per capita emissions in 2013 was 5.7 t CO₂e/y, only marginally up from the year before, and growing at a slower pace than the overall emissions. Yet estimates show that energy-related emissions would have to reach roughly 1 to 3 t CO₂e/y per person in 2050,² if the global temperature increase is to be kept below 2°C.

Development of key indicators



Source: CCPI, 2016

1 IEA (2016), “Decoupling of global emissions and economic growth confirmed”, <https://www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html>

2 CAT (2015), “Climate Action Tracker”, <http://climateactiontracker.org/>, calculates between 1.4 and 3.7tCO₂e/y per person in 2050 for all greenhouse gases and sectors based on modelled scenarios. Energy-related CO₂ emissions are usually reduced faster in modelled scenarios than other emissions.

PROMISING DECARBONISATION DEVELOPMENTS IN SOME AREAS, BUT ACTION NOT YET IN LINE WITH LONGER TERM GOALS

In general, G20 countries are using energy resources more efficiently than in the past. The energy intensity and the carbon intensity of the G20 economies are both decreasing. However, this positive trend is not enough to compensate for the increase in economic activity, which has led to an overall increase in G20 CO₂ and GHG emissions.

PLANS FOR NEW COAL FIRED POWER PLANTS REMAIN AN IMPORTANT OBSTACLE TO DECARBONISATION

The carbon intensity of the energy sector, however, is slightly increasing, a consequence of the still strong – and in some cases even growing – role of coal. Most of the G20 countries rely heavily on coal in their primary energy supply: developing countries like South Africa (69%), China (68%) and India (45%), but also industrialised countries like Australia (37%), Germany (26%), and Japan (25%). G20 countries are planning a large number of new coal fired power plants that, if realised, would almost double coal capacity, making it virtually impossible to keep the temperature increase to below 2°C, let alone 1.5°C.

RENEWABLE ENERGY IS A SUCCESS STORY WORLDWIDE

This development contrasts with the success story of renewable energy. For the G20, the use of renewable energy has increased by 18% since 2008. Countries with a high share of renewable energy production are Brazil, Canada, Italy, India, South Africa, Turkey – and the EU. The only G20 country where renewable energy declined from 2008 to 2013 was Mexico, a trend that is expected to change if Mexico adopts new policies under consideration.

NATIONAL CLIMATE POLICY FRAMEWORKS ARE DEVELOPING FAST

Much progress has been made with greening G20 country policy frameworks, at least on paper. All governments submitted Intended Nationally Determined Contributions (INDCs) under the Paris Agreement. Nearly all have introduced energy conservation policies in the building sector, and have emissions standards for cars. All have support schemes for renewable energy, and more than half have either an Emissions Trading Scheme or a Carbon Tax in place. Only half have developed long-term decarbonisation plans³ and eleven of the G20 countries have a 2050 greenhouse gas emissions target.

Experts give the policy frameworks of G20 countries and their implementation mixed reviews. On an international policy level, France gets high marks for its work on the Paris Agreement, as does Germany for putting decarbonisation on the G7 agenda.

China and India are ranked high for their domestic policy work, while Turkey, Japan and Italy are rated as the “brownest” countries on their national policy performance.

Carbon pricing schemes – emissions trading schemes (ETS) and carbon taxes – are expanding within the G20, with a whole range of different schemes being applied. The EU Emissions Trading System remains the single largest carbon-pricing instrument; China is expanding its ETS's, as are parts of the USA and Canada. India operates a carbon tax on coal. Several other countries have either an ETS or a carbon tax – or both. However, globally, existing carbon price levels vary significantly and are generally too low to achieve a significant drive to moving economies from brown to green.

Despite all these efforts to keep warming below the 2°C limit, the INDCs of the G20 countries are still far from being sufficient: indeed the G20, together, needs to reduce emissions in 2030 by a further 85% – six times the efforts they have pledged so far.⁴

³ These are not to be confused with the “long-term low Greenhouse gas emissions development strategies” that the Paris Agreement invites all countries to develop, but which no country has implemented yet.

⁴ Calculated based on the average emissions of the current policy pathways and the average emissions reduction of the country pledges (including conditional and unconditional targets).

FOSSIL FUEL SUBSIDIES ARE STILL WIDESPREAD

All G20 countries subsidise their fossil fuel industry – brown subsidies that support the use of carbon-intensive energy – despite the fact that, in 2009, G20 country leaders pledged to phase out fossil fuel subsidies. For the developed countries in the G20, these subsidies are substantially higher than their contribution to international climate finance.

INVESTMENTS START SHIFTING FROM BROWN TO GREEN, BUT STILL A LONG WAY TO GO

To be in line with a 2°C trajectory, average annual G20 country investment in the power sector will have to roughly double by 2035 from the level it is been over the period 2000-2013. Conditions for green investments vary in G20 countries.

Investment attractiveness in renewable energy is rated relatively high in China, France, Germany, India, the UK and the United States. China's high rating comes from the coherence and reliability of its green policy environment, India's from its ambitious renewable energy targets and the United States' from its overall size of the economy and commercial and regional importance. While Germany and France are also rated high, Germany's investment attractiveness has dropped due to its upcoming renewable energy cap, and France due to its reliance on nuclear energy slowing the uptake of renewables. Similarly, in the UK, the latest national referendum on the EU membership might affect its currently high rated investment attractiveness.

At the other end of the scale are Russia, Saudi Arabia and Turkey. Russia has little support for renewables, as with Saudi Arabia, where the power system has an almost negligible capacity for absorbing them. Turkey has turned to coal, putting up barriers to renewable investments which, up to 2014, were comparatively high.

INTERNATIONAL CLIMATE FINANCE IS INCREASING, BUT BELOW EXPECTATIONS

The eight G20 countries obliged to provide climate finance⁵ include some of the world's largest climate finance donors. Taking into account international climate finance provided through bilateral and multilateral channels, France, Germany, Japan, the UK and the United States each provided between USD 1.2 billion and USD 8.4 billion a year in 2013 and 2014. These contributions are modest in comparison to GDP. Ratios are highest in the case of Japan (0.18%) and France (0.12%) and lowest in the case of Canada (0.0008%), Australia (0.001%) and Italy (0.0003%).

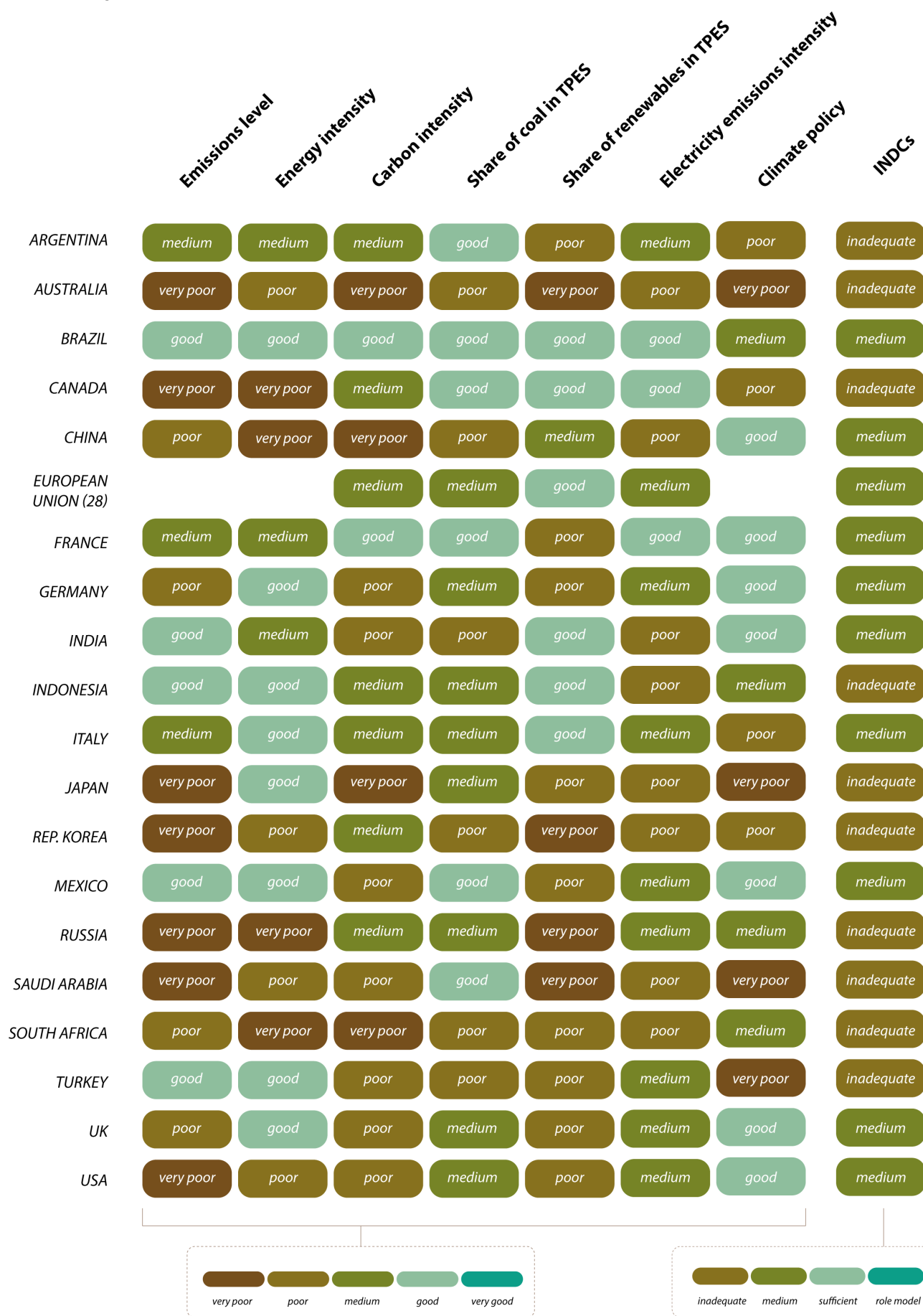


CLIMATE CHANGE IS ONE OF THE GREATEST CHALLENGES FACING THE WORLD TODAY.

*China Presidency Statement,
Second G20 Sherpa Meeting*

⁵ As developed countries Australia, Canada, France, Germany, Italy, Japan, the UK and the United States are obliged to provide climate finance under the UNFCCC.

G20 climate performance scorecard



The background of the slide is a photograph of a blue sky with a large, fluffy white cloud. In the bottom right corner, there is a large, abstract orange shape that resembles a stylized mountain or a folded piece of paper, with a darker orange section at the bottom right.

EMISSIONS

Still not declining

The G20 states are responsible for 74.9% of global greenhouse gas emissions.⁶ From 1990 to 2013, their absolute energy-related CO₂ emissions have increased by 56%. Preliminary data from the International Energy Agency for 2014 and 2015, however, suggests that global energy-related CO₂ emissions have plateaued.⁷ While detailed data is not yet publicly available, this most likely implies that these emissions also stopped increasing in the G20 member states. If global temperature increase is to be kept “well below 2°C, pursuing efforts to keep it below 1.5°C”, as the Paris Agreement mandates, then absolute emissions have to be drastically reduced in the near future.

A slightly different picture emerges when looking at per capita energy-related CO₂ emissions. In the majority of G20 countries (12), per capita emissions are no longer growing. The G20 average of per capita energy-related CO₂ emissions is 5.7tCO₂e/y (2013). Estimates show that, in 2050, these emissions should be between around 1 to 3 tCO₂e/y,⁸ if global temperature increase is to be limited to 2°C, showing the scale of transition in the economies needed. If temperature increase were to be held “well below 2°C”, as the Paris Agreement mandates, this would require even stronger reductions,⁹ and even further cuts for 1.5°C.

Of all the G20 member states, Australia, Canada, Saudi Arabia and the United States stand out with by far the highest per capita energy-related CO₂ emissions. Saudi Arabia, South Korea and Japan still show an increase over the five-year period 2008-2013. Argentina and South Africa have declining per capita emissions, as with the EU and its big member states Germany, France, Italy and UK.

Brazil, India and Indonesia have the lowest per capita energy-related CO₂ emissions among the G20 countries, although there is a relatively strong upward trend in Brazil and India.¹⁰ China's per capita emission are now above the G20 average: at 38%, China has the highest growth rate between 2008 and 2013.

6 IEA (2015)

7 IEA (2016), “Decoupling of global emissions and economic growth confirmed”, <https://www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html>

8 A range of 1.4 and 3.7tCO₂e/y for all greenhouse gases and sectors is calculated based on the maximum and minimum values of a collection of about 100 scenarios with 2°C pathways for this indicator. Energy-related CO₂ emissions are usually reduced faster in modelled scenarios than other emissions. This data collection was carried out as part of the decarbonisation indicators developed by the Climate Action Tracker (2015).

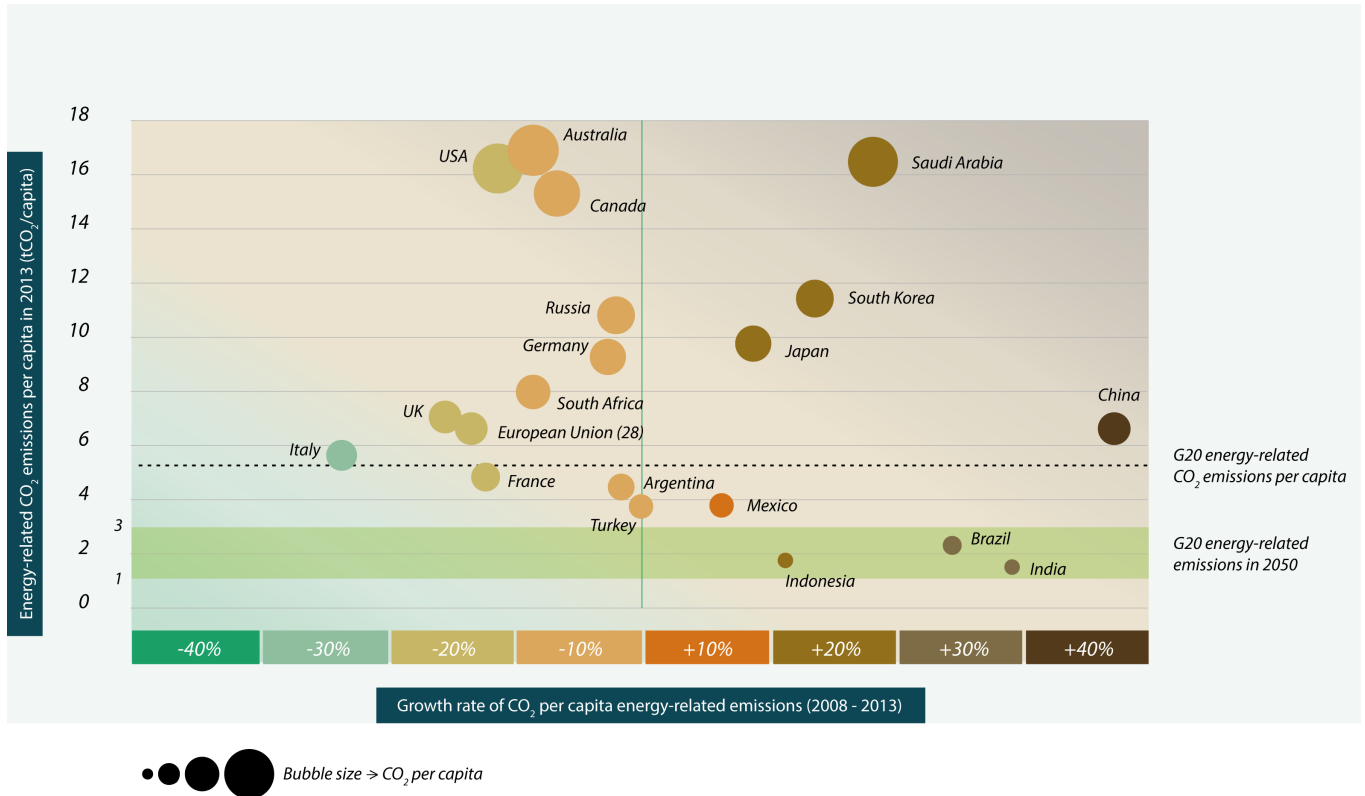
9 CAT (2015), “Climate Action Tracker”, <http://climateactiontracker.org/>

10 Increasing per capita emissions are strongly linked to the needed development of these countries, all having a relatively low Human Development Index score compared to the other G20 states.

Cumulative emissions are the best indicator for the effects of climate change, but they have no predictive value when it comes to assessing whether a country is transitioning to a low-carbon economy.

For this purpose, this report presents decarbonisation indicators which describe the role of carbon in the economy and the power sector.

Level and growth rate of CO₂ per capita emissions (2008 - 2013)



Source: Calculations by CCPI based on IEA (2014) data.

WE NOW HAVE SEEN TWO STRAIGHT
YEARS OF GREENHOUSE GAS
EMISSIONS DECOUPLING FROM
ECONOMIC GROWTH.

Fatih Birol, International Energy Agency

DECARBONISATION

Promising developments,
but coal needs to go



ENERGY AND CARBON INTENSITY

For the G20 as a whole, the energy intensity of the economy (TPES/GDP) and the carbon intensity of the economy (CO₂/GDP) decreased by about 18% and 27% respectively between 1990 - 2013. This decreasing trend is, however, not enough to compensate for the increase in economic activity - so the absolute effect is an increase in total G20 emissions.

All G20 countries, with the exception of Brazil and Russia (and even they are expected to follow the general trend in the future), are reducing the energy intensity of their economies. While Brazil is below the G20 average, Russia has a high energy intensity, well above the average.

Canada, China, South Korea, Russia and South Africa all have an energy intensity level above G20 average. The UK has the lowest level, partly explained by a strong financial sector and an overall trend towards a service-orientated economy.¹¹

The carbon intensity of the energy sector (CO₂/TPES) in the G20 is slightly increasing, a consequence of the still strong – and in some cases even growing – role of coal in the energy sector. Only Australia, the EU, France, Germany, South Korea, Russia, Turkey and the UK show a decreasing carbon intensity of their energy sectors. This trend may not continue, as fluctuations in the energy and electricity market can strongly influence the use of fossil fuels.

SHARE OF RENEWABLE ENERGY IN THE ENERGY SUPPLY

For the G20, the use of renewable energy has increased by 18% since 2008. The only G20 country where the use of renewable energy has decreased is Mexico,¹² a trend expected to change if it adopts and implements new policies currently under consideration – e.g. 35% clean energy target for 2024.

Brazil and Indonesia have the highest share of renewable energy in total primary energy supply, and positive growth rates, due to a large share of hydropower.¹³ The next is India, a traditionally high user of biomass.

Looking only at the power sector, Brazil's already high share of renewables in its electricity mix is expected to increase from 82% in 2012 to 85% by 2030. Similarly, Indonesia's share of renewable energy in the electricity mix, although much lower than Brazil's, shows positive growth rates in future projections, going from 11% in 2012 to 17% in 2030.¹⁴

Italy, South Korea and the UK have the strongest growth of absolute renewable energy consumption in primary energy; however, South Korea and the UK are starting from a low base.

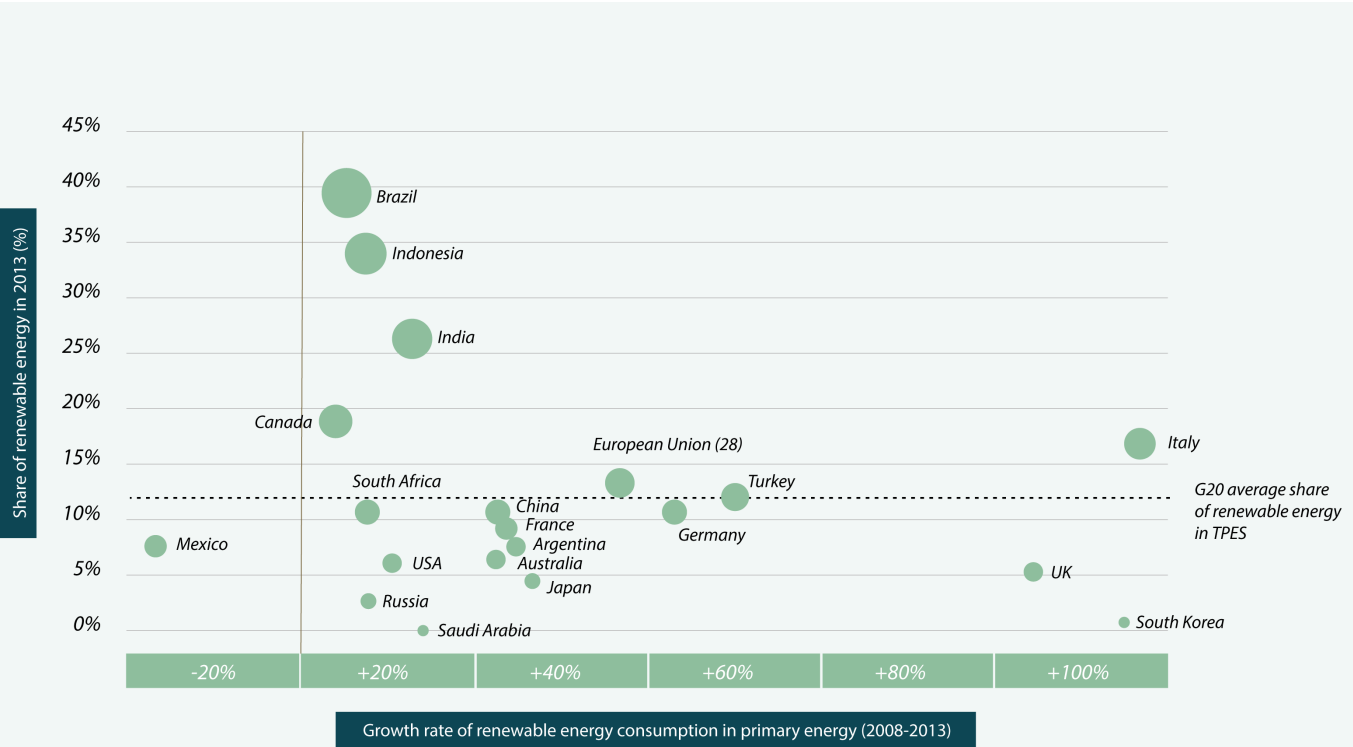
11 European Energy Agency (2016), "Energy Intensity", <http://www.eea.europa.eu/data-and-maps/indicators/total-primary-energy-intensity-1/assessment>

12 This trend results from Mexico's recent energy reform breaking up its oil, gas and electricity monopolies and auctioning off oil exploration areas and heavily investing in natural gas transportation. Under the reform, high-efficiency natural gas units with carbon capture and storage qualify as clean energy.

13 Noting there are environmental and social concerns about large hydro.

14 CAT (2015), "Climate Action Tracker", <http://climateactiontracker.org/>

Share and growth rate of renewables in total primary energy supply (TPES) (2008 - 2013)



••••• Bubble size > renewable energy share

Source: Calculations by CCPI based on IEA (2014) data.

”

A CLEAN, LOW-CARBON, SAFE AND EFFICIENT MODERN ENERGY SYSTEM SHALL TAKE SHAPE TO ENSURE AFFORDABLE, RELIABLE AND SUSTAINABLE CLEAN ENERGY FOR ALL.

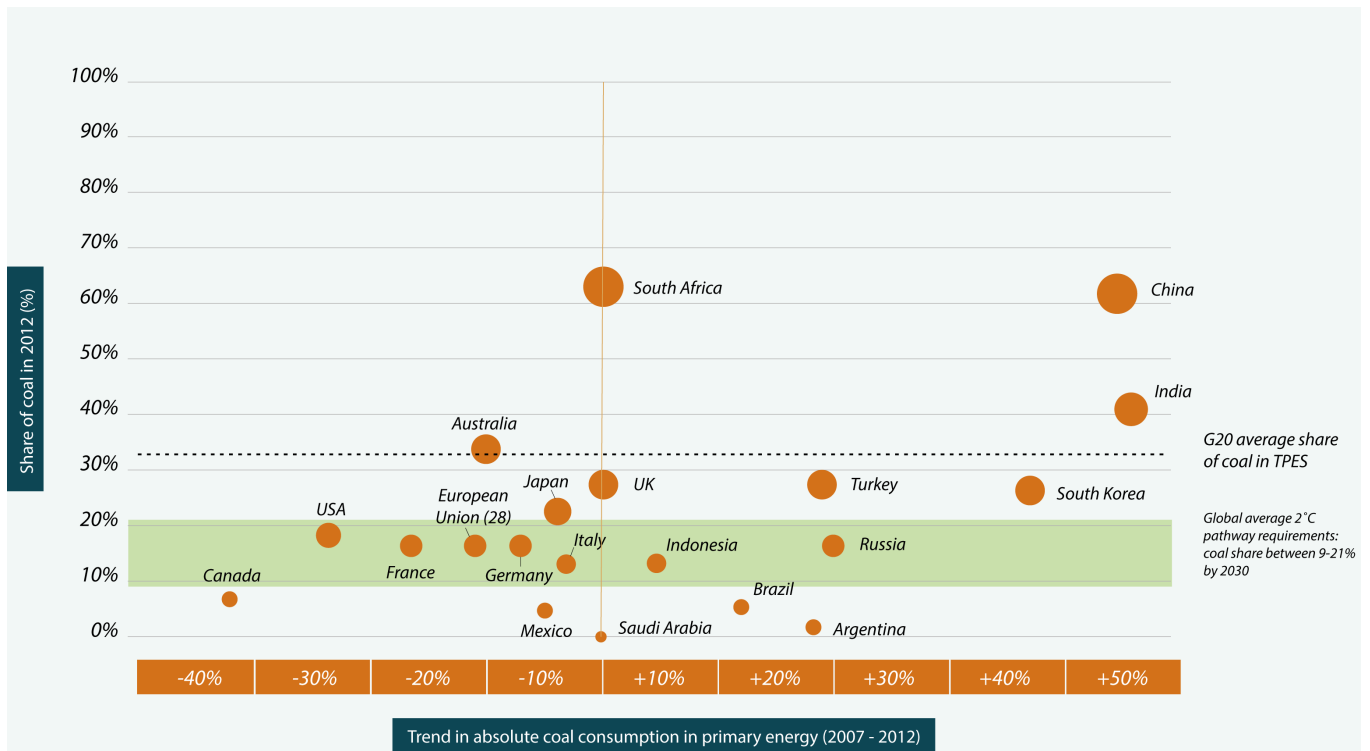
Communiqué of Civil Society 20 China 2016

SHARE OF COAL IN THE ENERGY SUPPLY

While, overall, the share of renewable energy is increasing in G20 countries, most of them still rely – in some cases to a very high degree – on coal in their total primary energy supply: South Africa (69%), China (68%), India (45%), Australia (37%), Turkey (30%), South Korea (29%), Germany (26%) and Japan (25%).

The coal share of China, India, South Africa and Turkey will remain clearly above the maximum 2°C benchmark in the time period until 2030. Increased coal use is a serious threat to keeping the temperature increase below 2°C, let alone 1.5°C.

Share and growth rate of coal in total primary energy supply (TPES) (2007 - 2012)



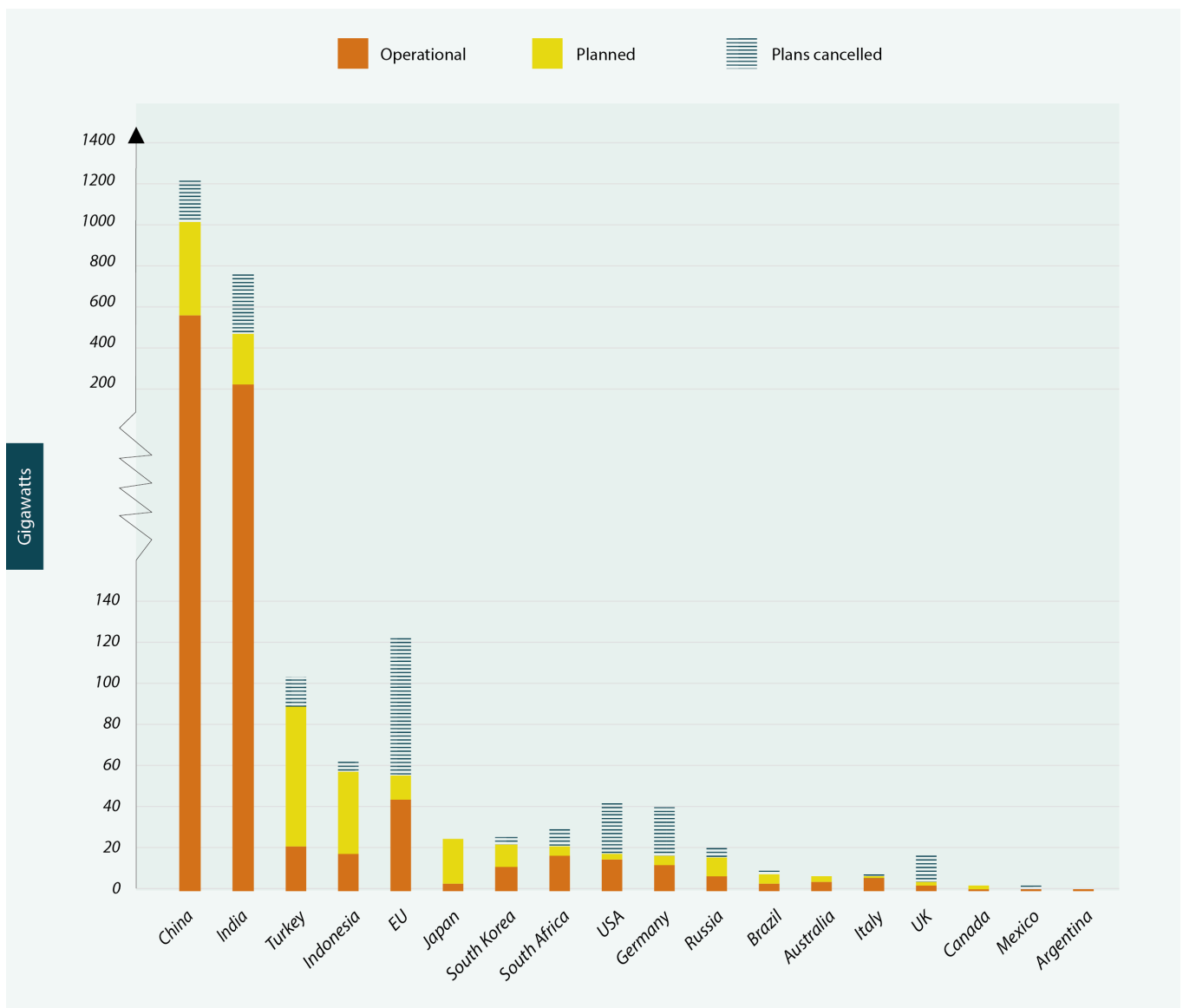
Source: Calculations by CAT (2015) based on national policies and country communications

COAL PLANTS

The G20 countries' operating coal power plants have a combined capacity of 975 gigawatts (GW). A further 900GW are planned. However, this should be seen in conjunction with the 650GW of cancelled new coal plant plans, i.e. not all planned plants are actually being built.

Even if only a small fraction of the planned coal plants were built, it would become virtually impossible to keep temperature increase below the 2°C limit, or down to 1.5°C.¹⁵

Coal plants - Operational, planned and cancelled amount of gigawatts



Source: Global Coal Plant Tracker (2015)

¹⁵ ECOFYS (2016) "The incompatibility of high-efficient coal technology with 2°C scenarios", <http://www.ecofys.com/files/files/ecofys-2016-incompatibility-of-hele-coal-w-2c-scenarios.pdf>

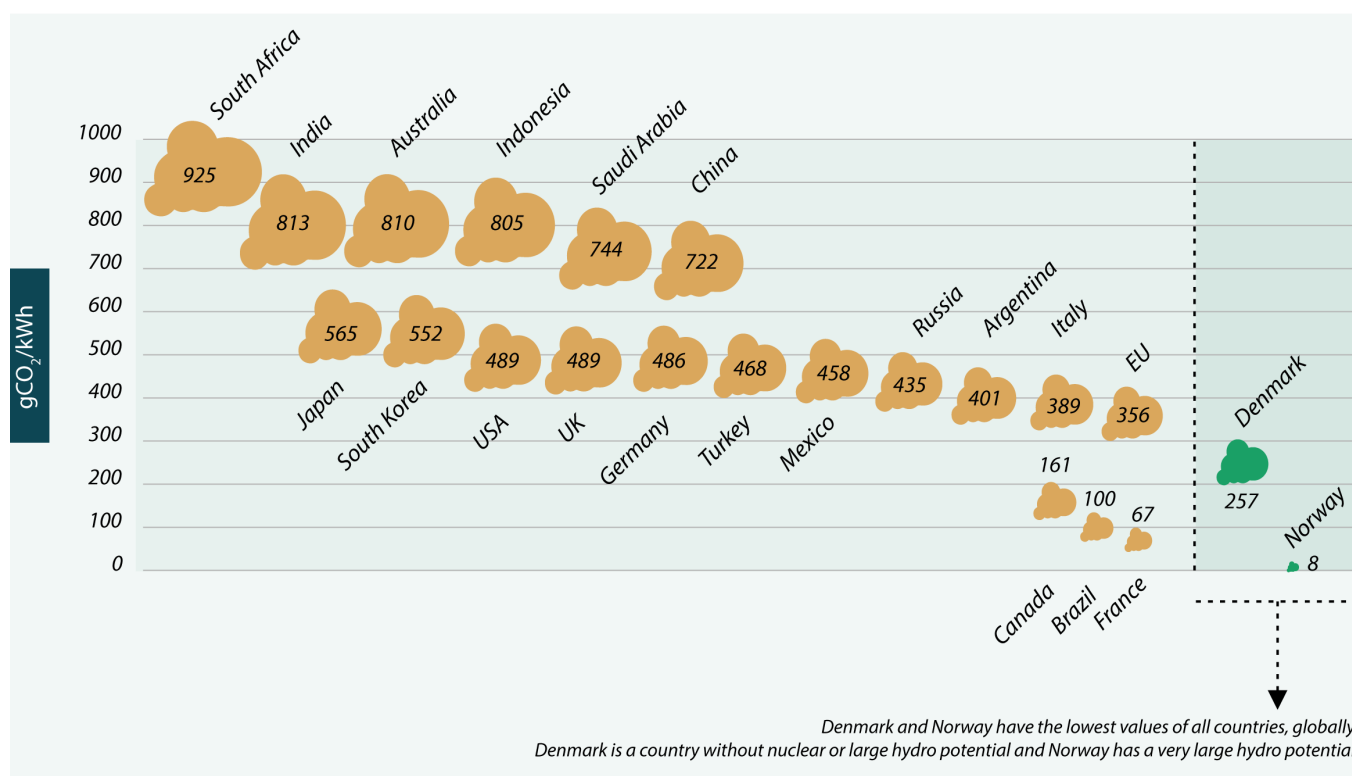
CARBON INTENSITY OF THE ELECTRICITY SECTOR

In basically all G20 countries, electricity use is growing faster than energy use.¹⁶ Full decarbonisation would require a shift towards renewables, and away from fossil fuels, rendering electricity the most important factor in countries' decarbonisation pathways.

Electricity emissions intensity (gCO_2/kWh) varies significantly between G20 countries. At $925 \text{ gCO}_2/\text{kWh}$, South Africa accounts for the highest - in line with the high share of coal in its electricity production. South Africa's emissions per kWh are more than three times higher than those of Denmark, a worldwide good-practice example country that has neither large hydropower potential, nor nuclear power. South Africa is followed by India, Australia and Indonesia, who all have an electricity emissions intensity of over $800 \text{ gCO}_2/\text{kWh}$.

G20 countries with low electricity emissions intensity are Brazil ($100 \text{ gCO}_2/\text{kWh}$), Canada ($161 \text{ gCO}_2/\text{kWh}$) and France ($67 \text{ gCO}_2/\text{kWh}$). The relatively low-intensity level in Brazil and Canada results from their large hydropower sector and, in France from its high share of nuclear power. However, neither Brazil nor Canada perform so well when compared with Norway, also regarded as a worldwide good-practice example of low electricity emissions intensity ($8 \text{ gCO}_2/\text{kWh}$), despite having a very high hydropower potential.

Carbon intensity of the G20 electricity sector



Source: Calculations by CAT (2015) based on national policies and country communications

¹⁶ Biomass for cooking and heating and petroleum for lighting are increasingly being replaced by electricity.

Nations Unies

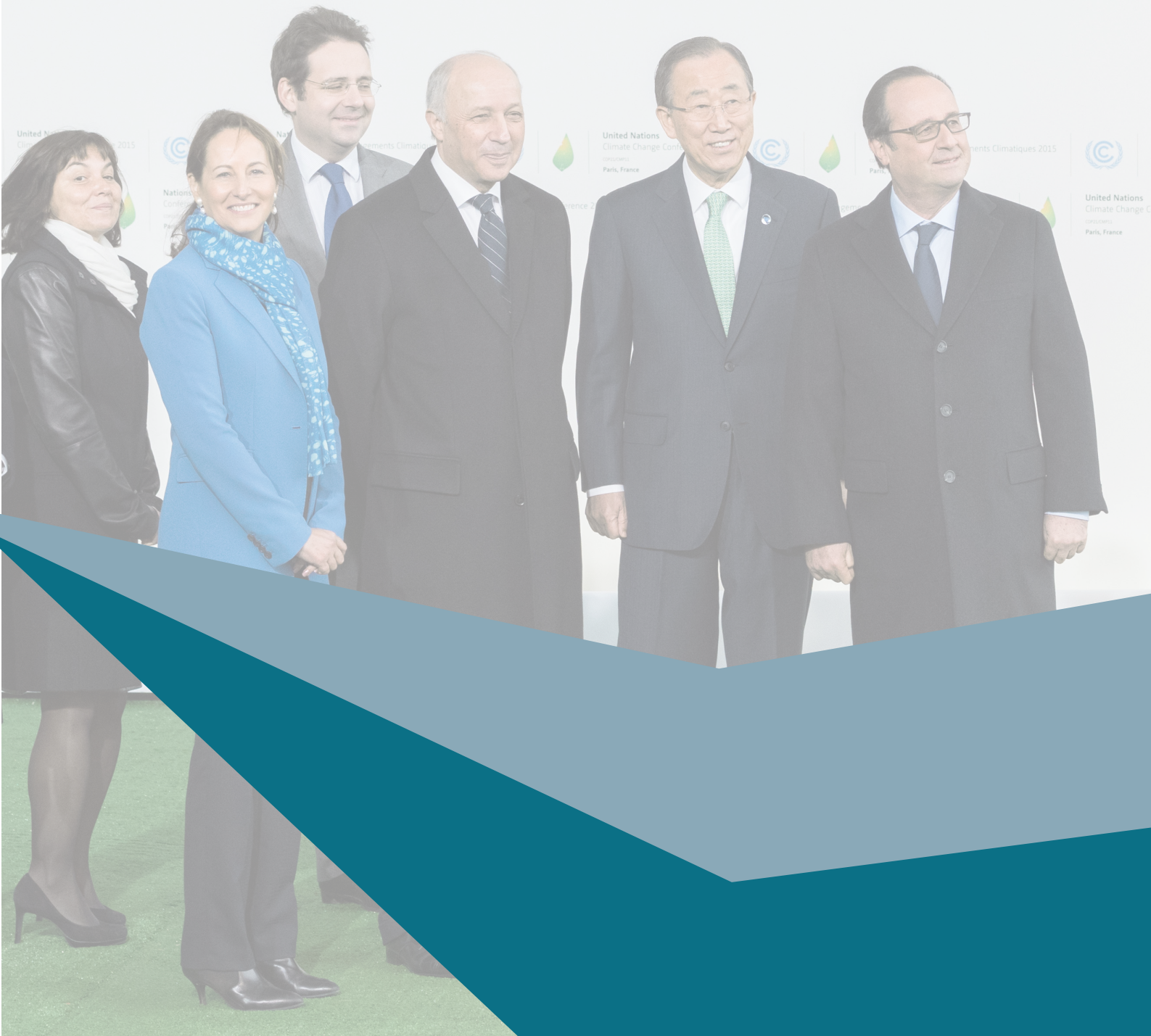
Conférence sur les Changements Climatiques

CLIMATE POLICY PERFORMANCE

COP21/CMP11

Paris, France

More action needed
for 2°C limit



CLIMATE POLICY FRAMEWORK

G20 countries have increasingly introduced climate policies, showing growing awareness around the need for climate action and its benefits.

Important policy instruments are codes, standards and incentives for low-emissions options in the building sector, support schemes for renewables in the power sector, emission performance standards for cars, emission trading schemes (ETS) and carbon taxes.

With the exception of Argentina and Saudi Arabia, all G20 countries have introduced instruments for energy efficiency improvements in the building sector and emission performance standards for cars. Emission Trading Schemes (ETS) are in place in Australia, Canada, China, EU countries, Japan, South Korea, and parts of the United States. Canada, France, Japan, Mexico and the UK make use of a carbon tax to reduce their emissions. All G20 states have developed support schemes for renewable energy in the power sector.

So far, only half the G20 countries have low-emission development plans for 2050, or are planning to develop them.¹⁷ Eleven of the G20 countries have put forward a 2050 GHG emissions reduction target.

According to the CCPI,¹⁸ the G20 policy performance shows a wide spectrum of good and poor performers:

- At the international level, France's role in COP21 and in working for the Paris Agreement received high marks. Experts lauded Germany for pushing a decarbonisation agenda among the G7.
- Mexico and China were also praised for their international activities.
- Experts rank China and India highly for their national policy work.
- Poor performers in both national and international evaluations include Argentina, Australia, Canada, Italy, South Korea, Saudi Arabia and Turkey.
- In Argentina, weak requirements and controls in the industrial sector, and missing funding for renewable energy promotion led to a poor performance.
- Australia is one of the countries, which requested that the UNFCCC should not publish the mandatory data submissions of its GHG emissions for the most recent year.
- Despite an overall poor ranking, Canada's constructive role in the run-up to COP-21 in Paris was reflected in an improved evaluation of its international climate policy performance in the last edition of the CCPI.
- Italy lacks a coherent climate and energy policy and has played a very passive role in the EU climate policy.
- South Korea's score has drastically decreased in the latest CPPI evaluation as the government plans to build 20 new coal-fired power plans.
- Saudi Arabia strongly defends its fossil fuel interests and has only made limited effort to promote climate action at the national level.
- Turkey lacks effective policies as well as supervision and reporting mechanisms.

¹⁷ No country has yet implemented "long-term low greenhouse gas emission development strategies" as called for in Art. 4.19 of the Paris Agreement. Even though some countries like Germany have started to develop such a plan, at this point it is impossible to state which countries are in the process of doing so.

¹⁸ The CCPI evaluates a country's performance in national and international climate policy through feedback from national energy and climate experts. The experts assess the country's performance in international negotiations, national policymaking, and in implementing climate policies. CCPI (2016), "Climate Change Performance Index", <https://germanwatch.org/en/11390>

Checklist of the climate policy framework

	Low emissions development plan for 2050 ⁽¹⁾	2050 GHG emissions target	Building codes, standards and incentives for low-emission options	Support scheme for renewables in the power sector	Emissions performance standards for cars	Emissions Trading Scheme (ETS) ²	Carbon tax
ARGENTINA	✗	✗	✓	✓	✗	✗	✗
AUSTRALIA	✓	✓	✓	✓	✓	✓	✗
BRAZIL	✗	✗	✓	✓	✓	✗	✗
CANADA	✗	✓	✓	✓	✓	✓ ⁽³⁾	✓
CHINA	✗	✗	✓	✓	✓	✓ ⁽⁴⁾	✗
EU(28)	✓	✓	✓	✓	✓	✓	✗
FRANCE	✗	✓	✓	✓	✓	✓	✓
GERMANY	✓	✓	✓	✓	✓	✓	✗
INDIA	✗	✗	✓	✓	✓	✗ ⁽⁵⁾	✓ ⁽⁶⁾
INDONESIA	✓	✗	✓	✓	✗	✗	✗
ITALY	✗	✗	✓	✓	✓	✓	✗
JAPAN	✓	✓	✓	✓	✓	✓ ⁽⁷⁾	✓
MEXICO	✓	✓	✓	✓	✓	✗	✓
REP. KOREA	✓	✗	✓	✓	✓	✓	✗
RUSSIA	✗	✓	✓	✓	✗	✗	✗
SAUDI ARABIA	✗	✗	✓	✓	✗	✗	✗
SOUTH AFRICA	✓	✓	✓	✓	✗	✗	✗
TURKEY	✗	✗	✓	✓	✗	✗	✗
UK	✓	✓	✓	✓	✓	✓	✓
USA	✓	✓	✓	✓	✓	✓ ⁽⁸⁾	✗

¹Understood as decarbonisation plans and not specifically as the plans called for in the Paris Agreement

²Including partial ETS, e.g. on a regional level

³Partial ETS; ⁴Partial ETS; ⁵ Although not an explicit carbon tax, India has a nationwide tax on coal, both produced and imported.

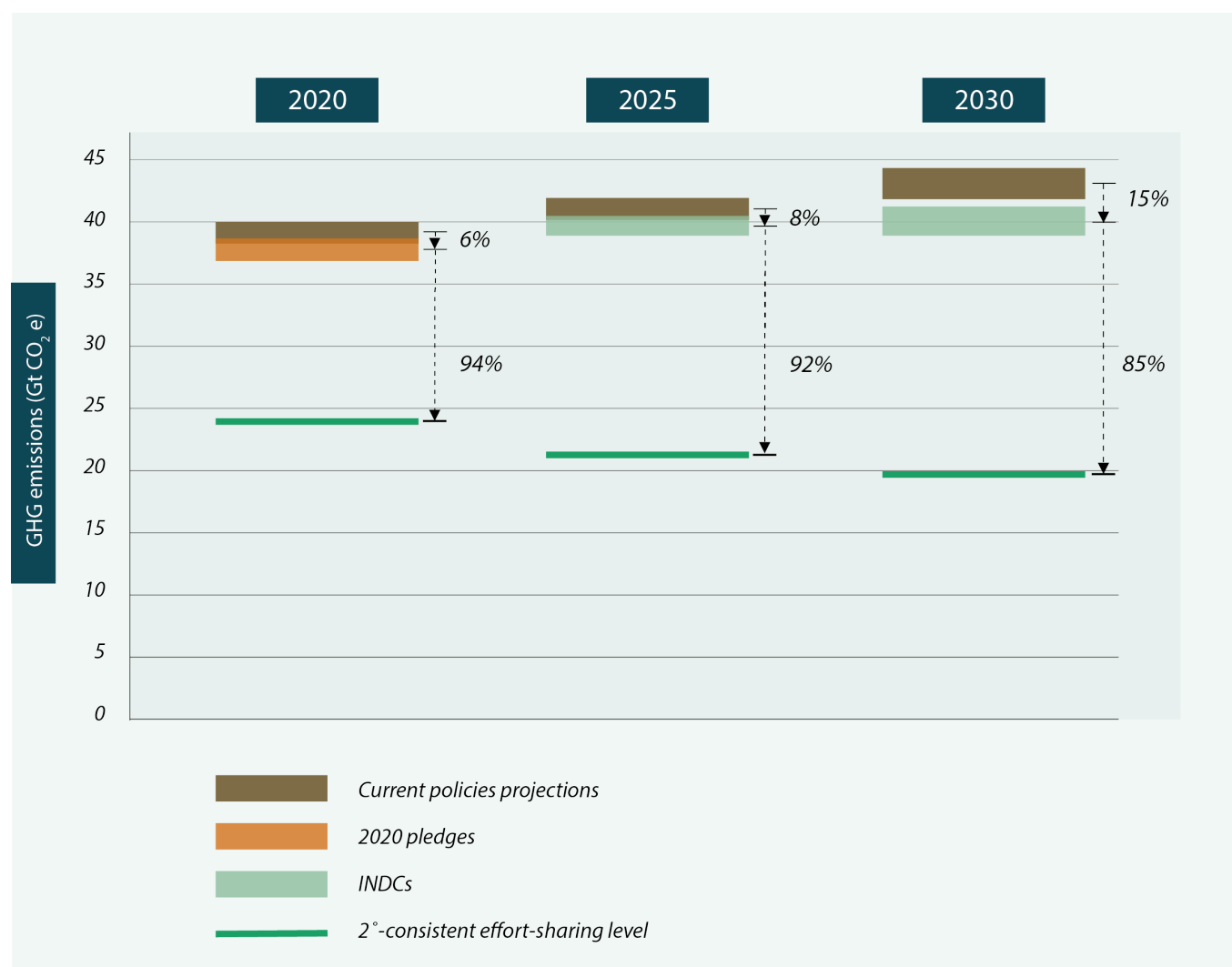
⁶ India has a nationwide tax on coal, which is however not counted as explicit carbon pricing.; ⁷Partial ETS; ⁸Partial ETS

INTENDED NATIONALLY DETERMINED CONTRIBUTIONS

In the run-up to the Paris climate summit, all G20 states submitted Intended Nationally Determined Contributions (INDCs), indicating their planned climate actions.¹⁹ According to the Climate Action Tracker, the INDCs go beyond current G20 member state policies and, if fully implemented, do result in lower emissions. However, current G20 INDCs are inadequate to limit global warming below 2°C, let alone 1.5°C.

Emission reductions foreseen in the INDCs cover only 15%²⁰ of the reduction needed for moving to a 2°C trajectory. In other words, to keep within a 2°C trajectory, the G20 as a whole, needs to reduce emissions in 2030 by a further 85% - six times the efforts they have pledged so far.²¹ For the Paris Agreement, it would have to take even stronger action.

Development and projections of the G20's GHG emissions and the effect of their INDCs



Source: Calculations by CAT (2015) based on national policies and country communications

¹⁹ As the Paris Agreement enters into force, these will become Nationally Determined Contributions (NDCs).

²⁰ Calculated based on the average emissions of the current policy pathways and the average emissions reduction of the country pledges (including conditional and unconditional targets)

²¹ CAT (2015) "Climate Action Tracker", <http://climateactiontracker.org/>. The calculation of climate action compatible with 2°C is based on an analysis which makes various assumptions for sharing global efforts fairly among countries. This analysis indicates the level of ambition required by the G20 as a whole, while allowing for variation among individual members, according to the chosen approach for sharing effort.



FINANCING THE TRANSITION

Glimpses of green
amongst the brown

INVESTMENT ATTRACTIVENESS

The transition from a brown to a green, low-carbon economy crucially depends on how attractive it is to invest. The investment attractiveness for renewable energy differs substantially between G20 countries.

Investment attractiveness is rated relatively high in China, France, Germany, India, the UK and the United States.

- China's medium to high investment attractiveness is determined to a significant degree by the coherence and reliability of its green policy environment, as well as good domestic capacity and experience with technology and value chains.
- Despite France's overall high investment attractiveness, policy commitment to a low-carbon energy transition that is not based on nuclear power is less certain, resulting in a lower uptake of solar and wind technology.
- Germany's excellent performance so far could potentially be affected by uncertainty around the renewables law, with a newly proposed cap of 40%-45% power generation from renewables by 2025.
- India's medium to high investment attractiveness is based on ambitious renewable energy targets and legislation, as well as multiple recent pledges by major domestic and international investors to develop large-scale renewable energy projects.
- The UK has a medium to high investment attractiveness giving its stable investment environment. The latest referendum and the uncertainty surrounding the upcoming negotiation process with the EU might negatively affect investment attractiveness in the future.
- Investment attractiveness in the United States is generally rated medium to high due to the overall size of the economy and commercial and regional importance of the country. However, differences in party positions pull down long term policy predictability, particularly concerning the National Climate Action Plan.

In contrast, Russia, Saudi Arabia and Turkey have low investment attractiveness for renewable energy.²² Saudi Arabia also rates low due to its negligible support mechanisms for renewable energy, and its power system's almost non-existent absorption capacity for renewable electricity. Turkey's plans to extend coal-based power generation - and its barriers to the development of renewables - recently weakened its investment conditions: up to 2014, its investments in renewables had been comparatively high.





















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**WE HAVE ENTERED
A NEW ERA OF
CLEAN ENERGY
GROWTH THAT CAN
FUEL A FUTURE
OF OPPORTUNITY
AND GREATER
PROSPERITY FOR
EVERY PERSON ON
THE PLANET.**

*UN Secretary General Ban
Ki-Moon*

²² Overall investment attractiveness in these countries is relatively low at the moment due to investors' perception of high political risks.

Investment attractiveness of the G20

		Allianz Energy and Climate Monitor	RECAI ¹	Trend ²
ARGENTINA		LOW	LOW	no data
AUSTRALIA		MEDIUM	MEDIUM	↑
BRAZIL		LOW	MEDIUM	↑
CANADA		MEDIUM	MEDIUM	↓
CHINA		MEDIUM	HIGH	=
EU(28)		Not covered		
FRANCE		HIGH	MEDIUM	↓
GERMANY		HIGH	HIGH	↓
INDIA		MEDIUM	HIGH	=
INDONESIA		LOW	LOW	↓
ITALY		MEDIUM	LOW	↓
JAPAN		MEDIUM	MEDIUM	↓
MEXICO		LOW	MEDIUM	↑
REP. KOREA		MEDIUM	LOW	↓
RUSSIA		VERY LOW	Not covered	no data
SAUDI ARABIA		VERY LOW	Not covered	no data
SOUTH AFRICA		LOW	MEDIUM	↑
TURKEY		VERY LOW	LOW	↓
UK		HIGH	MEDIUM	↓
USA		MEDIUM	HIGH	=

¹Adapted from RECAI and re-classified in 3 categories (low, medium high) for comparison purposes with Allianz Monitor.

²Taken from RECAI issue of May 2016

INVESTMENT NEEDS

Channelling resources to green infrastructure and industries is essential to address the climate change challenge. Between 2000 and 2013, G20 states have invested an average of USD 371 billion a year in the power sector.²³ Investments in renewable energy (USD 117,78 billion/year) were, on average, higher than investments in fossil fuels and nuclear energy (USD 92,79 billion/year). Argentina, Brazil, France, Germany, Italy, Turkey²⁴ and the UK all had a very high share of renewable investments. In contrast, Russia and Saudi Arabia accounted for a very low share over the same period. Australia, Canada, China, India, Indonesia, Japan, Mexico, South Africa, South Korea and the United States have a relatively even share of investments between renewable energy, fossil fuels and nuclear energy.

To be in line with a 2°C-compatible trajectory by 2035,²⁵ G20 countries face an enormous investment gap of almost 340 billion USD/year in the power sector. This means doubling the annual investments in the power sector for most developing countries in the G20 and specifically for South Africa and India, more than tripling them. Not only do countries need to scale-up investments in the power sector, but they also need to shift from brown to green investments.

In a 2°C compatible pathway, investment needs in the power sectors of the G20 states vary between 73% and 21%. They are particularly high for India, Indonesia, Russia and South Africa – offering an opportunity to scale-up green investments that will foster economic growth and job creation.

FOSSIL FUEL SUBSIDIES

Back in 2009, G20 leaders pledged to phase-out 'inefficient' fossil fuel subsidies. However, their governments provided, on average, almost USD 70 billion in subsidies for fossil fuel production between 2013 and 2014. This does not include subsidies such as those for electricity and fuel use, nor other indirect support. Russia provided almost USD 23 billion, the United States more than USD 20 billion, Australia and Brazil USD 5 billion. China's annual average subsidies in 2013 and 2014 were estimated at just over USD 3 billion, including tax breaks for oil, gas and coal producers. The UK is one of the few G20 countries increasing fossil fuel production subsidies, while reducing investments into renewable energy. It has increased its national subsidies to fossil fuel production to more than USD 1 billion a year in 2013 and 2014 to encourage offshore oil and gas in the North Sea.

Reducing fossil fuel subsidies could, in theory, create fiscal space for more international climate finance. In 2013 and 2014, fossil fuels subsidies were significantly higher than public climate finance in Australia (USD 5 billion vs. USD 0.15 billion), Canada (USD 2.7 billion vs. USD 0.14 billion), Italy (USD 1.2 billion vs. USD 0.06 billion) and the United States (USD 20 billion vs. USD 2.7 billion).



THE G20 NEEDS TO EXPLORE WAYS TO ENCOURAGE GREENER FINANCIAL INSTITUTIONS WORLDWIDE, AND IMPROVE THE CAPACITY OF CAPITAL MARKETS IN CHANNELING RESOURCES TO GREEN INDUSTRIES

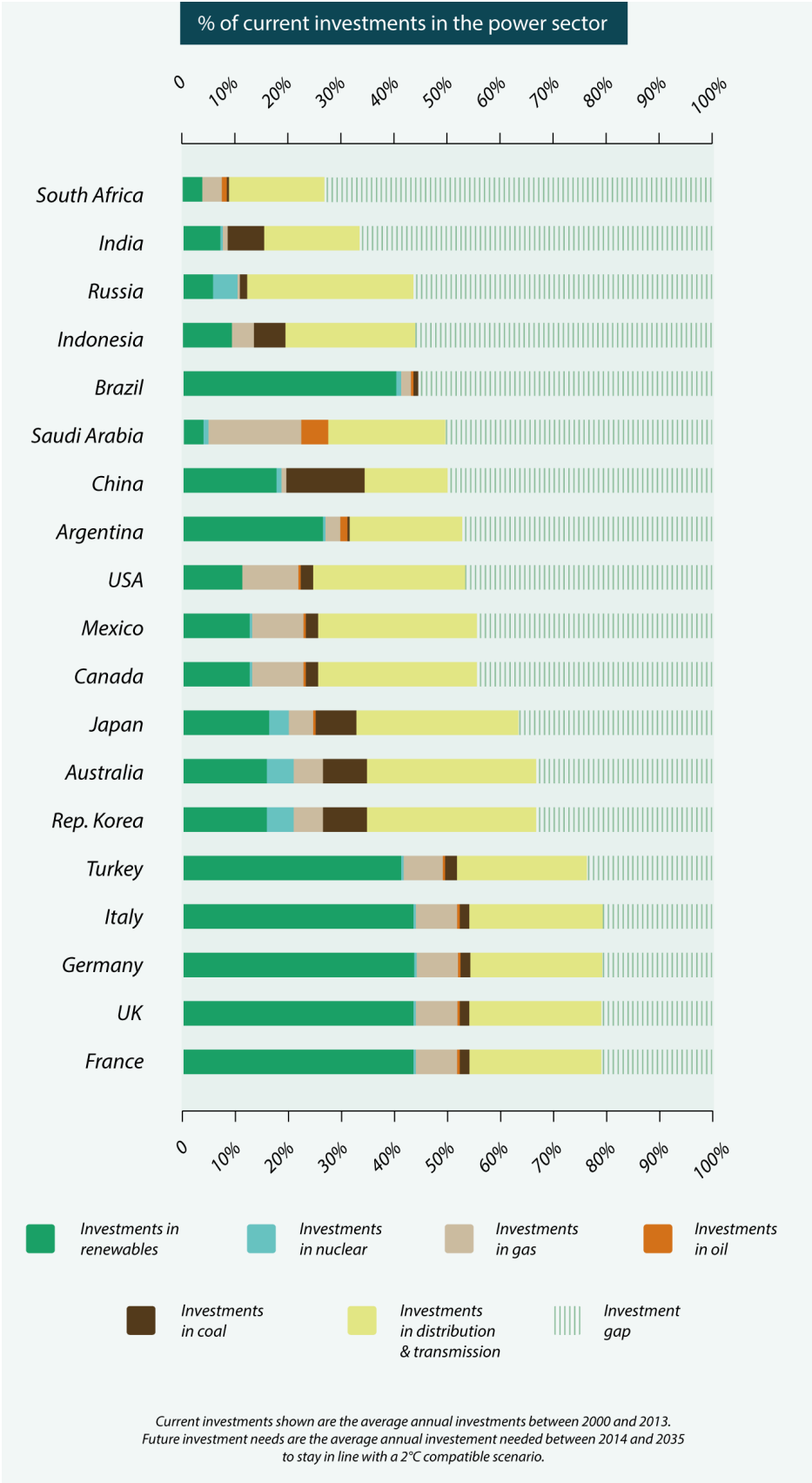
Message from President Xi Jinping on the 2016 G20 China Summit

²³ Investment in the power sector include energy generation, transmission and distribution.

²⁴ Due to Turkey's plans to extend coal-based power generation and barriers to the development of renewables, it received a poor rate in the CPPI policy performance rating of 2016.

²⁵ Investment needs were estimated based on the cumulative investments required between 2014-2035 to be in line with a 450 scenario from the World Energy Outlook developed by the International Energy Agency.

Past investments (2000-2013) and future power sector investment needs for a 2°C pathway



Source: Own calculations based on WEIO, 2014

CARBON PRICING

In general, carbon pricing is expanding within the G20, with a whole range of different schemes being applied. However, they have only partially achieved their purpose: the price of carbon has been too low to steer economies towards lower carbon.

The European Union Emissions Trading System (EU ETS), covering 45% of the EU's GHG emissions, remains the single largest international carbon pricing instrument. In China, carbon pricing instruments cover 1.3 GtCO₂e, while in the United States they cover 0.5 GtCO₂e. In 2013, China started seven pilot ETS's at the sub-national level (Beijing, Guangdong, Hubei, Shanghai, Shenzhen, Tianjin, Chongqing). Two years later, China announced plans to introduce a national ETS in 2017 that will cover eight sectors, and is expected to form the largest national carbon pricing initiative in the world in terms of volume.

Several other countries have begun to implement pricing schemes during recent years:

- Australia introduced a national ETS in 2016. It has been criticised, however, for its baselines being so high that they will not require any emission cuts. Moreover, Australia repealed its comprehensive carbon price mechanism in 2014;
- Canada has had an ETS in Quebec since 2013 and in Manitoba and Ontario since 2015, and implemented a carbon tax in British Columbia in 2008;
- Japan introduced a national carbon tax in 2012, the city of Tokyo introduced an ETS in 2010, and the Saitama region in 2011;
- Mexico implemented a carbon tax in 2014;
- South Korea launched its national ETS in 2015;
- South Africa has drafted a Carbon Tax Bill, with implementation expected in 2016;
- In 2010, India introduced a nationwide tax on coal of 400 rupees (USD 5.95) a tonne of both domestically-produced and imported coal;
- Brazil, Indonesia and Turkey are currently exploring possibilities to use carbon pricing schemes to meet their voluntary GHG reduction commitment more cost-effectively.

At a global level, the existing carbon prices vary significantly — from less than USD 1 per tCO₂e to USD 130 per tCO₂e. The majority of emissions (85%) are priced at less than USD 10 per tCO₂e. This is considerably lower than the prices needed to meet the 2°C. Similarly, every country defines the scope of their pricing mechanism and its emissions coverage. In many instances, the coverage is limited and therefore not in line with what would be required in 2° compatible scenarios.

CLIMATE FINANCE

Developed countries have committed to mobilising USD 100 billion a year of climate finance to developing countries from public and private sources by 2020.

The eight G20 countries obliged to provide climate finance under the UNFCCC include some of the largest climate finance donors. Taking into account international climate finance provided through bilateral and multilateral channels, France, Germany, Japan, the UK and the US each provided between USD 1.2 billion and USD 8.4 billion a year in 2013 and 2014.

Australia, Canada and Italy provided far lower amounts of climate finance during this period. These contributions are modest in comparison to GDP. Ratios are highest in the case of Japan (0.18%) and France (0.12%) and lowest in the case of Canada (0.0008%), Australia (0.001%) and Italy (0.0003%). The Green Climate Fund is a new institution with strong political significance as the primary channel for delivering climate finance under the UNFCCC to support the implementation of the Paris Agreement. Again, the US, Japan, the UK, France and Germany are the five largest contributors to the GCF, making pledges ranging from USD 1 billion to USD 3 billion. Three developing G20 countries without obligations to provide climate finance – Indonesia, Mexico and South Korea – have shown leadership by also pledging to the GCF.



Climate
Transparency