Climate Action and Sustainable Development

After the IPCC Special Report on: Global warming of 1.5°C (…) in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

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« From science to policy: Achieving the SDGs in a 1.5 degree warmer world », IAI, German Committee Future Earth, DFG, UNOSSC, Katowice, 4 December 2018

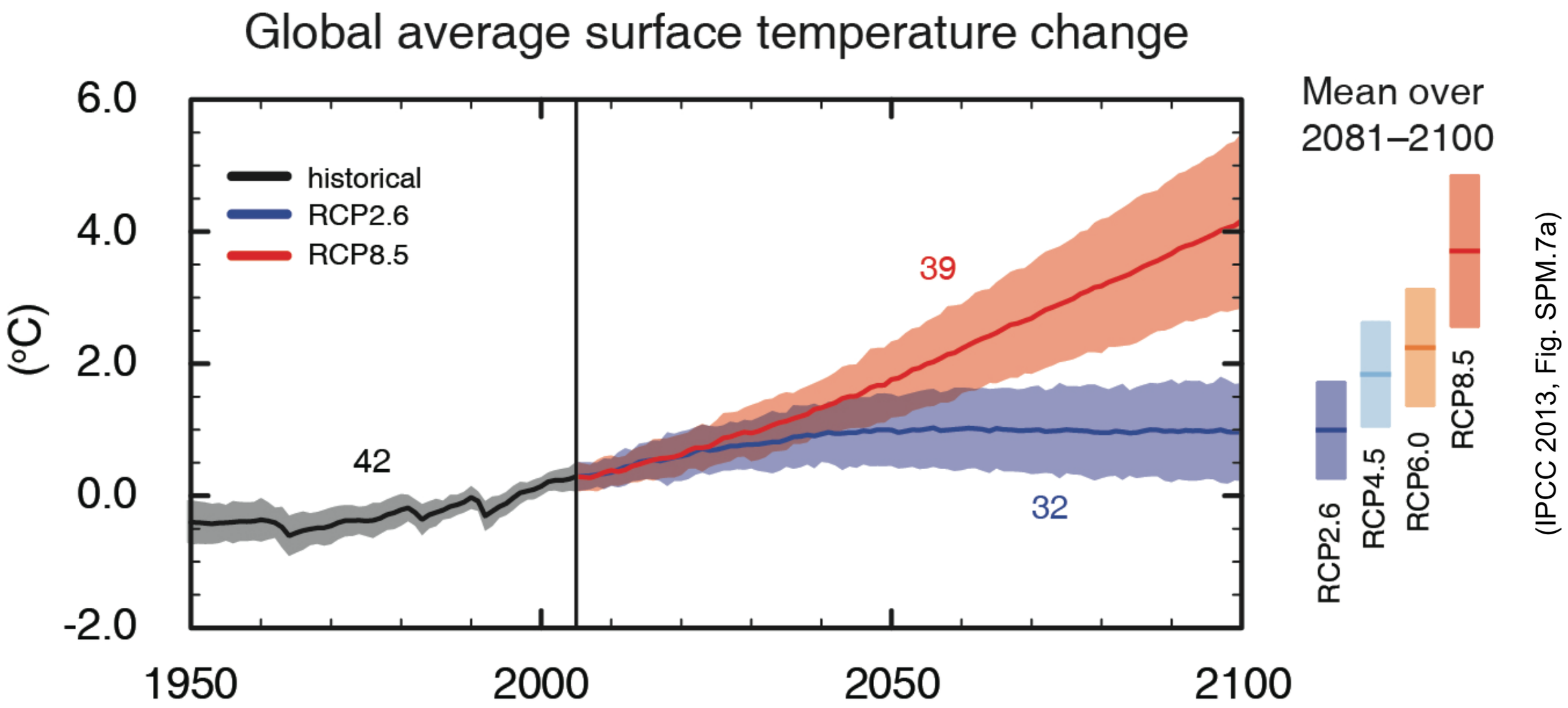
Thanks to the Walloon government for supporting www.plateforme-wallonne-giec.be and my team at UCLouvain (Université catholique de Louvain, Belgium)

SUSTAINABLE DEVELOPMENT GOALS

Key messages from IPCC AR5

- → **Human influence on the climate system is clear**
- → **Continued emissions of greenhouse gases will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems**
- → **While climate change is a threat to sustainable development, there are *many opportunities to integrate mitigation, adaptation, and the pursuit of other societal objectives***
- → **Humanity *has* the means to limit climate change and build a *more sustainable and resilient future***

ipcc INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

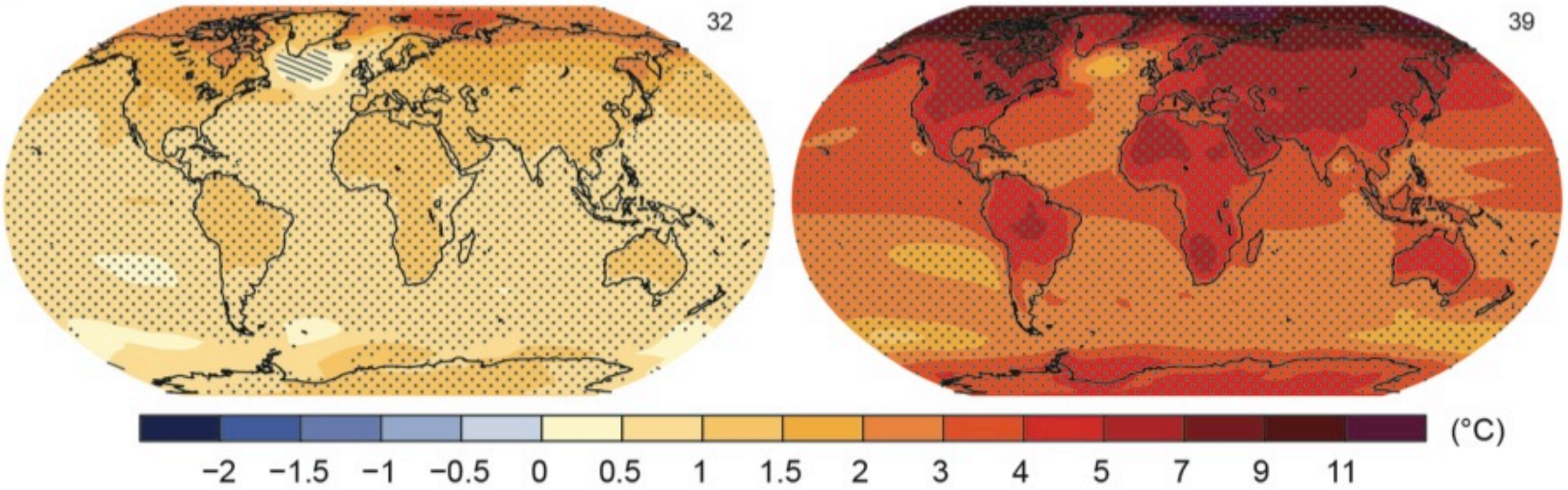


Only the lowest (RCP2.6) scenario maintains the global surface temperature increase above the pre-industrial level to less than 2˚ C with at least 66% probability

RCP2.6

RCP8.5

Fig. SPM.8



Humanity has the choice

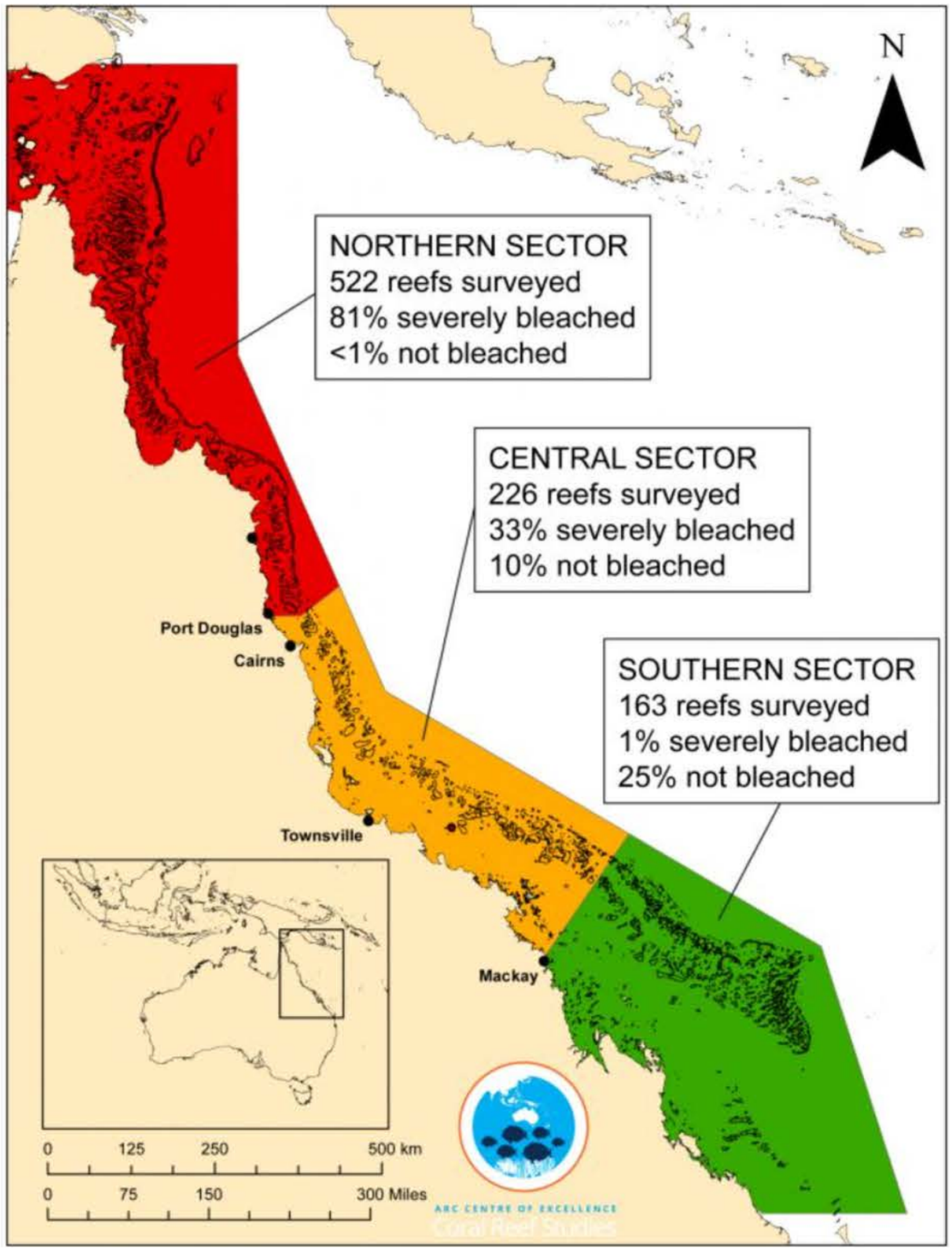
Risk = Hazard x Vulnerability x Exposure

(Victims of New Orleans floods after Katrina in 2005)

AP Photo - Lisa Krantz (http://lisakrantz.com/hurricane-katrina/zspbn1k4cn17phidupe4f9x5t1mzdr)

More heavy precipitation and more droughts….

2016: Only 7% of the Great Barrier Reef has avoided coral bleaching



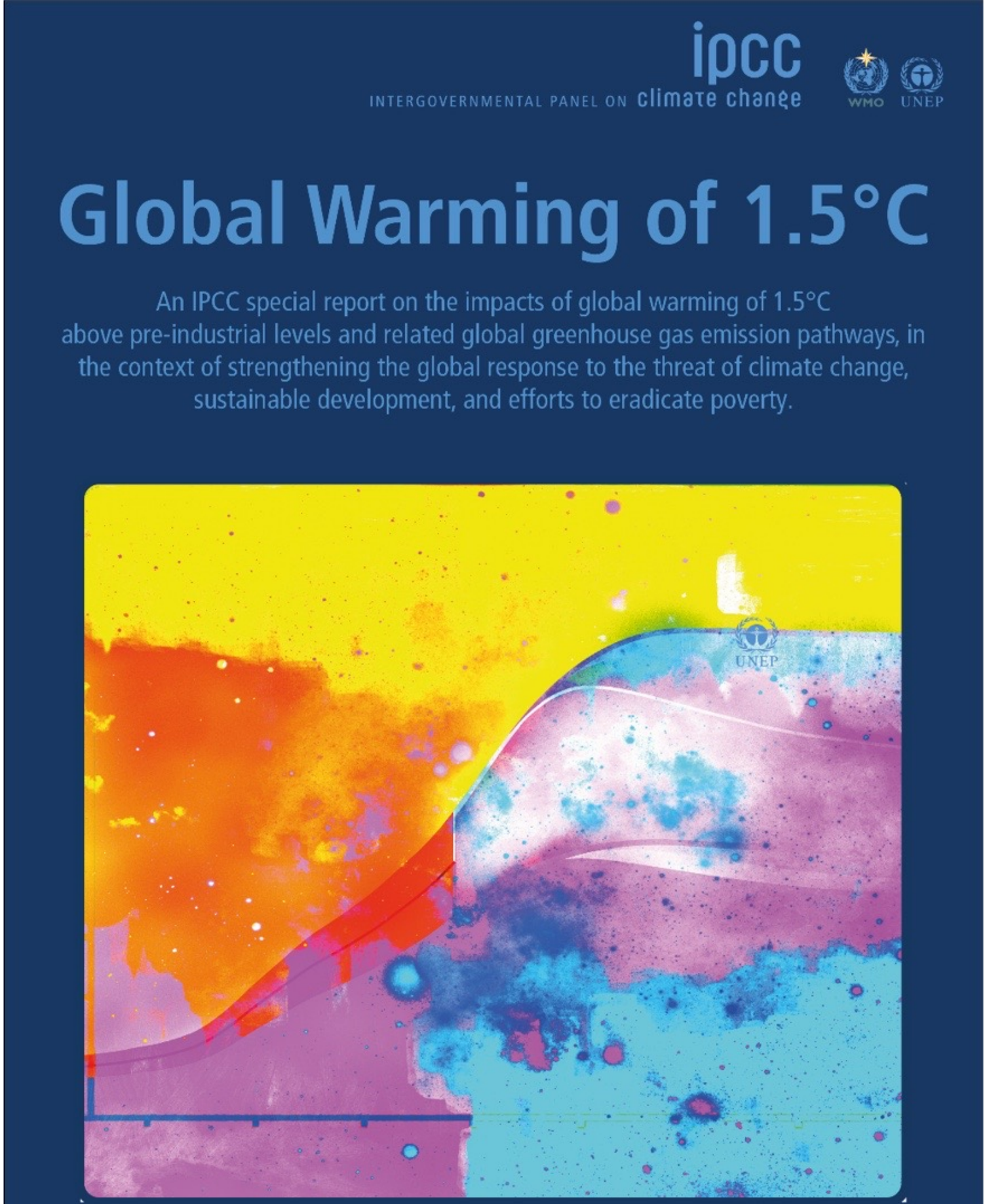
JCU Australia - ARC Centre of Excellence for Coral Reef Studies / Tom Bridge and James Kerry

Why this IPCC SR15 report?

After a scoping process, the IPCC Plenary (Bangkok, October 2016) decided to accept the COP21 invitation and to produce:

« *An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways,* ***in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*** »

The SR15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INTERGOVERNMENTAL PANEL ON climate change
WMO
UNEP
Global Warming of 1.5°C
An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
UNEP

Global warming of 1.5°C

A IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, ***in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty***

Proposed outline (as adopted in October 2016; report to be finalized in 2018) :

- Summary for policy makers *(max 10 pages)*
- Chapters :
  - 1. Framing and context
  - 2. Mitigation pathways compatible with 1.5°C in the context of sustainable development
  - 3. Impacts of 1.5°C global warming on natural and human systems
  - 4. Strengthening and implementing the global response to the threat of climate change
  - 5. Sustainable development, poverty eradication and reducing inequalities
- Boxes (integrated case studies/regional and cross-cutting themes),
- FAQs (10 pages)

Impacts of global warming 1.5°C

At 1.5°C compared to 2°C:

- Less extreme weather where people live, including extreme heat and rainfall
- By 2100, global mean sea level rise will be around 10 cm lower
- 10 million fewer people exposed to risk of rising seas

Impacts of global warming 1.5°C

At 1.5°C compared to 2°C:

- Lower impact on biodiversity and species
- Smaller reductions in yields of maize, rice, wheat
- Global population exposed to water shortages up to 50% less

Impacts of global warming 1.5°C

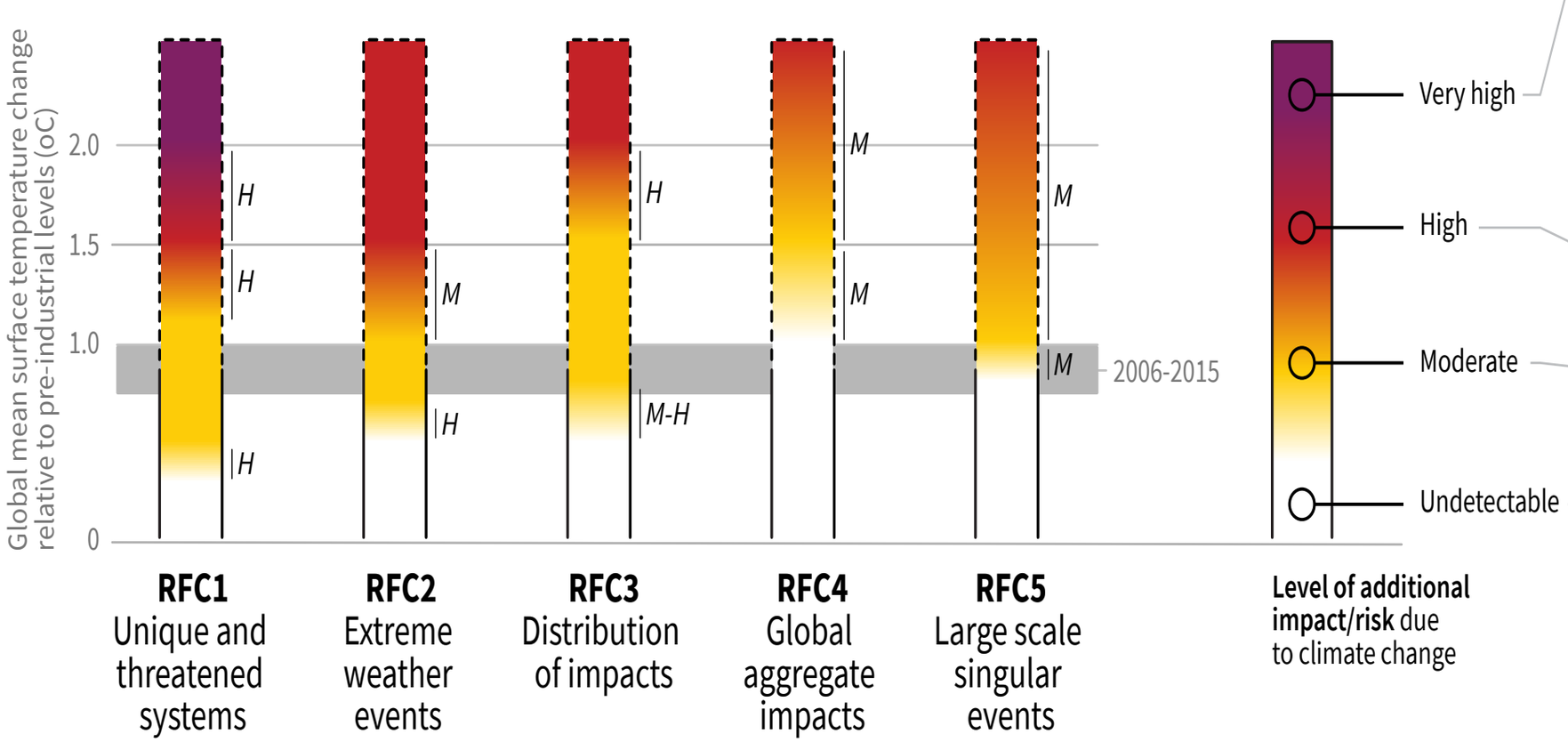
At 1.5°C compared to 2°C:

- **Up to several hundred million fewer people exposed to *climate-related risk* *and* susceptible to *poverty* by 2050**

How the level of global warming affects impacts and/or risks associated with the Reasons for Concern (RFCs) and selected natural, managed and human systems

Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

Impacts and risks associated with the Reasons for Concern (RFCs)



Purple indicates very high risks of severe impacts/risks and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks.

Red indicates severe and widespread impacts/risks.

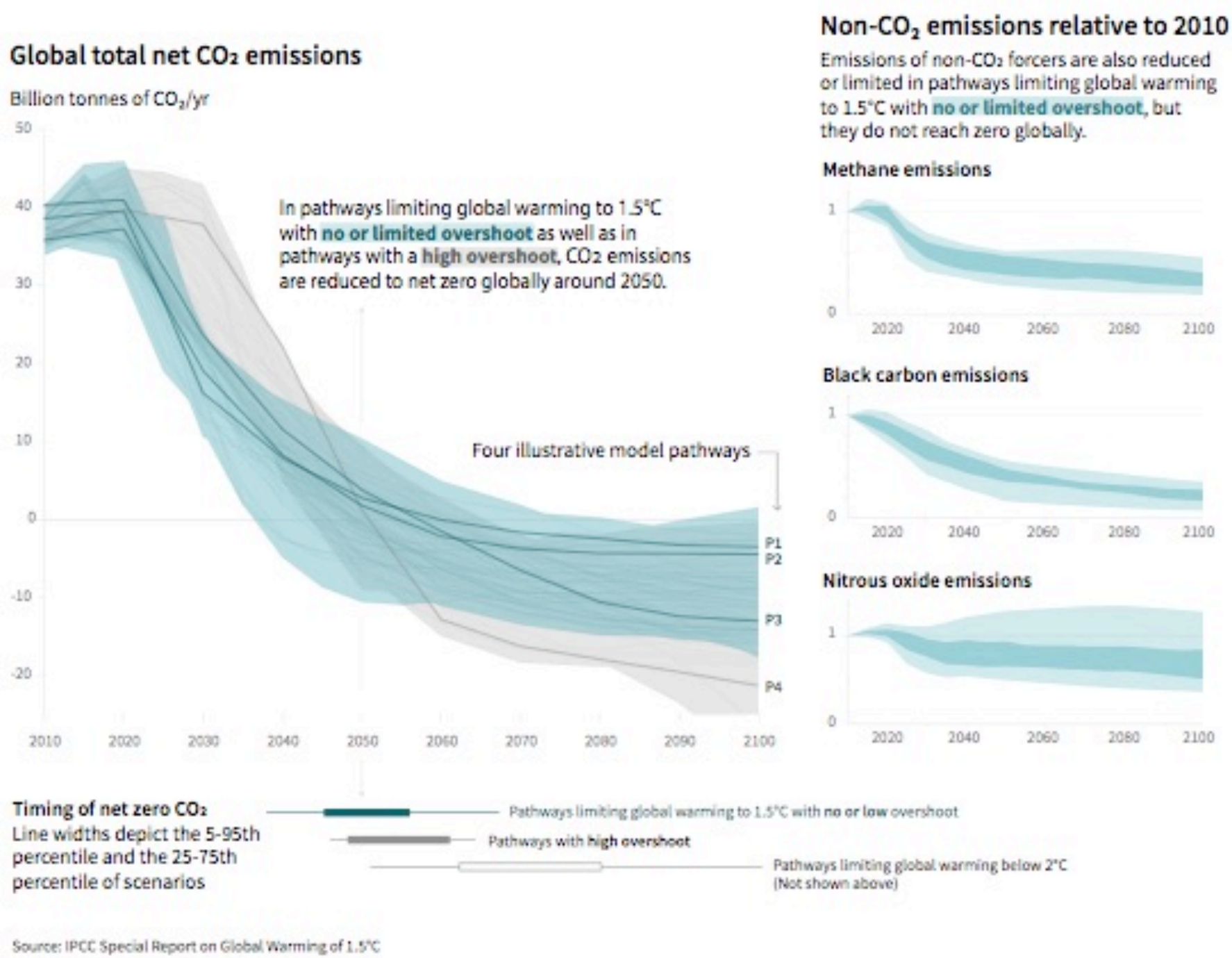
Yellow indicates that impacts/risks are detectable and attributable to climate change with at least medium confidence.

White indicates that no impacts are detectable and attributable to climate change.

Emission Pathways and System Transitions Consistent with 1.5° C Global Warming

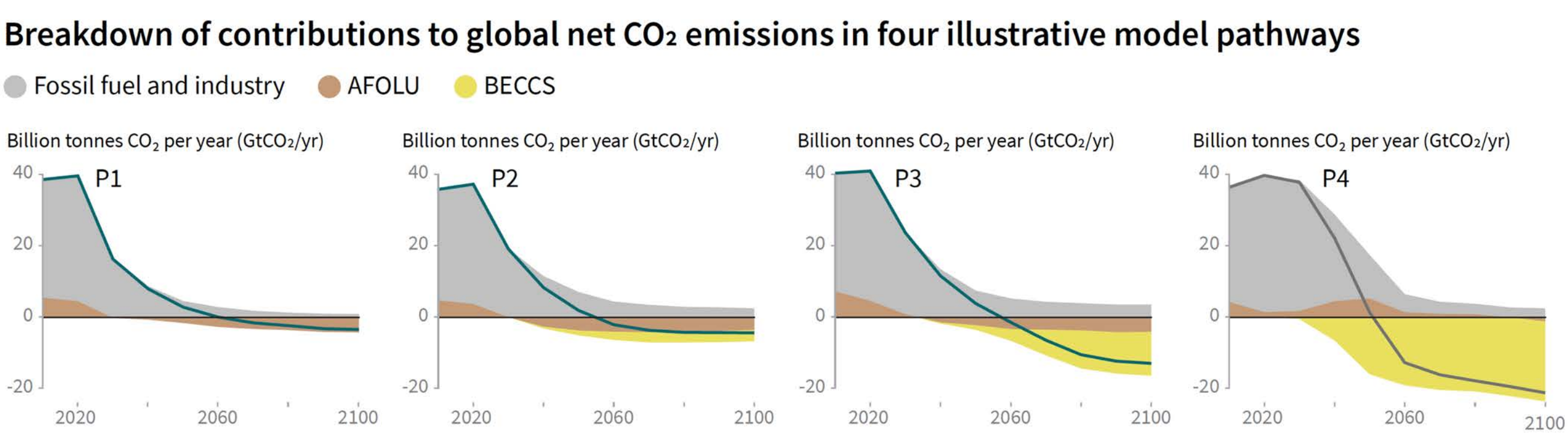
Global emissions pathway characteristics

General characteristics of the evolution of anthropogenic net emissions of CO_2, and total emissions of methane, black carbon, and nitrous oxide in model pathways that limit global warming to 1.5°C with no or limited overshoot. Net emissions are defined as anthropogenic emissions reduced by anthropogenic removals. Reductions in net emissions can be achieved through different portfolios of mitigation measures illustrated in Figure SPM3B.



Source: IPCC Special Report on Global Warming of 1.5°C

Four illustrative model pathways in the IPCC SR15:



P1: A scenario in which social, business, and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A down-sized energy system enables rapid decarbonisation of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

P2: A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

P4: A resource and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

Four illustrative model pathways in the IPCC SR15:

Global indicators	P1	P2	P3	P4	**Interquartile range**
Pathway classification	No or low overshoot	No or low overshoot	No or low overshoot	High overshoot	No or low overshoot
CO_2 emission change in 2030 (% rel to 2010)	-58	-47	-41	4	(-59,-40)
↳ *in 2050 (% rel to 2010)*	-93	-95	-91	-97	(-104,-91)
Kyoto-GHG emissions in 2030 (% rel to 2010)*	-50	-49	-35	-2	(-55,-38)
↳ *in 2050 (% rel to 2010)*	-82	-89	-78	-80	(-93,-81)
*Final energy demand** in 2030 (% rel to 2010)*	-15	-5	17	39	(-12, 7)
↳ *in 2050 (% rel to 2010)*	-32	2	21	44	(-11, 22)
Renewable share in electricity in 2030 (%)	60	58	48	25	(47, 65)
↳ *in 2050 (%)*	77	81	63	70	(69, 87)
Primary energy from coal in 2030 (% rel to 2010)	-78	-61	-75	-59	(-78, -59)
↳ *in 2050 (% rel to 2010)*	-97	-77	-73	-97	(-95, -74)
from oil in 2030 (% rel to 2010)	-37	-13	-3	86	(-34,3)
↳ *in 2050 (% rel to 2010)*	-87	-50	-81	-32	(-78,-31)
from gas in 2030 (% rel to 2010)	-25	-20	33	37	(-26,21)
↳ *in 2050 (% rel to 2010)*	-74	-53	21	-48	(-56,6)
from nuclear in 2030 (% rel to 2010)	59	83	98	106	(44,102)
↳ *in 2050 (% rel to 2010)*	150	98	501	468	(91,190)
from biomass in 2030 (% rel to 2010)	-11	0	36	-1	(29,80)
↳ *in 2050 (% rel to 2010)*	-16	49	121	418	(123,261)
from non-biomass renewables in 2030 (% rel to 2010)	430	470	315	110	(243,438)
↳ *in 2050 (% rel to 2010)*	832	1327	878	1137	(575,1300)
Cumulative CCS until 2100 ($GtCO_2$)	0	348	687	1218	(550, 1017)
↳ *of which BECCS ($GtCO_2$)*	0	151	414	1191	(364, 662)
Land area of bioenergy crops in 2050 (million hectare)	22	93	283	724	(151, 320)
Agricultural CH_4 emissions in 2030 (% rel to 2010)	-24	-48	1	14	(-30,-11)
in 2050 (% rel to 2010)	-33	-69	-23	2	(-46,-23)
Agricultural N_2O emissions in 2030 (% rel to 2010)	5	-26	15	3	(-21,4)
in 2050 (% rel to 2010)	6	-26	0	39	(-26,1)

NOTE: Indicators have been selected to show global trends identified by the Chapter 2 assessment. National and sectoral characteristics can differ substantially from the global trends shown above.

Source: IPCC Special Report on Global Warming of 1.5°C

** Kyoto-gas emissions are based on SAR GWP-100*
*** Changes in energy demand are associated with improvements in energy efficiency and behaviour change*

For 3 illustrative model pathways that limit warming with no or limited overshoot

(%rel to 2010)	P1	P2	P3
CO_2 (2030/2050)	-58 / - 93	-47 / -95	-41 / -91
Final energy demand (2030/2050)	-15 / -32	-5 / +2	+17 / +21
Primary energy from coal (2030/2050)	-78/-97	-61/-77	-75/-73
Primary energy from non-biomass renewables (2030/2050)	+430/+832	+470/+1327	+315/+878

IPCC SR15
Fig SPM 3b

Greenhouse gas emissions pathways

- Limiting warming to 1.5° C would require changes on an unprecedented scale
  - Deep emissions cuts in all sectors
  - A range of technologies
  - Behavioural changes
  - Increase investment in low carbon options

Strengthening the Global Response in the Context of Sustainable Development and Efforts to Eradicate Poverty

Climate change and people

- Close links to United Nations Sustainable Development Goals (SDGs)
- Mix of measures to adapt to climate change and reduce emissions can have benefits for SDGs
- National and sub-national authorities, civil society, the private sector, indigenous peoples and local communities can support ambitious action
- International cooperation is a critical part of limiting warming to 1.5° C

Example of synergies: Energy efficiency in the building sector

It offers many opportunities in reducing bills and pollution, enhancing meaningful economic activity, improving wellbeing…

@JPvanYpersele

Trying to practice what I « preach »

External insulation with wood fiber

Example of synergies: Combustion of fossil fuels, wood, and biomass also causes air pollution, which kills 7 million people per year (World Health Organization, 2018)

Opportunity: Addressing the causes of climate change can also improve air quality and wellbeing

@JPvanYpersele

Children are particularly sensitive to air pollution

Photo: Indiatoday.in, 6-12-2017

An example from SR15: CDR, trade-offs & synergies

- C3.5 **Some AFOLU-related CDR** (Carbon Dioxide Removal) measures such as restoration of natural ecosystems and soil carbon sequestration **could provide co-benefits** such as improved **biodiversity**, **soil** quality, and local **food security**.
- If deployed at large scale, they **would require governance systems** enabling sustainable land management to conserve and protect land carbon stocks and other ecosystem functions and services (medium confidence).

From SR15: Possible conflicts with food security

- C2.5 Model pathways that limit global warming to 1.5°C with no or limited overshoot project the **conversion** of **0.5–8 million km2 of pasture** and **0–5 million km2 of non-pasture agricultural land for *food and feed* crops *into* 1–7 million km2 for *energy* crops** … (medium confidence).

IPCC SR15
Fig SPM 4

Indicative linkages between mitigation options and sustainable development using SDGs (The linkages do not show costs and benefits)

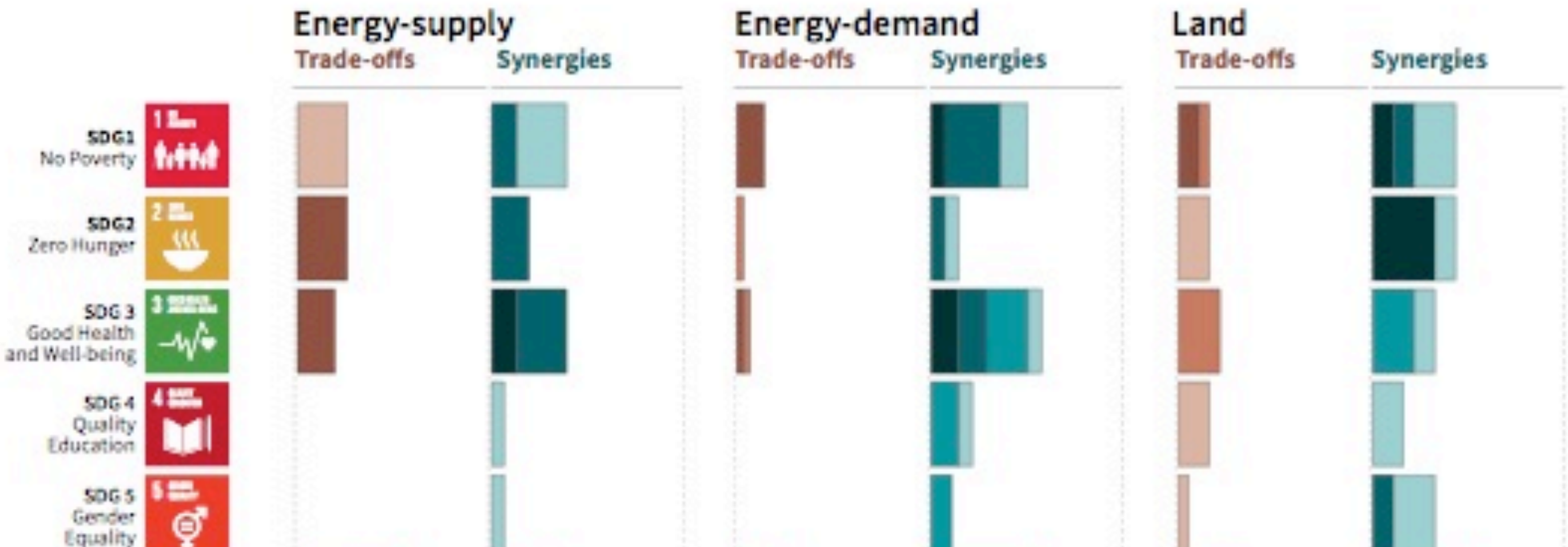
Mitigation options deployed in each sector can be associated with potential positive effects (synergies) or negative effects (trade-offs) with the Sustainable Development Goals (SDGs). The degree to which this potential is realized will depend on the selected portfolio of mitigation options, mitigation policy design, and local circumstances and context. Particularly in the energy-demand sector, the potential for synergies is larger than for trade-offs. The bars group individually assessed options by level of confidence and take into account the relative strength of the assessed mitigation-SDG connections.

Length shows strength of connection

The overall **size of the coloured bars** depict **the relative** for synergies and trade-offs between the sectoral mitigation options and the SDGs.

Shades show level of confidence

The shades depict **the level of confidence** of the assessed potential for **Trade-offs/Synergies**.



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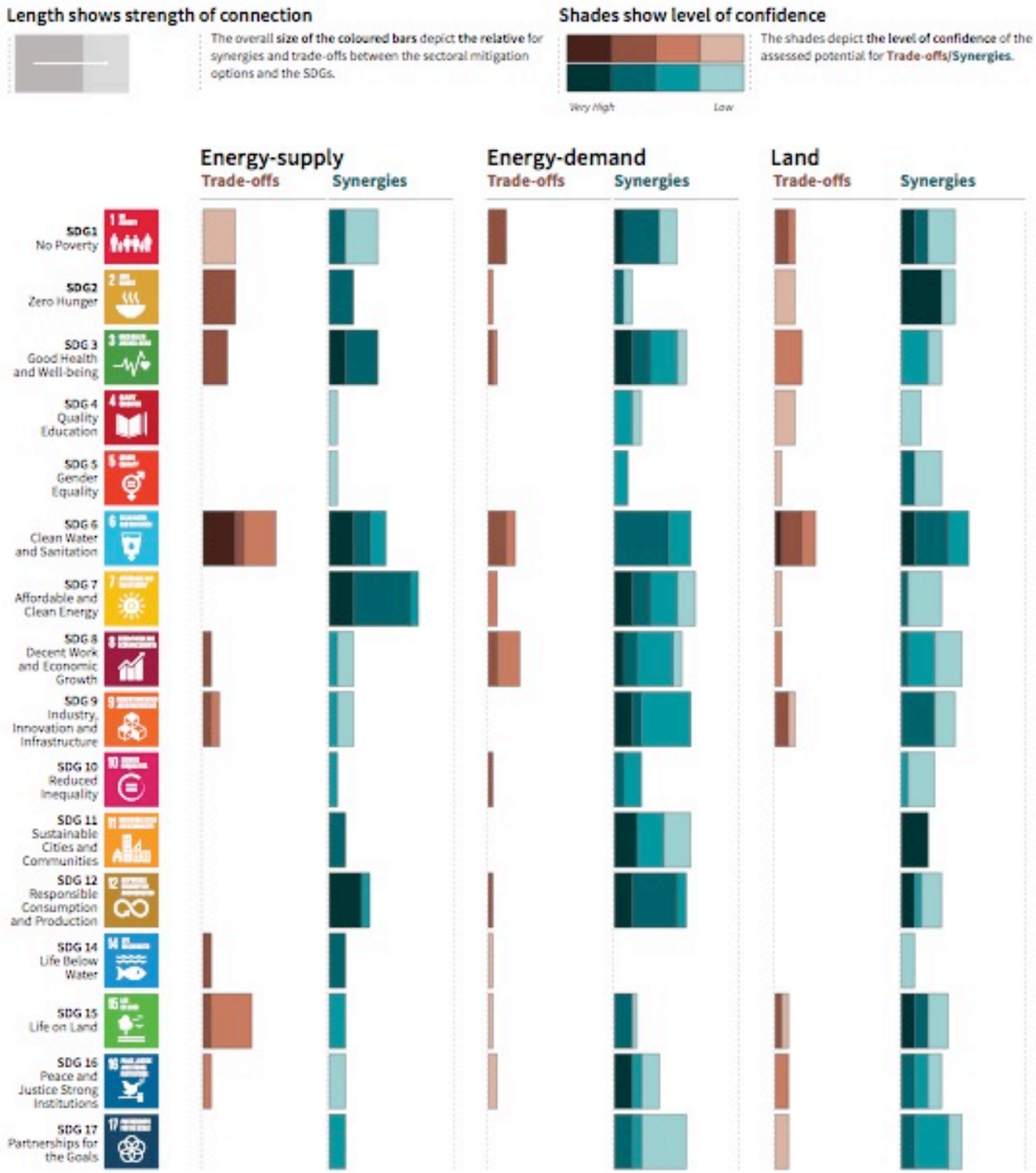


Source: IPCC Special Report on Global Warming of 1.5°C

IPCC SR15
Fig SPM 4

Conclusions

- The challenge is huge: transform the world in a few decades so that the whole world activities are decarbonized, while poverty and hunger are eliminated and the Agenda 2030 achieved!

- Many opportunities for climate action to address in a synergistic manner other societal goals (incl. the 17 Sustainable Development Goals) exist, but particular attention about trade offs is needed.

Twitter: @JPvanYpersele

En français:

Plateforme Wallonne pour le GIEC

Lettre N°5 - juillet 2017

Action climatique et développement durable

Exploiter les synergies, résoudre les incompatibilités

Cette Lettre explore les liens entre objectifs de développement durable, dont l'action en matière climatique. Le développement durable est une matière très vaste, qui peut concerner quasiment tous les aspects des activités humaines, et le parcours que nous proposons ne peut être qu'incomplet. Nous espérons cependant qu'il donne un premier aperçu du potentiel de réalisation de ces multiples objectifs d'une manière intégrée.

Vous trouverez en dernière page les principaux points de l'agenda du GIEC, dont l'appel à participer à la relecture du rapport spécial « Réchauffement global de 1.5°C ».

Disponible gratuitement, 6X/an: www.plateforme-wallonne-giec.be

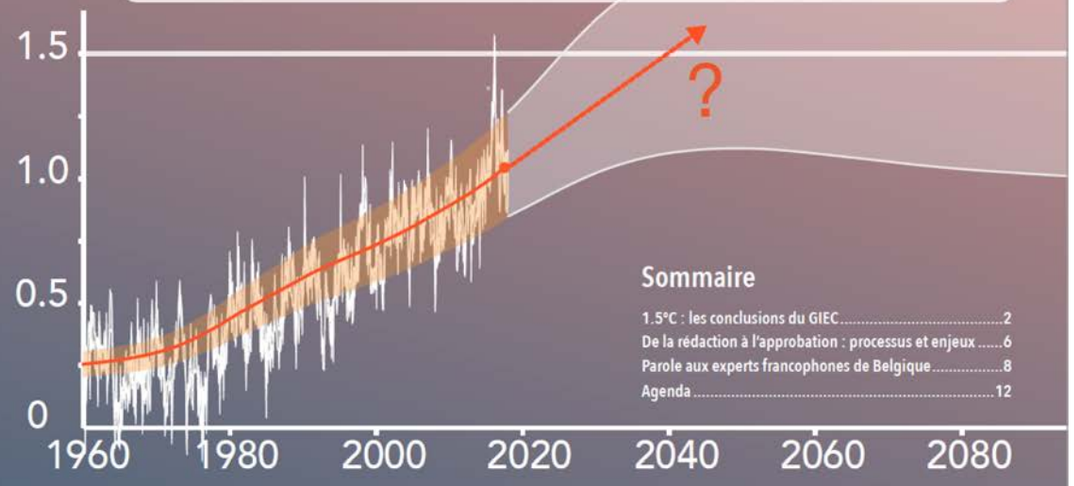
En français:

Plateforme Wallonne pour le GIEC

Lettre N°11 - octobre 2018

Le rapport spécial du GIEC

Réchauffement planétaire de 1.5°C



Sommaire

Pour de nombreuses populations et écosystèmes, il est essentiel de limiter le réchauffement à 1.5°C ou de ne dépasser ce niveau que temporairement. Et c'est potentiellement encore réalisable. Le 6 octobre 2018, l'assemblée Plénière du GIEC a adopté le Rapport Spécial sur un « Réchauffement planétaire de 1.5°C », qui fait le point au sujet des impacts et scénarios correspondant à ce niveau de réchauffement.

Ce rapport conclut que pour limiter le réchauffement climatique à 1.5°C, il faut des transformations radicales et rapides dans tous les domaines de notre société. Il précise que ces changements sont sans précédent en termes d'échelle, mais pas nécessairement en termes de rapidité.

L'origine du rapport est une demande formelle au GIEC de la part des Parties à la Convention cadre des Nations Unies sur les changements climatiques (CCNUCC) lors de l'adoption de l'Accord de Paris, en 2015 (21e Conférence des Parties, COP21). La COP21 avait aussi indiqué que le rapport du GIEC devrait identifier le niveau auquel les émissions mondiales devraient être ramenées en 2030 pour contenir l'élévation de température en-dessous de 1.5°C.

Le rapport a été adopté à l'issue d'une semaine de discussions intenses au sujet de la formulation du Résumé à l'intention des décideurs, sur la base des chapitres et du projet de résumé rédigés par les scientifiques - qui ont toujours le dernier mot en ce qui concerne le contenu. Il forme une base scientifique essentielle pour les prochaines négociations internationales dans le cadre de la CCNUCC, qui auront lieu à Katowice (Pologne) en décembre 2018 (COP24).

Dans cette Lettre, nous donnons d'abord un aperçu des conclusions du rapport, ensuite un aperçu du processus d'approbation et des enjeux associés. Pour ouvrir le débat et fournir un ensemble de points de vue, nous avons ensuite donné la parole aux experts francophones de Belgique, qui nous ont aimablement fait part des commentaires que vous trouverez en troisième partie. L'agenda indique les prochaines périodes de relecture de rapports du GIEC et annonce deux événements à venir en Belgique.

Nous vous en souhaitons une bonne lecture,
Jean-Pascal van Ypersele, Bruna Gaino et Philippe Marbaix

Image de fond : extrait adapté de la figure SPM1 du Rapport spécial

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To go further :

- www.ipcc.ch : IPCC
- www.climate.be/vanyp : my slides (under « conferences)
- www.plateforme-wallonne-giec.be : IPCC-related in French, Newsletter, latest on SR15, previous on CC & SDGs
- **Twitter: @JPvanYpersele & @IPCC_CH**

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