

# **Ecological Transition & Climate Change: Global Challenge, Global Opportunities**

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**Justice and Peace Commission for Europe,**

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and to my team at the Université catholique de Louvain for their support**

# The Essential Truth About Climate Change in Ten Words

The basic facts of climate change, established over decades of research, can be summarized in five key points:

IT'S REAL

IT'S US

EXPERTS AGREE

IT'S BAD

THERE'S HOPE

Global warming is happening.

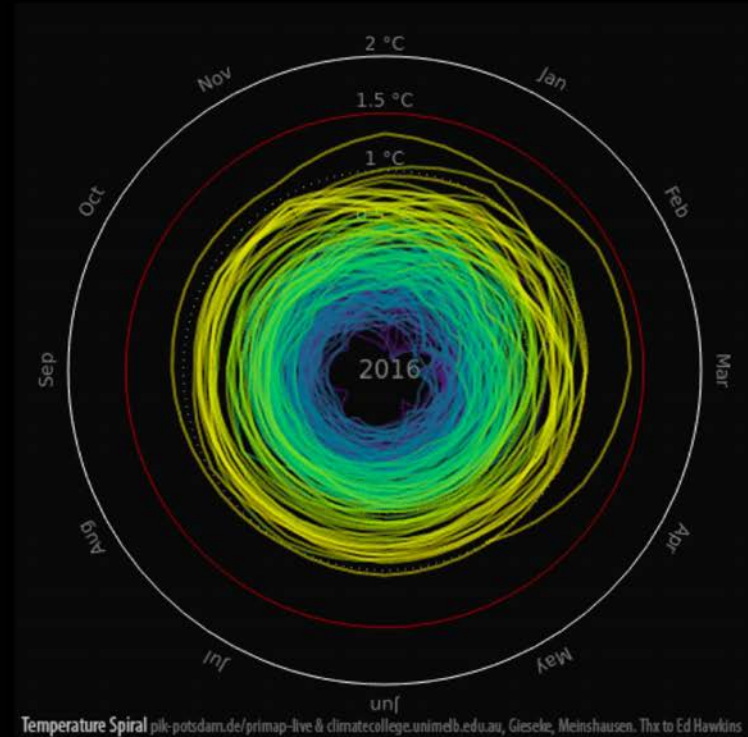
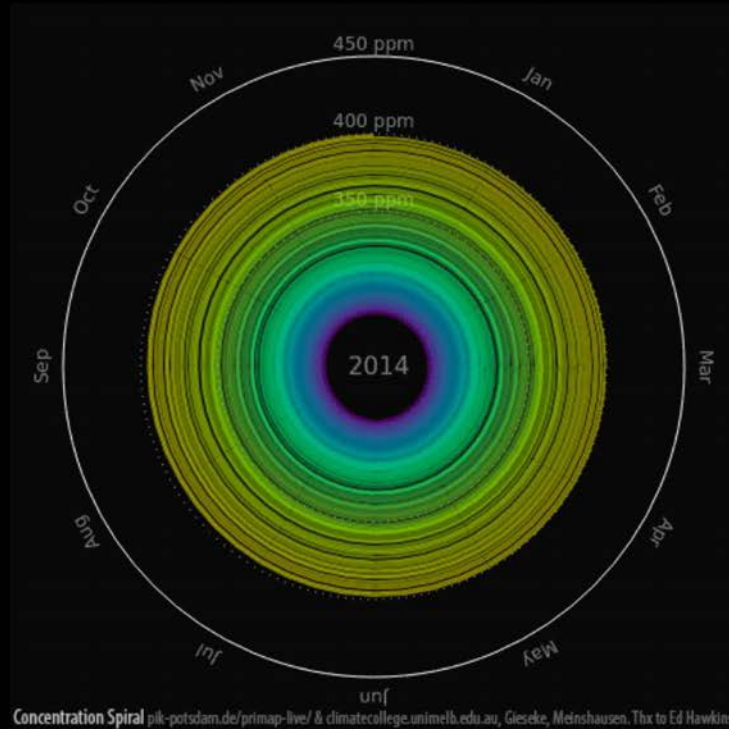
Human activity is the main cause.

There's scientific consensus on human-caused global warming.

The impacts are serious and affect people.

We have the technology needed to avoid the worst climate impacts.

# CO<sub>2</sub> Concentration and Temperature spirals



CO<sub>2</sub> Concentration since 1850 and Global Mean Temperature in °C relative to 1850 – 1900  
Graph: Ed Hawkins (Climate Lab Book) – Data: HadCRUT4 global temperature dataset  
Animation available on <http://openclimatedata.net/climate-spirals/concentration-temperature/>

**Fact: Extreme weather events are becoming more frequent or intense due to climate change, sealevel rise threatens coastal communities...**

# Heat waves kill



Une personne âgée dans un couloir des urgences du centre hospitalier de Versailles en août 2003. | AFP PHOTO MARTIN BUREAU



## Floods cause a lot of suffering



**Kiribati, after tropical storm Pam**  
Source: Plan international Australia

## Wallonia Floods, July 2021



Source:  
VRT Nieuws



**Risk = Hazard x Vulnerability x Exposure**  
**(Katrina flood victim, New Orleans, 2005)**



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

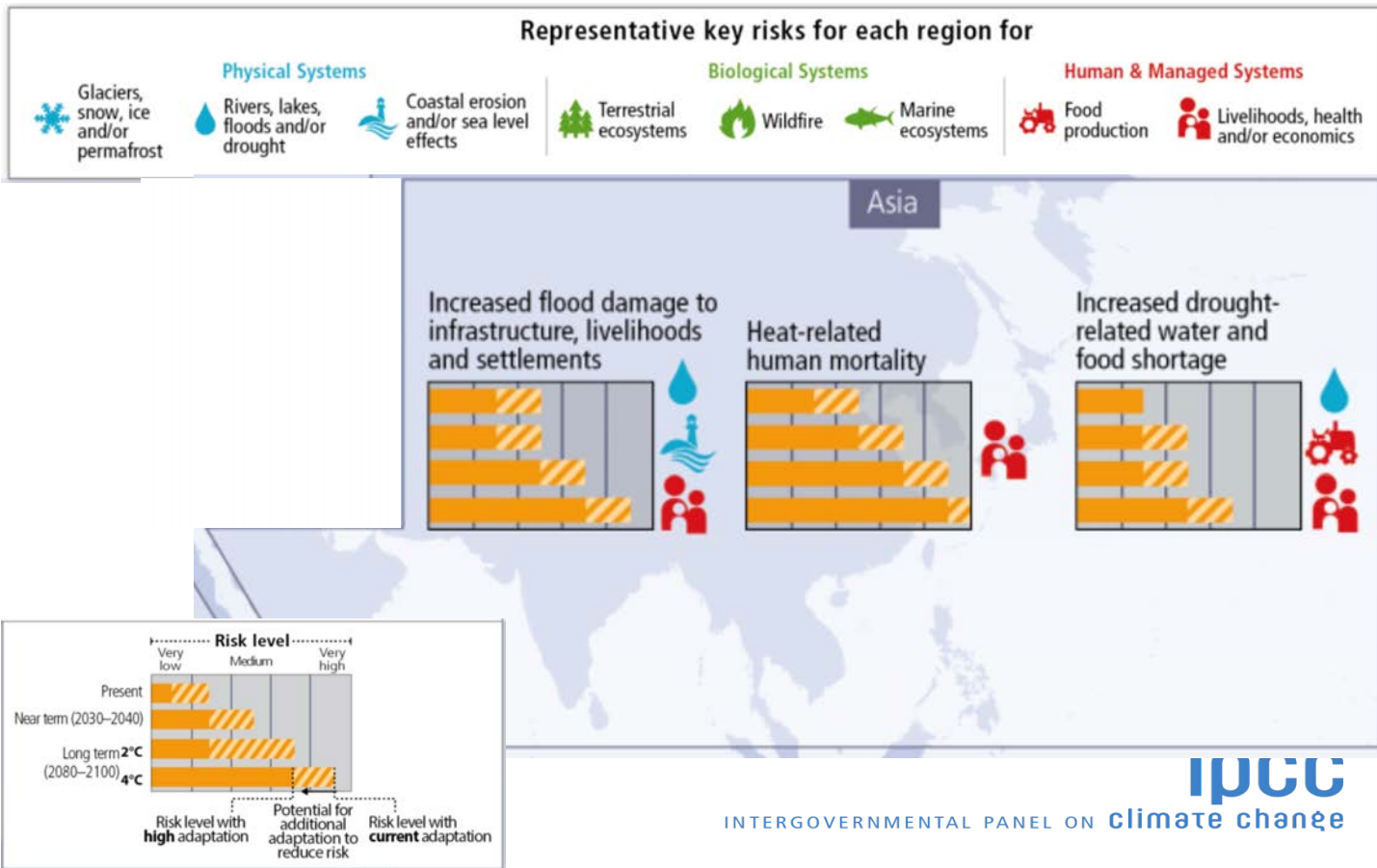


Flood risk adaptation in Bangladesh (example):  
cyclone shelters, awareness raising, forecasting and warning

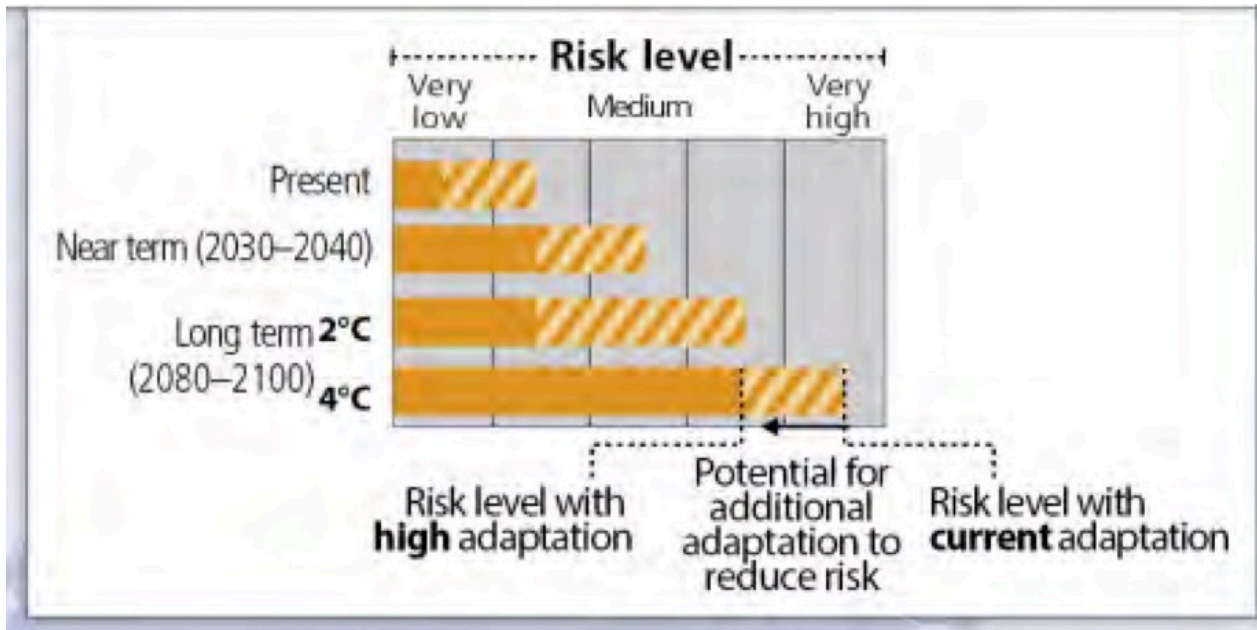


photo: Dr Thorsten Klose/German Red Cross (2010), evaluation of the  
Community Based Disaster Preparedness Programme run by the Red Cross in 1996-2002

# Regional key risks and potential for risk reduction: Asia (IPCC, AR5, SPM, Figure SPM.8)

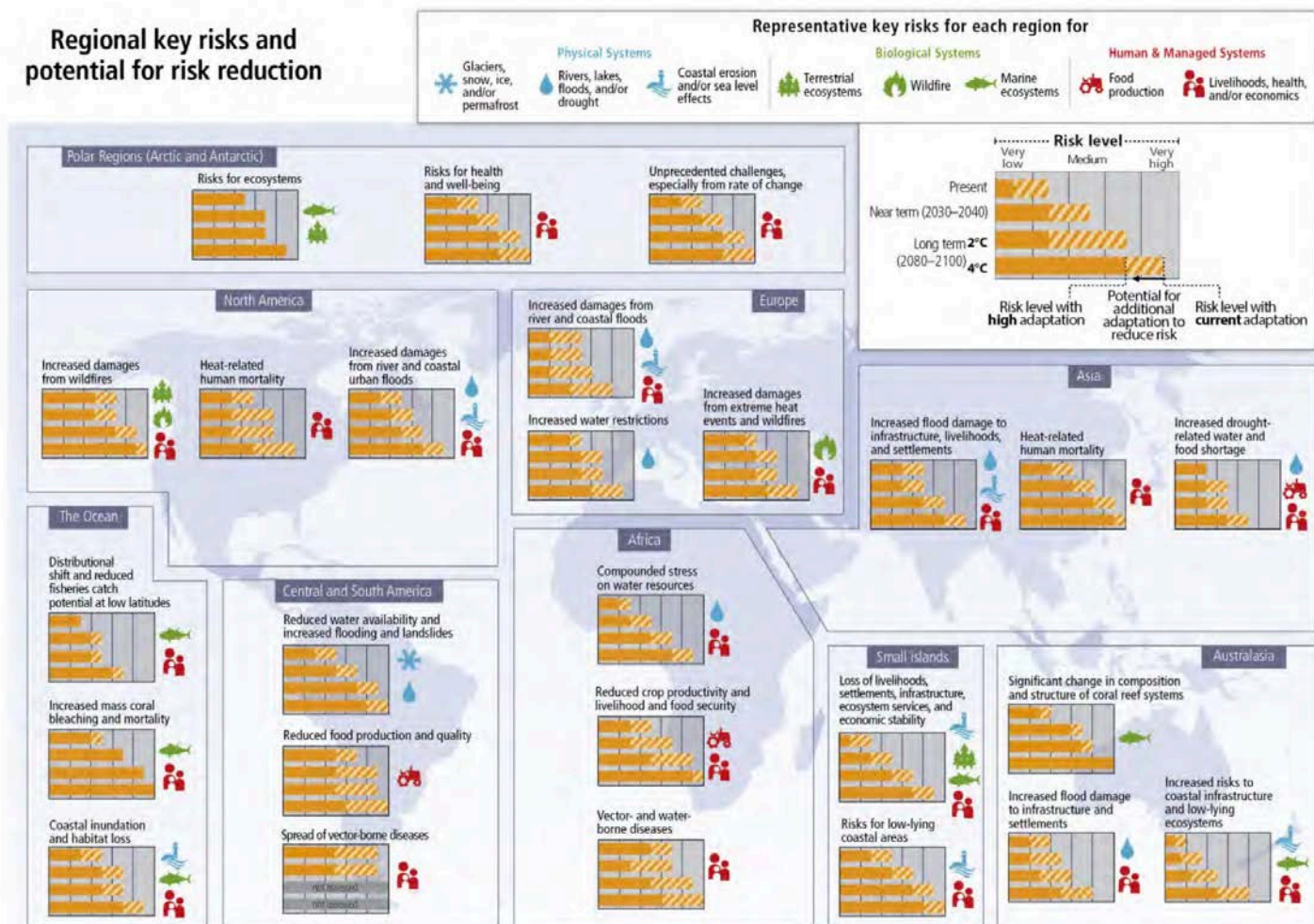


# Regional key risks and potential for risk reduction through adaptation





# Regional key risks and potential for risk reduction





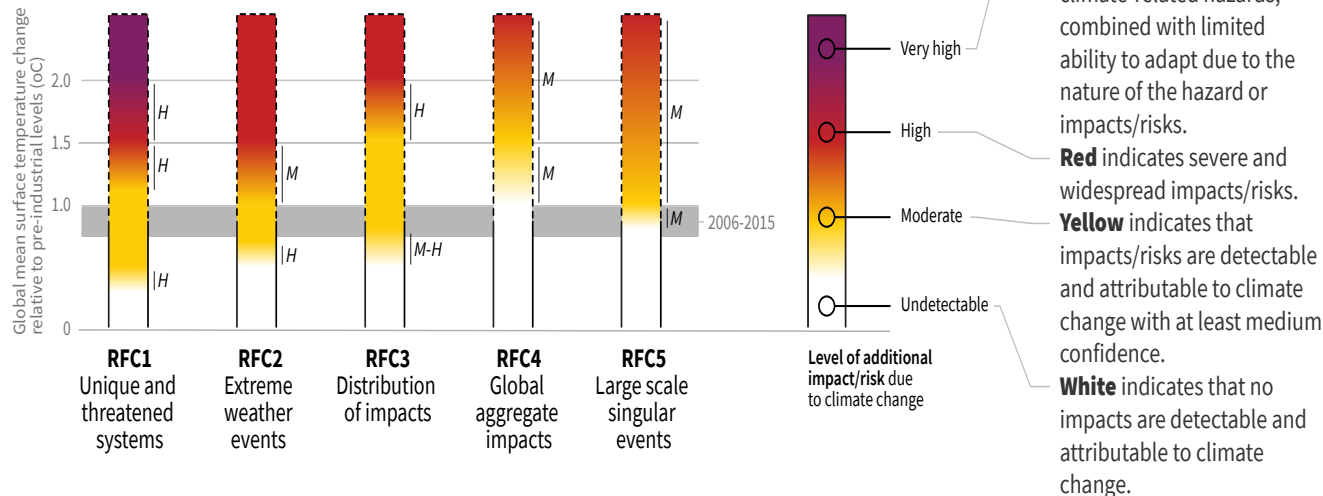
## **John Holdren, President of the American Association for the Advancement of Science, Obama Science Adviser**

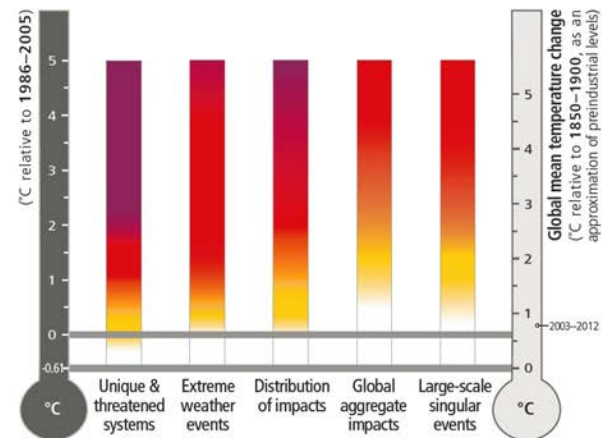
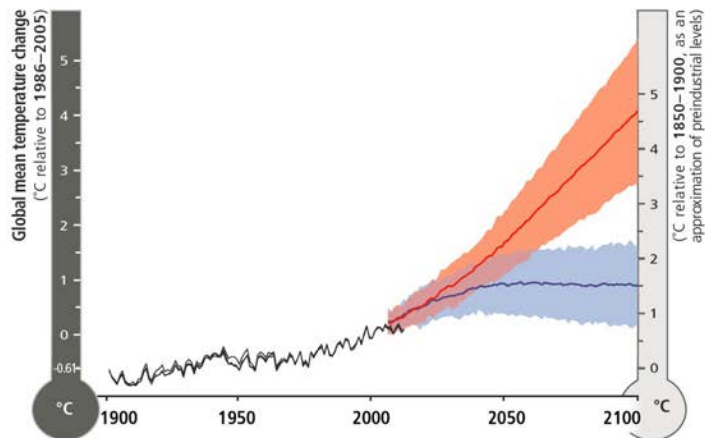
- ***‘We basically have three choices – mitigation, adaptation, and suffering.***
- ***We’re going to do some of each. The question is what the mix is going to be.***
- ***The more mitigation we do, the less adaptation will be required, and the less suffering there will be.’***

# 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)





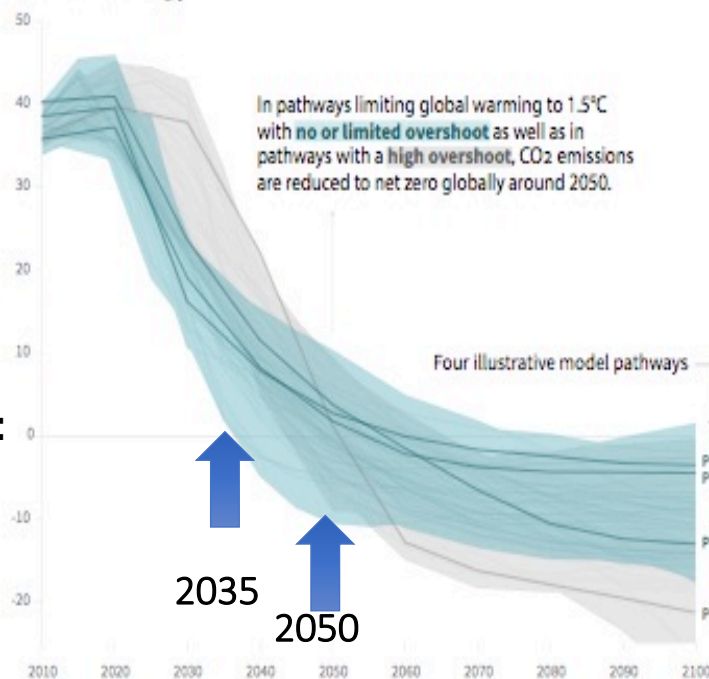
#### Level of additional risk due to climate change

Undetectable Moderate High Very high

# Emission pathways compatible with below 1.5° C warming:

## Global total net CO<sub>2</sub> emissions

Billion tonnes of CO<sub>2</sub>/yr



Net ZERO:

2035

2050

### Timing of net zero CO<sub>2</sub>

Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios



Pathways limiting global warming to 1.5°C with no or low overshoot

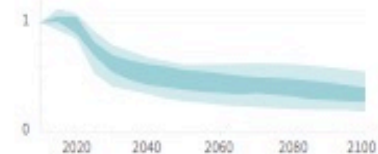
Pathways with high overshoot

Pathways limiting global warming below 2°C (Not shown above)

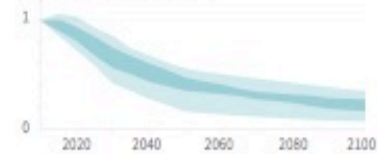
## Non-CO<sub>2</sub> emissions relative to 2010

Emissions of non-CO<sub>2</sub> forcings are also reduced or limited in pathways limiting global warming to 1.5°C with no or limited overshoot, but they do not reach zero globally.

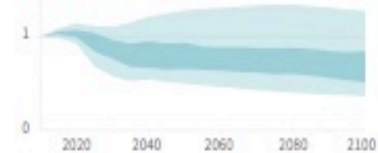
### Methane emissions



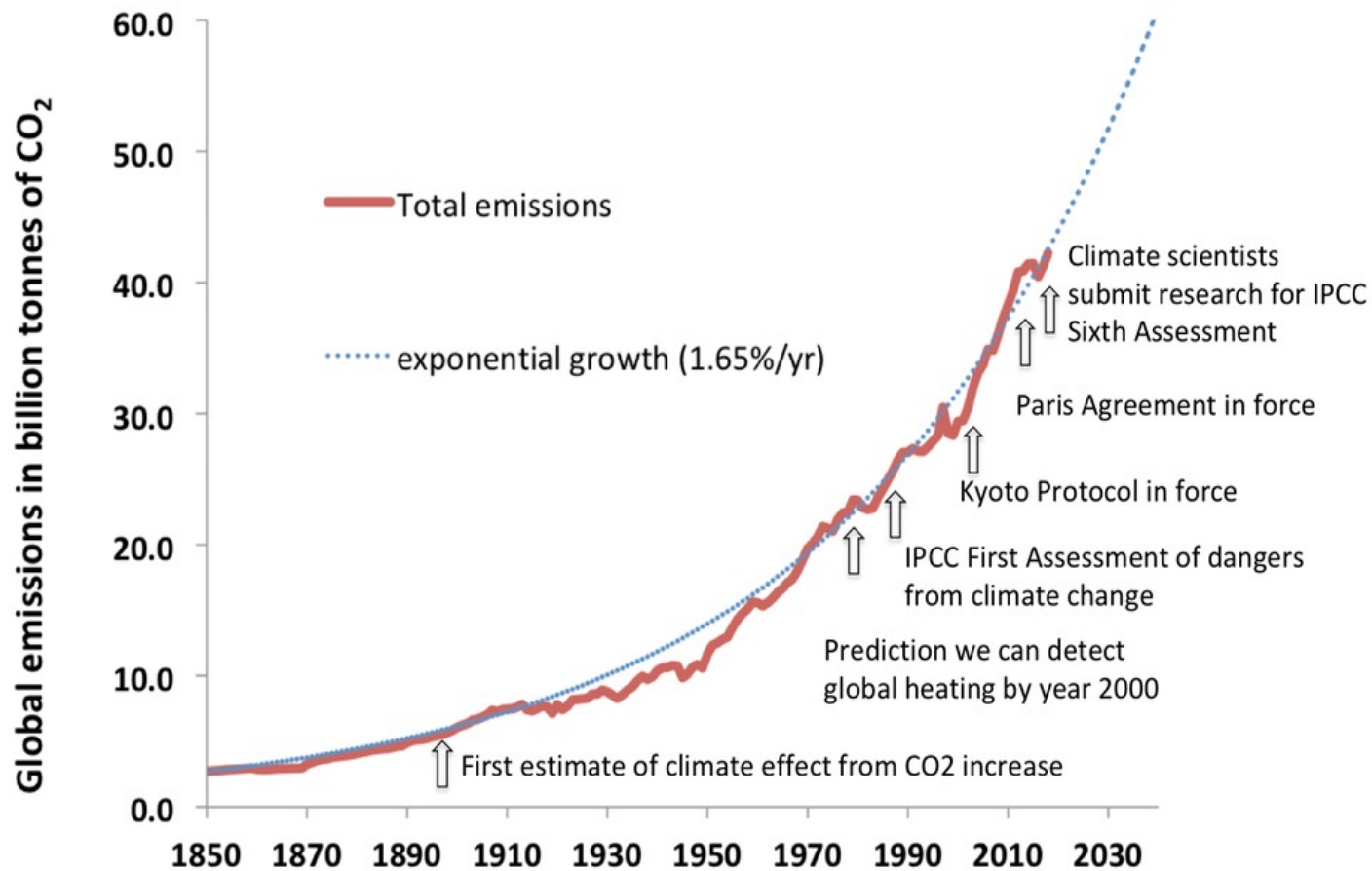
### Black carbon emissions



### Nitrous oxide emissions

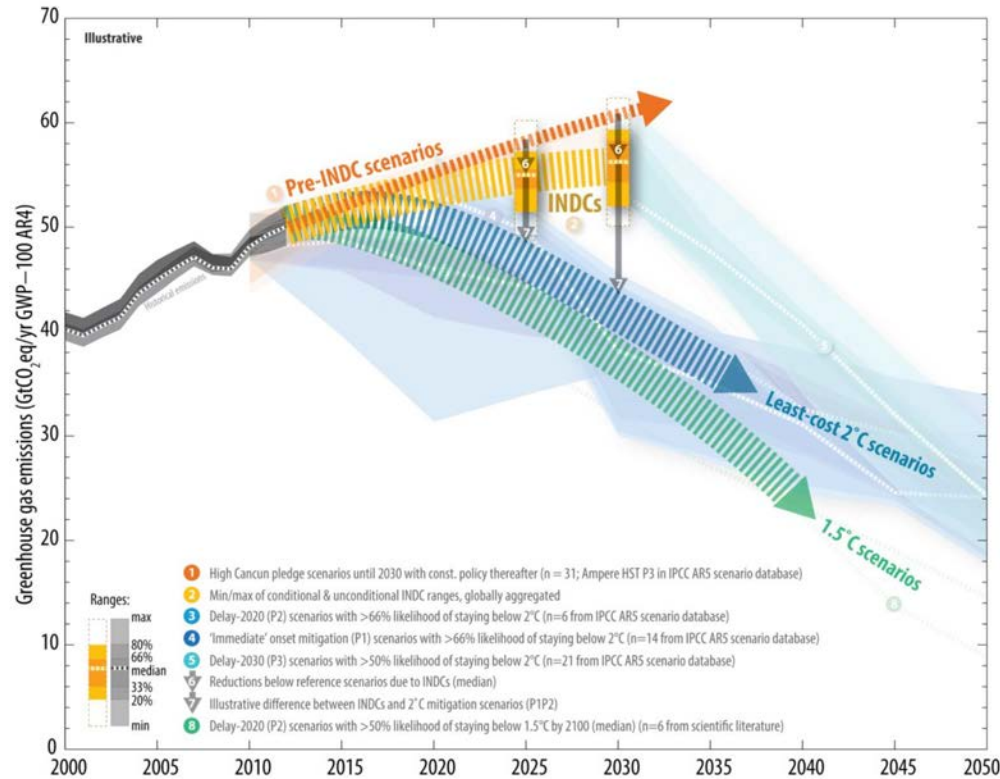






Source: Wolfgang Knorr, in The Conversation (2019)

# Comparison of global emission levels in 2025 and 2030 resulting from the implementation of the intended nationally determined contributions



UNFCCC, Aggregate effect of the intended nationally determined contributions: an update

<http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf>



## 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

# Mitigation Measures



More efficient use of energy



**Greater use of low-carbon and no-carbon energy**

- Many of these technologies exist today
- But worldwide investment in **research** in support of GHG mitigation is small...



**Improved carbon sinks**

- **Reduced deforestation** and improved forest management and planting of new forests
- **Bio-energy with carbon capture and storage**



Lifestyle and behavioural changes

AR5 WGIII SPM



**Solution: Economic actors must  
be confronted much more  
clearly with their  
responsibilities**

Degrowth of climate-unfriendly activities  
must be accepted, while growth of activities  
helping climate protection and poverty  
eradication must be encouraged

**Solution: Transition towards a  
clean and sustainable economy  
and energy system must be  
« just », and other synergies with  
the SDGs must be sought**



# SUSTAINABLE DEVELOPMENT GOALS



**Solution: Before looking at how to produce energy cleanly, much more attention must be given to reducing energy demand and efficiency, in all sectors**

All production and consumption patterns must be reconsidered, helped by energy audits, etc.



- **Substantial reductions in emissions to stay under 2° C would require large changes in investment patterns e.g., from 2010 to 2029, in billions US dollars/year:** (mean numbers rounded, IPCC AR5 WGIII Fig SPM 9)

• <b>energy efficiency:</b>	<b>+330</b>
• <b>renewables:</b>	<b>+ 90</b>
• <b>power plants w/ CCS:</b>	<b>+ 40</b>
• <b>nuclear:</b>	<b>+ 40</b>
• <b>power plants w/o CCS:</b>	<b>- 60</b>
• <b>fossil fuel extraction:</b>	<b>- 120</b>

**Solution: Building sector: offers  
many opportunities in energy  
saving, economic activity, improving  
wellbeing...**

Trying to be coherent (external insulation)



**Solution: Mobility : much more space  
and priority to pedestrians, bicycles,  
and public transport; reduce priority  
given too long to individual transport in  
urban planning**

Electrify remaining vehicles (with clean  
electricity). Fly less, only if essential.



Foto Marieke de Lange / OEK (Fietzersbond Amsterdam)



**Solution: Food and agriculture. A possible change with big positive impact: eat less (red) meat and cheese, of better quality! Eat more plant-based food (produced cleanly)**

**...It is good for health as well!**

## *A move to more balanced diets could help us adapt to and limit climate change*

- Some diets require more land and water and lead to higher emissions than others.
- Diets high in grains, nuts and vegetables have a lower carbon footprint than those that are high in meat, and lead to better health outcomes.
- Dietary choices are influenced by local production practices and cultural habits.

31

**Solution: The Sun gives us in two hours  
about as much energy as the world uses in  
*one year*, all forms of energy considered**

The cost of solar kWh is crashing, wind  
power, heat and electricity storage, and  
smart grids are moving forward

Trying to be coherent...



**Solution : Move the finance sector  
towards climate-friendly and  
ethical investments promoting the  
17 Sustainable Development Goals**

**NB: Up to now, ethical/green investments  
are still marginal for most banks**

# **If well designed, measures to prevent climate change could offer so many opportunities:**

- **Co-benefits in reduced pollution, health improvement, employment, gender equality, food security, reduced poverty, energy independence...**
- **Opportunities to shift the tax burden away from labour and implement sustainable development**
- **Opportunities to integrate research results in a useful, policy-relevant way, accross disciplines (including social sciences)**





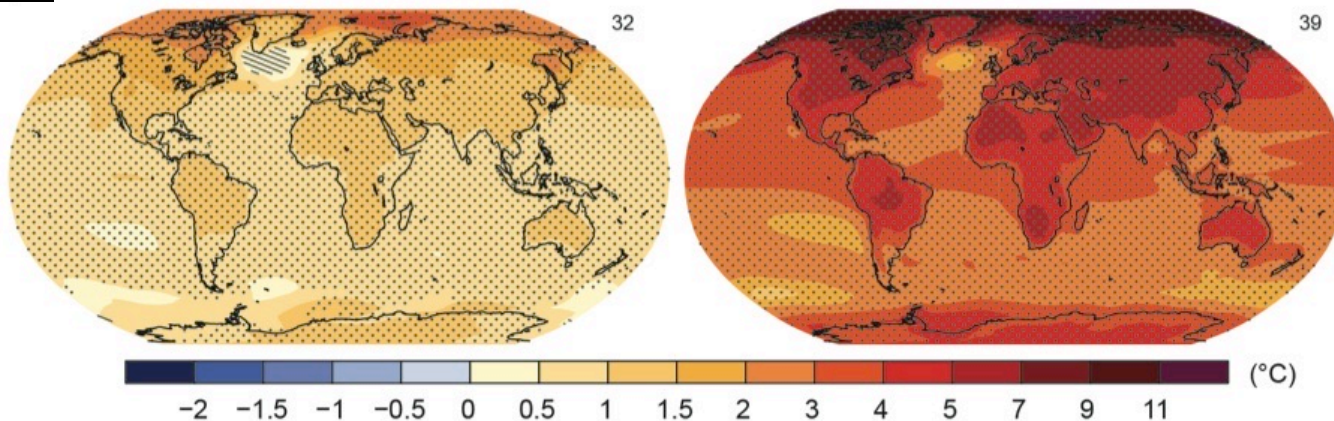
Joel Pett, USA Today

# RCP2.6

# RCP8.5

Change in average surface temperature (1986–2005 to 2081–2100)

Fig. SPM.8



Humanity has the choice

# Conclusions

**The inhabitability of the Earth is at stake due to climate change**

**Adaptation is key, and resources need to be much better shared and managed, but adaptation will not be sufficient at all**

**Stabilizing the temperature as close as possible to no more than 1.5°C above the pre-industrial is essential, and requires to move away quickly from fossil fuels, and to stop deforestation**

**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**

**Addressing this challenge opens so many opportunities, including opportunities to address in a synergistic manner other societal goals, such as the 17 Sustainable Development Goals.**

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Le réveil climatique

JEAN-PASCAL VAN YPERSELE - DIRK DRAULANS

LE VIF



LE VIF

# CLIMAT : ÉTAT D'URGENCE POURQUOI IL N'Y A PLUS DE TEMPS À PERDRE

JEAN-PASCAL VAN YPERSELE - DIRK DRAULANS



# DAT POLITICI OVER TWINTIG JAAR NIET KOMEN JANKEN DAT ZE HET NIET WISTEN.



**DIRK DRAULANS**

(1956) is bioloog, doctor in de wetenschappen en was gastonderzoeker aan de University of Oxford. Sinds 1987 is hij journalist bij Knack.



**JEAN-PASCAL  
VAN YPERSELE (1957)**

is fysicus en klimatoloog. Hij is hoogleraar klimatologie en milieuwetenschappen aan de UCLouvain en was ondervoorzitter van het Intergovernmental Panel on Climate Change (IPCC).

BIJLAGE BIJ KNACK VAN 16 SEPTEMBER 2020. MAG NIET LOS VERKOCHT WORDEN.

# HET KLIMAAT ALARM

Dirk Draulans en  
Jean-Pascal van Ypersele



**Knack**

HET KLIMAATALARM

Gratis op  
[www.knack.be/klimaatalarm](http://www.knack.be/klimaatalarm)



# Useful links:

- [www.ipcc.ch](http://www.ipcc.ch) : IPCC (reports and videos)
- [www.unfccc.int](http://www.unfccc.int) : Climate Convention
- [www.climate.be/vanyp](http://www.climate.be/vanyp) : my slides and other documents
- [www.skepticalscience.com](http://www.skepticalscience.com): excellent responses to contrarians arguments
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