POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

Joining energy and climate policies: Transformation of the Energy Sector

Prof. Dr. Ottmar Edenhofer

1st Meeting
G20 Sustainability Working Group
G20 Energy Sustainability Working Group
G20 Climate Sustainability Working Group

Munich, 14 December 2016

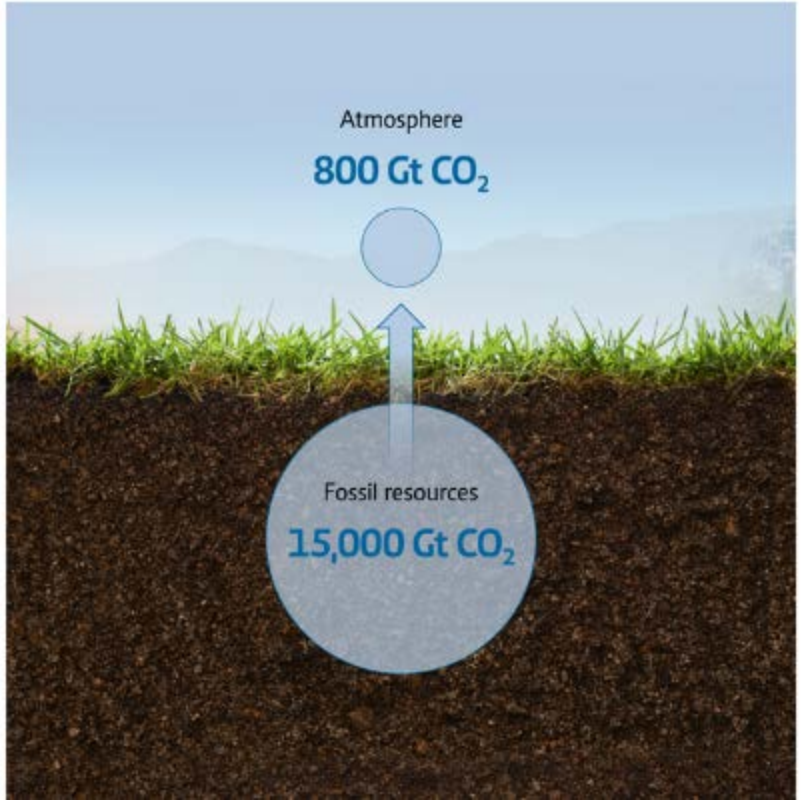
Leibniz Gemeinschaft

MCC Mercator Research Institute on Global Commons and Climate Change

Technische Universität Berlin

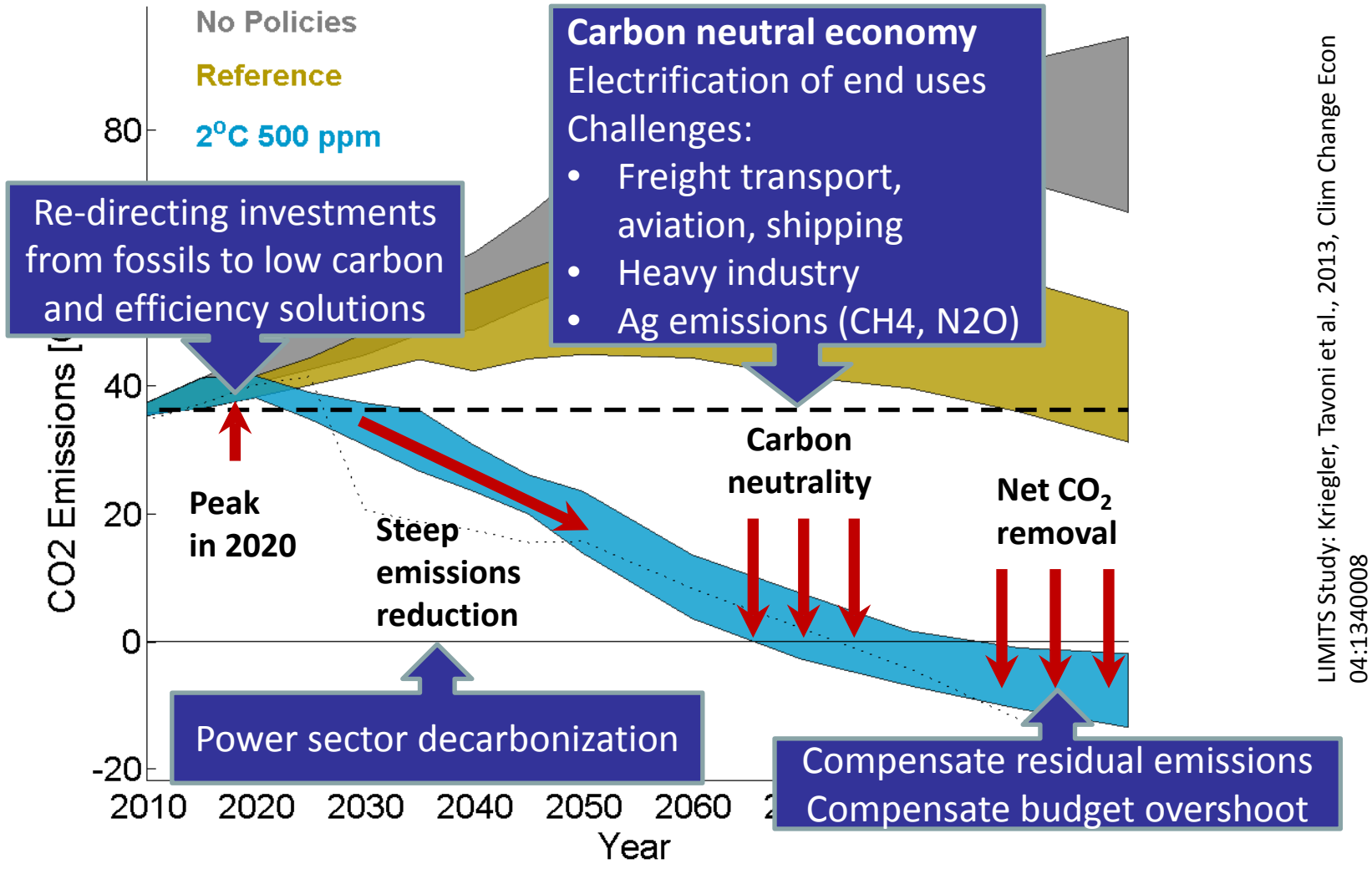
The challenges for the G20

Overuse of the global commons



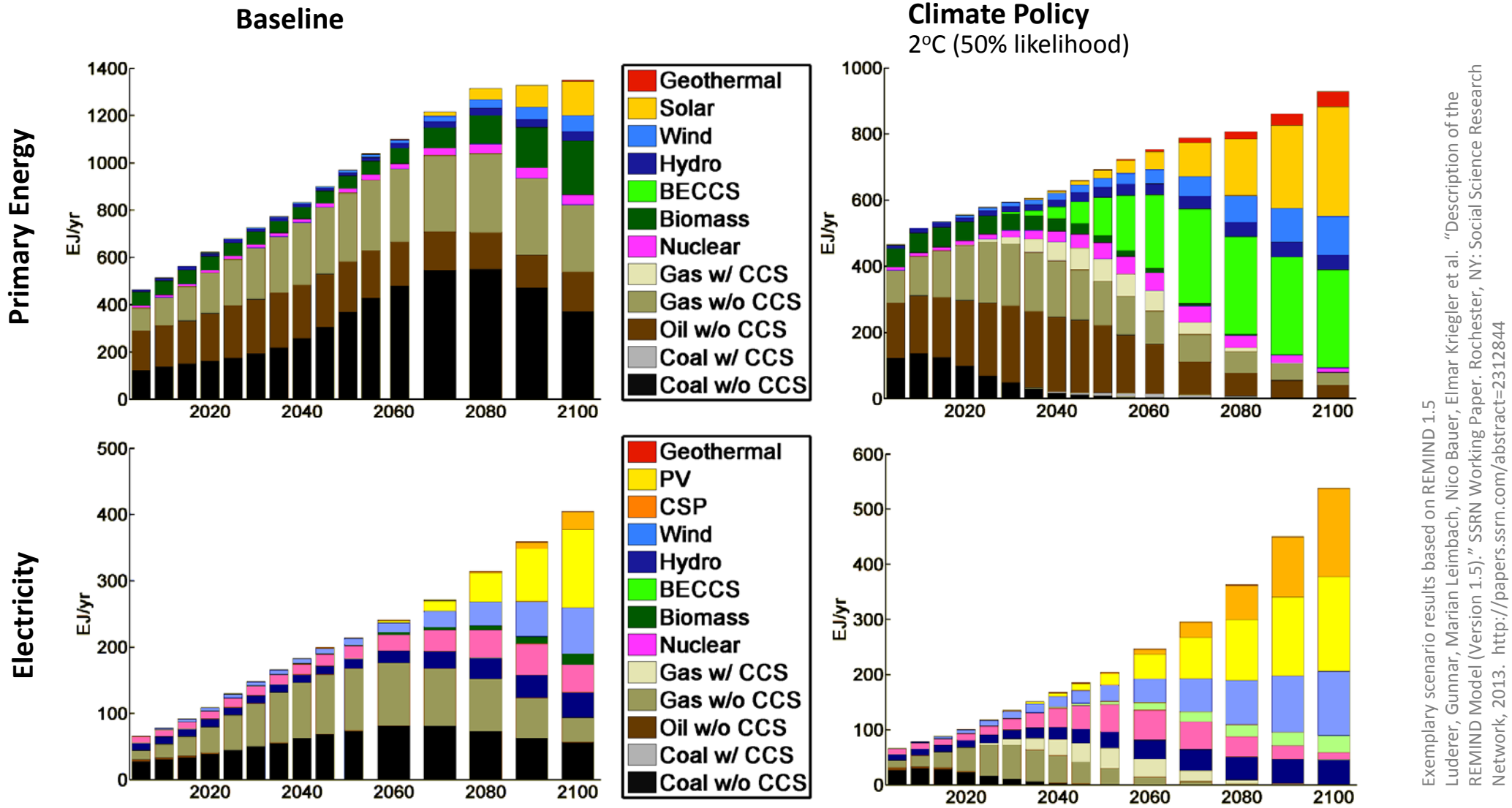
Underprovision of public infrastructure

General structure of mitigation pathways



LIMITS Study: Kriegler, Tavoni et al., 2013, Clim Change Econ 04:1340008

Global energy system transformation pathways



Exemplary scenario results based on REMIND 1.5
Luderer, Gunnar, Marian Leimbach, Nico Bauer, Elmar Kriegler et al. "Description of the REMIND Model (Version 1.5)." SSRN Working Paper. Rochester, NY: Social Science Research Network, 2013. http://papers.ssrn.com/abstract=2312844

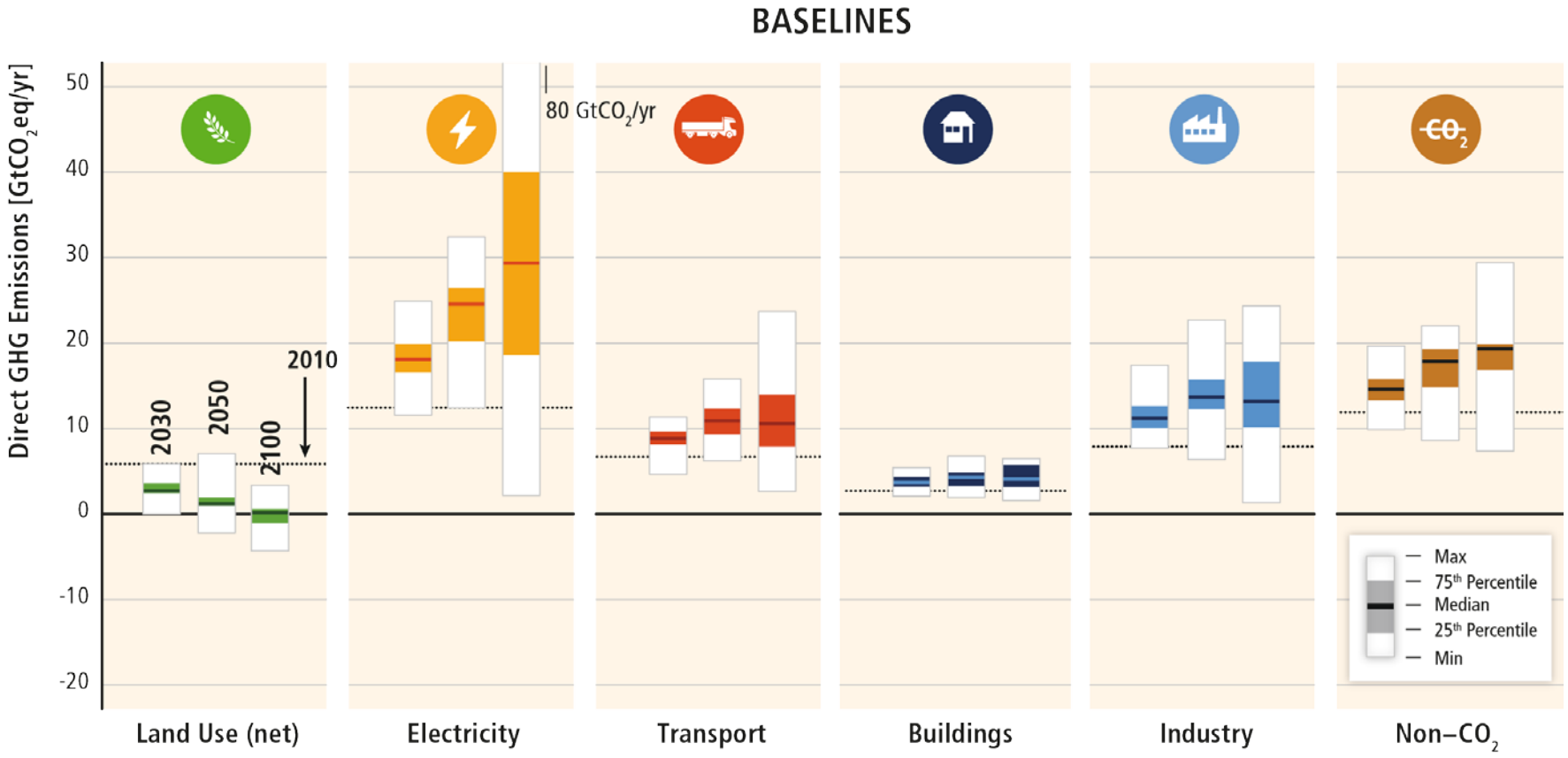
PIK

MCC Mercator Research Institute on Global Commons and Climate Change

Technische Universität Berlin

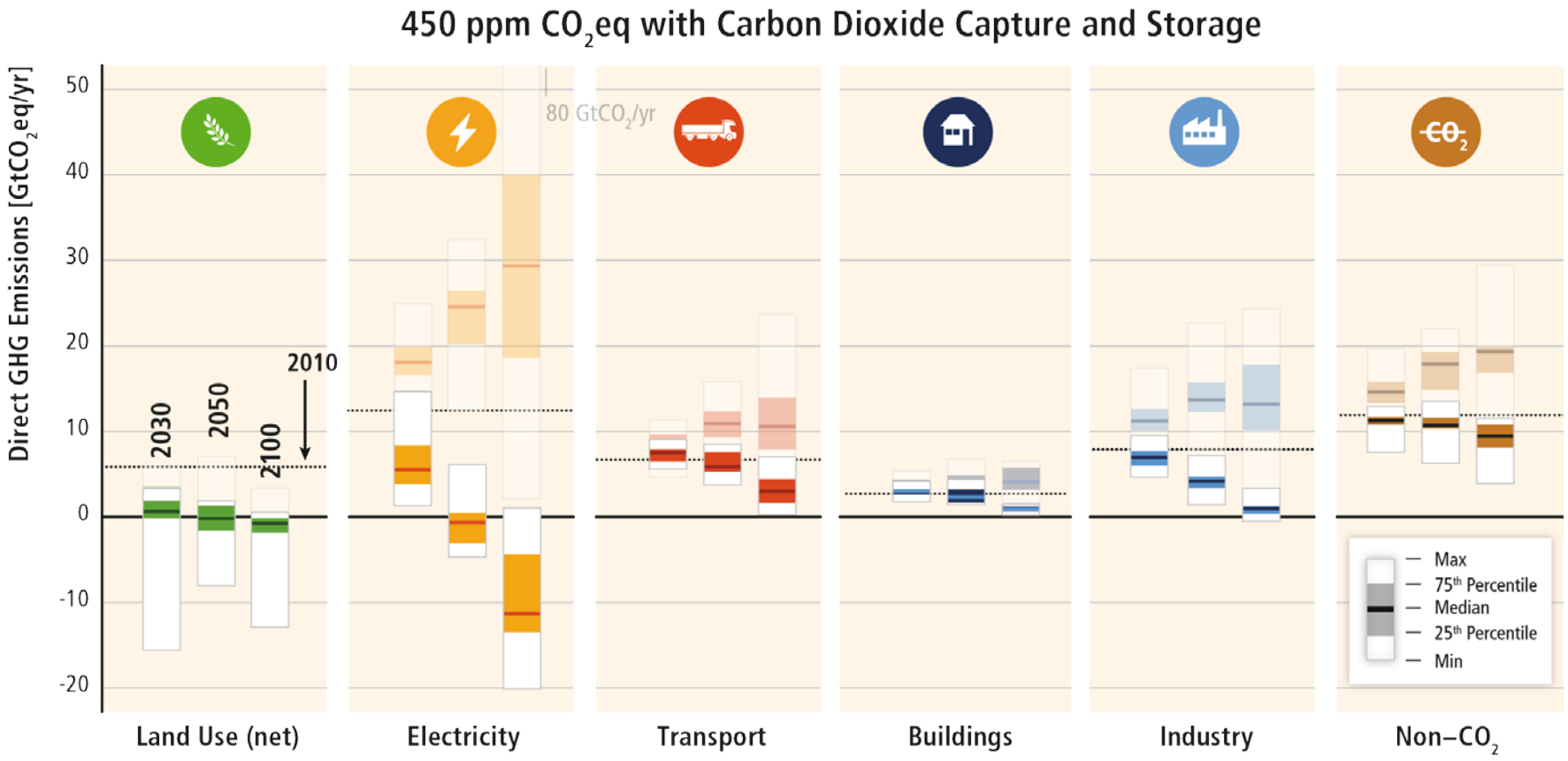
4

Sectoral Emissions



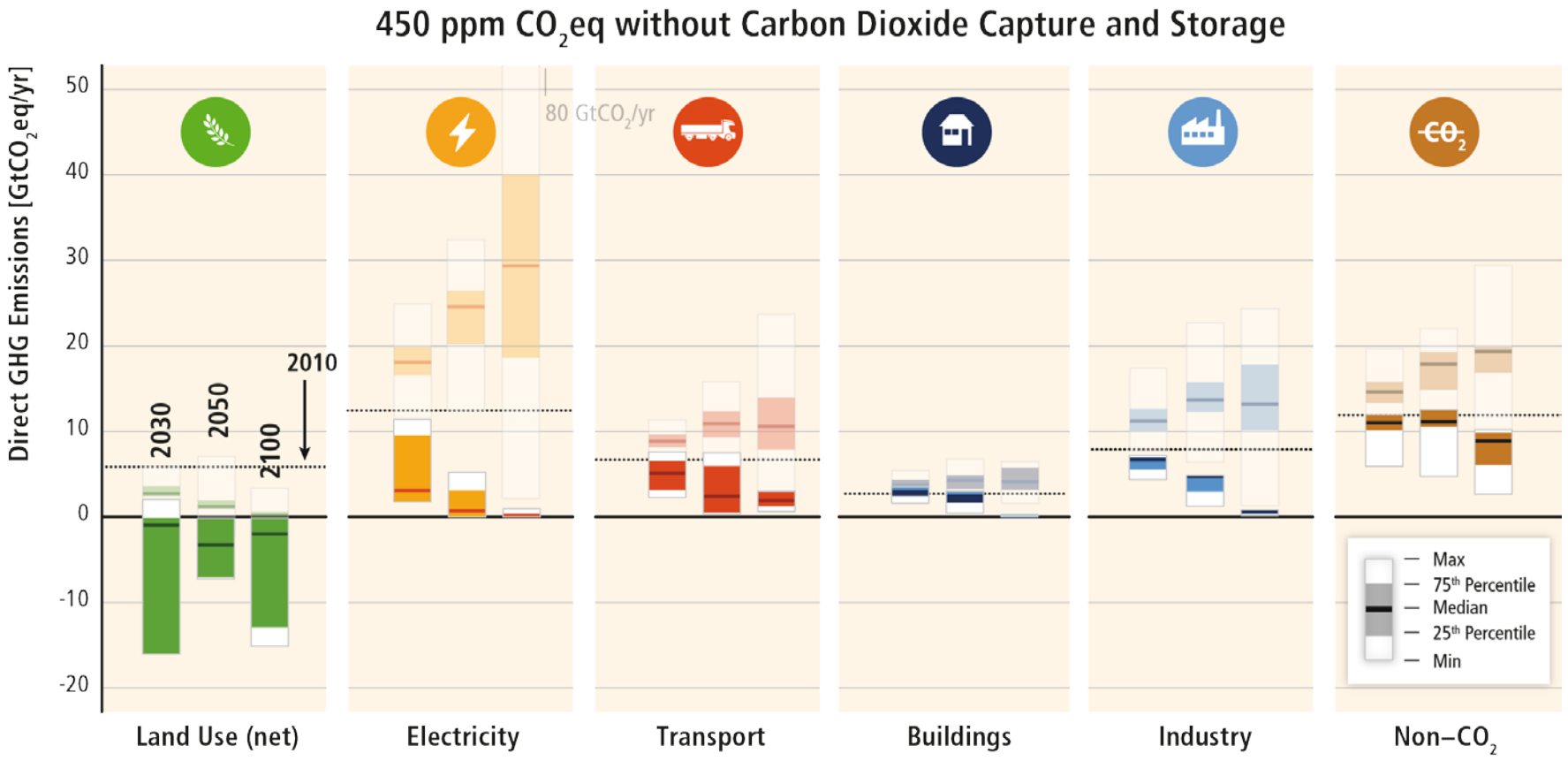
Based on IPCC AR5 WGIII Figure TS.17

Each sector has to contribute – the power sector most



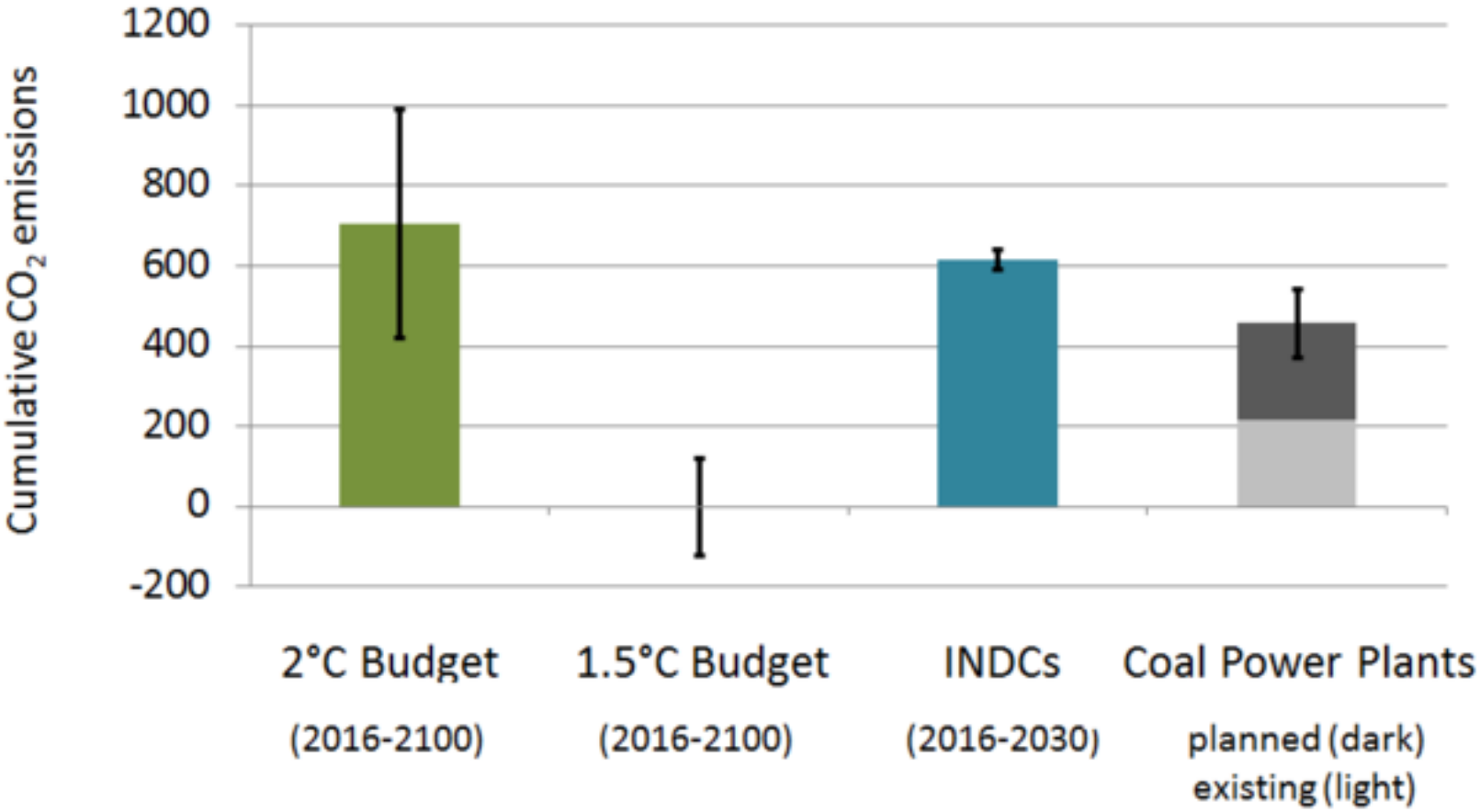
Based on IPCC AR5 WGIII Figure TS.17

Afforestation becomes important when CCS is not available



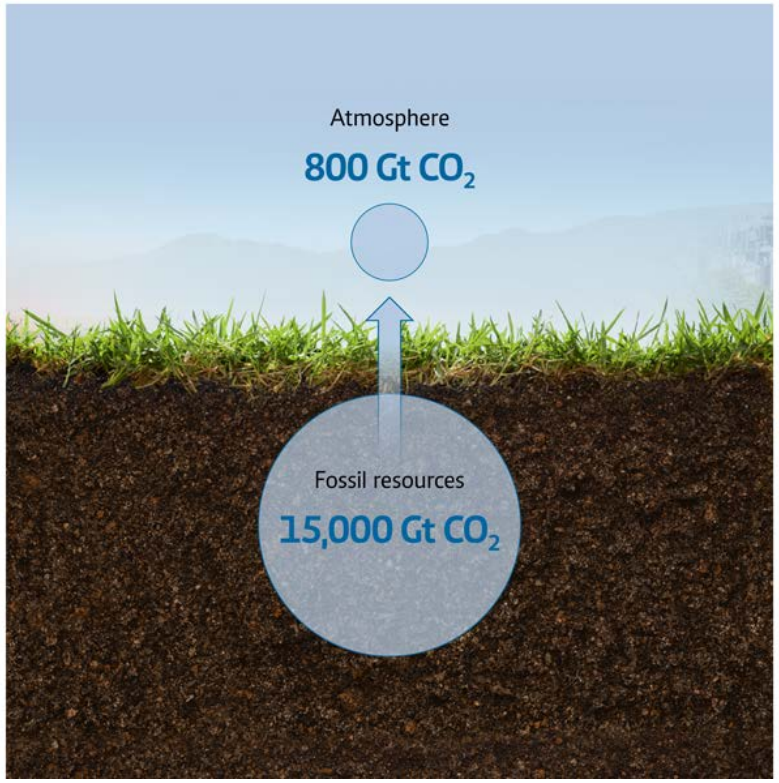
Based on IPCC AR5 WGIII Figure TS.17

The 2°C budget does not leave any leeway



Edenhofer et al. (2016)

The climate problem at a glance



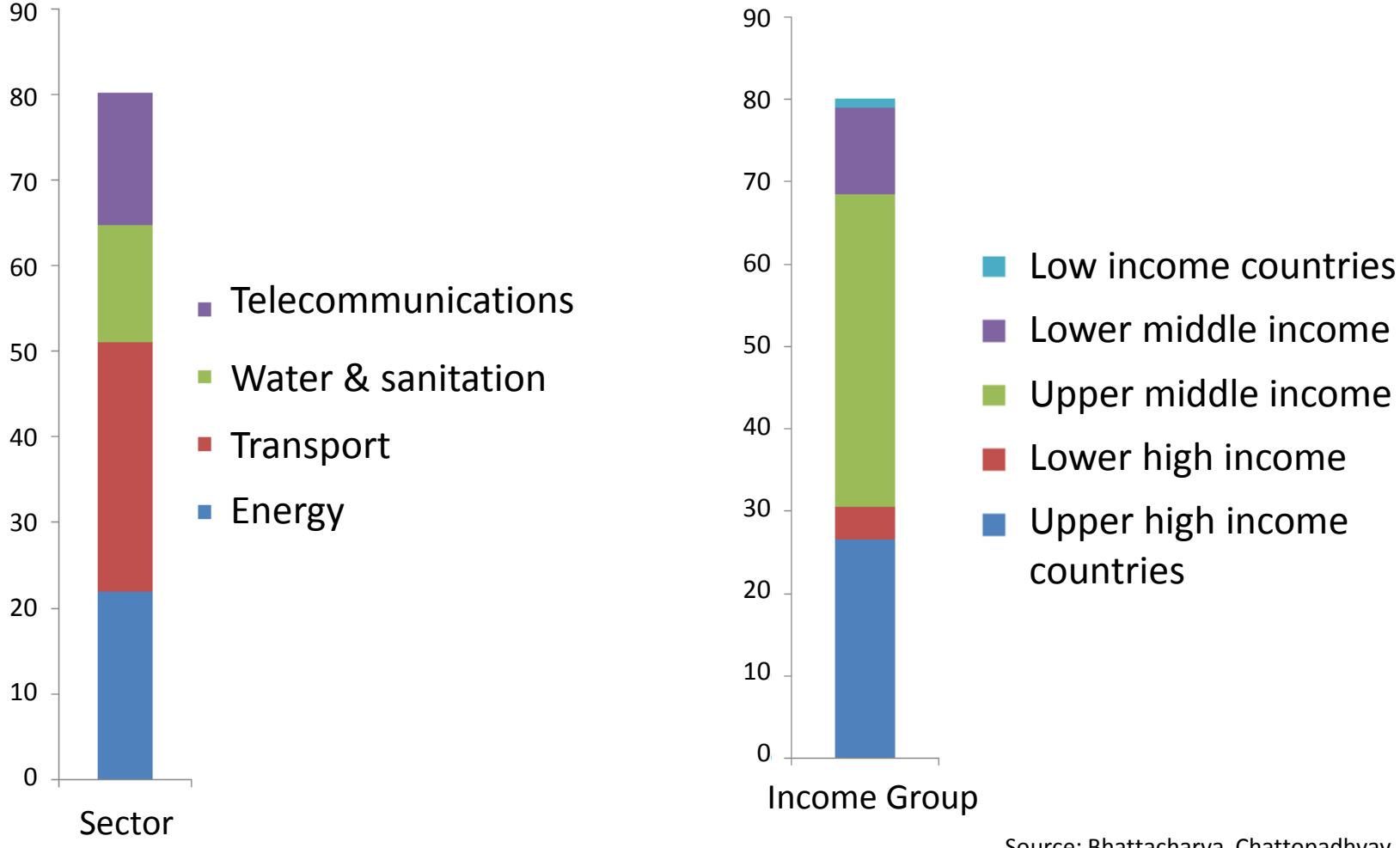
Resources and reserves to remain underground until 2100 (median values compared to BAU, AR5 Database)

Until 2100	With CCS [%]	No CCS [%]
Coal	70	89
Oil	35	63
Gas	32	64

Source: Bauer et al. (2014); Jakob, Hilaire (2015)

Projected cumulative infrastructure demand, 2015-2030

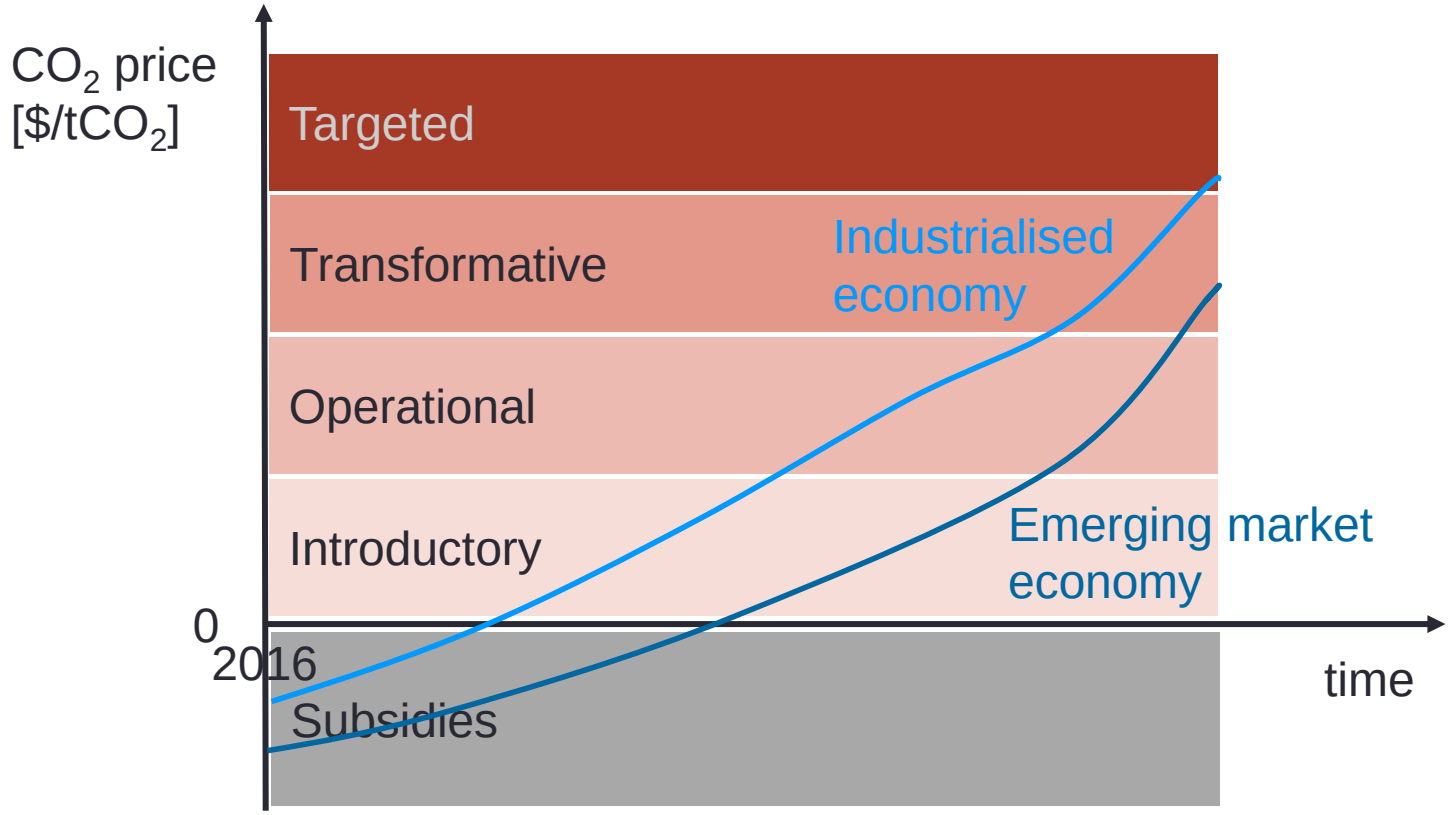
2014 US$, trillions



Source: Bhattacharya, Chattopadhyay, and Nagrah (forthcoming)

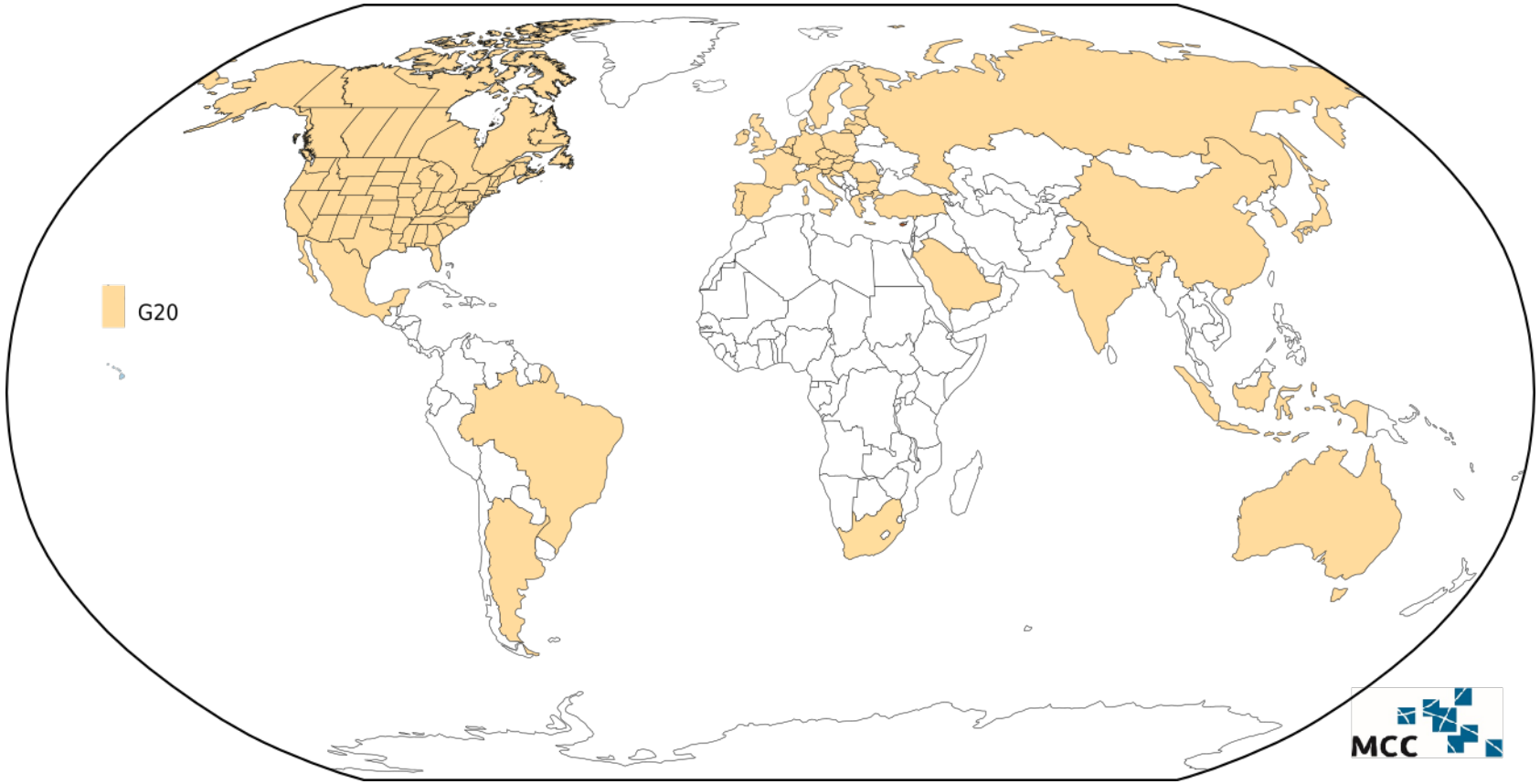
Carbon pricing along common but differentiated responsibilities

Carbon pricing - via taxes or emission trading systems - is essential because of the oversupply of fossil fuels.

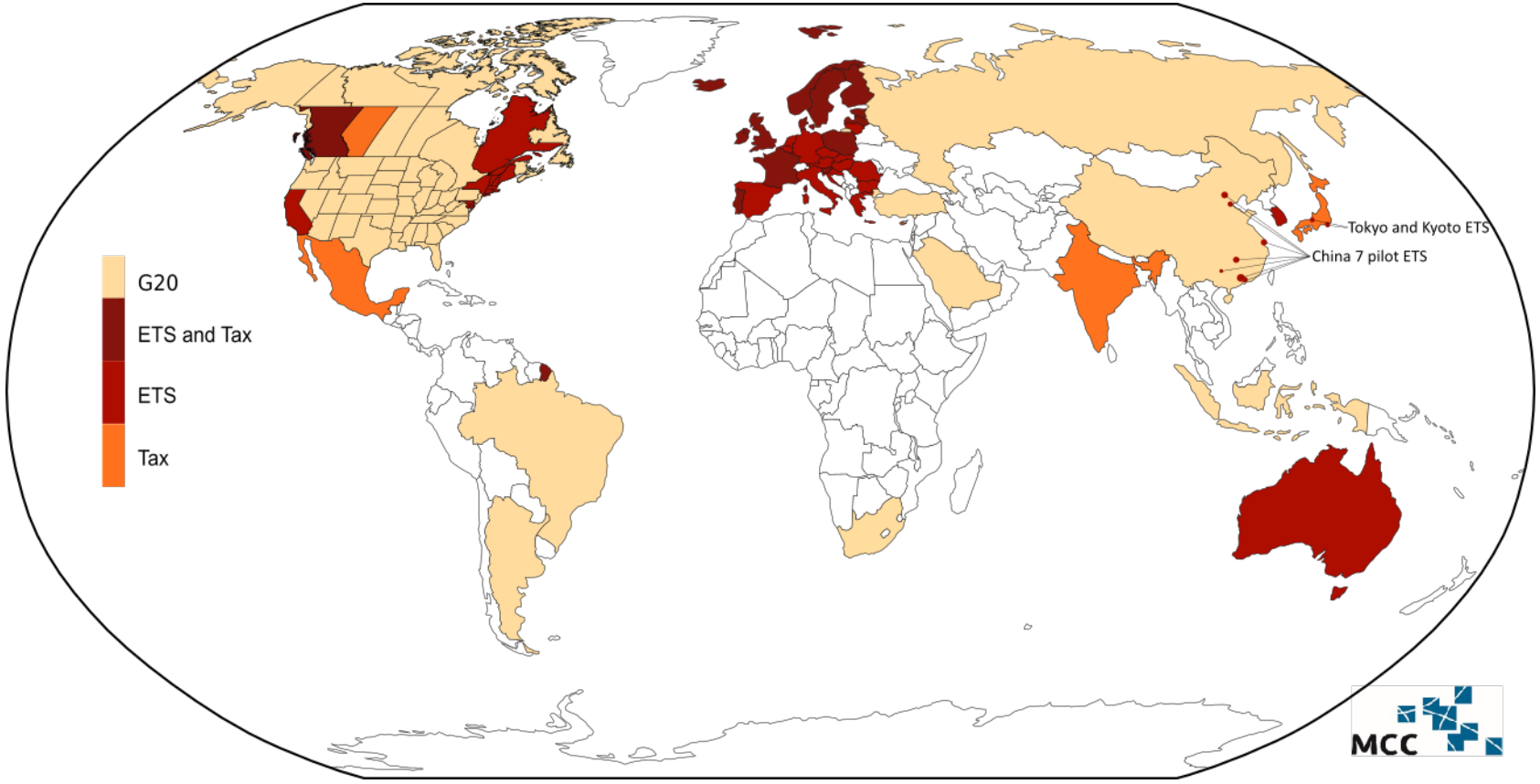


adapted from @CDP, own presentation

G20 Countries

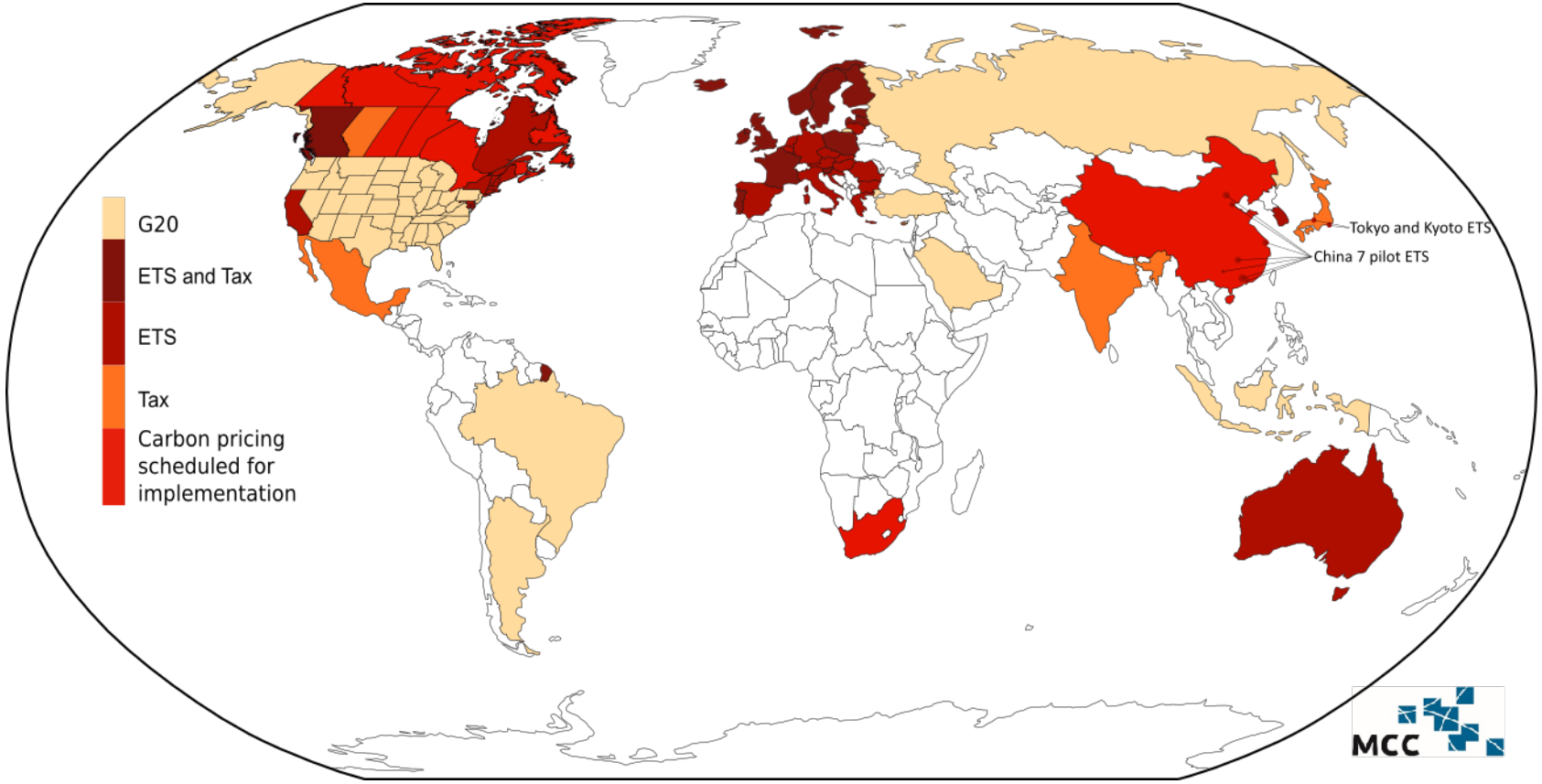


G20: Status of carbon pricing in 2016



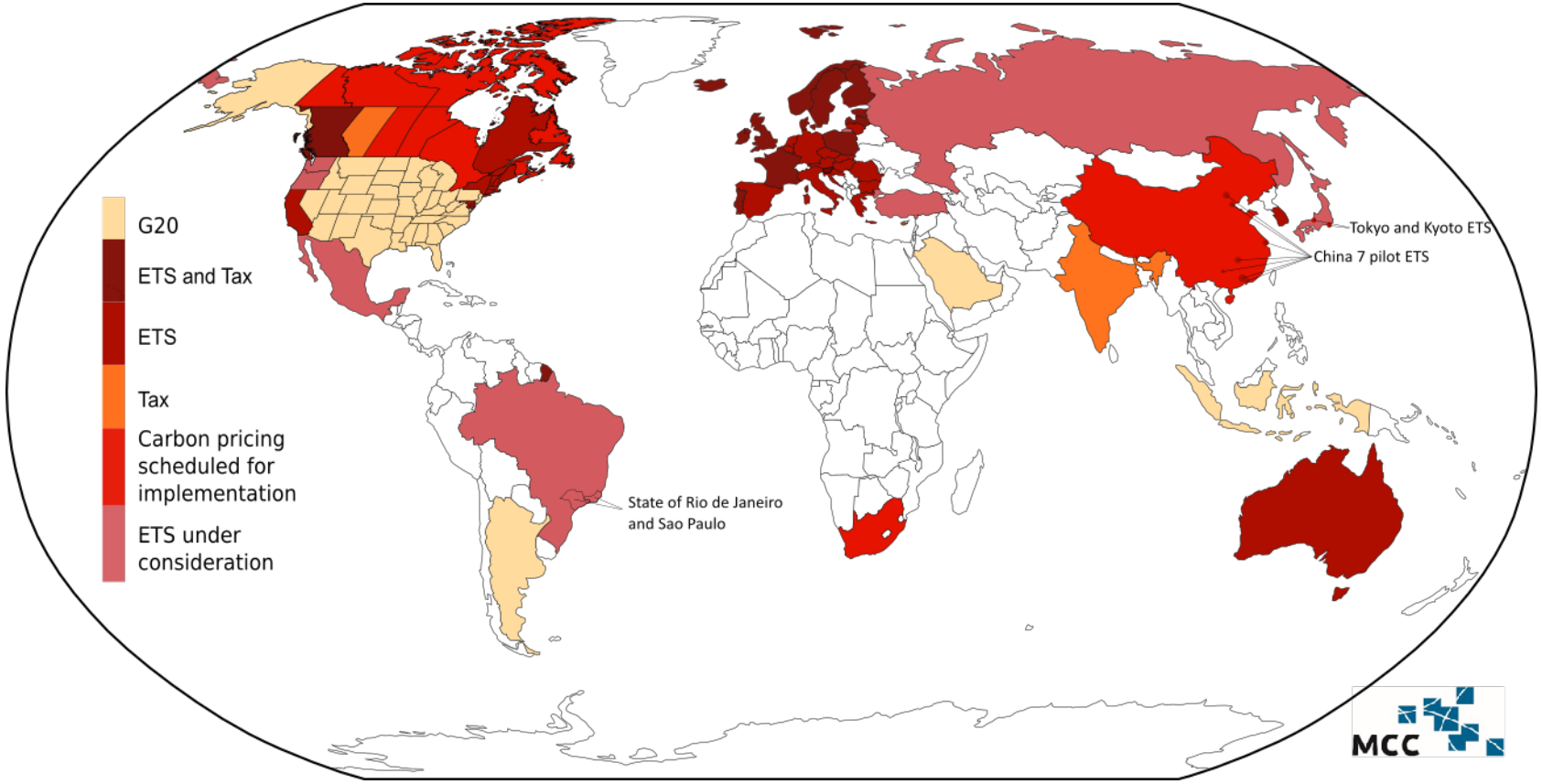
MCC (2016). Data based on ICAP (2016), Worldbank (2015, 2016)

G20: Status of carbon pricing in 2018



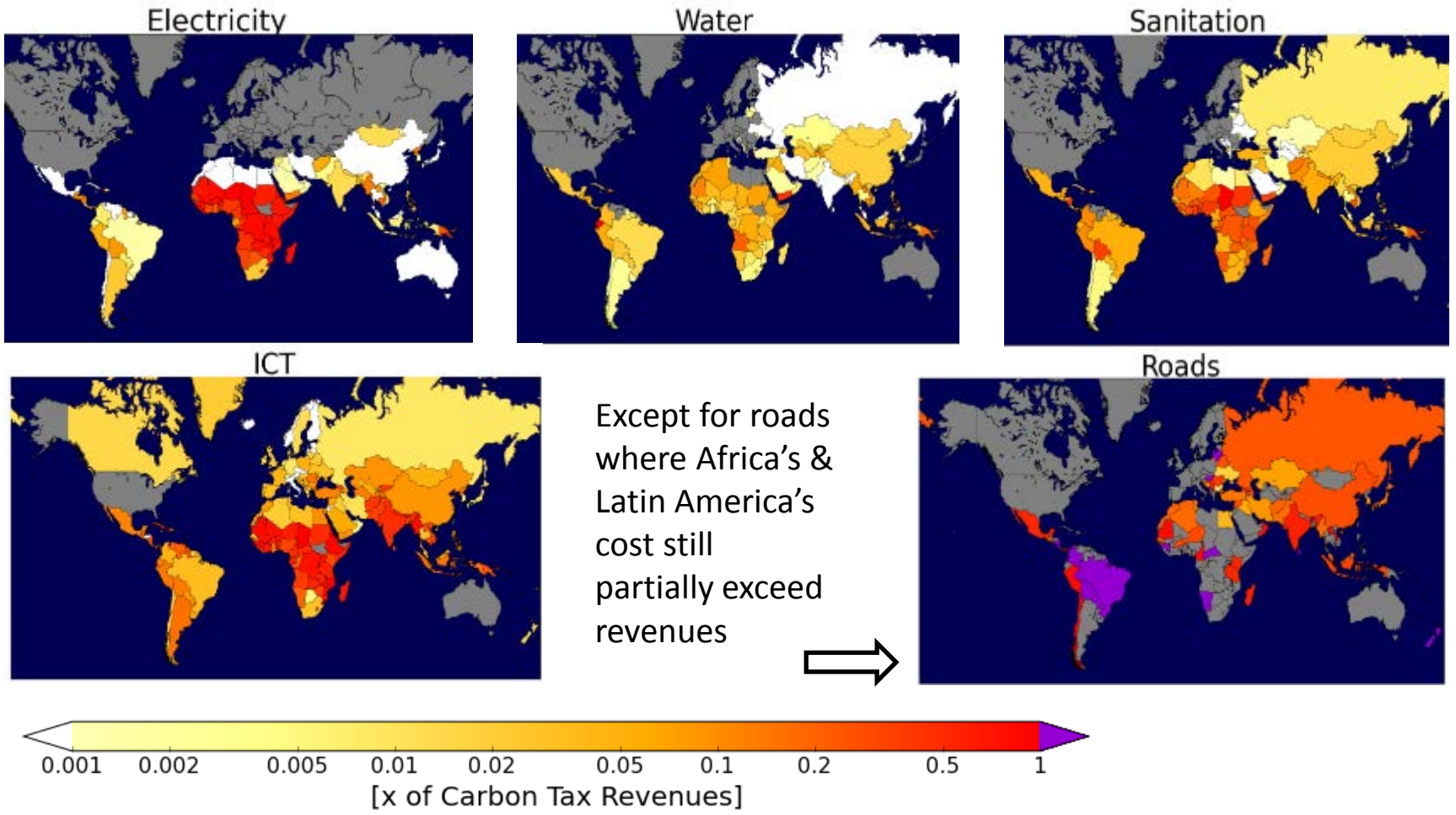
MCC (2016). Data based on ICAP (2016), Worldbank (2015, 2016)

G20: Status of carbon pricing in 2025…?



MCC (2016). Data based on ICAP (2016), Worldbank (2015, 2016)

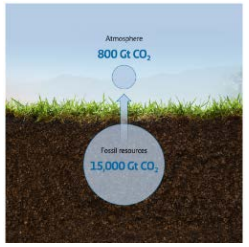
Carbon pricing revenues are sufficient to finance universal access to infrastructure



Jakob et al. (2016)

The challenges for the G20… and the perspective

Overuse of the global commons



Underprovision of public infrastructure

G20 has to combine the growth agenda with climate protection and the SDGs