

# G20 CLIMATE ACTION – A TURNING POINT?

An overview of climate mitigation action  
by the G20 countries



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G20 countries represent two thirds of the world population, and four fifths of global economic output, as measured by gross domestic product (GDP). Collectively, these countries currently emit three quarters of global annual greenhouse gases (GHG). Average per capita GHG emissions in G20 countries are nearly eleven tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). To keep global average warming below two degrees Celsius (2°C), global average per capita emissions – not just of the G20 – should be around 1–3 tCO<sub>2</sub>e, by 2050.

There are good reasons to draw attention to the climate mitigation action of the G20. Because of their collective size, it is vital that G20 countries reduce their per capita emissions to the safe range mentioned above, even though this would be insufficient on its own to tackle climate change. Because of their enormous political and economic power, these countries help determine the dynamics of the global economy. For example, much technological innovation arises from within the G20. And their share of global trade is even higher than their share of the world economy. Collectively, G20 countries drive the global trend in green-

**Most of the world's top-20 annual GHG emitters are G20 countries. That is unsurprising, given their large economic size. However, some of these countries would not appear on a top-20 list of the world's biggest cumulative emitters. And fewer than half would appear on a top-20 list of the world's biggest per capita emitters. Emerging economies, for example, still have smaller per capita emissions than most industrial nations.**

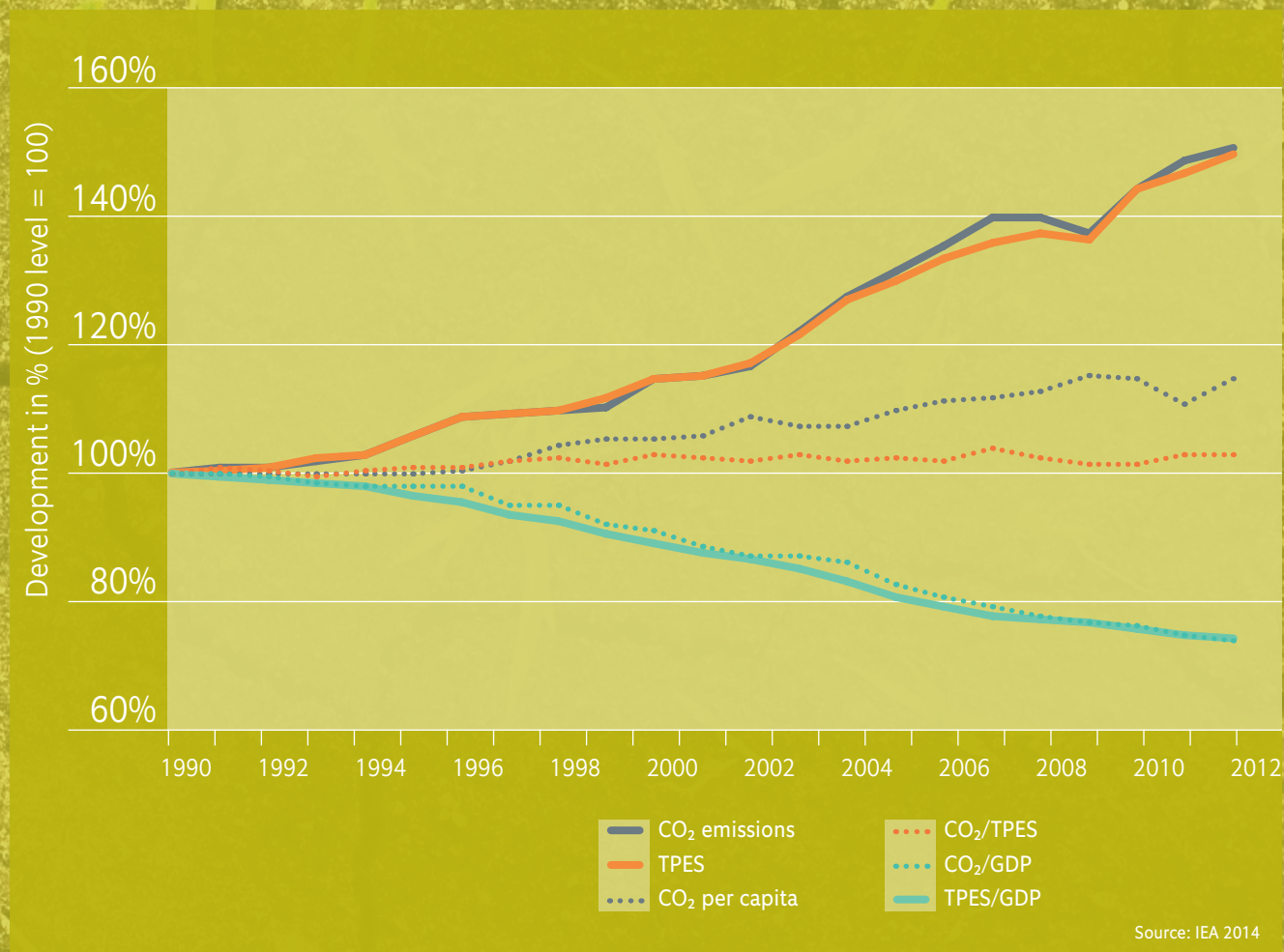
house gas emissions, evening out structural economic changes which may shift emissions one way or another in individual nations.

The necessity for average per capita emissions to fall to 1–3 tCO<sub>2</sub>e follows from climate science.

However, this prescription does not, on its own, translate into fair contributions across individual nations. A thorough comparison of the climate mitigation action of G20 countries is a vital precondition for stimulating national debates about what is fair and possible. A transparent comparison of climate action will inform such debate, hold governments to account, and help the world understand what it would take to avoid dangerous climate change. A comparison of climate action across nations must consider a range of criteria: the historical development of emissions; the capacities and capabilities of countries; indicators of decarbonisation, such as the development of renewable energy, and carbon and energy intensity; the national and international climate policy performance of governments; and policy ambition, as expressed in countries' Intended Nationally Determined Contributions (INDCs), in the context of the globally agreed 2°C target.



## G20 – DEVELOPMENT OF KEY INDICATORS





Reviewing the trajectory of global emissions over the last 25 years makes sobering reading. In the space of a quarter of a century, G20 carbon dioxide (CO<sub>2</sub>) emissions have increased by nearly 50%, with faster growth in the second half of this period.<sup>1</sup> Per capita emissions have grown less strongly, by about 18%, reflecting population growth.

Two indicators have fallen by more than 25%, namely carbon and energy intensity, defined as CO<sub>2</sub> emissions per unit of primary energy supply, and primary energy supply per unit of GDP. This shows that energy has been used more efficiently to produce goods and services, and that relatively less CO<sub>2</sub> was emitted to produce energy. Because global GDP has grown strongly in the last 25 years however, the overall effect has still been a big increase in emissions.

If the world continues along its present path, rising emissions will take the global average temperature far above 2°C, compared with preindustrial levels. The Intergovernmental Panel on Climate Change (IPCC) has highlighted this danger. Similarly, parties of the United Nations Framework Convention on Climate Change (UNFCCC) have recognised the need for urgent action, at their annual global climate conferences.

Parties to the UNFCCC comprise almost every nation on Earth. Aware of the urgency to cut GHG emissions, they have prepared new pledges for climate action, called Intended Nationally Determined Contributions (INDCs). These INDCs will form the centrepiece of a new global climate agreement, which the world is expected to reach at a summit in Paris at the end of this year.

The INDCs are a major step forward. Never before have so many countries committed to take action on climate change, and published such detailed pledges for public scrutiny. Collectively, the INDCs will slow global growth in annual emissions, future review processes have the potential to strengthen the ambition. As the analysis of Climate Action Tracker (CAT) shows, even if these plans were fully implemented, they would still lead to an increase in global

**With present commitments global temperature would be 2.7 degrees higher in 2100.**

temperature of 2.7°C by 2100.<sup>2</sup> The longer it takes to mobilise the necessary ambition to keep global average warming below 2°C, the more difficult this target will become, requiring ever steeper, more challenging emissions reductions.

However, while these numbers are sobering, there are strong indications that G20 countries are reaching a turning point.

In eleven G20 countries, annual per capita GHG emissions are now on a downward path. Renewable energy is continuing its strong growth worldwide. Costs have fallen sharply, and parity with traditional forms of energy is in sight, or already reached. Renewable energy sources are also helping to bring power to the millions of people who do not have access to electricity, where off grid renewable power can be installed faster and cheaper than a grid connection. Climate legislation has been introduced in many countries and targets have been strengthened over time. Increasingly, there is knowledge sharing and collaboration over policies to promote renewable power, energy efficiency and carbon pricing. A substantial number of countries and regions have introduced carbon markets. Climate mitigation action is increasingly seen not as a cost, but a necessary investment in the future, which brings multiple other benefits.

An important demonstration of the cumulative effect of these developments is that according to the International Energy Agency energy related emissions did not grow in 2014.<sup>3</sup> Such a reversal of GHG emissions growth was previously seen only during periods of economic downturn. This time, it seems that climate policy is working. More ambition is needed, but there is room for hope and optimism.

1 There are more reliable data for CO<sub>2</sub> emissions than for GHG emissions. While there are variations between countries as to the relative part of CO<sub>2</sub>, for the G20 they are a good indicator also for GHG emissions.

2 Source: [http://climateactiontracker.org/assets/publications/CAT\\_global\\_temperature\\_update\\_October\\_2015.pdf](http://climateactiontracker.org/assets/publications/CAT_global_temperature_update_October_2015.pdf)  
The analysis of CAT comes to the conclusion that there would be a “best guess” global temperature increase of 2.7°C in 2100 with a 66% likelihood of being below 3°C.

3 [www.iea.org/newsroomandevents/news/2015/march/global-energy-related-emissions-of-carbon-dioxide-stalled-in-2014.html](http://www.iea.org/newsroomandevents/news/2015/march/global-energy-related-emissions-of-carbon-dioxide-stalled-in-2014.html)

# EMISSIONS AND EMISSION TRENDS

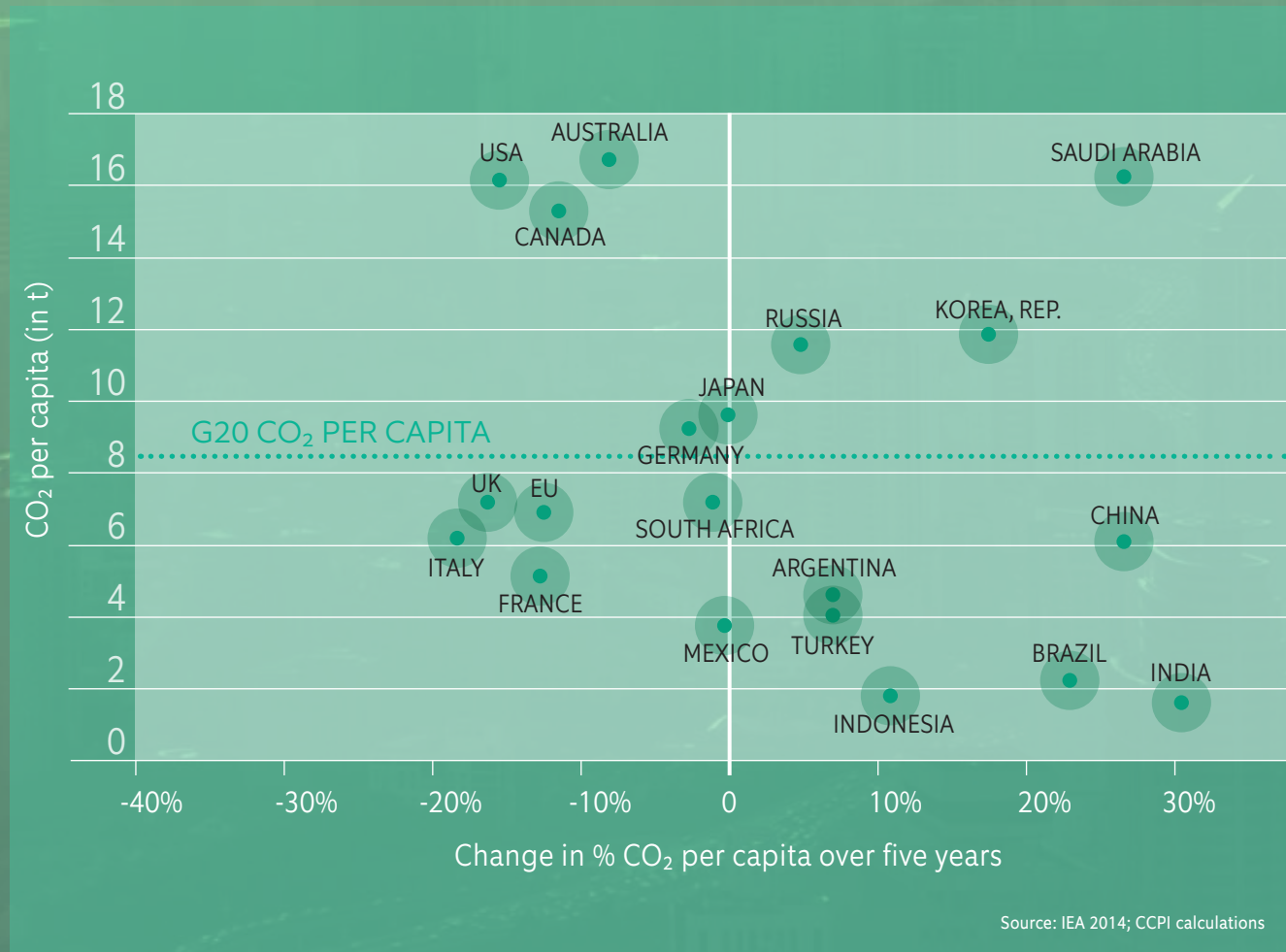
Climate policy  
is working, but  
more ambition  
is needed.

G20 countries account for 74% of current global greenhouse gas emissions. Average annual per capita emissions are nearly 11 t CO<sub>2</sub>e. The vast majority of these, at about eight tonnes per capita, are carbon dioxide (CO<sub>2</sub>) emissions from burning fossil fuels to produce energy. If the 2°C target is to be met, global average emissions should fall to be in the order of 1–3 t CO<sub>2</sub>e by 2050, an order of magnitude lower than present.

While both per capita and overall emissions of the G20 have continued to rise, the IEA analysis of energy related CO<sub>2</sub> emissions suggests that such growth is not only slowing, but on the verge of stopping.

Half of G20 countries no longer show growth in energy-related CO<sub>2</sub> emissions. Among countries with high per capita emissions, Saudi Arabia and Korea, Rep. are still increasing their emissions, whereas emissions are falling in the United States, Canada and Australia. Among countries with lower per capita emissions, India, China and Brazil all have high growth rates, while emissions are falling in the EU as a whole, and in some of its member states, in particular, such as France, Italy and the UK.

## ANNUAL CO<sub>2</sub> PER CAPITA EMISSIONS – LEVEL 2012 AND TREND 2007–2012



# DECARBONISATION

Decarbonisation of the global economy will be a crucial element for staying below the 2°C threshold. Two important steps towards achieving such decarbonisation are a shift from fossil fuels to renewable energy sources, and a reduction in carbon and energy intensity.

## RENEWABLE ENERGY

The most positive change has been in the field of renewable energy. Twenty years ago, only a few countries had embarked on major programs to increase the share of renewable energy in their energy mix. Now, nearly all G20 countries have either already substantially increased their renewable energy portfolio, or have plans to do so.

Many G20 countries have seen strong growth rates in renewable energy production. In some cases, the overall share of renewable energy in total primary energy supply is also rising, thus cutting fossil fuel use. The share of renewable energy is rising, in this way, in Germany, Italy, France, the UK, the EU, the United States, Canada and Japan.

Across the G20, the average share of renewables in the total primary energy supply had a slightly negative trend until 2012, however. This indicated that the production of energy from other sources such as fossil fuels and nuclear power was rising even faster.

## DECOUPLING OF CARBON- AND ENERGY INTENSITY<sup>4</sup>

Globally, there is a trend of weak decoupling of CO<sub>2</sub> emissions from growth in both GDP and total primary energy supply. Such a decoupling would be expected to follow rapid growth in the renewable energy sector. However, no clear trend is visible across the G20, reflecting strong growth also in the fossil fuel energy sector.

The G20 has seen falling energy intensity of the economy. Such a decline could have a variety of causes, including rising energy efficiency; structural economic change towards services industries away from energy-intensive manufacturing; or the relocation of energy-intensive industries to other countries.<sup>5</sup>

For a clear decoupling trend across the G20, both the energy intensity of the economy and carbon intensity of energy supply will have to decline. Within the G20, there are some leading countries where both indicators are falling, including the EU as a whole, EU member states such as France, the UK and Germany, and the United States and Russia.

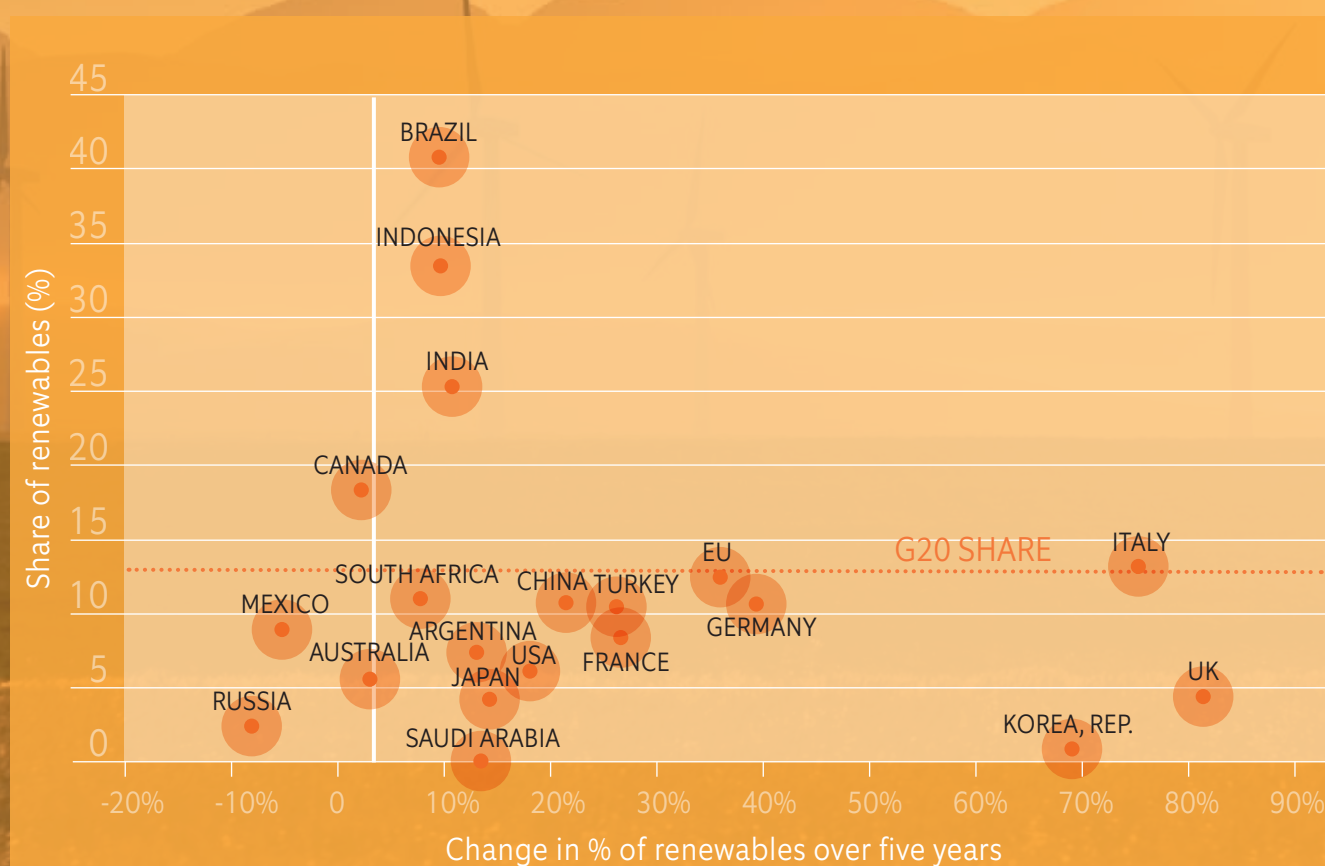
Most positive  
change:  
renewable  
energy.

<sup>4</sup> PwC produces an annual Low Carbon Economy Index, which in 2015 has ranked G20 economies by carbon intensity of GDP and also assessed national targets. More information is available at: [www.pwc.co.uk/sustainability](http://www.pwc.co.uk/sustainability)

<sup>5</sup> These effects, which may have a substantial effect on the national indicators, largely compensate each other when looking at the G20 averages.



## RENEWABLE ENERGY – SHARE 2012 AND TREND 2007–2012



Source: IEA 2014; CCPI calculations

# CLIMATE POLICY PERFORMANCE

The CCPI policy evaluations show a growing sensibility among G20 governments of the need for and benefits from climate action. Many countries are investing heavily in renewable energy, and some are even developing decarbonisation pathways.

Across the G20, there is a wide spectrum of good and poor performers taking into account countries' respective capabilities. Because of its progressive attitude in climate negotiations, Mexico usually receives positive CCPI evaluations for its international policy performance. South Africa, Germany and the UK also rank relatively highly in this area. At the level of national climate policy, India, the Korea, Rep. and China rank highly, compared with other G20 countries. Poor performers in both national and international evaluations include Saudi Arabia, Canada, Australia and Turkey. Australia lost ground after its last general election, when the subsequent government reversed most climate policies. Turkey has also stopped promoting climate action. Canada is expected to improve its performance after its newly elected government announced plans to increase its climate ambition. The performance ranking of the United States and China benefited from taking the lead in international negotiations in 2014.

Countries are developing decarbonisation pathways.

## INDCS

All G20 countries (with the exception of Saudi Arabia) have submitted new climate change plans, called "Intended Nationally Determined Contributions", or INDCs, towards the Paris climate meeting. These proposals will bend downwards the emissions curve of the G20 as whole. However, the INDCs are insufficient to meet a trajectory compatible with limiting global average warming to 2°C (see figure).

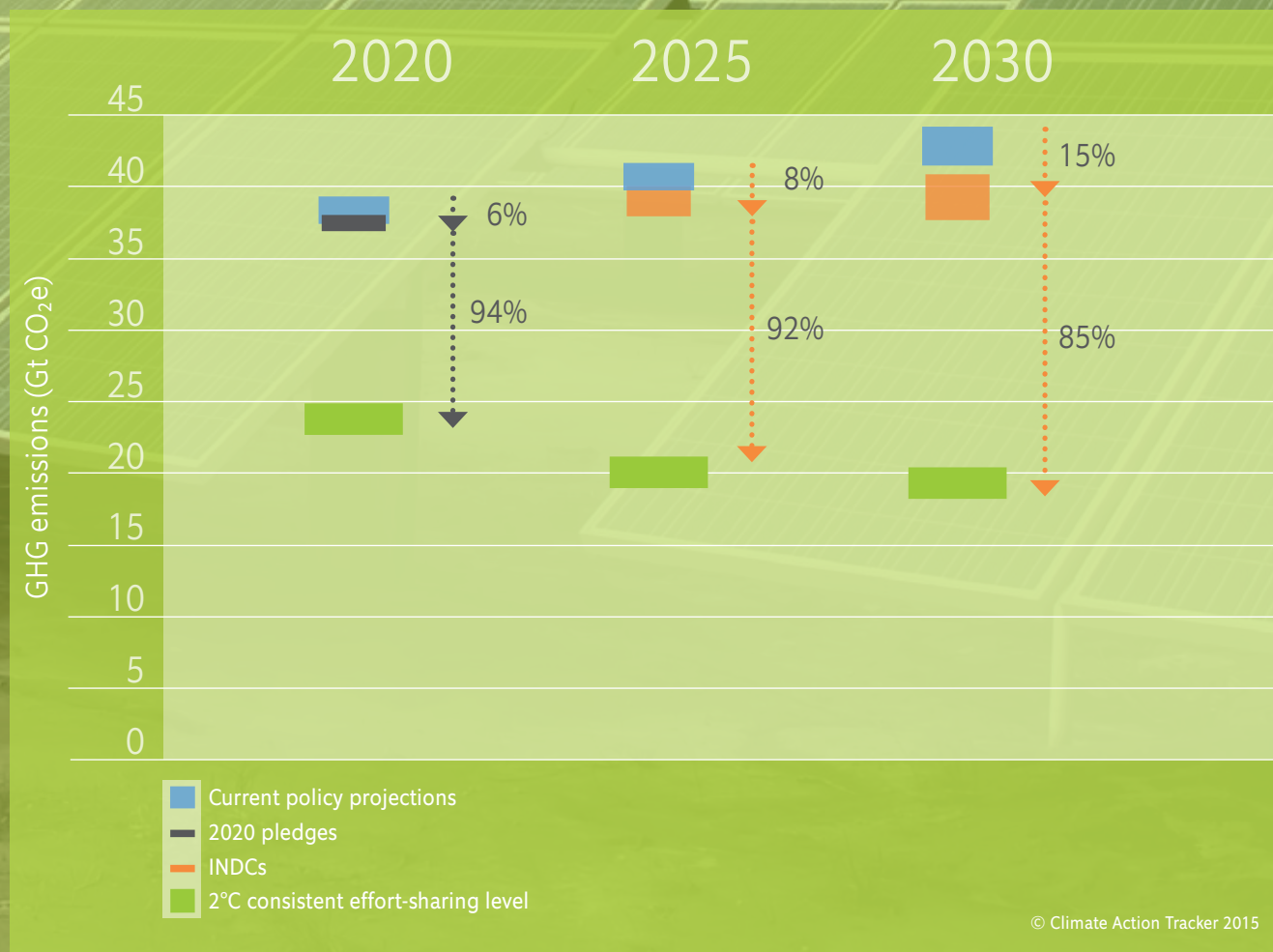
The Climate Action Tracker finds that the INDCs go beyond current G20 climate policies, resulting in lower emissions, if fully implemented. However, these emissions reductions still only go 15% of the way to making G20 climate action compatible with a goal to limit global average warming to below 2°C. The calculation of a level of ambition compatible with 2°C is based on analysis which makes various assumptions for sharing global effort fairly among countries.<sup>6</sup> 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.<sup>7</sup>

Beyond the G20, more than 140 countries have submitted INDCs towards a Paris agreement. If these were all implemented, they would lead to a "best guess" global temperature increase of 2.7°C in 2100, with a 66% likelihood of staying below 3°C, according to the assessment of the CAT. There is therefore a clear need, and room, for enhanced ambition in climate mitigation by G20 countries.

<sup>6</sup> <http://climateactiontracker.org/methodology/85/Comparability-of-effort.html>

<sup>7</sup> See also Bloomberg New Energy Finance: BNEF, "How ambitious are the past – 2020 Targets? – Assessing the INDCs", October 2015.

## DEVELOPMENT AND PROJECTIONS OF THE G20'S GHG EMISSIONS AND THE EFFECT OF THEIR INDCs





# CO-BENEFITS OF CLIMATE ACTION

Countries are increasingly aware of multiple additional benefits from reducing greenhouse gas emissions, besides avoided climate change. These so-called co-benefits can reduce or offset the perceived costs of mitigation, and provide strong arguments for raising ambition.

These benefits include improved economic growth and jobs, through low-carbon infrastructure investment; enhanced productivity and energy efficiency, as a result of renewed focus on technology innovation; better energy security and balance of payments, by lowering fossil fuel imports; and better health outcomes, through reduced air pollution.

By taking into account such effects, countries will already benefit from implementing their INDCs, for example through reduced fossil fuel imports, new jobs and lower air pollution. These benefits could be even larger, if countries scaled up their ambitions, for example for 100% renewable energy.

Climate action offers benefits for economic growth, jobs, energy security, reduced air pollution and health.

# KEY INDICATORS FOR G20 COUNTRIES

The table below provides an overview of key indicators and trends, across G20 countries.

	Share of global GHG emissions [%]*	Share of global GDP [%]	Share of global population [%]	GHG emissions per capita [t CO <sub>2</sub> e/cap]	Energy intensity of GDP [TPES (MJ)/GDP (US\$)]	CO <sub>2</sub> emission intensity of energy [t CO <sub>2</sub> /TJ]	CO <sub>2</sub> emission intensity of GDP [kg CO <sub>2</sub> /(2000) US\$]	2012 Share of fossil in primary energy [%]	2012 Share of coal in electricity production [%]	2012 Share of renewables in primary energy [%]
ARGENTINA*	0.65%	0.79%	0.58%	↗ 7.94	↘ 5.36	↗ 56.12	↘ 0.29	89.8%	2.73%	7.30%
AUSTRALIA	1.19%	1.05%	0.33%	↘ 24.39	↘ 6.15	↘ 71.92	↘ 0.44	94.39%	68.8%	5.53%
BRAZIL	3.22%	3.05%	2.82%	↘ 5.91	↗ 4.57	↗ 37.32	↗ 0.17	56.55%	2.56%	40.72%
CANADA	1.45%	1.56%	0.50%	↘ 21.21	↘ 8.33	↘ 50.76	↘ 0.41	73.4%	10.04%	18.30%
CHINA*	21.69%	16.03%	19.30%	↗ 7.16	↘ 9.31	↘ 67.75	↘ 0.62	88.23%	75.93%	10.71%
EU	9.95%	17.08%	7.21%	↘ 8.41	↘ 4.86	↘ 50.93	↘ 0.25	73.4%	28.13%	12.40%
FRANCE	1.06%	2.36%	0.93%	↘ 7.11	↘ 5.49	↘ 31.6	↘ 0.17	48.73%	3.87%	8.36%
GERMANY	1.91%	3.44%	1.16%	↘ 11.63	↘ 4.73	↗ 57.72	↘ 0.26	80.41%	46.06%	10.58%
INDIA*	5.65%	6.72%	17.57%	↗ 1.92	↘ 5.97	↗ 59.22	→ 0.35	73.64%	71.07%	25.19%
INDONESIA*	3.83%	2.35%	3.51%	↘ 6.02	↘ 4.79	↗ 48.7	↘ 0.22	66.46%	48.66%	33.42%
ITALY	1.00%	1.94%	0.87%	↘ 7.41	↘ 4.26	↘ 56.37	↘ 0.23	83.87%	18.2%	13.12%
JAPAN	2.71%	4.82%	1.81%	↘ 9.99	↘ 4.98	↗ 64.6	↗ 0.31	94.56%	29.55%	4.13%
KOREA. REP.	1.31%	1.69%	0.71%	↗ 12.85	↗ 7.91	↗ 53.76	↗ 0.42	83.23%	45.08%	0.85%
MEXICO*	1.28%	1.90%	1.66%	↗ 6.31	↘ 5.06	↘ 55.25	↘ 0.28	90.15%	11.68%	8.83%
RUSSIA	4.99%	2.63%	2.04%	↗ 12.25	↘ 14.60	↘ 52.37	↘ 0.76	91.07%	15.75%	2.36%
SAUDI ARABIA*	1.02%	1.54%	0.40%	↗ 17.31	↗ 6.53	↘ 54.72	↗ 0.36	99.997%	0%	0.00%
SOUTH AFRICA*	0.98%	0.67%	0.74%	↗ 10.91	↘ 10.91	↗ 64.17	↘ 0.67	86.97%	93.84%	10.91%
TURKEY	0.84%	1.22%	1.06%	↗ 5.08	↗ 4.79	↘ 61.78	→ 0.3	89.36%	28.4%	10.39%
UK	1.20%	2.50%	0.91%	↘ 9.11	↘ 3.94	↘ 56.84	↘ 0.22	85.16%	39.96%	4.36%
USA	13.48%	17.17%	4.47%	↘ 17.62	↘ 6.58	↘ 56.62	↘ 0.36	83.71%	38.48%	6.03%
G20 – TOTAL	Σ 74.24%	Σ 80.27%	Σ 64.72%	Ø 10.95	Ø 6.92	Ø 56.62	Ø 0.39	Ø 83.43%	Ø 35.67%	Ø 12.32%

\* GHG data from 2010

Data Sources: Climate Action Tracker (2015): Country Tools. Available at: <http://climateactiontracker.org/countries.html>[1] | International Energy Agency (2014a): Emissions from fuel combustion: Beyond 2020 documentation. IEA, Paris | International Energy Agency (2014b): Energy Balances of OECD Countries 2014. IEA, Paris. | United Nations, Department of Economic and Social Affairs (2015): World Population Prospects: The 2015 Revision. Available at: <http://esa.un.org/unpd/wpp> | UNFCCC (2015): GHG Data – UNFCCC: Time series – Annex I. Available at: [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/time\\_series\\_annex\\_i/items/3814.php](http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php) | World Bank (2015a): Fossil fuel energy consumption. Available at: <http://data.worldbank.org/indicator/EG.USE.COMM.FO.ZS/countries> | World Bank (2015b): Electricity production from coal sources. Available at: <http://data.worldbank.org/indicator/EG.ELC.COAL.ZS>.

[1] Climate Action Tracker collects the latest data for every country from different sources. Detailed information can be gathered at the different country profiles at their online presence.



# SUMMARY TABLE OF CCPI'S AND CAT'S EVALUATION OF THE G20



	Evaluation in overall Score CCPI	CCPI Evaluation of Emissions Level	CCPI Evaluation of Renewable Energies	CCPI Evaluation of Energy- and Carbon Intensity	CCPI Evaluation of Climate Policy	CAT INDC rating – with respect to 2°C scenario	CAT: How much additional effort beyond current policies is needed to achieve the INDC?
ARGENTINA	VERY POOR					INADEQUATE	A LITTLE
AUSTRALIA	VERY POOR					INADEQUATE	A LOT
BRAZIL	VERY POOR					MEDIUM	A LITTLE
CANADA	VERY POOR					INADEQUATE	A LOT
CHINA	POOR					MEDIUM	NONE
EU	N/A	N/A	N/A	N/A	N/A	MEDIUM	A LITTLE
FRANCE	GOOD					MEDIUM (EU rating)	A LITTLE (EU rating)
GERMANY	MEDIUM					MEDIUM (EU rating)	A LITTLE (EU rating)
INDIA	MEDIUM					MEDIUM	Emissions from current policies lower than INDC
INDONESIA	MEDIUM					INADEQUATE	Emissions from current policies lower than INDC
ITALY	MEDIUM					MEDIUM (EU rating)	A LITTLE (EU rating)
JAPAN	VERY POOR					INADEQUATE	A LITTLE
KOREA, REP.	VERY POOR					INADEQUATE	A LITTLE
MEXICO	MEDIUM					MEDIUM	A LITTLE
RUSSIA	VERY POOR					INADEQUATE	Emissions from current policies lower than INDC
SAUDI ARABIA	VERY POOR					N/A	N/A
SOUTH AFRICA	POOR					INADEQUATE	A LOT
TURKEY	VERY POOR					INADEQUATE	A LITTLE
UK	GOOD					MEDIUM (EU rating)	A LITTLE (EU rating)
USA	POOR					MEDIUM	A LOT

### **About Climate Transparency**

Climate Transparency is an open consortium of organizations and initiatives with a shared mission to improve both the quality and impact of assessments of climate action. The consortium was established in 2014 following an initiative by the World Bank Group. Climate Transparency seeks to foster collaboration in assessing national and international climate action, and ensure clear and comprehensive communication of such action, for key influencers and decision makers. → [www.climate-transparency.org](http://www.climate-transparency.org)

### **About the Climate Action Tracker**

The Climate Action Tracker is an independent scientific analysis conducted by four research organisations: Climate Analytics, New Climate Institute, Ecofys and the Potsdam Institute for Climate Impact Research. → [www.climateactiontracker.org](http://www.climateactiontracker.org)

### **About the Climate Performance Index**

The Climate Change Performance Index is jointly published by Germanwatch and Climate Action Network Europe, a coalition of over 120 member organizations. The Index is 80% based on objective indicators of a country's emissions trends and levels, renewable energy and energy efficiency. The remaining 20% is based on assessments, by more than 300 experts from the respective countries, of national and international climate policy performance.

→ [www.germanwatch.org/en/ccpi](http://www.germanwatch.org/en/ccpi)