

Country Profiles – Data Sources and Methodology

The G20 Country Profiles of the “Brown to Green” Report assess past, present and indications of future performance towards a low-carbon economy by evaluating emissions, decarbonisation, climate policy performance and climate finance. This technical note lists the sources and methods used to calculate the indicators.

1. Country Characteristics

Human Development Index Score [scale: 0 - 1]

Source:

- United Nations Development Programme (2015): Human Development Report. Available at: <http://hdr.undp.org/en/composite/trends>

Share of global GHG emissions [%]

Sources:

- World Bank (2016): World Development Indicators: Available at: <http://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE>

GHG per Capita [t CO₂e/cap]

Sources:

- World Bank (2016): World Development Indicators: Available at: <http://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE>
- United Nations, Department of Economic and Social Affairs (2016): World Population Prospects: The 2015 Revision. Available at: <http://esa.un.org/unpd/wpp>

Share of global GDP (PPP) [%]

Gross Domestic Product (GDP) is an indication of a country's overall output of goods and services. There are different ways to measure the GDP; this indicator reflects the use of purchasing power parity rates (PPP) of a country and puts it into perspective by comparing the value to the other countries and stating its share in per cent.

Sources:

- International Energy Agency (2015a): CO₂ Emissions from Fuel Combustion. Paris.

GDP per Capita (PPP) [US\$]

GDP per capita based on purchasing power parity (PPP) is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP per Capita in PPP is further defined by the World Bank at:

<http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

Sources:

- International Energy Agency (2015a): CO2 Emissions from Fuel Combustion. Paris.
- United Nations, Department of Economic and Social Affairs (2016): World Population Prospects: The 2015 Revision. Available at: <http://esa.un.org/unpd/wpp>

2. Greenhouse gas (GHG) emissions

GHG historic emissions and future emissions projections

Sources:

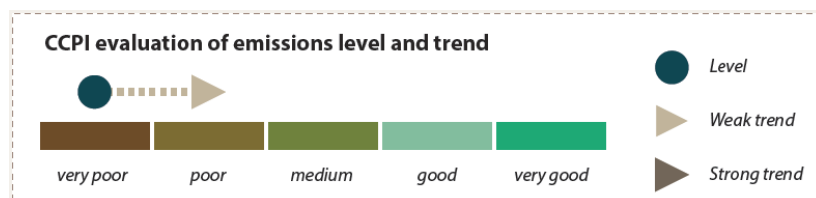
- International Energy Agency (2015a): CO2 Emissions from Fuel Combustion. Paris.
- Climate Action Tracker (2015): Country Tools. Available at: <http://climateactiontracker.org/countries.html>

Composition of GHG

Sources:

- International Energy Agency (2015a): CO2 Emissions from Fuel Combustion. Paris.
- Climate Action Tracker (2015): Country Tools. Available at: <http://climateactiontracker.org/countries.html>
- UNFCCC (2015): GHG Data - UNFCC: Time series - Annex I. Available at: http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php

CCPI evaluation of emissions level and trend



The Climate Change Performance Index (CCPI) evaluation does not rate countries in absolute terms but in relation to the other countries. The dot on the scale describes the country's performance regarding the emissions level; the arrow shows the strength and direction of its emissions trend based on the country's performance over the last five years. If no clear trend can be noted, there is no arrow included. Low emissions are considered positive, growing emissions (a trend towards the brown zone) are considered negative.

The CCPI evaluates a country's emissions level (dot on the scale) by taking into account three indicators: per capita energy-related CO2 emissions, per capita supply of primary energy and a target-performance-comparison. The trend (arrow on the scale) reflects the development of the indicator energy-related CO2 emissions over the last five years.

Source:

- Burck, J., Hermwille, L. and Bals, C. (2015): The Climate Change Performance Index: Background and Methodology. Available at: http://germanwatch.org/en/ccpi_bame.

3. Decarbonisation

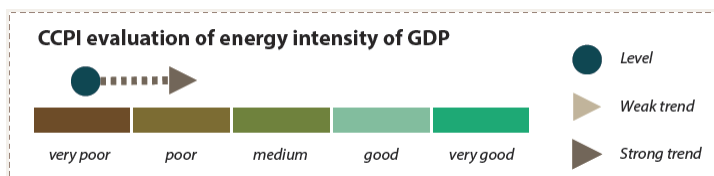
Energy intensity of the economy

The total primary energy supply per GDP (TPES/GDP) describes how much energy is needed to produce one unit of GDP and therefore constitutes one indicator for efficiency of energy use in the economy. The lower the value, the less energy is needed for economic activities. A low value of this indicator can be a sign for high efficiency, but it can also be the consequence of a structural change or of variations in the economy.

Source:

- International Energy Agency (2015a): CO2 Emissions from Fuel Combustion. Paris.

CCPI evaluation of a country's energy intensity



The CCPI evaluates a country's efficiency level by taking into account the two indicators: CO2 per total primary energy supply and total primary energy supply per GDP. The trend reflects the development of those indicators over the last five years. For the G20 Country Profiles, energy intensity of the economy and carbon intensity of the economy sector are evaluated separately. Declining carbon and energy intensity are considered positive.

Source:

- Burck, J., Hermwille, L. and Bals, C. (2015): The Climate Change Performance Index: Background and Methodology. Available at: http://germanwatch.org/en/ccpi_bame.

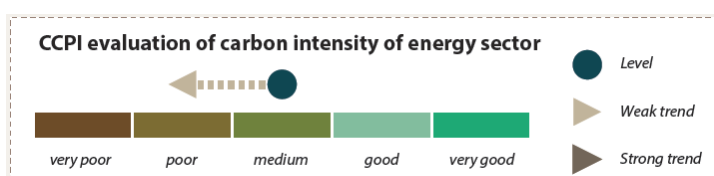
Carbon intensity of the energy sector

CO2 per total primary energy supply (CO2/TPES) indicates to what extent fossil fuels are used in energy production. Decreases in the indicator can point to a shift away from fossil fuels. The graph also shows the projected development of carbon intensity of the energy sector until 2030 and a global benchmark for 2°C pathway, both future estimates coming from the Climate Action Tracker analysis.

Sources:

- International Energy Agency (2015a): CO2 Emissions from Fuel Combustion. Paris.
- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

CCPI evaluation of a country's carbon intensity



The CCPI evaluates a country's carbon efficiency level by taking into account the two indicators: CO₂ per total primary energy supply and total primary energy supply per GDP. The trend reflects the development of those indicators over the last five years. For the G20 country profiles, energy intensity of the economy and carbon intensity of the economy sector are evaluated separately. Declining carbon and energy intensity are considered positive.

Source:

- Burck, J., Hermwille, L. and Bals, C. (2015): The Climate Change Performance Index: Background and Methodology. Available at: http://germanwatch.org/en/ccpi_bame.

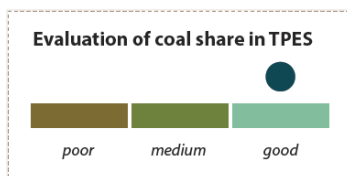
Share of coal in Total Primary Energy Supply (TPES)

The graph shows absolute coal supply (in TJ) and coal's share in the country's energy mix (in %). Both indicators combined provide an overview of the decarbonisation of the country's energy sector. In addition to this, a global benchmark for 2°C pathway until 2030 is included.

Source:

- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

Evaluation of coal share in TPES



This evaluation is based on an own categorisation using the Climate Action Tracker's estimates of global average 2°C pathway requirements: The 10% and 90% percentile point of the estimated range is taken to divide G20 countries into a three-scale performance ranking.

Source:

- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

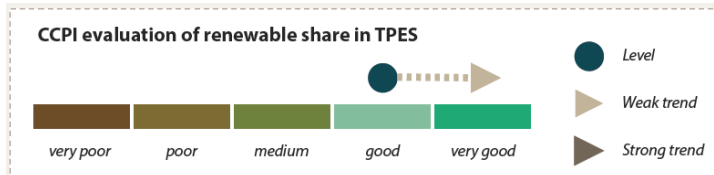
Renewable Energy in TPES and electricity sector

The graph shows absolute renewable energy supply (in TJ) and its share in the country's energy mix (in %). Both indicators combined provide an overview of the decarbonisation of the country's energy sector. In addition to this, a global benchmark for 2°C pathway until 2030 is included.

Sources:

- International Energy Agency (2015a): CO₂ Emissions from Fuel Combustion. Paris.
- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

CCPI evaluation of a country's renewable energy



The CCPI evaluates a country's renewable energy level and trend by taking into account the share of renewable energy in total primary energy supply and the development of energy supply from renewable energy sources over the last five years. A high level is considered positive, a decline in total amount is considered negative.

Source:

- Burck, J., Hermwille, L. and Bals, C. (2015): The Climate Change Performance Index: Background and Methodology. Available at: http://germanwatch.org/en/ccpi_bame.

Electricity demand per capita

Sources:

- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

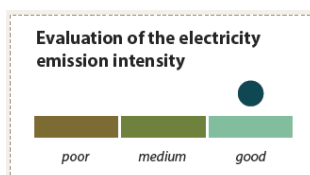
Emissions intensity of the electricity sector

Apart from showing the emissions from the electricity sector of each country, this graphs includes two good practice benchmarks as reference for comparison: the case of Denmark which has nuclear or large hydro potential and the case of Norway which has a large hydro potential.

Sources:

- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

Evaluation of electricity emissions intensity



This evaluation is based on an own categorisation using the Climate Action Tracker's estimates of global average 2°C pathway requirements: The median and the maximum point of the estimated range is taken to divide G20 countries into a three-scale performance ranking.

Source:

- Climate Action Tracker (2015): Trends of sectors across countries Tool. Available at: http://climateactiontracker.org/decarbonization/sectors/electricity/countries/eu+mx+cn+in+us/indicators/electricity_emission_intensity/variables/all

4. Climate Policy Performance

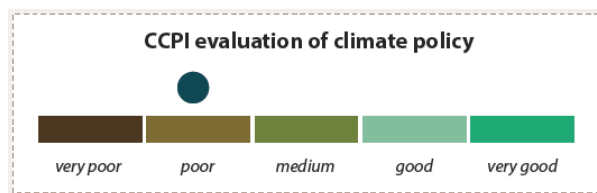
Checklist of the climate policy framework

Source:

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

Climate policy evaluation by experts and CCPI evaluation of a country's climate policy

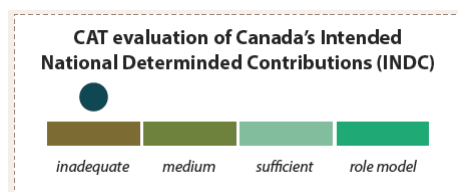
The CCPI evaluates a country's performance in national and international climate policy through feedback from national energy and climate experts about the country's performance in international negotiations, national policy making and the implementation of those policies. The CCPI ranks countries not in absolute terms but in relation to each other. If many countries perform worse, a good evaluation does not necessarily mean, that the country's climate policy is ambitious and progressive. The CCPI does not calculate a trend for a country's policy evaluation.



Source:

- Burck, J., Hermwille, L. and Bals, C. (2015): The Climate Change Performance Index: Background and Methodology. Available at: http://germanwatch.org/en/ccpi_bame.

Compatibility of National Climate Targets with 2°C and CAT Evaluation of a country's Intended Nationally Determined Contributions (INDC)



The Climate Action Tracker (CAT) quantifies, evaluates and rates INDCs 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 plus additional analyses the CAT has performed to compare the fairness of government efforts and INDC 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.

Source:

- Climate Action Tracker (2015): Country Tools. Available at: <http://climateactiontracker.org/countries.html>

5. Financing the transition

Investment attractiveness

Country profiles show data from two indices:

- a) The Allianz Energy & Climate Monitor which ranks G20 member states on their relative fitness as potential investment destinations for building low-carbon electricity infrastructure. The investment attractiveness of a country is assessed through four categories: Policy adequacy, policy reliability of sustained support, market absorption capacity and the national investment conditions.
- b) The Renewable Energy Country Attractiveness Index (RECAI) which produces score and rankings for countries' 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 Energy & Climate Monitor. The trend shown for each country was taken from the RECAI issue published in May, 2016.

Source:

- Allianz (2016): Allianz Energy and Climate Monitor. Available at: https://www.allianz.com/v_1464968153000/en/sustainability/media-2016/climate_and_energy_monitor_full_report.pdf
- E&Y (2016): Renewable energy country attractiveness index (RECAI). Available at: <http://www.ey.com/gl/en/industries/power---utilities/ey-renewable-energy-country-attractiveness-index-our-index>

Historical investment in renewable energy and investment gap

Historical investments in the power sector shown in the country profiles are average numbers for the period between 2000 and 2013, as reported in the World Energy Investment Outlook (2014). Investments reported for the power sector include energy generation, transmission and distribution apart from investments in each specific energy source (renewables, nuclear, gas, oil and coal). When numbers are only available at a regional level, these were downscaled based on the ratio of the total final electricity consumption of the country compared to the one from the region, using World Energy Outlook statistics.

Future investment needs in the power sector are estimated based on the average annual investments required between 2014 and 2035 to be in line with the 450 scenario from the World Energy Outlook developed by the International Energy Agency (similar to a 2°C compatible pathway). Similar to historical investments, when numbers were only available at a regional level, these were downscaled based on the total final electricity consumption ratio of the country compared to the one from the region.

Source:

- IEA (2014): World Energy Investment Outlook. Available at: <https://www.iea.org/publications/freepublications/publication/WEIO2014.pdf>
- IEA (2014): World Energy Outlook statistics. Available at: <http://www.iea.org/statistics/ieaenergyatlas>

Carbon pricing mechanisms

The analysis is focused on two key types of carbon pricing systems, emission trading schemes (ETS) and carbon taxes. At the country level, a summarised assessment of the carbon pricing systems' design, level of maturity, ambition and scope is provided.

Source:

- Climate Policy Database (2016): Good practice policy menu. Available at: http://climatepolicydatabase.org/index.php?title=Good_practice_menu_and_its_coverage
- Australian Government (2016): The Safeguard Mechanism - Overview. Available at: <https://www.environment.gov.au/climate-change/emissions-reduction-fund/publications/factsheet-erf-safeguard-mechanism>
- Bloomberg (2016): Germany considers minimum EU Carbon Price in Energy Policy Draft. Available at: <http://www.bloomberg.com/news/articles/2016-05-04/germany-considers-minimum-eu-carbon-price-in-energy-policy-draft>
- C2ES (2013): Options and considerations for a federal carbon tax. Available at: <http://www.c2es.org/publications/options-considerations-federal-carbon-tax>
- C2ES (2016): California Cap and Trade. Available at: <http://www.c2es.org/us-states-regions/key-legislation/california-cap-trade>
- C2ES (2016): Regional Greenhouse Gas Initiative (RGGI). Available at: <http://www.c2es.org/us-states-regions/regional-climate-initiatives/rggi>
- Government of British Columbia: How the carbon tax works. Available at: <http://www.fin.gov.bc.ca/tbs/tp/climate/A4.htm>
- Government of British Columbia (2016): Climate Action Legislation. Available at: <http://www2.gov.bc.ca/gov/content/environment/climate-change/policy-legislation-programs/climate-action-legislation>
- Government of India (2010): India: Taking on climate change. Available at: <http://www.moef.nic.in/downloads/public-information/India%20Taking%20on%20Climate%20Change.pdf>
- ICAP (2016): Brazil - Rio de Janeiro. Available at: https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&system%5B%5D=60
- ICAP (2016): Japan- Tokyo Cap-and-Trade Program. Available at: https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&system%5B%5D=51
- ICAP (2016): Japan-Saitama Target Setting Emissions Trading System. Available at: https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&system%5B%5D=84
- IEA (2015): Japan Carbon Tax. Available at: <http://www.iea.org/policiesandmeasures/pams/japan/name-139284-en.php>
- IETA (2015): Quebec: An Emission Trading Scheme case study. Available at: http://www.ieta.org/resources/Resources/Case_Studies_Worlds_Carbon_Markets/quebec_case_study-may2015.pdf
- IETA (2016): China's National Emissions Trading System. Available at: http://www.ieta.org/resources/China/Chinas_National_ETS_Implications_for_Carbon_Markets_and_Trade ICTSD_March2016_Jeff_Swartz.pdf
- Sartor, O. & Berghmans, N. (2011): Carbon Price Flaw? The impact of the UK's CO2 price support on the EU ETS, Paris: CDC Climate Research.

- The New Climate Economy (2016): Better Growth, Better Climate, s.l.: s.n.
- Twidale, S. (2014): Osborne freezes carbon tax at 2015 level. Reuters, 19 March.
- World Bank (2016): Partnership for Market Readiness - Indonesia. Available at: <https://www.thepmr.org/country/indonesia-0>
- World Bank (2016): Partnership for Market Readiness - India. Available at: <https://www.thepmr.org/country/india-0>
- World Bank and Ecofys (2016): Carbon Pricing Watch 2016, s.l.: Washington DC.
- World Bank (2015): States and Trends of Carbon Pricing 2015, s.l.: s.n.
- World Bank (2016): Pricing Carbon. Available at: <http://www.worldbank.org/en/programs/pricing-carbon>
- World Bank (2016): Partnership for Market Readiness - Mexico. Available at: <https://www.thepmr.org/country/mexico-0>

Fossil fuel subsidies

This section examines fossil fuel subsidy removal activities across G20 nations. Due to data constraints, this section focuses on production subsidy data from ODI. While other databases (such as OECD) provide more detailed information on consumption subsidies as well, their numbers are not necessarily comparable across countries, since the tax base for each country is different.¹ Focusing on production subsidies limits the analysis to the level of direct support to fossil fuel sectors across countries, and not indirect impacts through consumption subsidies.

Source:

- Climate Policy Database (2016): Good practice policy menu. Available at: http://climatepolicydatabase.org/index.php?title=Good_practice_menu_and_its_coverage
- G20 (2015): G20 Progress Report: Summary of Progress Reports on the Commitment to Rationalize and Phase Out Inefficient Fossil Fuel Subsidies. Available at: <http://g20.org.tr/wp-content/uploads/2015/11/Summary-of-Progress-Reports-on-the-Commitment-to-Rationalize-and-Phase-Out-IFFS.pdf>
- ODI (2015): Empty Promises: G20 subsidies to oil, gas and coal production. Available at: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9957.pdf>
- ODI (2015): G20 subsidies to oil, gas and coal production: country studies. Available at: <https://www.odi.org/publications/10058-empty-promises-g20-subsidies-oil-gas-and-coal-production>

Public climate finance

The figures for public climate finance delivered in 2013-14 are the sum of two sets of data:

- i) Bilateral climate finance committed directly by donors: These figures are sourced from Party reporting to the UNFCCC under the Common Tabular Format. They represent commitments of funds to projects or programmes, as opposed to actual disbursements.

¹ For example, a country may provide a tax exemption to the fossil fuel sector in order to maintain international competitiveness due to the high overall tax base. Therefore, such a subsidy measure would be useful for comparison across sectors within the country, but not necessarily for subsidies across countries, since the tax paid by the sector may be higher in spite of tax exemptions relative to a country with a low overall tax base.

- ii) Finance committed through dedicated multilateral climate funds: These figures for finance delivered through multilateral climate funds were sourced from Climate Funds Update, a joint ODI/Heinrich Boell Foundation database that tracks spending through all major climate funds. The resources approved by each fund's governing board/committee for projects in 2013 and 2014 were attributed to individual donors based on the percentage of the resources pledged by the countries to each fund at the end of 2014. Data for the following climate funds was included: 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.

Both flows are measured at the point of commitment to specific climate projects or programmes and do not include climate-related spending by multilateral development banks.² Climate Transparency only ranks those countries that are signatories to Annex II of the UNFCCC and therefore formally obligated to provide climate finance. While climate-related spending by multilateral development banks may exist for countries not listed in Annex II of the UNFCCC, this has not been included in this report.

In addition, current pledges to the Green Climate Fund (GCF) are shown separately for those countries that have made an official pledge/contribution to it.

Source:

- Climate Funds Update (2016): The latest information on climate funds. Available at: <http://www.climatefundsupdate.org/data>

² Others (e.g. CPI/OECD 2015) have included the aggregate share of climate-relevant spending by multilateral development banks (MDBs) that can be attributed to developed country donors in their estimations of climate finance flows. Developed countries are also able to include core contributions to multilateral organisations in their reporting on climate finance to the UNFCCC. Climate Transparency has not included these figures in the country totals as MDB investments in adaptation and mitigation cannot be directly attributed to the financial contributions of individual countries.