



Politiques face aux **défis planétaires** l'exemple du changement climatique

(Thomas Sterner)

Intégrer l'incertitude dans les décisions ou nier la science ?

Claude Henry, Sciences Po Paris,
Université Columbia (New York)

The Storm Sandy







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THE ANTHROPOCENE

nature

WEEKLY JOURNAL OF SCIENCE



THE HUMAN EPOCH

Defining the Anthropocene

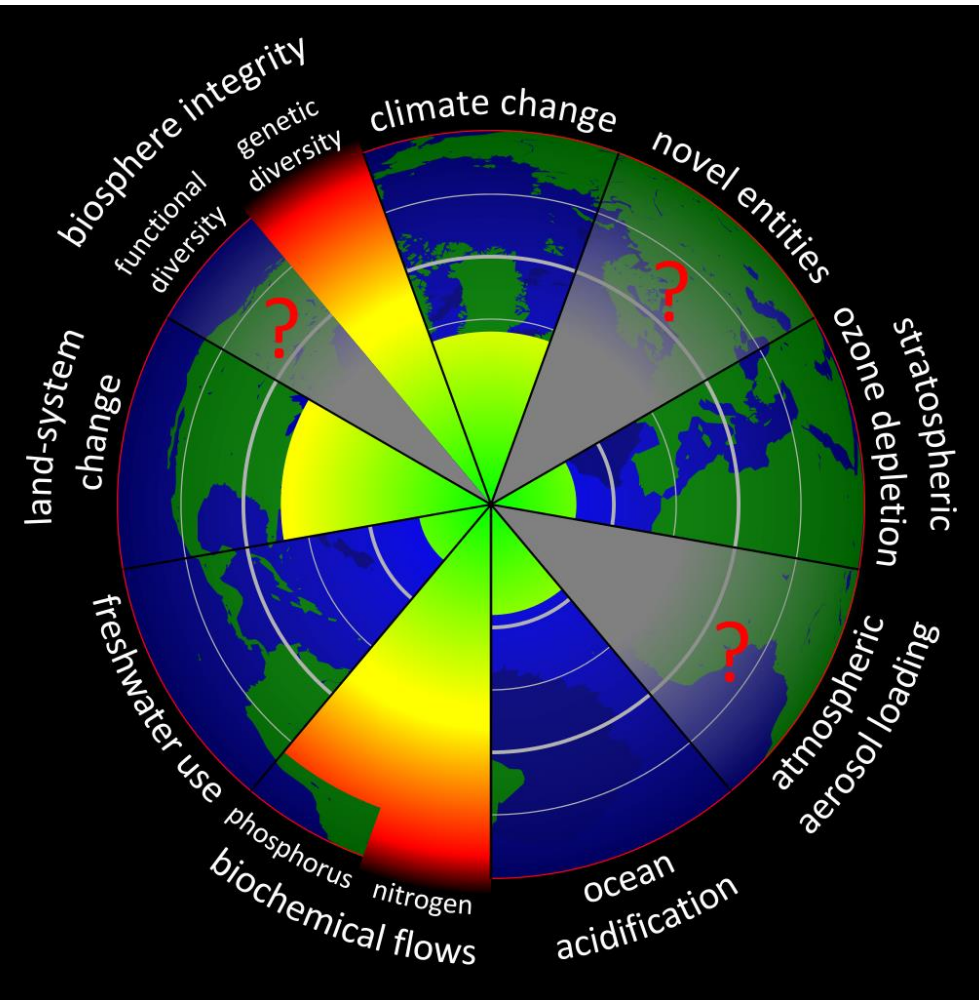
BUILDING BRIDGES
Long, winding structures
link the world's cities

SCIENTIFICALLY SPEAKING
How long has the
middle of the world?

TAKING IT PERSONALLY
Multiple growing
immunities of risk



Franchir les "limites Planétaires"



**O₃, Biodiversité,
L'acidification des
océans, Cycles du
phosphore et de
l'azote...**

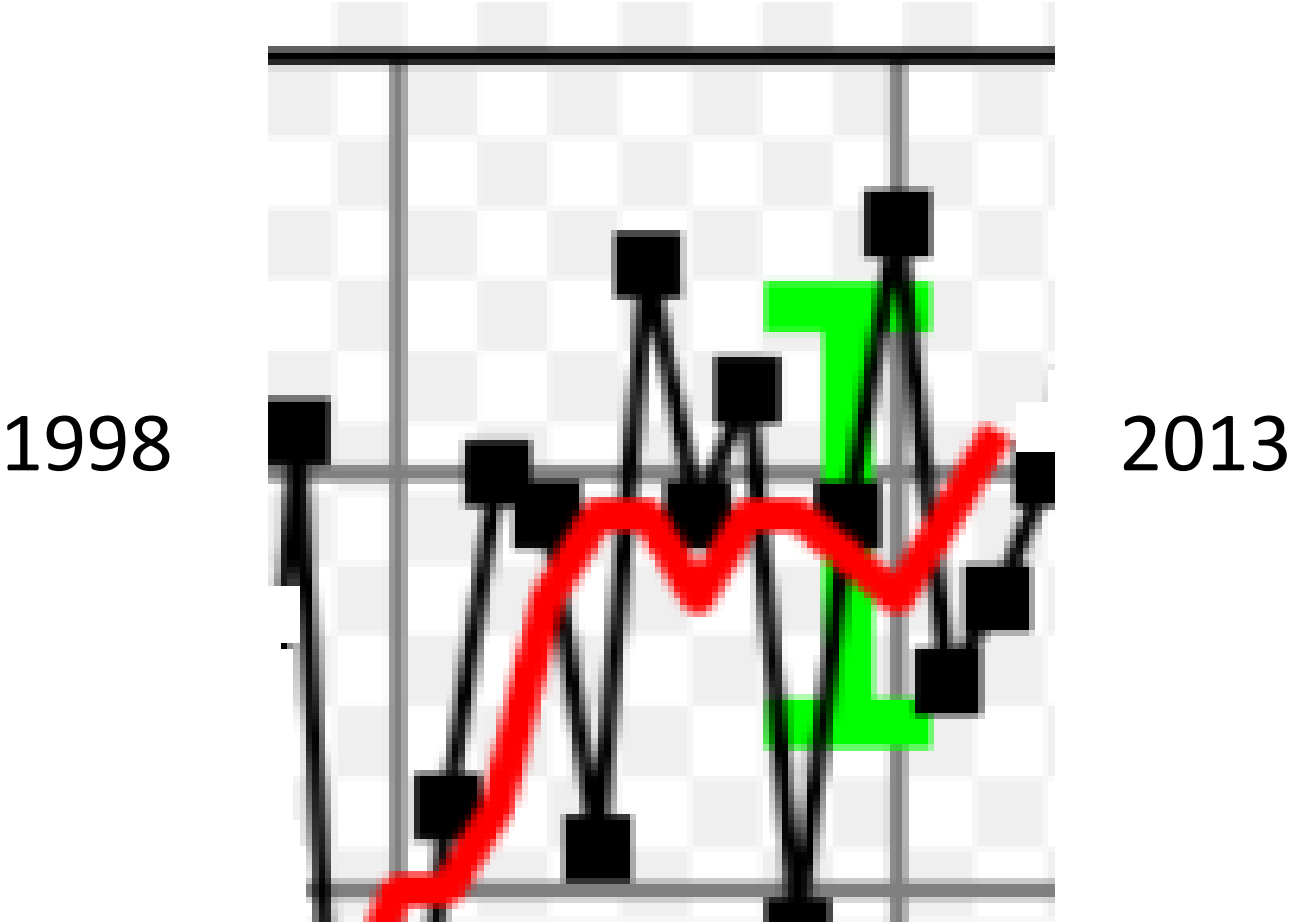
Liste de Défis

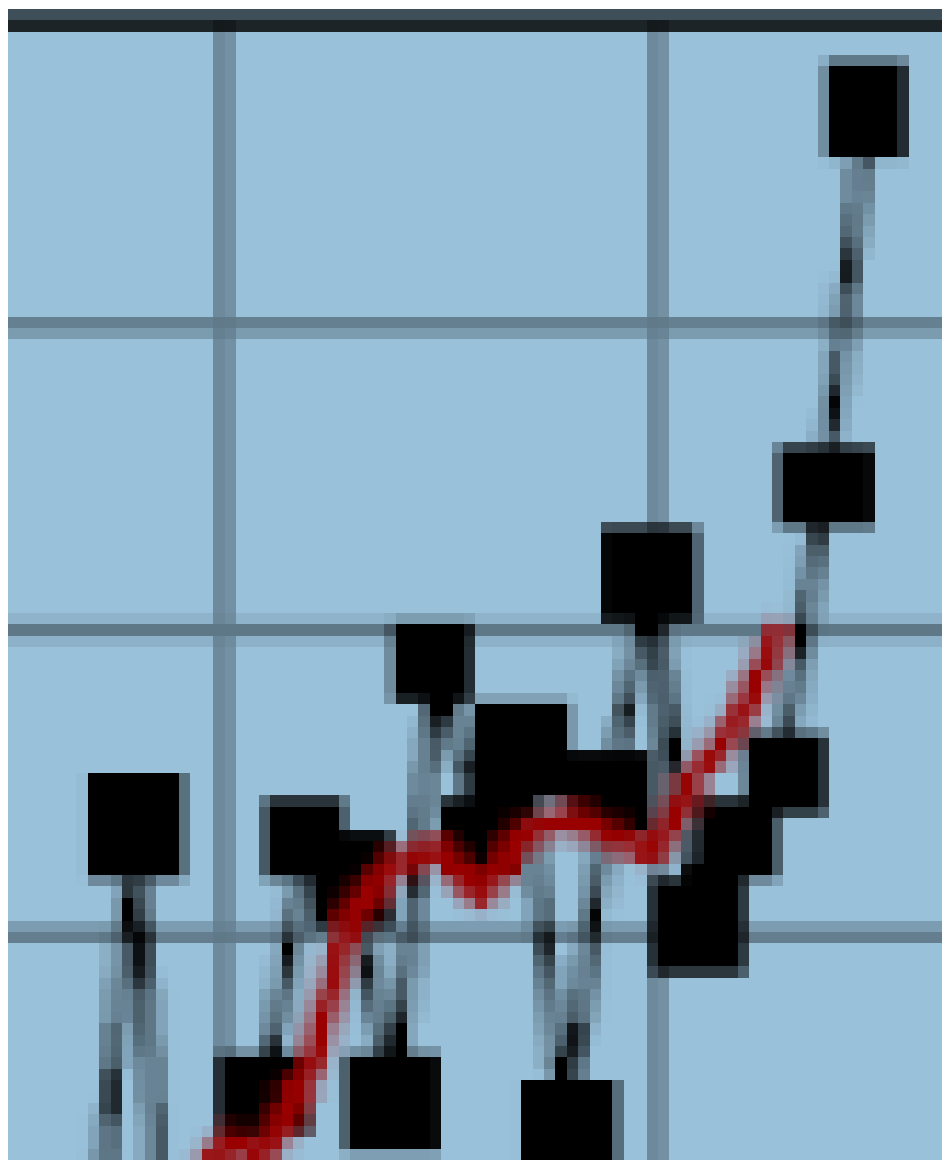
- Climate
- Ozone
- Acidification
- P and N cycles
- Water
- Biodiversity
- Land-use
- MORE, Chemicals...

Gestion des défis planétaires ?

- Batailles Intellectuelles
- Lutte des intérêts et lobbies
- Prennons changement climatique comme ex.

Hiatus de température 1998-2013





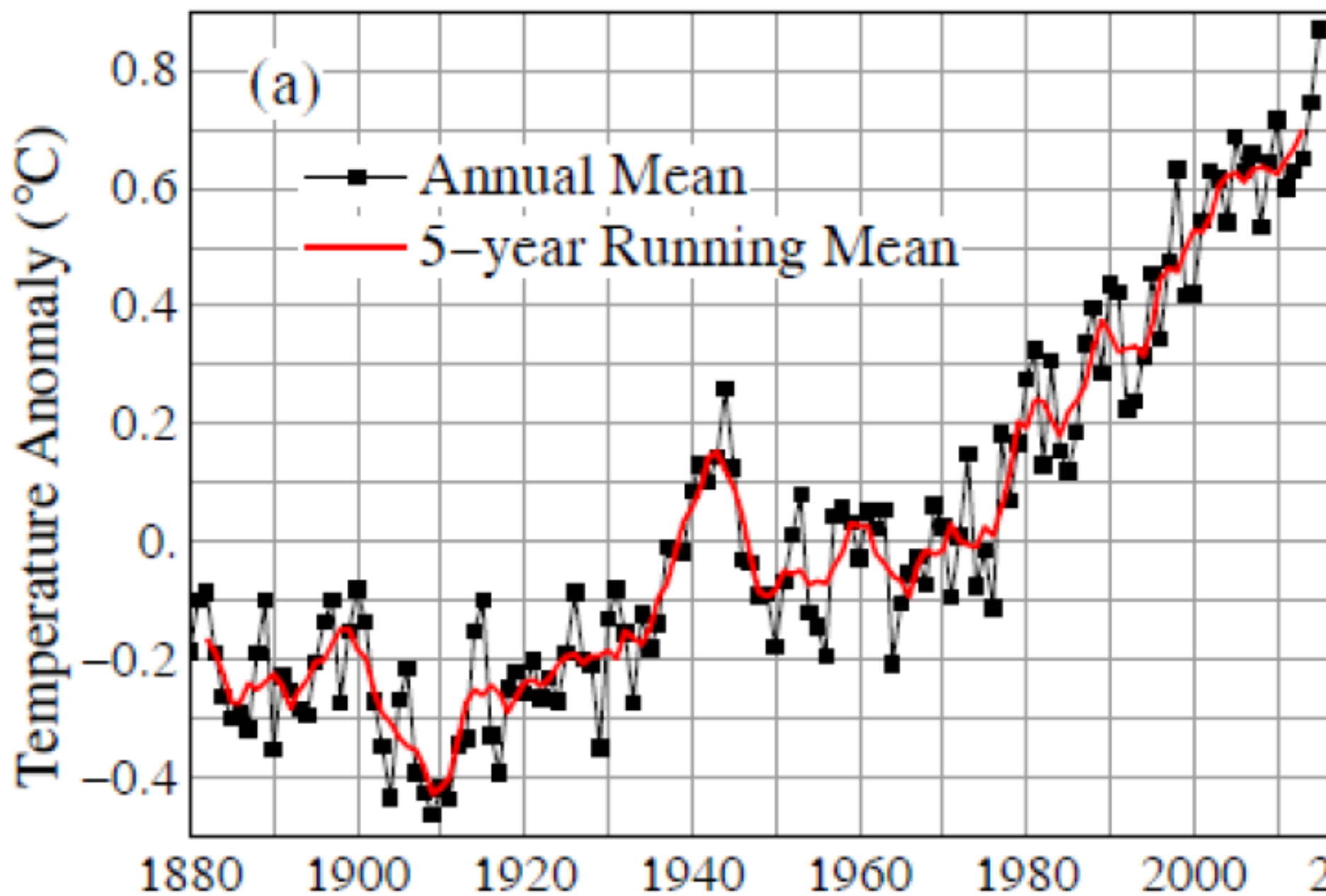


Fig. 1. Global surface temperatures relative to 1951-1980

A Paris on a décidé une
decarbonisation de la planète



The Climate problem

- Very complex
 - Long Run
 - Global Public Good.
-
- Costs now and benefits later
 - Discount rates, Public goods,...

The Climate problem

- Very complex
- Long Run
- Global Public Good.

- Costs now and benefits later
- Discount rates, Public goods,...
- Yes but naive to think that is whole story

Rank

Search company by name

1.



Walmart WMT, 2.27 %

Bentonville, AR
General Merchandisers

2.



Sinopec Group

Beijing, China
Petroleum Refining

3.



Royal Dutch Shell

The Hague, Netherlands
Petroleum Refining

4.



China National Petroleum

Beijing, China
Petroleum Refining

5.



Exxon Mobil XOM, 0.01 %

Irving, TX
Petroleum Refining

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Exxon Mobil XOM, 0.01 %

Irving, TX
Petroleum Refining

BP,
Volkswagen,
Toyota... Total,
Chevron,
Daimler, Exor,
GM, ENI
Gazprom,
Ford,
Petrobras

70%..

Yet the energy sector is
only a few % of GDP

The Koch Brothers

- N 2 parmi compagnies privés, Emploi 100 000 (17)
- Petroleum, chemicals, energy, fiber, minerals, fertilizers, pulp and paper, chemical technology equipment, ranching,
- K Foundations >\$1.5 billion to various causes:
- Tea Party
- Stop Obamacare
- Stop Climate Science (support Hiatus)
- Pledge by senators not to increase climate taxes

Koch Brothers Never Stop: Politicians Sign No New Climate Tax Pledge

SustainableBusiness.com News

The Koch Brothers are taking a cue from

POLITICS

Koch Brothers' Budget of \$889 Million for 2016 Is on Par with Parties' Spending

By NICHOLAS CONFESSORE JAN. 26, 2015



World Bank (2011–2014)

(based on actual data)^[4]

Rank ↕	Country ↕	Int\$ ↕	Year ↕
1	 Qatar	140,649	2014
—	 <i>Macau</i>	139,767	2014
2	 Luxembourg	97,662	2014
3	 Singapore	82,763	2014
4	 Kuwait	73,246	2014
5	 Brunei	71,185	2014
6	 United Arab Emirates	67,674	2014
7	 Norway	64,856	2014
8	 Switzerland	57,235	2014
—	 <i>Hong Kong</i>	55,084	2014
9	 United States	54,629	2014
—	 <i>Bermuda</i>	52,347	2013
10	 Saudi Arabia	51,924	2014



- The reduction of subsidies **to fossil fuels (for GHG related activities)** can achieve emission reductions **at negative social cost** depending on the social and economic context (*high confidence*). Since AR4 a small but growing literature has quantified emission reductions from subsidy reform and suggests that complete removal of s-----]

Ah But subsidised Diesel is very good. The saudis give us for free....

Copenhagen



Succé

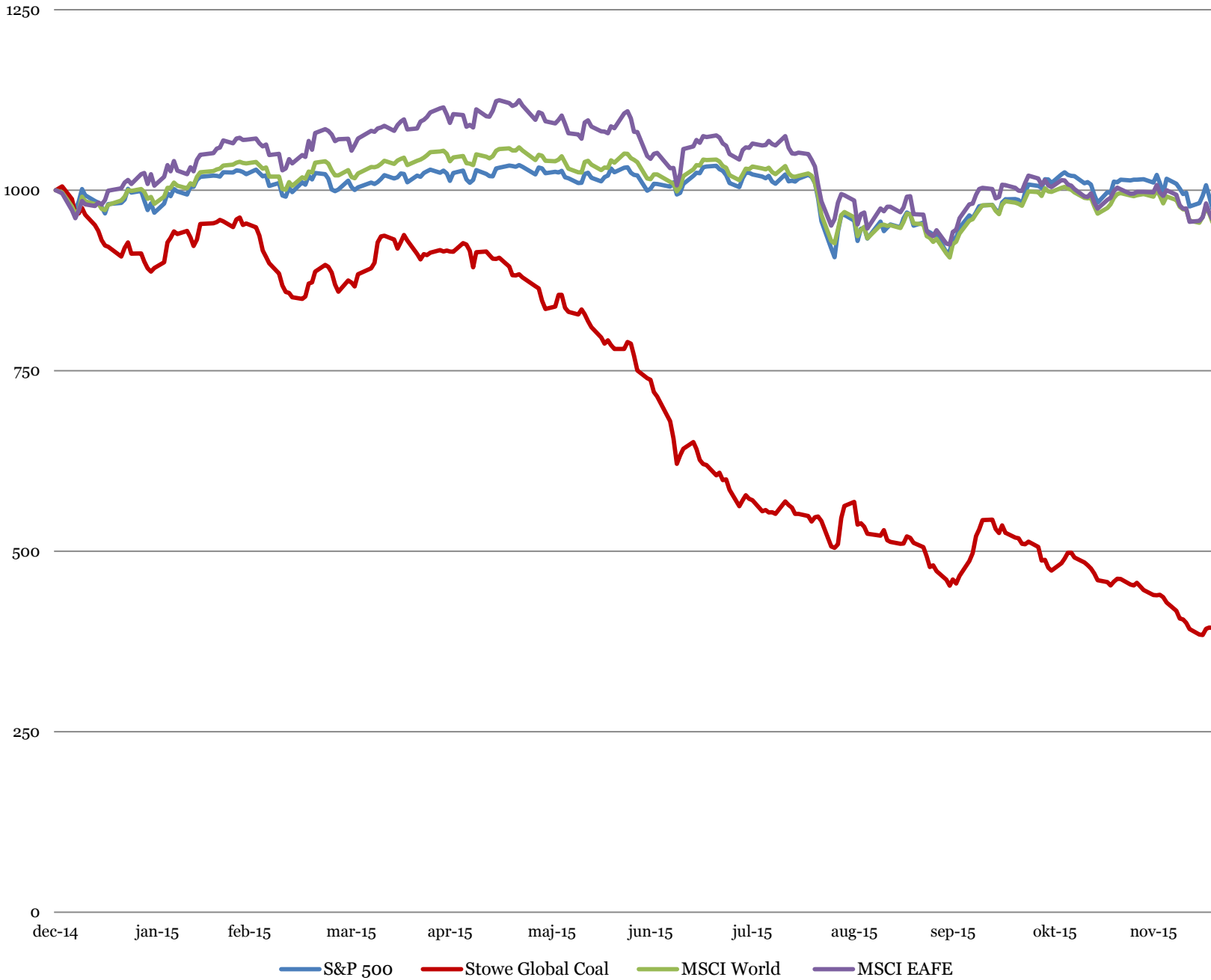
Nations Unies
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris, France



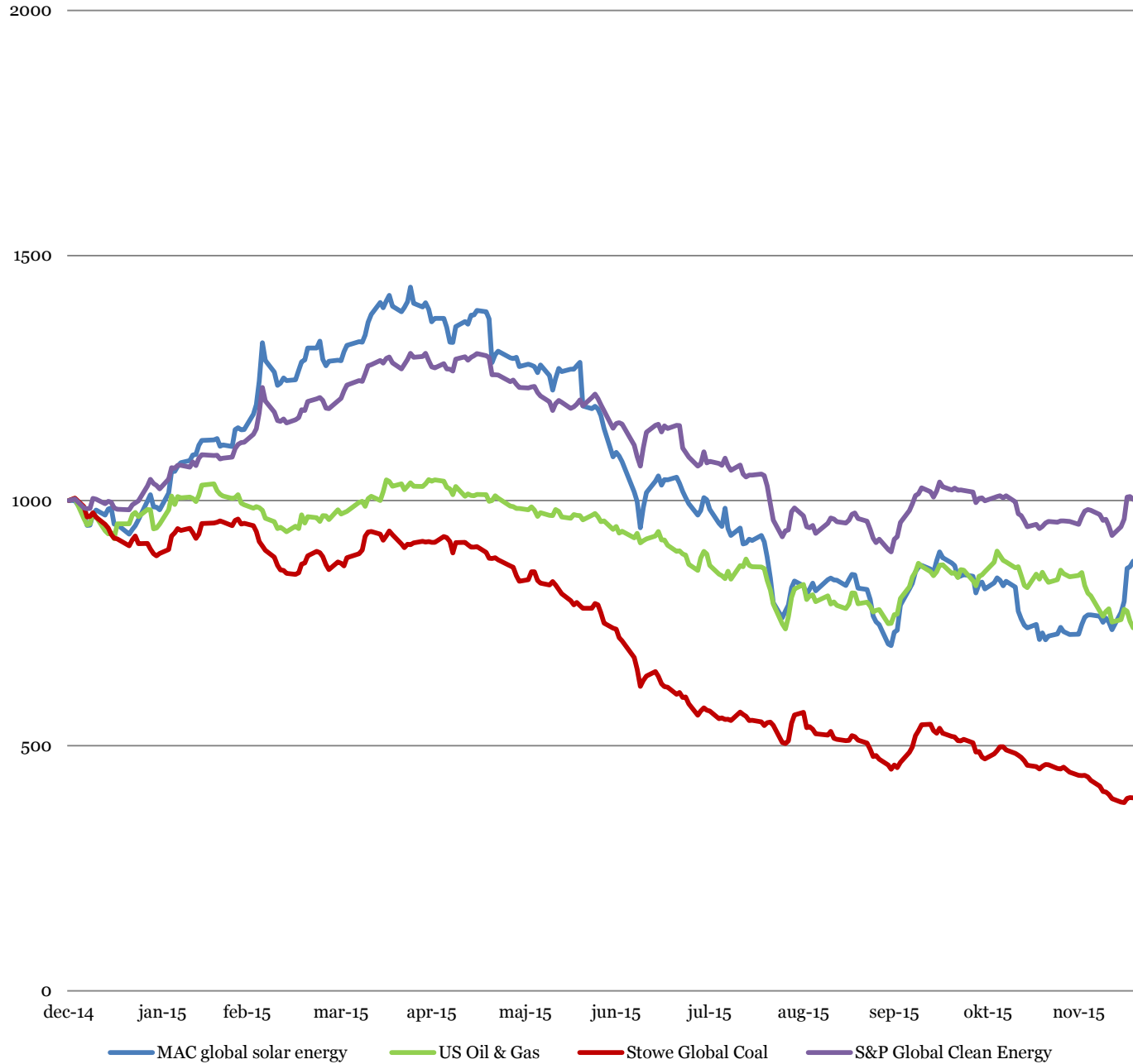
Comment evaluer Paris COP 21?

- Un Grand succès pour la diplomatie française
- $<2\text{ }^{\circ}\text{C}$ -----meme 1,5
- Pas de Prix Carbone
- Est-ce que les plans sont suffisamment contraignants?
- Les actions Charbon/Petrolières n'ont pas bougé

Stowe Global Coal Index vs Benchmarks (31/12/2014-18/12/2015)



Major Energy Indices (31/12/2014-18/12/2015)



Rockefellers, Heirs to an Oil Fortune, Will Divest Charity of Fossil Fuels

By JOHN SCHWARTZ SEPT. 21, 2014



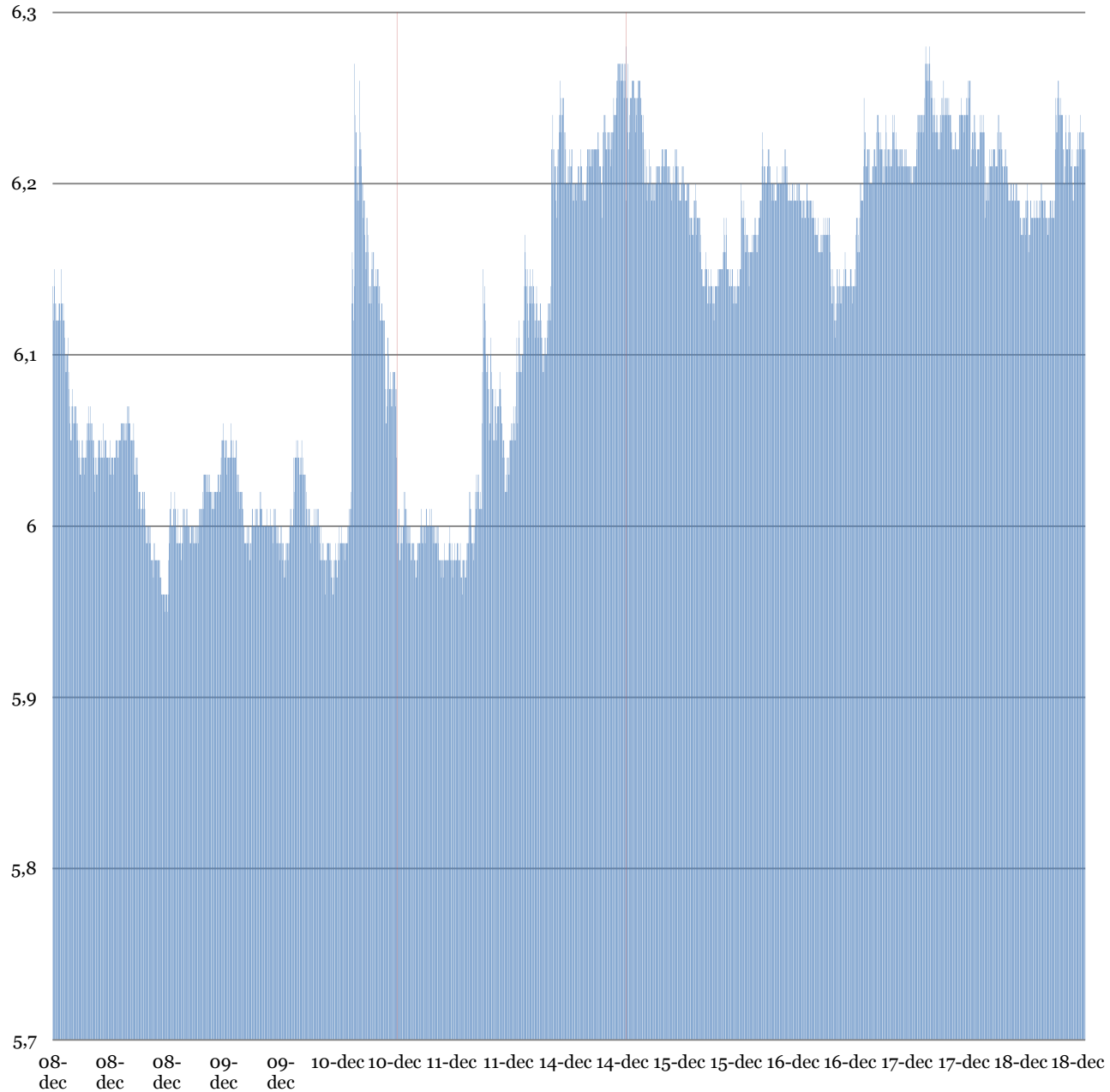
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Coal China



CHALMERS CLIMATE CALCULATOR

Christian Azar, Daniel Johansson (Frt) (1 region vs)

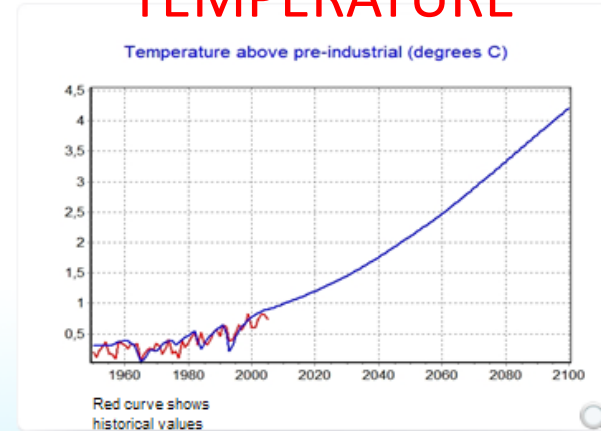
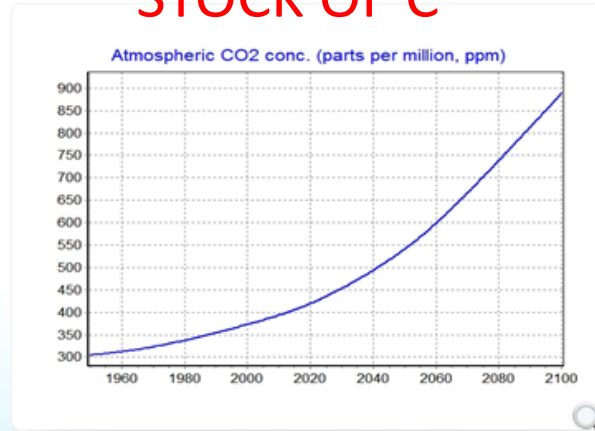
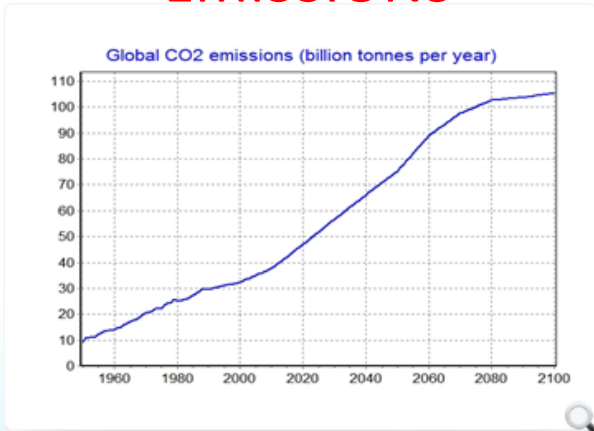


CHALMERS

EMISSIONS

STOCK OF C

TEMPERATURE



Emission scenario ?

Emission reductions start in year

Rate of reduction (% per year)

Climate sensitivity ?

- 1.5 °C per CO₂ doubling
- 3.0 °C per CO₂ doubling
- 4.5 °C per CO₂ doubling
- °C per CO₂ doubling (1 to 6)

Aerosol forcing in 2005 ?

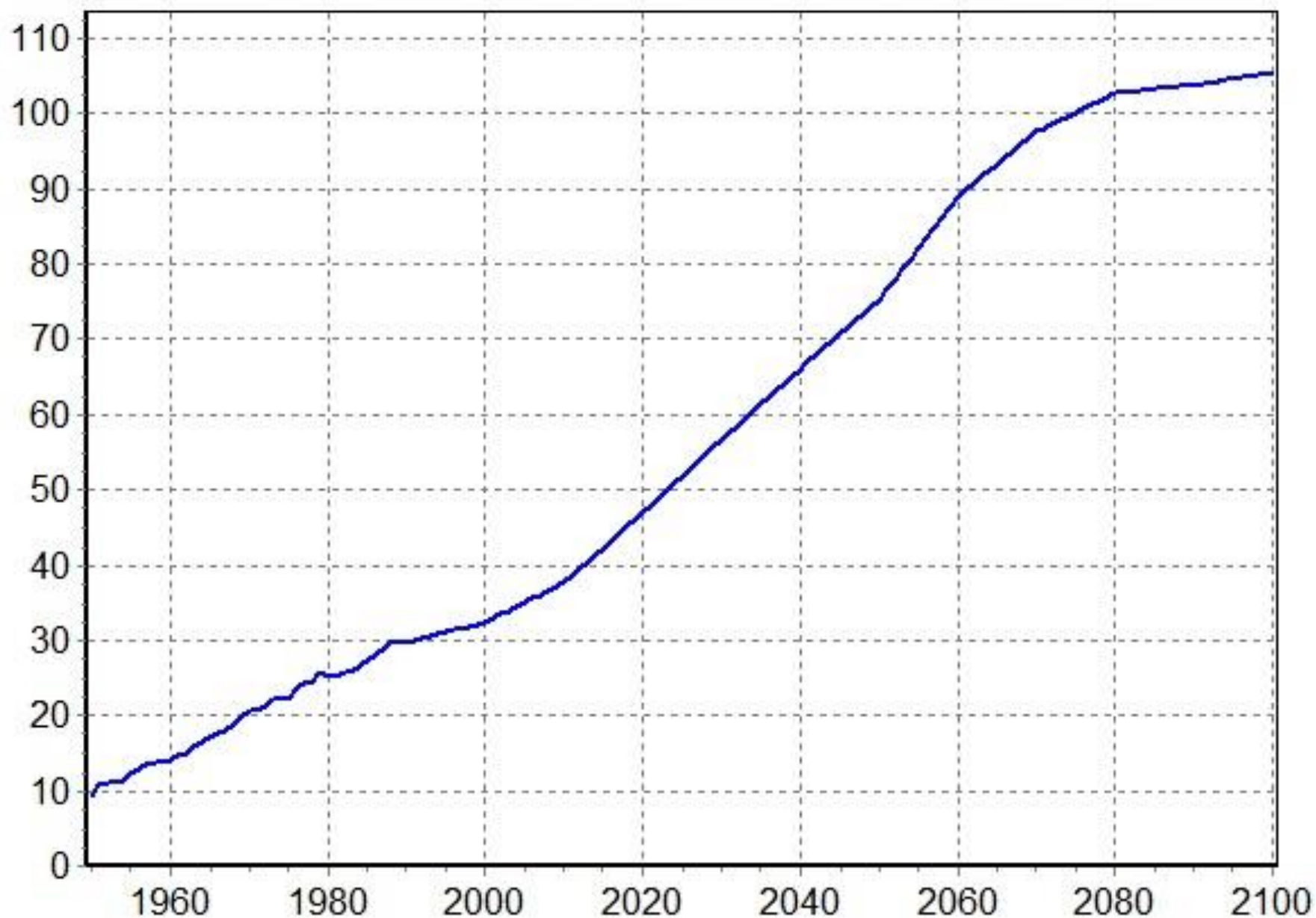
- Automatically calculated value
- W/m² (-2.2 to -0.5)

- User guide
- Model documentation
- Modeling team

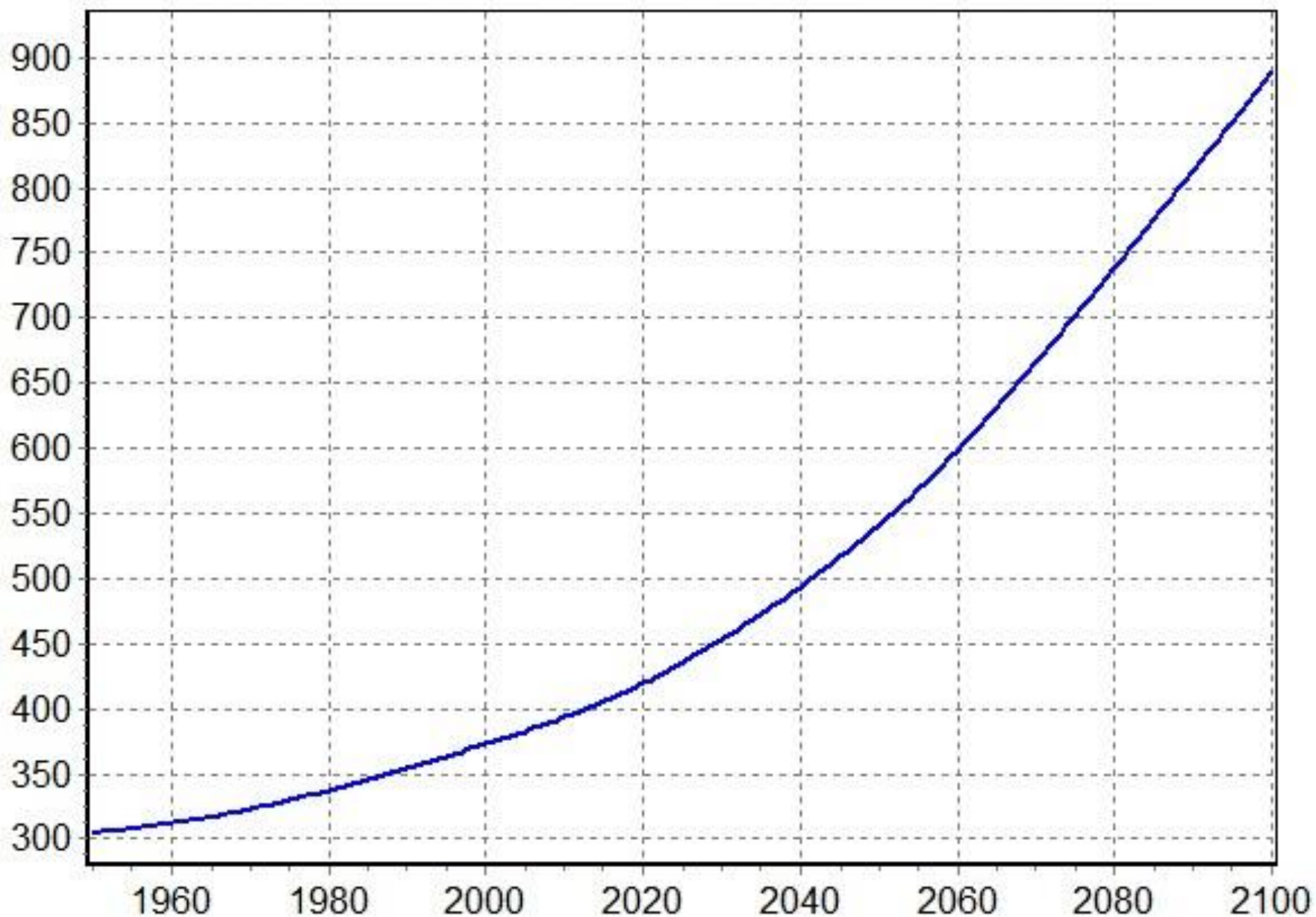
GENERATE SCENARIO

CLEAR GRAPHS AND GENERATE

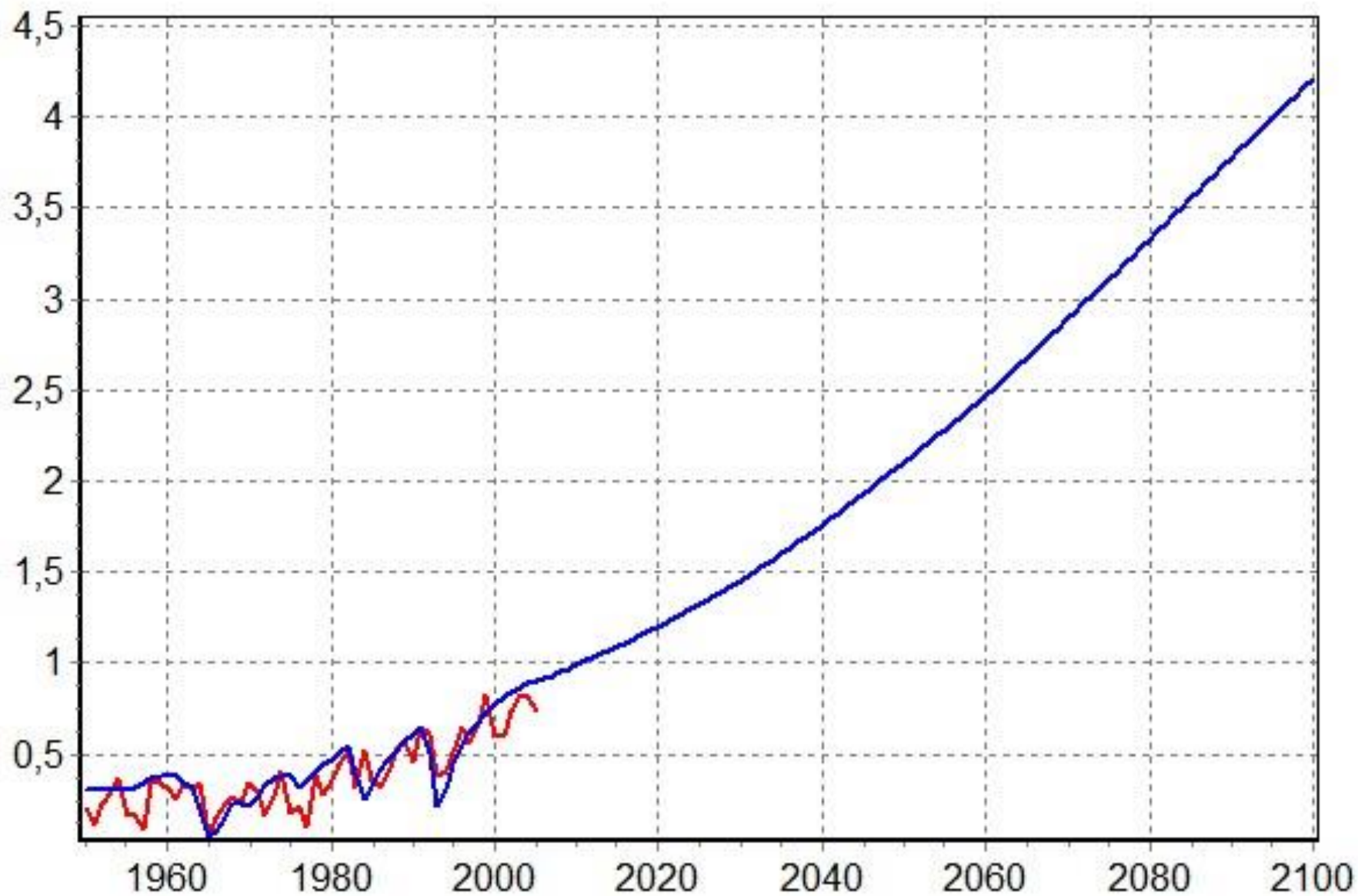
Global CO2 emissions (billion tonnes per year)



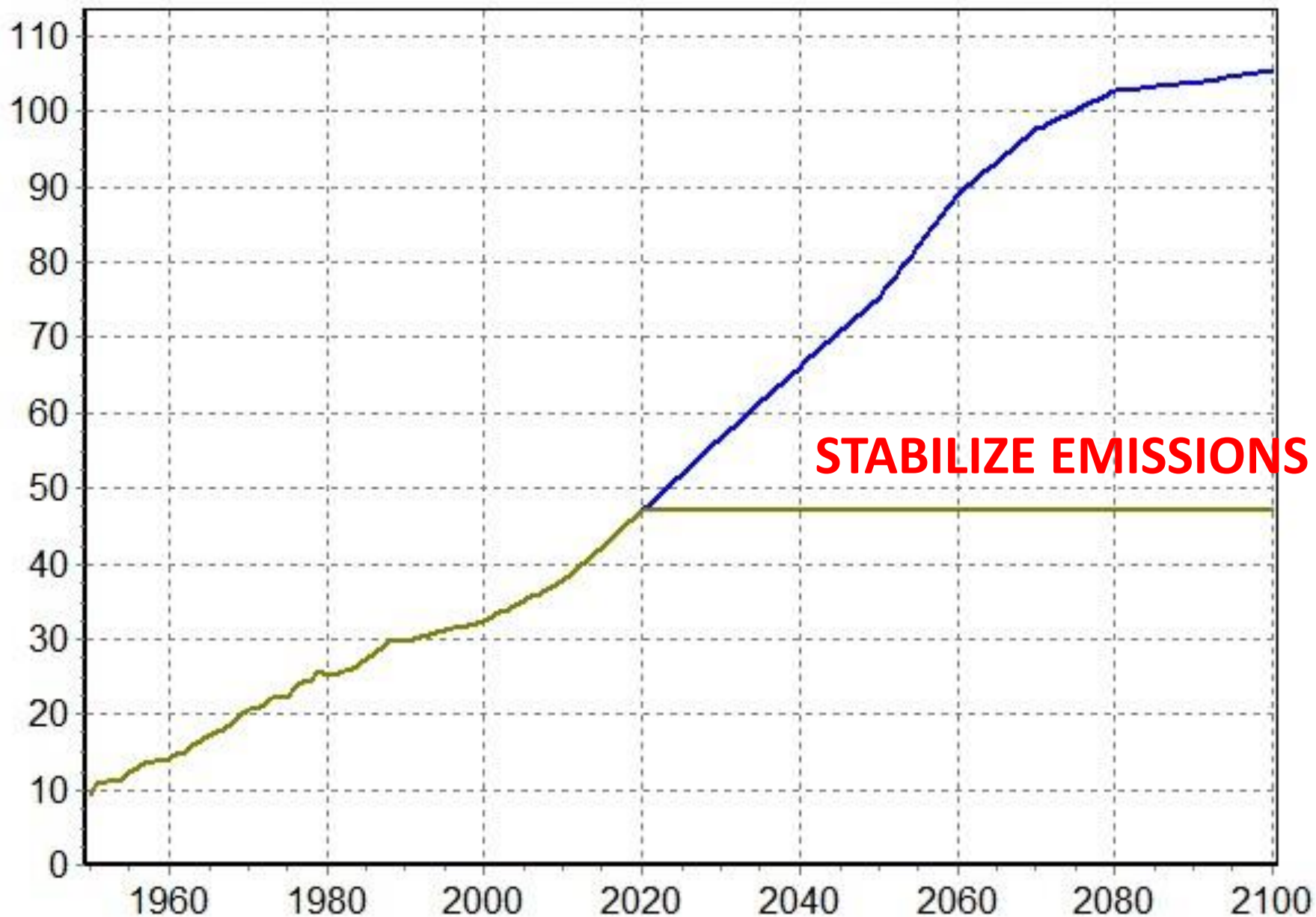
Atmospheric CO2 conc. (parts per million, ppm)



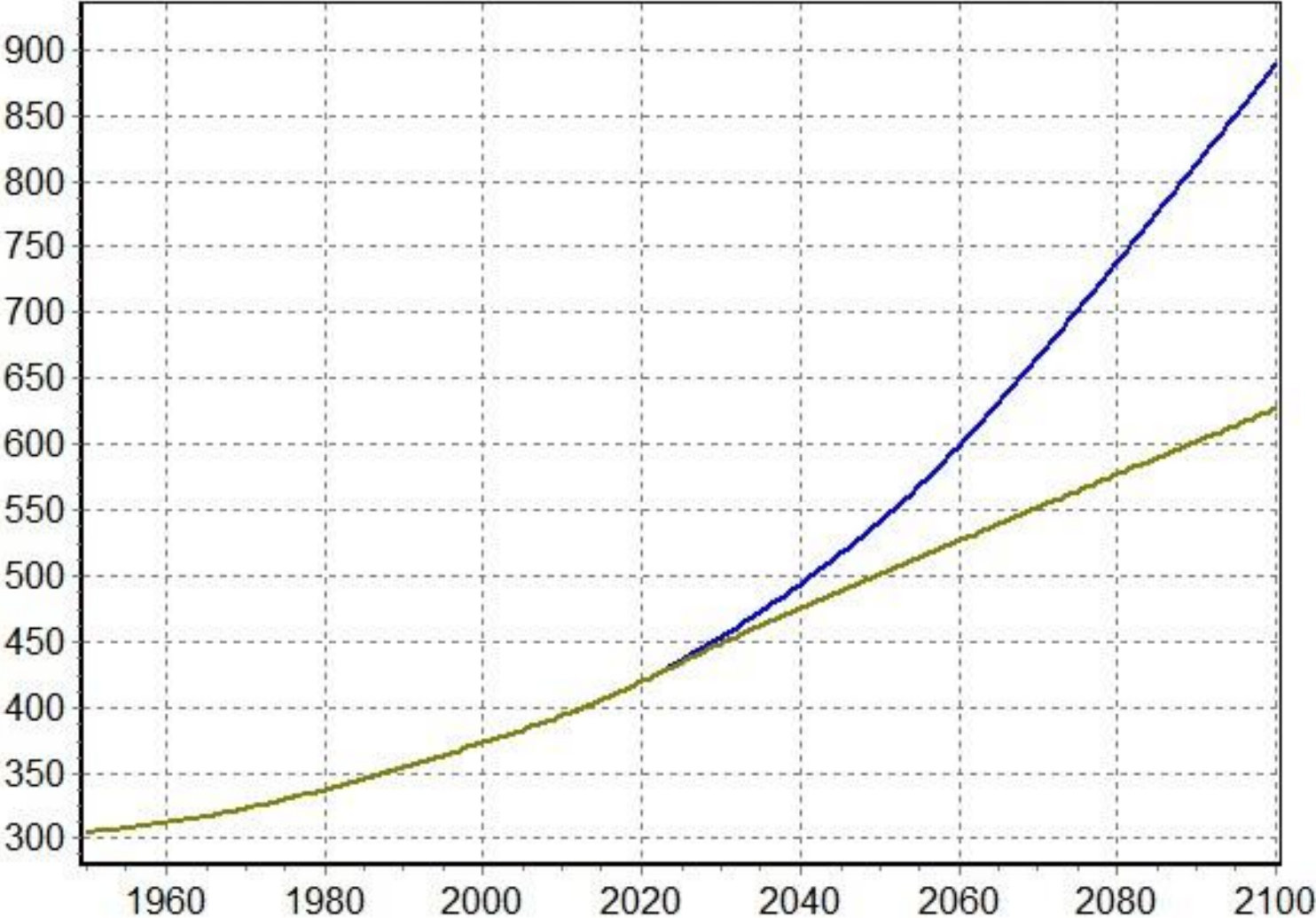
Temperature above pre-industrial (degrees C)



Global CO2 emissions (billion tonnes per year)

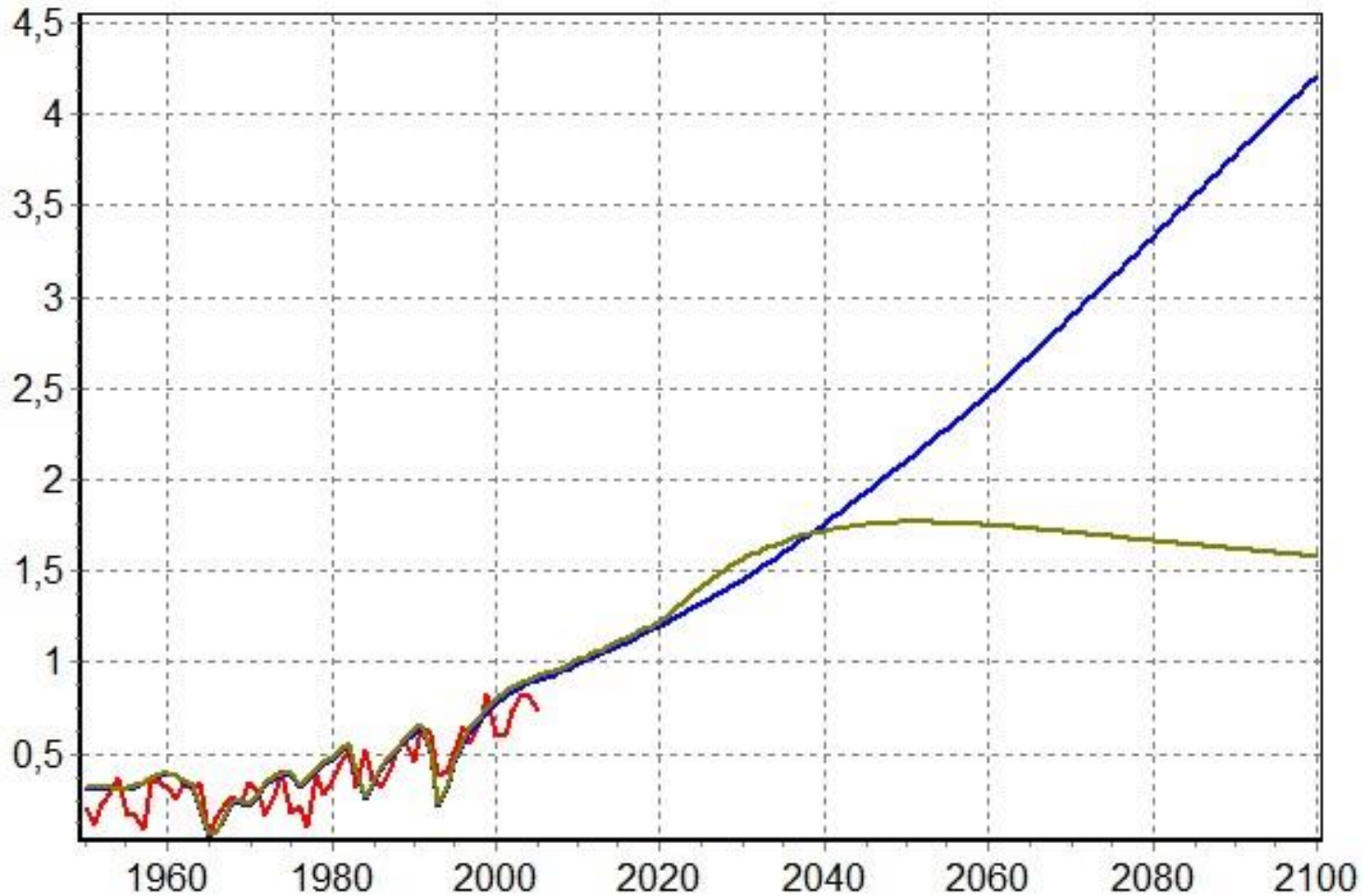


Atmospheric CO2 conc. (parts per million, ppm)



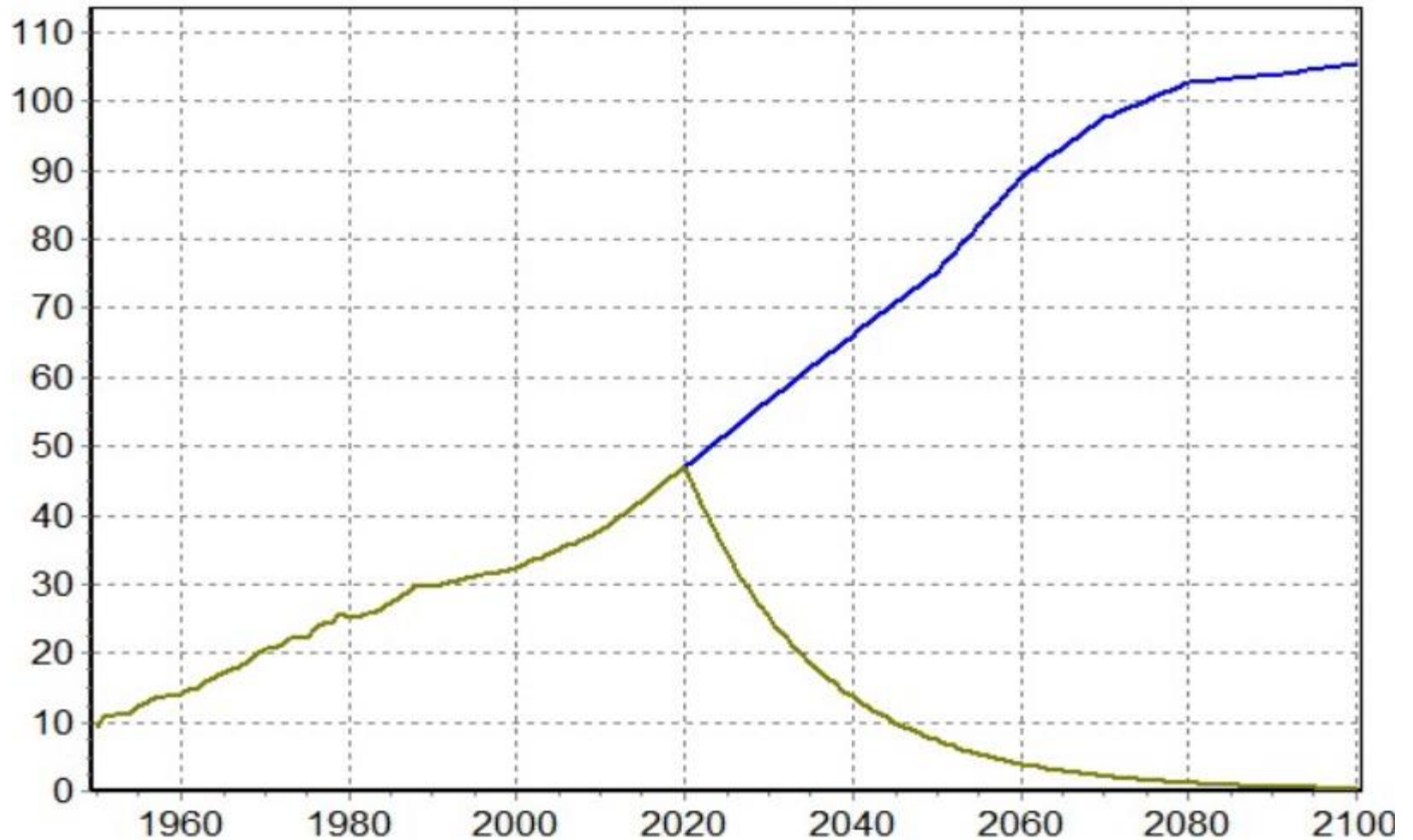
1,5 ? (Ou 1,8)

Temperature above pre-industrial (degrees C)

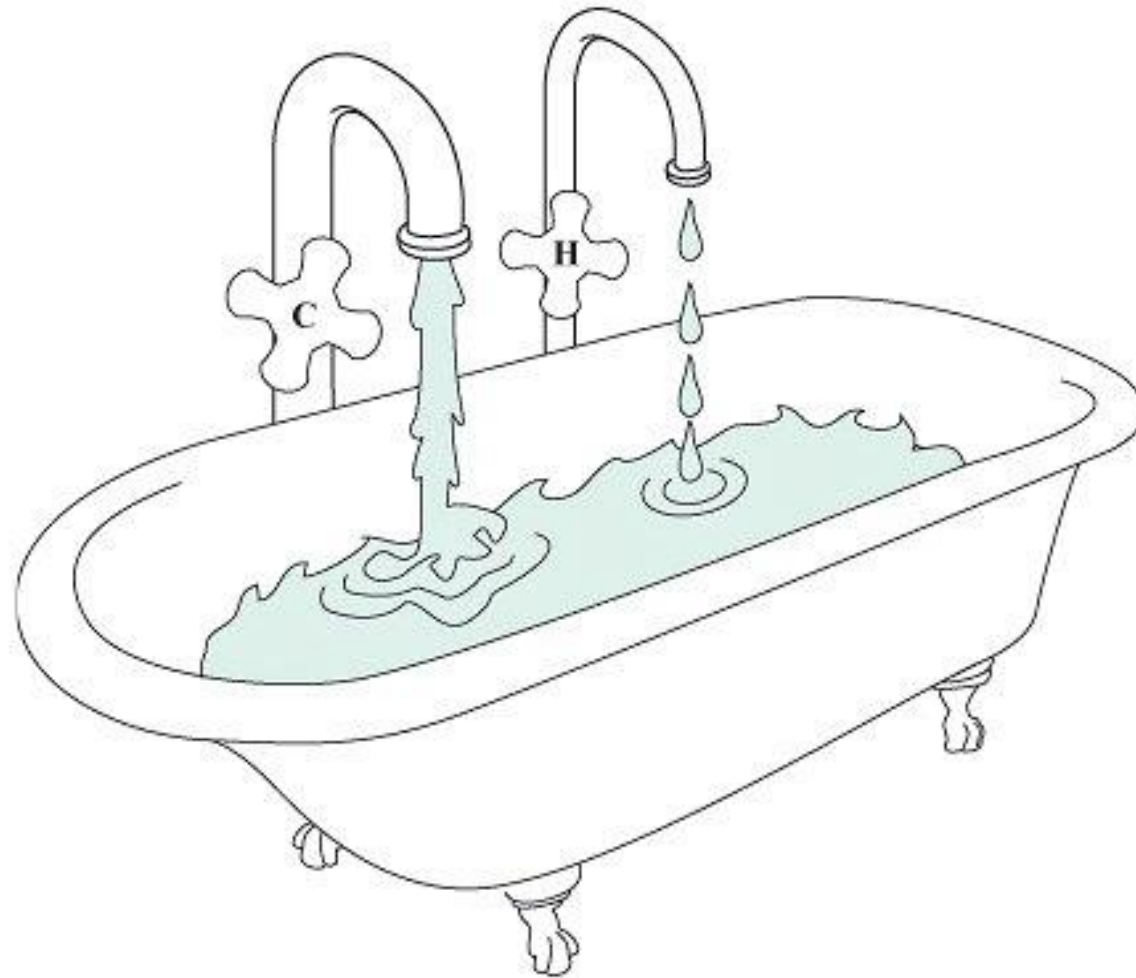


Emissions -6% global !

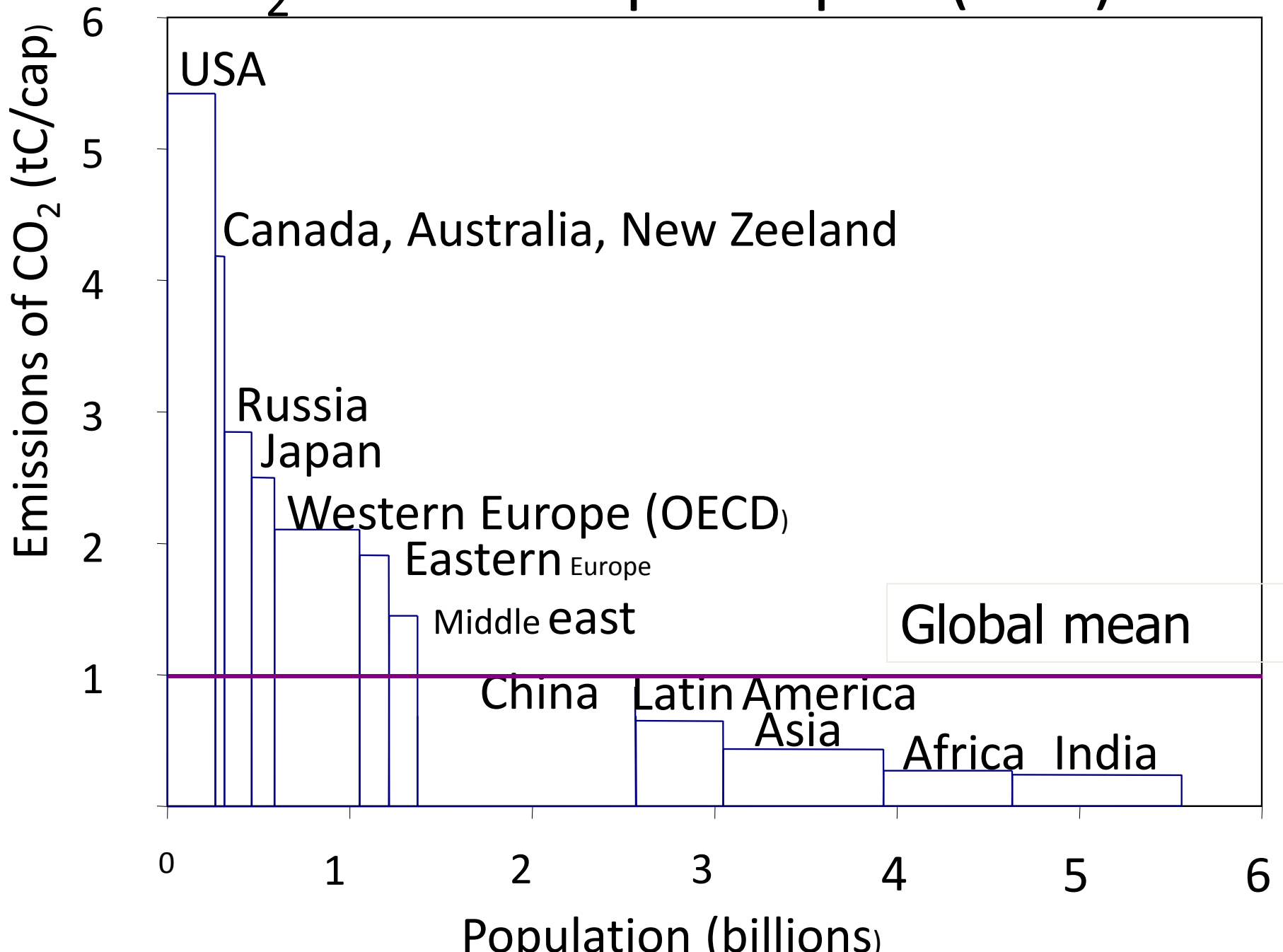
Global CO2 emissions (billion tonnes per year)



A paris on a decidé une
decarbonisation de la planète



CO₂ emissions per capita (as C)

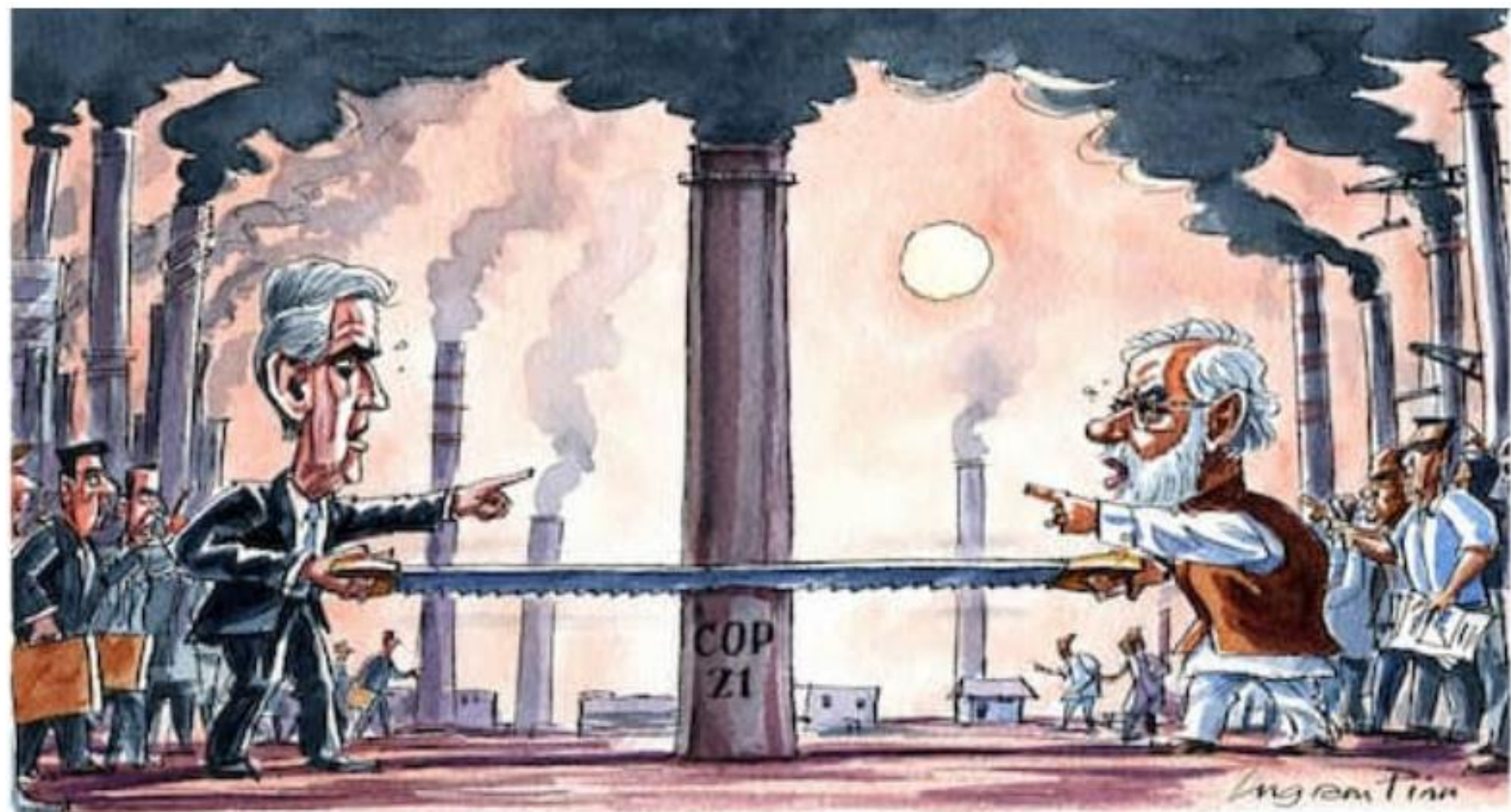


The right to emit **valuable**
20 Gtons CO₂ à 50 \$/t = **1000 B\$**

	Grand father	Per capita
--	-----------------	---------------

INDIA	6%	18%
-------	-----------	------------

USA	15%	4%
-----	------------	-----------



CUTTING CARBON

Percentage reductions VERY unfair to India

- In Copenhagen game of chicken. How long will neg take?
- BUT India will be one of the most affected countries

INDC

- Intended
- Nationally Determined
- Contributions

Elinor Ostrom: Bring stakeholders to the Table



Grand **Per** **INDC**
father **capita**

INDIA

6%

18%

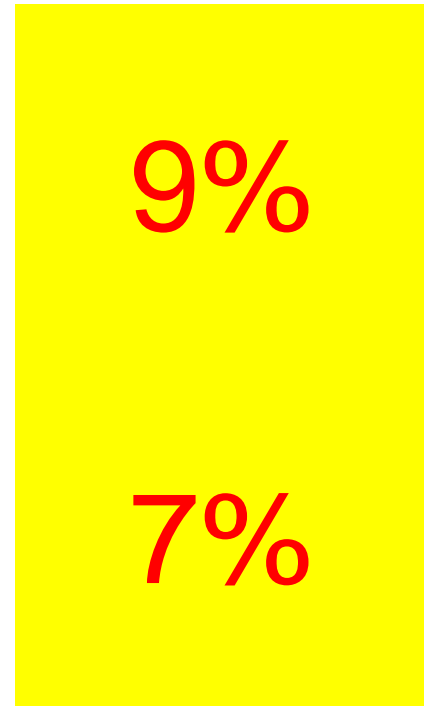
9%

USA

15%

4%

7%



A percentage reduction from INDCs

- Would not be so unfair.
- Can they serve as a new baseline.
- New negotiations are needed soon.
- INDCs \rightarrow NDCs \rightarrow New NDCs

Carbon Taxes/Price

- The Economist solution
- Tirole
- Weitzman
- Nordhaus

- Population in country i N_i
- Income per cap y_i
- Income $Y_i = y_i N_i$
- Carbon price P
- Carbon use $E_i = Y_i^a (P T_i)^b \Psi_i = (y_i N_i)^a (P T_i)^b \Psi_i$
-
- Carbon use ($a=1$; $T_i=T$) $E_i = Y_i (P T)^b \Psi_i$
- Global Carbon Use $E = Y (P T)^b$
- **Country share** E_i/E

Model of Carbon Emissions E

- $E_i = (y_i N_i)^a (PT_i)^b \Psi_i$ Per capita

allocation $\sigma_{in} = N_i/N$

1. Proportion to **income** $\sigma_{iy} = Y_i/Y = \sigma_{in} * (y_i/y)$

2. **Grandfathering** share us $\sigma_{ig} = E_{i,t-1}/E_{t-1}$

$$= (y_i N_i) (PT_i)^b \Psi_i / Y (PT)^b = \sigma_{in} * (y_i/y) * (T_i/T)^b \Psi_i$$

This is prop to Y with extra benefit for those **who had low taxes** historically and **high Ψ**

What does a Harmonised tax imply?

Harmonised tax implies $\sigma_{ip} = Y_i(\text{PT})^b \psi_i / Y (\text{PT})^b$
 $\sigma_{iy} \psi_i$

SAME AS INCOME SHARE CORRECTED FOR ψ

Reasonable?

Attractive? For India: Better than GF but not as good as per capita! Compensation will be demanded and may be difficult to pay.

Some Lessons

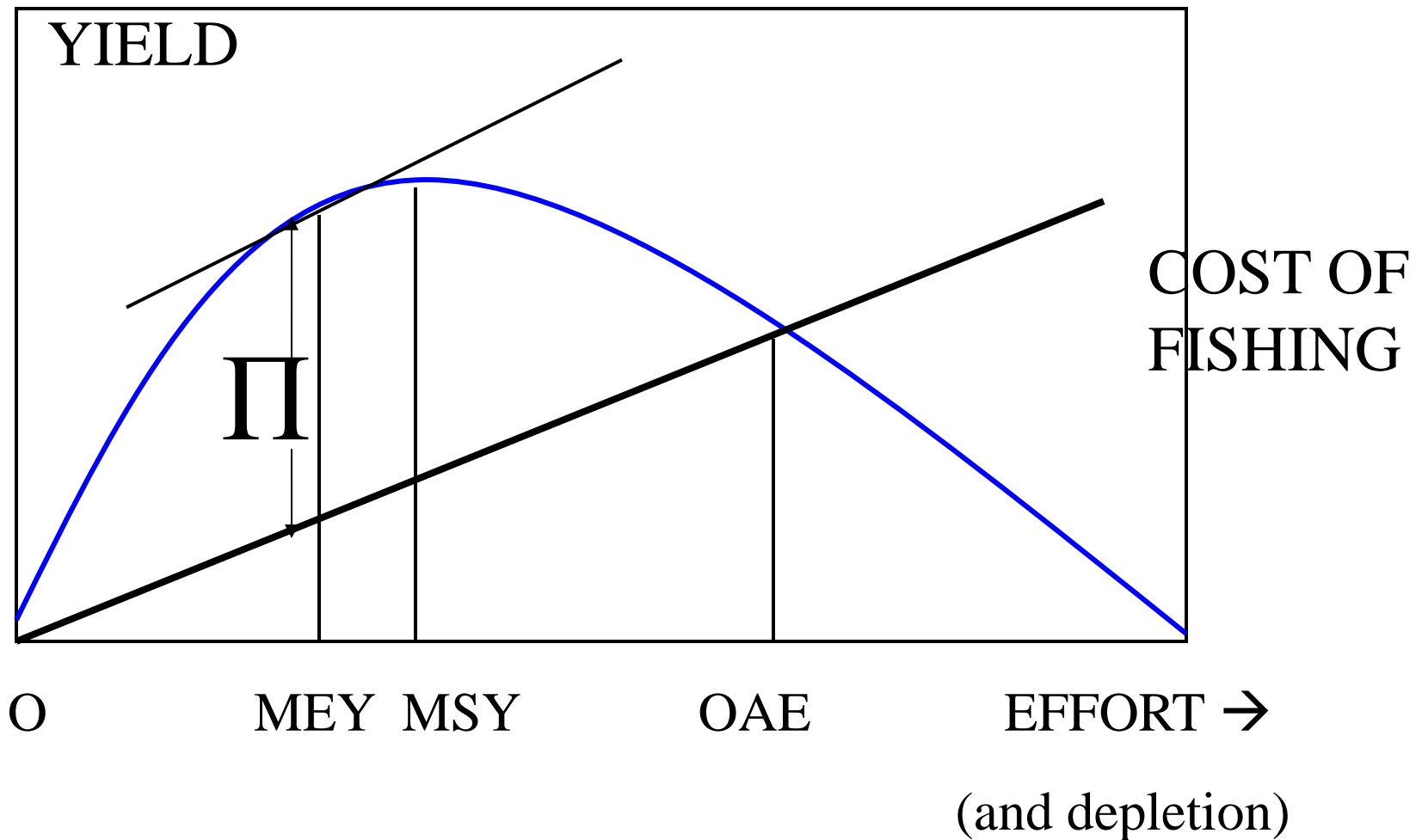
- Hard
- Lobbying
- Fairness and Distribution

MANAGING PLANETARY BOUNDARIES

- Global Institutions – Strengthened UN
- Independent Ecological governance..
- Like Central Banks?
- Interaction among several environmental and other issues...
- Managing RISK and Uncertainty (Claude H)

The Example of Fishing

A Bio-economic model of fishing



ITQs in % not in tons

2 steps

set ITQ in % and
then TAC in Tons!

Merci