



INTERNATIONAL POLITICAL ECONOMY OF CLIMATE CHANGE/DECARBONIZATION IN 2017

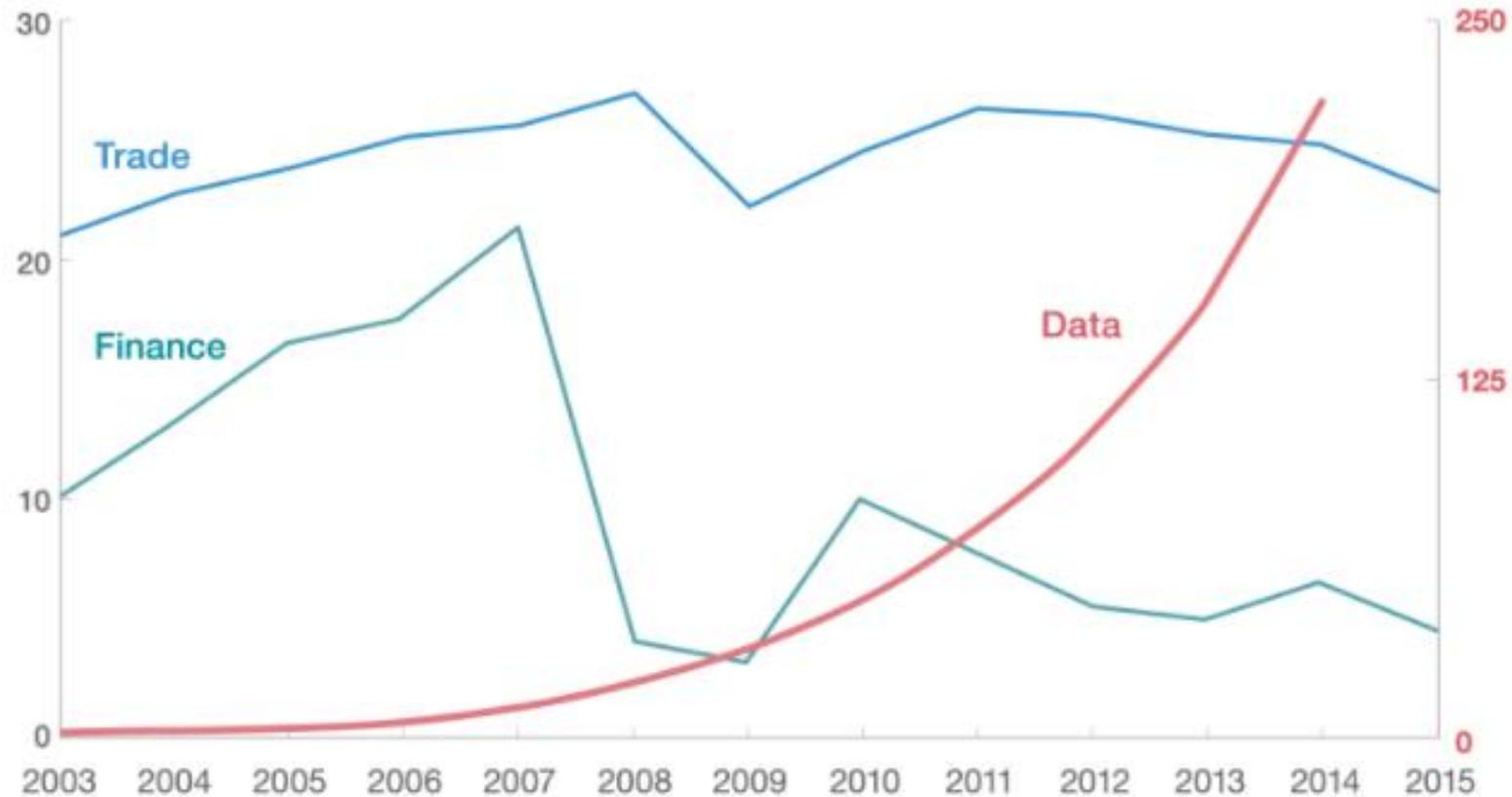
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Global flows of data have outpaced traditional trade and financial flows.

Flows of trade and finance,¹
% of GDP

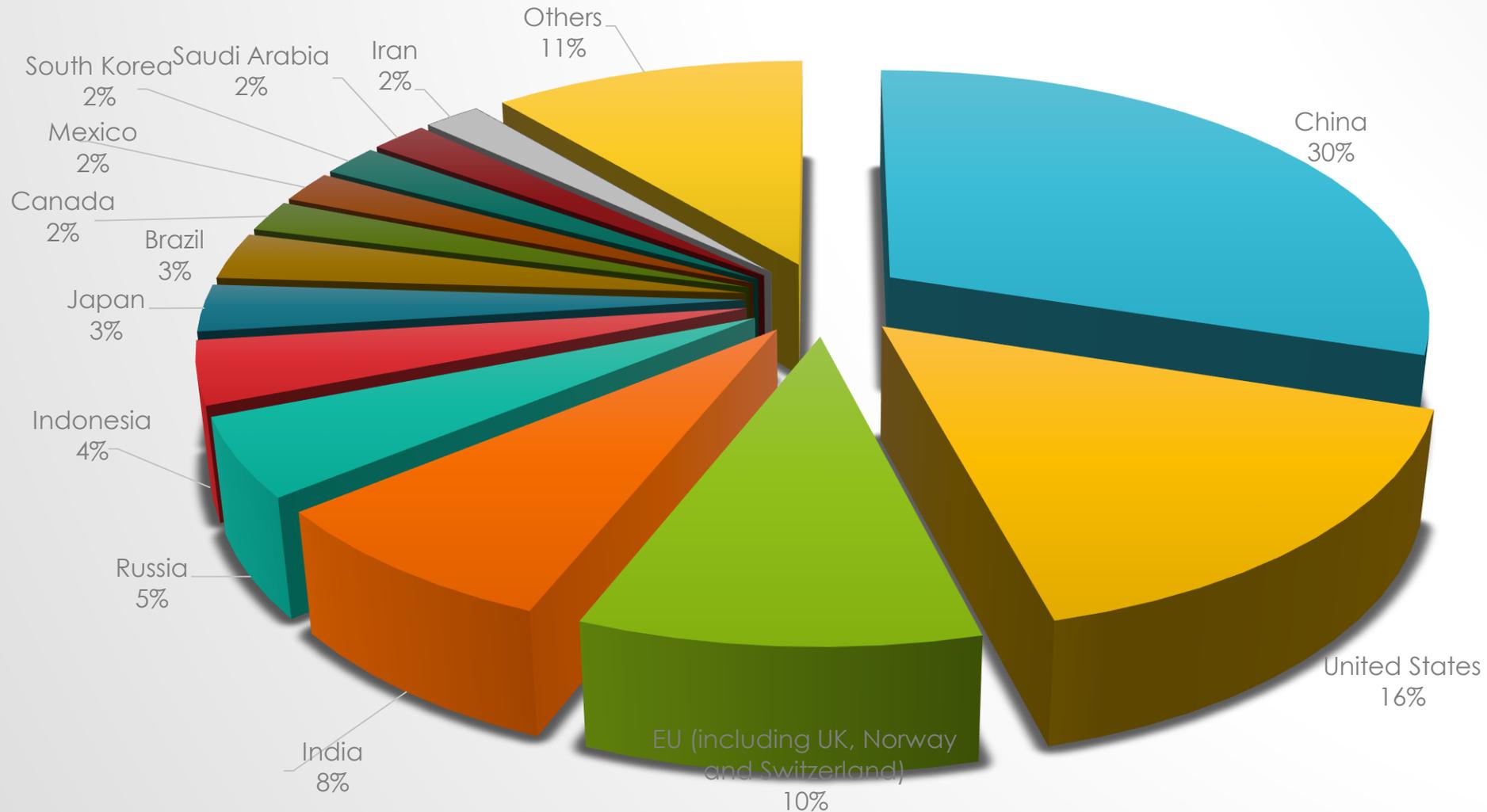
Flows of data,¹
terabits per second



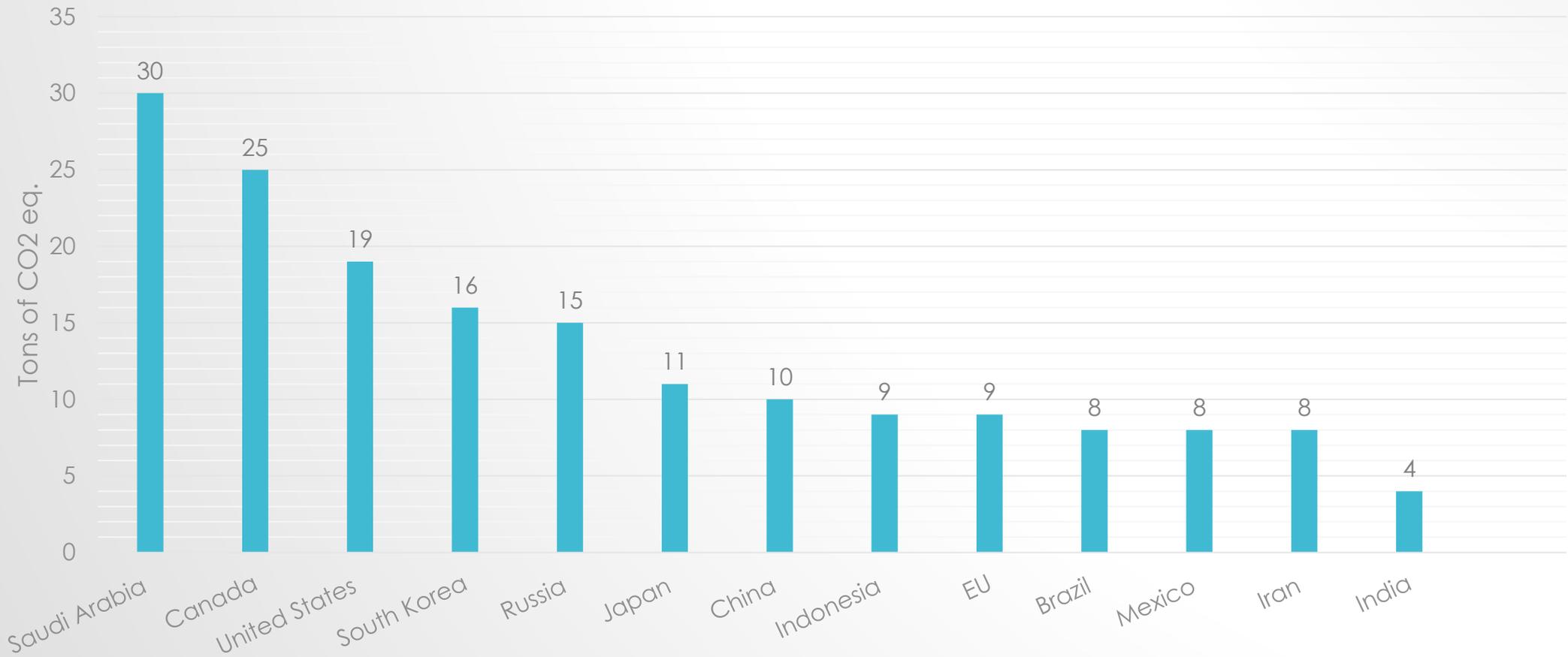
¹Trade and finance are inflows; data flows are a proxy to inflows, based on total flows of data.

Source: IMF Balance of Payments Statistics; TeleGeography, Global Bandwidth Forecast Service; UNCTAD;

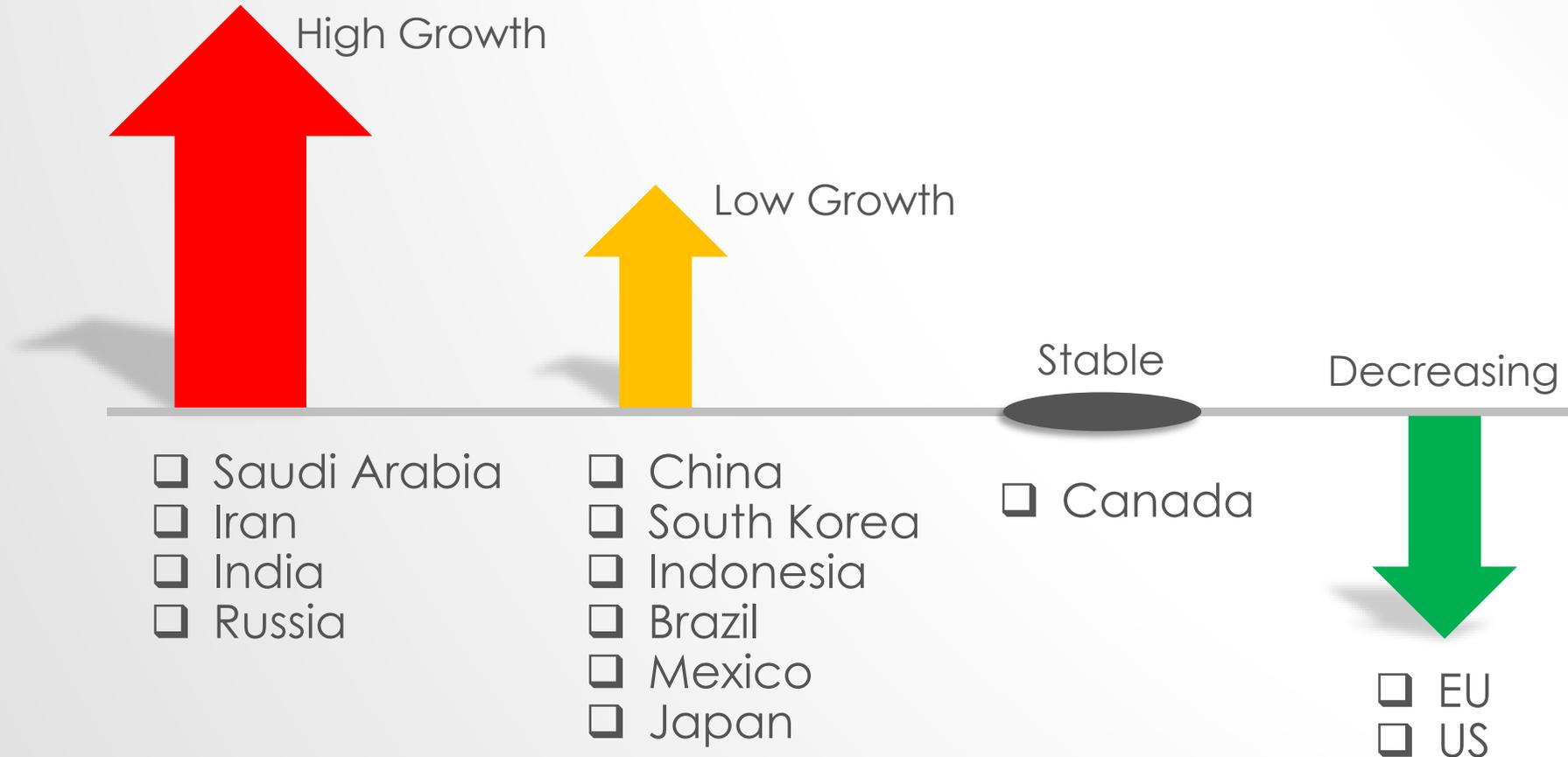
SHARE OF GLOBAL CARBON EMISSIONS OF 12 MAJOR POWERS IN 2016 (89%)



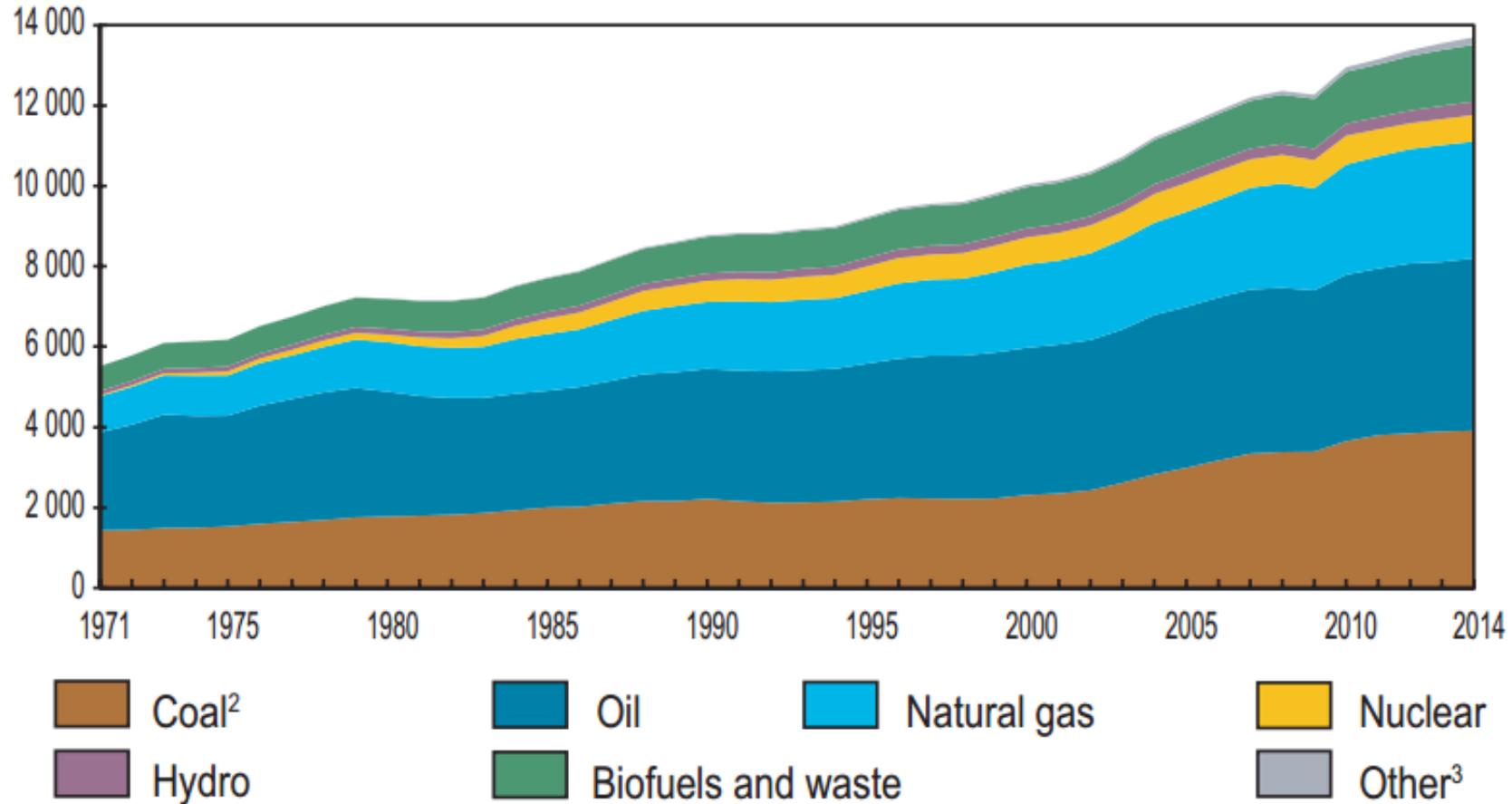
PER CAPITA EMISSIONS OF 12 MAJOR POWERS (tons of co2 eq.)



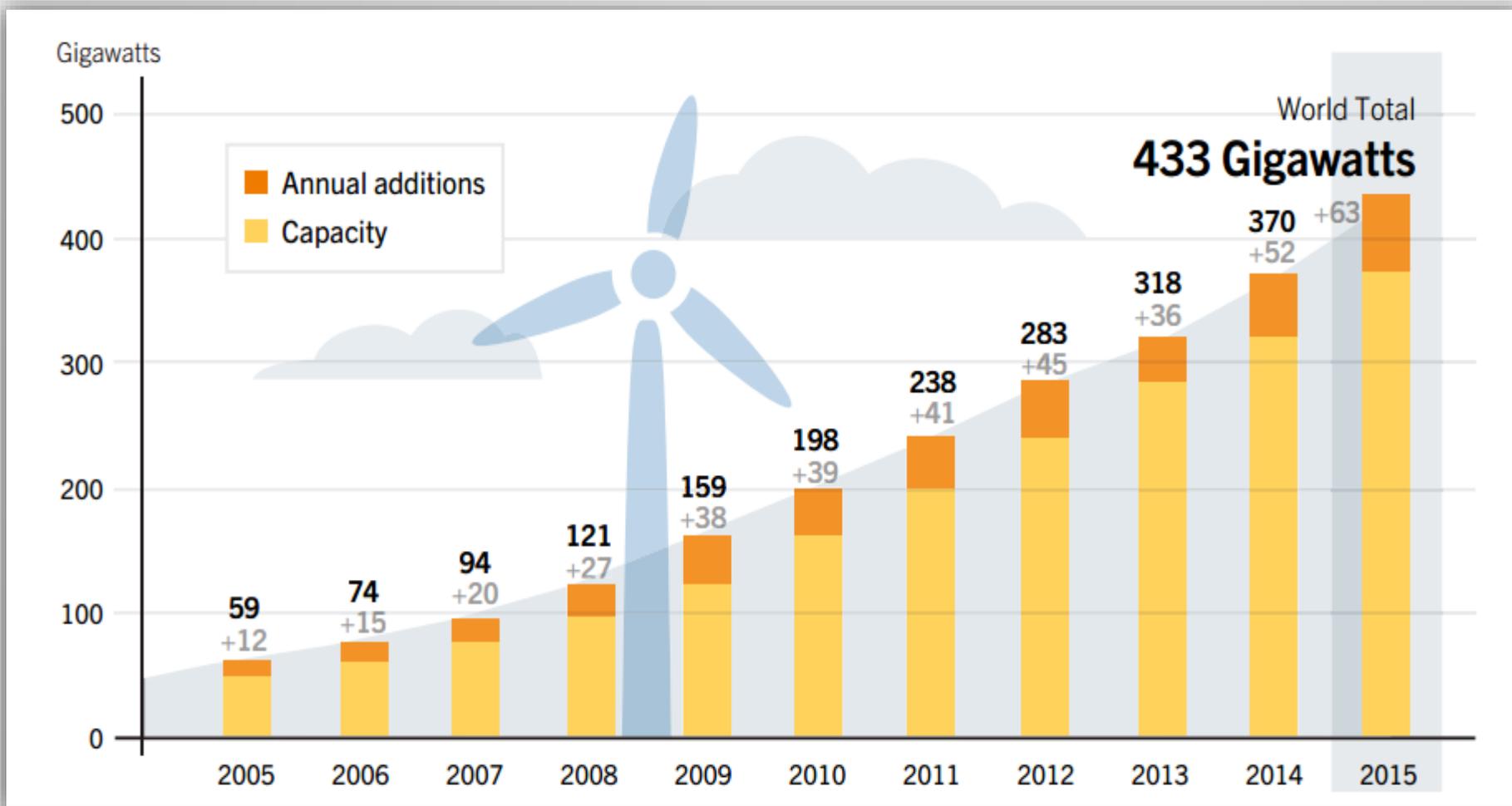
RECENT TRAJECTORY (2015-16) IN CARBON EMISSIONS



World¹ total primary energy supply (TPES) from 1971 to 2014 by fuel (Mtoe)

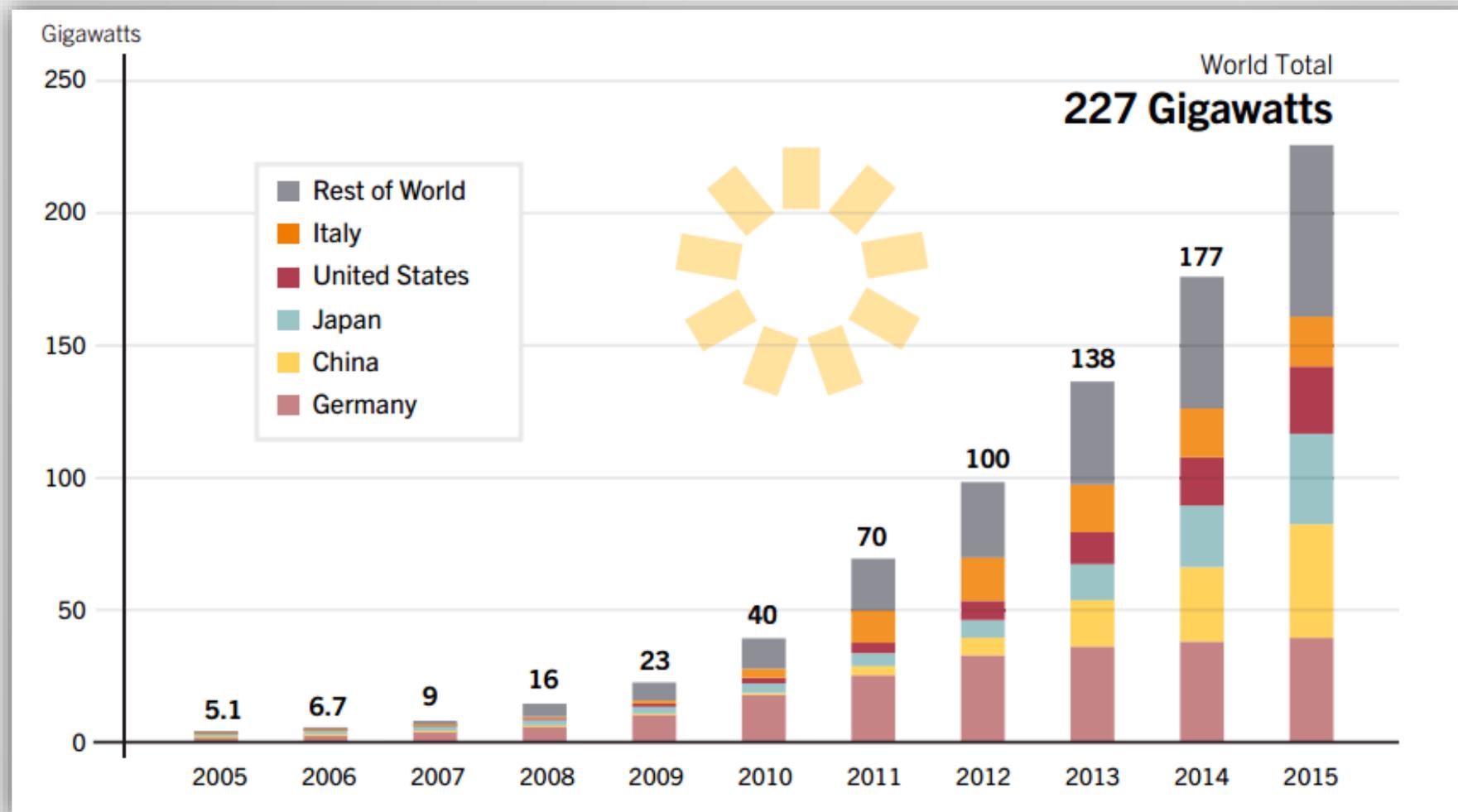


WIND POWER GLOBAL CAPACITY AND ANNUAL ADDITIONS, 2005–2015



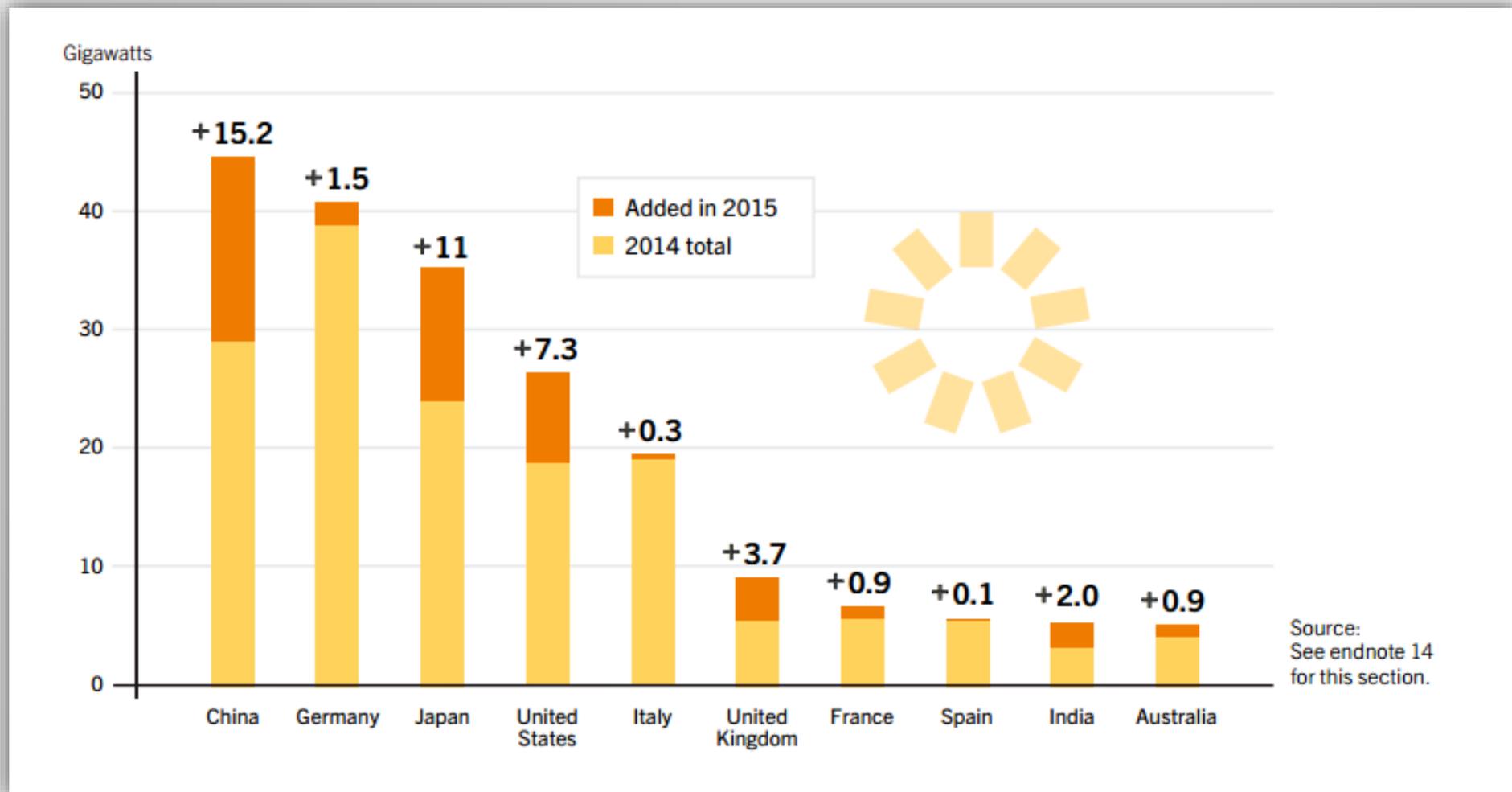
*IEA

SOLAR PV GLOBAL CAPACITY, BY COUNTRY/REGION, 2005–2015



*IEA

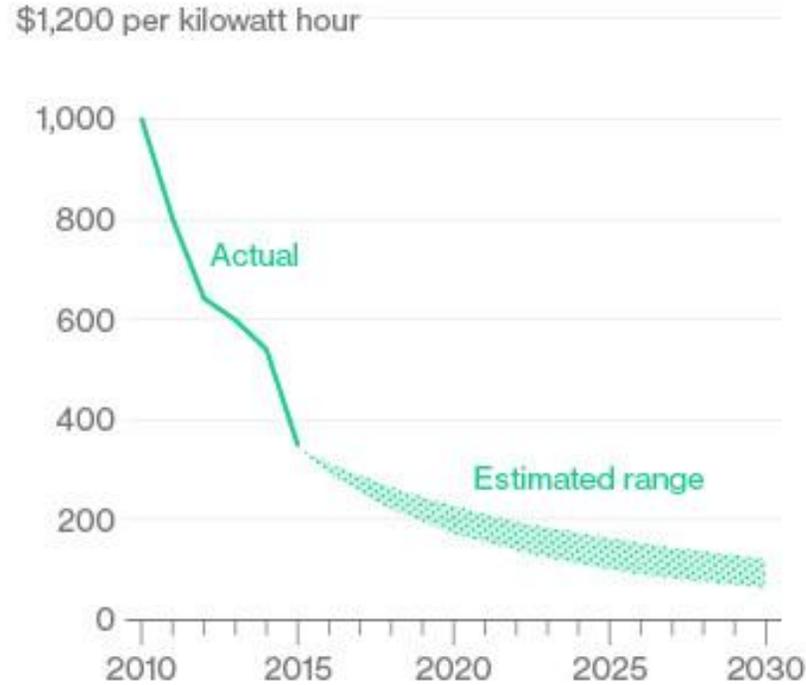
SOLAR PV CAPACITY AND ADDITIONS, TOP 10 COUNTRIES, 2015



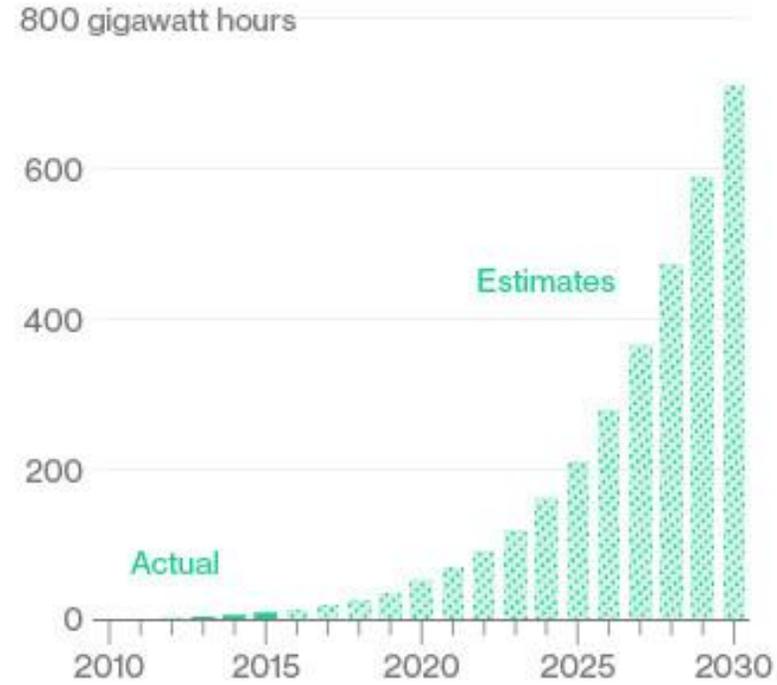
It's All About the Batteries

Batteries make up a third of the cost of an electric vehicle.
As battery costs continue to fall, demand for EVs will rise.

Cost for lithium-ion battery packs



Yearly demand for EV battery power



Source: Data compiled by Bloomberg New Energy Finance

THE WORLD IN 2017

- Continuous growing acceleration solar, wind, batteries
- Competitiveness of solar/wind in many regions world.
- Substantial carbon pricing (around US\$40.00/80.00 a Ton of CO₂ by 2020) key for accelerating deployment according Stern/Stiglitz Commission 2017. Completely unfeasible.
- EU, China, Japan, Canada committed with decarbonization
- High tech American corporations and some important states governments committed, Federal government uncommitted.
- Russia, Saudi Arabia and Iran invested in fossil fuels
- Brazil, India, Indonesia, South Korea and Mexico inertial.
- Trump is relevant for slowing down inertial countries.

BRAZILIAN SITUATION 2017 (1)

- Low quality democracy, systemic institutionalized corruption, complete delegitimation of political class, Congress, Executive and most governors and State Assemblies
- Extremely fragmented party system.
- Corruption was always high in Brazil but became systemic in the 2000s.
- Public Prosecutor, Federal Police and sector of Judiciary promoted vast and deep anti-corruption investigation, the most important in history of democratic world. Supported for vast public opinion and media.
- Climate change and generally environmental protection became marginal in public awareness priorities in the last three years.
- Core of Temer administration is not sensible to low carbon development, Meirelle's ideas are extremely conservative.

BRAZILIAN SITUATION 2017 (2)

- Public opinion centred in corruption, economic growth, unemployment, political reform. Dramatic declining in per capita income and increase in poverty. The 2013 per capita income will be recovered only in 2021, in the best scenario.
- Low attention to climate change will not recover significantly until there is a normalization of the economic and political situation, best scenario around 2019.
- Brazil NDC is not a good parameter Today because it was produced supposing an economic growth rate between 2015 and 2030 that was highly overestimated. It will be easy for Brazil to achieve the NDC, if there is a significant reversion of the dramatic increase in Amazonian deforestation in the last two years.

BRAZILIAN SITUATION 2017 (3)

- Wind and solar could grow more than predicted in NDC
- Major problem with ethanol, because in the last year has become clear that the world automobile industry has chosen to move away from the internal combustion car toward the electric. The government present plan is betting in ethanol but this will not be feasible because of the global profile of industry.
- Deforestation in the Amazon could decrease faster than predicted with strong rule of law.
- Important technological breakthrough could happen in relation to low carbon agriculture.
- Moving from extensive to intensive cattle raising is crucial for Brazil.

CONCLUSIONS (1)

- Globalization of trade and finance has been stagnated since 2008 but globalization of data has increased exponentially. This is very relevant because we live in a world where the proportion of data in relation to matter is increasing by the year.
- Wind/Solar are becoming competitive with fossil fuels but the growth pace is not enough without a carbon pricing.
- Carbon pricing is still marginal in the world, the only significant system is the EU, but price is low.
- The commitments in the Paris agreement are not enough for avoiding dangerous climate change. The situation worsens with Trump/Republicans controlling American federal government.
- Technological disruptions likely can change dramatically the situation: acceleration of Artificial Intelligence, 4th Industrial Revolution; Nanotechnology and Biotechnology. But the impacts on decarbonization are unknown so far.
- Adaptation became crucial, Geo-engineering (carbon dioxide removal and solar radiation management) could be relevant as complements to mitigation and adaptation.

CONCLUSIONS (2)

- In next years EU, Canada, China and Japan will be leaders of decarbonization. Strong opposition from Russia, Saudi Arabia, Iran and American Federal Government.
- A significant part of the global transnational corporations (particularly high tech) are in favour of decarbonization.
- Brazil has lost importance in the global arena of climate change and this situation will remain for the foreseeable future.
- Economic stabilization and improving the system of governance is pre-condition for climate governance, low carbon development needs to be internalized in the whole government.
- The level of commitment with climate policies from the new government (will start in 2019) will depend upon the presence of the issue in the electoral campaign. Perspectives are not good.