Climate Transparency

Brown to Green Report 2017: The G20 transition to a low-carbon economy
Technical Note: Data sources and methodology

03 July 2017

The Brown to Green report, including the country profiles, assesses the G20 countries' past, present and indications of future performance towards a low-carbon economy by evaluating emissions, climate policy performance, climate-related finance and decarbonisation. This technical note lists the sources and methods used to calculate the indicators presented in each country profile in their order of appearance. The report, which summarises and compares the main findings for the G20, draws on the data from the country profiles.

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1. Key indicators

1.1 Human Development Index

The Human Development Index (HDI) is a composite index published by the United Nations Development Programme (UNDP). It is a summary measure of average achievement in key dimensions of human development. A country scores higher when the lifespan is higher, the education level is higher, and GDP per capita is higher. Data presented in the report is for 2016.

UNDP (2017). International Human Development Indicators. United Nations Development Programme. Retrieved from: http://hdr.undp.org/en/countries

1.2 GDP, share of global GDP and GDP per capita

Gross Domestic Product (GDP) is the value of all final goods and services produced within a country in a given year. GDP per capita is calculated by dividing GDP with midyear population figures. This report uses GDP figures at purchasing power parity (PPP). Data presented in the report is for 2015.

World Bank (2017). The World Bank's Open Data initiative. Retrieved from: http://data.worldbank.org/indicator/

United Nations (2016). Population and Vital Statistics Report. UN Department of Economic and Social Affairs. Retrieved from: https://unstats.un.org/unsd/demographic/sconcerns/default.htm

1.3 GHG emissions per capita and share of global GHG emissions

PRIMAP-hist combines several published datasets to create a comprehensive set of greenhouse gas emissions pathways for every country and Kyoto gas covering the years 1850 to 2014 and all UNFCCC member states as well as most non-UNFCCC territories. The data resolves the main IPCC 1996 categories. Data presented in the report is for 2014. Population data is taken as reported by the United Nations Department of Economic and Social Affairs.

Gütschow, J. et al. (2016). Paris reality check: The PRIMAP-hist national historical emissions time series. *Earth System Science Data*, 8(2), pp.571–603. Retrieved from: https://www.pik-potsdam.de/primap-live/primap-hist/#id=ind&entity=kyotoghgar4

United Nations (2016). Population and Vital Statistics Report. UN Department of Economic and Social Affairs. Retrieved from: https://unstats.un.org/unsd/demographic/sconcerns/default.htm

1.4 University of Notre Dame Global Adaptation Initiative (ND-GAIN) index

The ND-GAIN Country Index, a project of the University of Notre Dame Global Adaptation Initiative (ND-GAIN), summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. A country's ND-GAIN score is composed of a vulnerability score and a readiness score. Vulnerability and readiness are based on compiled indicators: 36 indicators contribute to the measure of vulnerability and 9 indicators contribute to the measure of readiness. Each indicator comes from a public data source. Data presented in the report is for 2015 and only refers to the vulnerability sub-index.

ND-GAIN (2015). Notre Dame Global Adaptation Index. Retrieved from: http://index.gain.org/

1.5 Air pollution index

Air pollution is measured by the average level of exposure of a nation's population to concentrations of suspended particles measuring less than 2.5 microns in aerodynamic diameter, which are capable of penetrating deep into the respiratory tract and causing severe health damage. Data on exposure to ambient air pollution is derived from estimates of annual concentrations of very fine particulates produced by the Global Burden of Disease study, an international scientific effort led by the Institute for Health Metrics and Evaluation at the University of Washington. Estimates of annual concentrations are generated by combining data from atmospheric chemistry transport models, satellite observations of aerosols in the atmosphere, and ground-level monitoring of particulates. Exposure to concentrations of PM2.5 in both urban and rural areas is weighted by population and is aggregated at the national level. Data presented in the report is for 2015.

World Bank (2017). The World Bank's Open Data initiative. Retrieved from: http://data.worldbank.org/indicator/

2. Greenhouse gas (GHG) emissions development

2.1 Emissions and emissions trends

This indicator gives an overview of the country's emissions profile and the direction the country's emissions are taking under a current policy scenario. The section displays the data in a stacked graph, showing historic emissions in each of the IPCC source categories (energy, industrial processes, agriculture, etc.). Emissions from Land Use, Land Use Change and Forestry (LULUCF) are subject to high variability and are displayed separately in this report so as not to lose information on the emissions trends in other sectors. Emissions projections (excl. LULUCF) under a current policy scenario until 2030 are taken from the Climate Action Tracker, scaled to the historical emissions from PRIMAP. The rating for performance in GHG emissions is taken from the Climate Change Performance Index 2017 – G20 edition. The CCPI rates the 1) recent developments, 2) current levels, 3) policy progress and 4) the compatibility of the country's current performance and future targets with the international goal of limiting global temperature rise to well below 2°C.

Gütschow, J. et al. (2016). Paris reality check: The PRIMAP-hist national historical emissions time

series. *Earth System Science Data*, 8(2), pp.571–603. Retrieved from: https://www.pik-potsdam.de/primap-live/primap-hist/#id=ind&entity=kyotoghgar4

CAT (2017). Climate Action Tracker: Assessment of mitigation contributions to the Paris Agreement. Retrieved from: www.climateactiontracker.org

Germanwatch (2017). G20 Edition: Climate Change Performance Index (CCPI) 2017 – Background and methodology note. Retrieved from: https://germanwatch.org/en/download/18828.pdf

3. Climate policy performance

3.1 Policy evaluation

The Climate Transparency project team developed a categorisation to assess a country's policy performance (see table below). For the sector-specific policy criteria the 'high' rating is informed by the Climate Action Tracker (2016) report on the ten steps needed to limit warming to 1.5°C. The 'medium' rating is informed by the a good-practice GHG reduction policy menu from the Climate Policy Database. The list of policies displayed includes some of the key policies needed to align G20 economies with the Paris Agreement but is not exhaustive.

	Low	Medium	High
Long term low emissions development strategy	No long term low emissions strategy	Existing long term low emissions strategy	Long-term low emissions strategy submitted to the UNFCCC in accordance with Article 4, paragraph 19, of the Paris Agreement
GHG emissions target for 2050	No emissions reduction target for 2050 (or beyond)	Existing emissions reduction target for 2050 (or beyond)	Emissions reduction target to bring CO_2 emissions to at least net zero by 2050
Renewable energy in power sector	No policy or support scheme for renewable energy in place	Support scheme for renewables in the power sector in place	Support scheme and target for 100% renewables in the power sector by 2050 in place
Coal phase-out	No consideration or policy in place for phasing out coal	Significant action to reduce coal use implemented or coal phase-out under consideration	Coal phase-out in place
Efficient light duty vehicles	No policy or emissions performance standards for LDVs in place	Energy/emissions performance standards or support for LDVs	National target to phase out fossil fuel cars in place
Efficient residential buildings	No policy or low-emissions building codes and standards in place	Building codes, standards and fiscal/financial incentives for low-emissions options in place	National strategy for near-zero energy buildings (at least for all new buildings)
Energy efficiency in industry sector	No policy or support for energy efficiency in industrial production in place	Support for energy efficiency in industrial production (covering at least two of the country's subsectors (e.g. cement and steel production))	Target for new installations in emissions-intensive sectors to be low-carbon after 2020, maximising efficiency
Reducing deforestation	No policy or incentive to reduce deforestation in place	Incentives to reduce deforestation or support schemes for afforestation /reforestation in place	National target for reaching zero deforestation by 2020s

Climate Policy Database (2016). Climate Policy Database: Good practice policy menu. Retrieved from: http://climatepolicydatabase.org/index.php?title=Good_practice_menu_and_its_coverage

CAT (2016). Climate Action Tracker: The ten most important short term steps to limit warming to 1.5°C. NewClimate Institute, Climate Analytics, Ecofys. Retrieved from: http://climateactiontracker.org/assets/publications/publications/CAT_10_Steps_for_1o5.pdf

3.2 CCPI experts' policy evaluation

The CCPI evaluates a country's performance in national climate policy, meaning the performance in establishing and implementing a sufficient policy framework, as well as international climate diplomacy. The CCPI policy scores are based on a policy questionnaire filled out by national climate and energy experts.

Germanwatch (2017). G20 Edition: Climate Change Performance Index (CCPI) 2017 – Background and methodology note. Retrieved from: https://germanwatch.org/en/download/18828.pdf

3.3 Regulatory Indicators for Sustainable Energy (RISE) index

The RISE policy scorecard published by the World Bank helps to compare national policy and regulatory frameworks for sustainable energy by grading 111 countries with 27 indicators across three policy areas: renewable energy, energy efficiency and energy access. The Brown to Green report displays the RISE evaluation for renewable energy and energy efficiency. The indicators used to assess these two categories are displayed below. For more details on the scoring methodology, please refer to the RISE website: http://rise.esmap.org/scoring-system

Renewable energy indicators: 1) Legal framework, 2) Planning for renewable energy expansion, 3) Incentives and regulatory support, 4) Attributes of financial and regulatory incentives, 5) Network connection and pricing, 6) Counterparty risk, 7) Carbon pricing and monitoring.

Energy efficiency indicators: 1) National energy efficiency planning, 2) Energy efficiency entities, 3) Information provided to consumers about electricity usage, 4) EE incentives from electricity rate structures, 5) Incentives & mandates: large consumers, 6) Incentives & mandates: public sector, 7) Incentives & mandates: utilities, 8) Financing mechanisms, 9) Minimum performance standards, 10) Energy labelling systems, 11) Building energy codes, 12) Carbon pricing.

RISE classifies countries into a green zone of strong performers in the top third (Score: 67-100), a yellow zone of middling performers (Score: 34-66), and a red zone of weaker performers in the bottom third (Score: 0-33)

World Bank (2017). Regulatory indicators for sustainable energy: a global scorecard for policy makers. Retrieved from: http://documents.worldbank.org/curated/en/538181487106403375/Regulatory-indicators-for-sustainable-energy-a-global-scorecard-for-policy-makers and http://rise.esmap.org/

3.4 Compatibility of climate targets with a 2° C scenario

The Climate Action Tracker (CAT) quantifies, evaluates and rates Nationally Determined Contributions (NDCs) against effort-sharing ranges consistent with holding warming to below 2°C. The CAT Effort Sharing assessment methodology applies a wide range of literature, including over 40 studies used by the IPCC together with additional analyses the CAT has performed to compare the fairness of government efforts and NDC proposals against the level and timing of emission reductions needed to hold warming below 2°C. Using this approach, CAT abstains from defining what is fair but covers a holistic inclusion of very different viewpoints of what could be fair, including considerations of equity, historical responsibility, capability and equality.

CAT (2017). Climate Action Tracker: Assessment of mitigation contributions to the Paris Agreement. Retrieved from: www.climateactiontracker.org

4. Financing the transition

4.1 Investment attractiveness

The country profiles show data from two indices:

a) The Allianz Climate and Energy Monitor, which ranks G20 member states on their relative fitness as potential investment destinations for building low-carbon electricity infrastructure, judged against their current and future investment needs in the sector. The Allianz Monitor is a composite index with two broad pillars: the investment attractiveness and the investment needs of countries. The Brown to Green report displays the investment attractiveness rating of G20 members, which is assessed through four categories: policy adequacy, policy reliability of sustained support, market absorption capacity and the national investment conditions. For more details, please refer to the Allianz Monitor Technical Note: https://www.allianz.com/v_1498656130000/en/sustainability/media-2017/Allianz_Climate_and_Energy_Monitor_2017_-_Technical_Note_final.pdf

b) The Renewable Energy Country Attractiveness Index (RECAI) published by E&Y, produces scores and rankings for the top 40 countries' renewable energy attractiveness based on macroeconomic drivers, energy market drivers and technology-specific drivers which together compress a set of 5 drivers, 16 parameters and over 50 datasets. Country scores by RECAI were adapted and re-classified in 3 categories (low, medium and high) for comparison purposes with the Allianz Climate and Energy Monitor. The trend shown for each country was taken from the RECAI issue published in May 2017. For more details, please refer to the RECAI methodology: http://www.ey.com/gl/en/industries/power---utilities/ey-renewable-energy-country-attractiveness-index-methodology

Allianz (2017). Allianz Energy and Climate Monitor – Assessing the needs and attractiveness of low-carbon investments in G20 countries. Retrieved from: https://newclimateinstitute.files.wordpress.com/2017/06/allianz-climate-and-energy-monitor-2017.pdf

E&Y (2017). Renewable Energy Country Attractiveness Index (RECAI). Retrieved from: http://www.ey.com/gl/en/industries/power---utilities/renewable-energy-country-attractiveness-index and http://www.ey.com/Publication/vwLUAssets/EY-RECAI-49-May-2017-index-at-a-glance/$FILE/EY-RECAI-49-May-2017-index-at-a-glance.pdf

4.2 Green bonds

The green bonds indicator shows which countries are active in the green bond market by presenting green bonds outstanding per country as a percentage of the overall debt securities market for that country.

Green Bonds scope: All bonds labelled as 'green' by the issuer and that pass Climate Bonds Initiative filters (Bond labelled green or climate; bond in line with Climate Bonds Initiative taxonomy; no link to fossil fuels (e.g. clean coal); more than 95% of proceeds are going to finance and refinancing green projects; bonds with social spending are not included)

- Green bond data as of 11 April 2017

- Bond market data is the latest available data from the Bank of International Settlement which is from end Q3 2016.

The country attributed to each bond is the country of risk of the issuing entity. Bonds issued by supra-nationals such as the World Bank are not attributed a country as the proceeds are spend across multiple geographic locations. These are not included in the data.

All bond market data is taken from BIS Total debt securities by country. This is the best available proxy for the size of the bond market.

CBI (2017). Climate Bonds Initiative – Mobilizing debt capital markets for climate change solutions. Retrieved from: https://www.climatebonds.net/

4.3 Emissions of new investments in the power sector

This indicator shows the emissions per MWh coming from newly-installed power capacity in 2016. The smaller the value, the more decarbonised the newly-installed capacity. The detailed methodology steps are listed in the table below. The calculations were performed by IDDRI, a member of Climate Transparency, for the Brown to Green report 2017.

Methodology	Details
Step 1:	Computation of yearly capacity factor by country, type of energy, year (CF): Yearly total energy generation divided by yearly total installed capacity (GlobalData, 2016).
Step 2:	Computation of net capacity by country, type of energy, year: NetCap(yearX) = InstCap (yearX) - InstCap(year(X-1)). If NetCap is a negative value, then it means that assets have been removed (RemCap). If NetCap is a positive value, then it means that assets have been newly installed (NewCap).
Step 3:	IDDRI's team considers as an assumption that emission factors (EF) are: for Coal ($0,9tCO_2$/MWh), for Oil ($0,7tCO_2$/MWh), for Gas ($0,45tCO_2$/MWh), for other (0tCO2/MWh).
Step 4:	Computation of Net tCO_2 emissions by country by year: NettCO_2(yearX) = SumForEachEnergy of (NetCap(yearX)xCFxEFx8760h)
Step 5:	Computation of Total Removed + Installed energy generated: TotalEnergy = Sum(NewCap(yearX)xCF+RemCap(yearX)xCF) x 8760
Step 6:	Computation by country and by year of: For "Total", Total Emission Intensity (tCO_2/MWh) = NettCO_2 divided by TotalEnergy. For "Investment", only CO_2 emissions and energy generated by new installed capacity are taken into account.

GlobalData (2017). Global research and consulting for the energy industry. Reference at: https://energy.globaldata.com/

IEA (2016). World Energy Outlook 2016. Retrieved from: http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

4.4 Fossil fuel subsidies (for production and consumption)

The fossil fuel subsidies data presented in this report is taken from the OECD and the IEA. The data presented for all countries, except for Argentina and Saudi Arabia, is taken from the OECD inventory

(which does not have data for those two countries). The OECD inventory collates information on the amount of subsidies provided by governments in the form of tax breaks and budgetary support. These include support towards production and consumption of fossil fuel subsidies. It is used in this report because it provides a 'bottom-up' way of quantifying subsidies, and in this way, helps identify specific opportunities for reform. The results presented in this report are from the latest year for which data is available on the database, which is 2014 (some limited data exists for 2015, but it is currently minimal and incomplete). The OECD is currently updating their subsidy inventory, and will release the newest data in late-2017. The original data provided by the OECD is in national currencies, and converted to common currency using exchange rates from IRS website.

The subsidy data for Argentina and Saudi Arabia are from the IEA database. The IEA uses a different methodology for calculating subsidies, called the 'price-gap' approach. This approach compares average end-user prices paid by consumers with reference prices that correspond to the full cost of supply. It covers a sub-set of consumer subsidies, and does not include production subsidies.

OECD Stat (2017). OECD analysis of budgetary support and tax expenditures. Retrieved from: http://stats.oecd.org/Index.aspx?DataSetCode=FFS_AUS

Exchange rates taken from IRS website at: www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates and http://www.exchangerates.org.uk/historical/IDR/03_12_2014

IEA (2016). World Energy Outlook 2016: Energy subsidies by country. Retrieved from: http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

4.5 Public investments in energy

The data on public finance for energy is taken from the database compiled by Oil Change International (OCI) on government support for energy projects via public finance institutions. These institutions include bilateral public finance institutions, such as national development banks and other development finance institutions, overseas aid agencies, export credit agencies, and majority state-owned banks, as well as key multilateral development banks (MDBs). The institutions provide public finance in the form of grants, loans, equity, insurance and guarantees both domestically and internationally. Data provided in this report is for the years 2013-15.

OCI/ODI (2015). Empty promises: G20 subsidises to oil, gas and coal production. Retrieved from: https://www.odi.org/publications/10058-empty-promises-g20-subsidies-oil-gas-and-coal-production

4.6 Effective carbon rate

The 'effective carbon rates' (ECRs) presented in this report are taken from the OECD report titled 'Effective Carbon Rates' which calculates effective carbon rates in 41 countries, including G20 countries (with the exception of Saudi Arabia), and six sectors: road transport, off-road transport, industry, agriculture and fisheries, residential and commercial electricity. The effective carbon rate is the total carbon price that applies to CO_2 emissions from energy use as a result of market-based policy instruments.

The effective carbon rate adds up taxes and tradable emission permit prices, and has three components:

i. carbon taxes, which set a tax rate on the carbon content of each form of energy;

ii. other specific taxes (primarily excise taxes) on energy use, which are typically set per physical unit or unit of energy, but which can be translated into effective tax rates on the carbon content of that form of energy;

iii. and the price of tradable emission permits that must be surrendered per unit of CO_2 emissions, regardless of how it was acquired, representing the opportunity cost of emitting an extra unit of CO_2.

Data on two components of effective carbon rates, namely the specific taxes on energy use and the carbon taxes, are taken from OECD's Taxing Energy Use databases. The tax rates and energy use data are for 2012. Price data for emissions trading systems are for 2012 or the year nearest to 2012 during which the system was operational and price data are available.

Some countries have introduced substantial tax reforms since 2012. For reasons of methodological consistency, these could not be included in the report. While it OECD 2012 data are still informative as they are the latest compressive and internationally comparable data of effective carbon prices across G20 countries.

According to OECD estimates, emissions should be priced at least at € 30 / US$ 37 per ton - revealing a 'carbon pricing gap' within the G20.

The effective carbon rate calculations do not take into account support measures for fossil fuel use that may affect its price, and which also act as a negative carbon price. In future, these could also be factored in for calculating the effective carbon rates.

OECD (2016). Effective Carbon Rates – Pricing CO_2 through taxes and emissions trading systems. Retrieved from: http://www.oecd-ilibrary.org/taxation/effective-carbon-rates_9789264260115-en

4.5 Pledge to the Green Climate Fund (GCF)

The numbers published in the country profiles include the total pledges of G20 countries to the Green Climate Fund, a global fund created to support the efforts of developing countries to respond to the challenge of climate change. These signed pledges have not changed, except for the US. The US had pledged the largest amount of contributions to the GCF, at US$ 3 billion, and the previous administration transferred US$ 1 billion of this amount. However, President Trump announced to stop any future contributions as part of his decision to pull out of the Paris Agreement.

GCF (2017). The Green Climate Fund. Retrieved from: http://www.greenclimate.fund/what-we-do/portfolio-dashboard

4.7 Contributions through the major multilateral climate funds

The numbers published in the country profiles refer to the G20 contributions to the multilateral climate funds for the same years as the bilateral finance (2013-2014). It is generated by attributing the resources approved by each fund's governing board/committee for projects in 2013 and 2014 to individual donors based on the percentage of each funds resources that their pledges represented at the end of 2014. Data is included for the following climate funds: Adaptation for Smallholder Agriculture Programme; Adaptation Fund; Clean Technology Fund; Forest Carbon Partnership Facility; Forest Investment Program; Global Environment Facility (5th and 6th Replenishment, Climate

Mitigation Focal Area only); Least Developed Countries Fund; Partnership for Market Readiness; Pilot Program for Climate Resilience; Scaling-up Renewable Energy Program; Special Climate Change Fund.

Note that the GCF only approved projects in 2015, therefore, pledge data is all that can be represented until countries release reports on 2015-2016 period. In the report, these funds are also coded for the theme, 'adaptation', 'mitigation' and 'cross-cutting' based on the central objectives of the funds. It should be noted that such a thematic categorization can go against those of the countries that provide finance, e.g. while REDD+ was designed as a mitigation mechanism, many contributors consider adaptation benefits can also be delivered and may consider such projects cross-cutting.

Figures for finance delivered through multilateral climate funds are sourced from Climate Funds Update, a joint ODI/Heinrich Boell Foundation database that tracks spending through all major climate funds.

Table 1: Multilateral climate change funds

	Fund	Objectives and structure
Mitigation focus	Global Environment Facility *Trust Fund 5, 6 only	The Global Environment Facility (GEF) aims to help developing countries and economies in transition to contribute to the overall objective of the United Nations Framework Convention on Climate Change (UNFCCC) to both mitigate and adapt to climate change, while enabling sustainable economic development. The GEF is intended to cover the incremental costs of a measure to address climate change relative to a business as usual base line.
	Clean Technology Fund	The Clean Technology Fund (CTF), one of two multi-donor Trust Funds within the Climate Investment Funds (CIFs), promotes scaled-up financing for demonstration, deployment and transfer of low-carbon technologies with significant potential for long-term greenhouse gas emissions savings.
	Scaling-Up Renewable Energy Program	The Scaling-Up Renewable Energy Program in Low Income Countries (SREP) is a targeted program of the Strategic Climate Fund (SCF), which is one of two funds within the Climate Investment Funds (CIF) framework. The SREP was designed to demonstrate the economic, social and environmental viability of low carbon development pathways in the energy sector in low-income countries. It aims to help low-income countries use new economic opportunities to increase energy access through renewable energy use.
	Partnership for Market Readiness	The Partnership for Market Readiness (PMR) is a partnership of developed and developing countries administered by the World Bank, established to use market instruments to scale up mitigation efforts in middle income countries. Although initially geared towards promoting market readiness for the anticipated emergence of international carbon markets, this approach has become more flexible, providing grants and technical support for proposals for implementation of market tools that contribute to mitigation efforts.
	Forest Carbon Partnership Facility	The Forest Carbon Partnership Facility (FCPF) is a World Bank programme and consists of a Readiness Fund and a Carbon Fund. The FCPF was created to assist developing countries to reduce emissions from deforestation and forest degradation, enhance and conserve forest carbon stocks, and sustainably manage forests (REDD+).
	Forest Investment Programme	The Forest Investment Program (FIP) is a targeted program of the Strategic Climate Fund (SCF) within the Climate Investment Funds (CIF). The FIP supports developing countries' efforts to reduce deforestation and forest degradation (REDD) and promotes sustainable forest management that leads to emission reductions and the protection of carbon reservoirs. It achieves this by providing scaled-up financing to developing countries for readiness reforms and public and

		private investments, identified through national REDD readiness or equivalent strategies.
Adaptation focus	Least Developed Countries Fund (2002)	The Least Developed Countries Fund (LDCF) was established to meet the adaptation needs of least developed countries (LDCs). Specifically, the LDCF has financed the preparation and implementation of National Adaptation Programs of Action (NAPAs) to identify priority adaptation actions for a country based on existing information.
	Special Climate Change Fund (2002)	The Special Climate Change Fund (SCCF) addresses the specific needs of developing countries under the UNFCCC. It covers the incremental costs of interventions to address climate change relative to a development baseline. Adaptation to climate change is the top priority of the SCCF, although it can also support technology transfer and its associated capacity building activities.
	Adaptation Fund (2009)	The Adaptation Fund supports concrete adaptation projects and programmes in developing country Parties to the Kyoto Protocol, in an effort to reduce the adverse effects of climate change facing communities, countries and sectors. The Fund is financed through both governments and private donors, and from a 2% share of proceeds from Certified Emissions Reductions (CERs), issued under the Kyoto Protocol's Clean Development Mechanism (CDM).
	Adaptation for Smallholder Agriculture Programme	The Adaptation for Smallholder Agriculture Programme (ASAP) aims to channel climate and environmental finance to smallholder farmers, scale up climate change adaptation in rural development programmes and mainstream climate adaptation into the work of the International Fund for Agricultural Development (IFAD).
	Pilot Programme for Climate Resilience	The Pilot Program for Climate Resilience (PPCR) is a targeted program of the Strategic Climate Fund (SCF), which is one of two funds within the Climate Investment Funds (CIF) framework. The PPCR aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation by providing incentives for scaled-up action and initiating transformational change.
Cross cutting focus	Green Climate Fund	In the context of sustainable development, the Green Climate Fund aims to promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change.

Climate Funds Update (2016). Climate Funds Update: The latest information on climate funds – data dashboard. Retrieved from: http://www.climatefundsupdate.org/data

4.8 Bilateral climate finance contributions

The figures for bilateral public climate finance delivered annually in the period 2013-14[1] includes climate finance committed directly by donors. Bilateral finance figures are sourced from Party reporting to the UNFCCC under the Common Tabular Format. Flows are measured at the point of commitment to specific climate projects or programmes. Figures represent commitments of funds to projects or programmes, as opposed to actual disbursements.

[1] Countries will provide data for 2015 and 2016 for the next Biennial Assessment to be released by the UNFCCC Standing Committee on Finance in 2018.

The theme of the bilateral climate finance is dictated by the reporting of the country to the UNFCCC. It is classified as mitigation, adaptation, cross-cutting or other. In the next reports to the UNFCCC, countries will be required to provide their definitions of these categories that vary by country (and institution), other, however, where used, generally refers to finance supporting REDD+ (see UNFCCC 2016, Annex D, Table D1). For the contribution to the climate funds, the theme is dictated by the nature of the fund and can be split into 'adaptation', 'mitigation' and to projects that deliver both mitigation and adaptation actions, so called 'cross-cutting'.

The nature of the bilateral contributions captures the financial instruments that the countries report in the categories of grant, concessional loan, non-concessional loan, equity and other. Where countries report 'other' this usually refers to situations where a combination of instruments have been used (but their distribution is not available) (see UNFCCC 2016, Annex D, Table D1). Data is also included on whether export credits are included and if efficient coal technologies are funded. The report only presents data for those countries that are listed as Annex II of the UNFCCC and are therefore formally obligated to provide climate finance. GDP is measured in constant 2011 international $ with PPP for 2014.

Climate Funds Update (2016). Climate Funds Update: The latest information on climate funds – data dashboard. Retrieved from: http://www.climatefundsupdate.org/data

4.9 Climate finance contributions through Multilateral Development Banks (MDBs)

Data for the MDB spending on climate action includes ADB, AfDB, EBRD, EIB, IDB, IFC and the World Bank. Data is self-reported annually by the MDBs, based on a shared methodology they developed. The reported data includes MDBs' own resources and expenditure in EU13, not funding from external sources that are channelled through the MDBs (e.g. through bilateral donors and dedicated climate funds that are captured elsewhere). Data reported corresponds to the financing of adaptation or mitigation projects or to those components, sub-components, or elements within projects that provide adaptation or mitigation benefits (rather than the entire project cost). It does not include public or private finance mobilised by MDBs.

4.10 Future climate finance commitments

It is noted that 'providing information on future finance levels is challenging including because not all countries can provide information about future budget allocations, and because actual climate finance depends on unknowns such as recipient demand, availability of projects, and indirect economic factors'. While projections of finance to 2020 have been made using the stated future commitments of countries using a number of assumptions, the Brown to Green report, instead records what has been pledged and leaves interpretation of ambition to the reader.

Government of Australia; The United Kingdom; et al. (2016). Roadmap to US$100 Billion. Retrieved from: http://dfat.gov.au/international-relations/themes/climate-change/Documents/climate-finance-roadmap-to-us100-billion.pdf

5. Decarbonisation

5.1 Sector-specific indicators

Power sector	○ Electricity demand per capita (Data for 2014) ○ Emissions intensity of the power sector (Data for 2014) ○ Share of renewables in the power generation (Data for 2014 and 2015) ○ Share of population with access to electricity (Data for 2014 and 2016) ○ Share of population with biomass dependency (Data for 2014) **CAT (2017).** Climate Action Tracker: Decarbonisation indicators. Retrieved from: http://climateactiontracker.org/decarbonisation/macro/countries/cn+us/indicators/gdp_per_capita+primary_energy_demand_per_capita/variables/all
Transport sector	○ Transport emissions per capita (Data for 2014) ○ Share of private cars and motorcycles (Data for 2010) ○ Transport emissions intensity (Data for 2010) ○ Share of global electric vehicle sales (Data for 2015) **CAT (2017).** Climate Action Tracker: Decarbonisation indicators. Retrieved from: http://climateactiontracker.org/decarbonisation/macro/countries/cn+us/indicators/gdp_per_capita+primary_energy_demand_per_capita/variables/all **IEA (2016).** World Energy Outlook 2016. Retrieved from: http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html
Industry sector	○ Industry emissions intensity (Data for 2014) **CAT (2017).** Climate Action Tracker: Decarbonisation indicators. Retrieved from: http://climateactiontracker.org/decarbonisation/macro/countries/cn+us/indicators/gdp_per_capita+primary_energy_demand_per_capita/variables/all
Building sector	○ Residential building space (Data for 2010 and 2011) ○ Building emissions per capita (Data for 2014) ○ Residential buildings emissions intensity (Data for 2010 and 2011) **CAT (2017).** Climate Action Tracker: Decarbonisation indicators. Retrieved from: http://climateactiontracker.org/decarbonisation/macro/countries/cn+us/indicators/gdp_per_capita+primary_energy_demand_per_capita/variables/all
Agriculture sector	○ Agriculture emissions intensity (Data for 2014) **World Bank (2017).** The World Bank's Open Data initiative. Retrieved from: http://data.worldbank.org/indicator/ **Gütschow, J. et al. (2016**). Paris reality check: The PRIMAP-hist national historical emissions time series. *Earth System Science Data*, 8(2), pp.571–603. Retrieved from: https://www.pik-potsdam.de/primap-live/primap-hist/#id=ind&entity=kyotoghgar4
Forest sector	○ Forest area in the country compared to 1990 level (Data from 2015) **CAT (2017).** Climate Action Tracker: Decarbonisation indicators. Retrieved from: http://climateactiontracker.org/decarbonisation/macro/countries/cn+us/indicators/gdp_per_capita+primary_energy_demand_per_capita/variables/all

5.2 Energy mix

All energy data shown in this report is from the IEA energy balances and excludes non-energy use values.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/

5.3 Share of coal in energy supply

The share of coal in total primary energy supply reveals the country's historical and current proportion of coal in the energy mix. As coal is one of the dirtiest of fossil fuels, reducing coal's share in its energy mix is a crucial step for a country's transition to a green economy.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/

5.4 Share of renewables in energy supply

The share of renewable energy in total primary energy supply shows a country's historical and current proportion of renewables in the energy mix. The numbers displayed in the graph include hydro and exclude residential biomass and waste values. Replacing fossil fuels and promoting the expansion of renewable energy is an important step for reducing emissions. The rating comes from the Climate Change Performance Index (CCPI) which, on the basis of standardised criteria, evaluates and compares the climate protection performance of countries in the categories GHG emissions, renewable energy and energy use. It assesses the recent developments, current levels, policy progress and the compatibility of the country's current performance and future targets with the international goal of limiting global temperature rise well below 2°C.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/

Germanwatch (2017). G20 Edition: Climate Change Performance Index (CCPI) 2017 – Background and methodology note. Retrieved from: https://germanwatch.org/en/download/18828.pdf

5.5 Energy use per capita

Total Primary Energy Supply (TPES) per capita displays the historical, current and projected energy supply in relation to a country's population. Alongside the intensity indicators (see below; TPES/GDP and CO_2/TPES), TPES per capita gives an indication on the energy efficiency of a country's economy. In line with a well-below 2˚C limit, TPES/capita should not grow above current global average levels. This means that developing countries are still allowed to expand their energy use to the current global average, while developed countries have to simultaneously reduce it to that same number. The rating comes from the Climate Change Performance Index (CCPI) which, on the basis of standardised criteria, evaluates and compares the climate protection performance of countries in the categories GHG emissions, renewable energy and energy use. It assesses the recent developments, current levels, policy progress and the compatibility of the country's current performance and future targets with the international goal of limiting global temperature rise well below 2°C.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/

Germanwatch (2017). G20 Edition: Climate Change Performance Index (CCPI) 2017 – Background and methodology note. Retrieved from: https://germanwatch.org/en/download/18828.pdf

5.6 Energy intensity of the economy

TPES per unit of GDP describes the energy intensity of a country's economy. This indicator illustrates the efficiency of energy usage by calculating the energy needed to produce one unit of GDP. A decrease in this indicator can mean an increase in efficiency but also reflects structural economic changes.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/

5.7 Carbon intensity of the energy sector

This indicator describes the carbon intensity of a country's energy sector (expressed as the CO_2 emissions per unit of total primary energy supply) and gives an indication on the share of fossil fuels in the energy supply.

IEA (2016). Energy balances. Retrieved from: http://www.iea.org/statistics/topics/energybalances/