Planetary Boundaries...Planetary Economics?

Norwegian Seminar on Green Economics
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Photo: Yann Arthus-Bertrand
1 °C above pre-industrial
The plateau of last year was not peak emissions after all... 2% growth

37 billion tonnes

In 2017, global carbon dioxide emissions from fossil fuels and industry will reach around 37bn tonnes of carbon dioxide.

Total emissions from all sources: approx 41GtCO₂

Le Quéré et al ESSDD Global Carbon Budget 2017
... but atmospheric concentrations continue to rise

In 2016 atmospheric CO₂ levels reached 403 ppm...
...and are projected to increase by 2.5 ppm in 2017 (+2.0 to +3.0 ppm)

Data: Scripps/NOAA-ESRL

Le Quéré et al Global Carbon Budget 2017
The land and ocean absorb around half the emissions.

The carbon cycle has both emissions sources and carbon sinks, and their difference is the atmospheric growth (2007-2016).

Le Quéré et al. ESSDD Global Carbon Budget 2017
Risk of Tipping the Earth System away from Manageable Inter-glacial?

Steffen et al., in prep
Planetary Economics...
A good life for all within planetary boundaries

Daniel W. O'Neill, Andrew L. Fanning, William F. Lamb and Julia K. Steinberger
Large potential reduction in economic damages under UN mitigation targets

Marshall Burke¹,²,⁎, W. Matthew Davis³ & Noah S. Diffenbaugh¹,⁴
(IPCC TAR, AR4, AR5)
Risks related to agreed global goal of 450 ppm

Average Global Temp rise at Equilibrium (C)

Probability of Exceedance

4

7%

6

1.6%

Global Challenges Foundation
Economic Growth and Climate Change – the conventional macro-economic approach

(Applying DICE, 2014)
A Planetary Soufflé

*Human Prosperity within Planetary Boundaries*
The Carbon Law – A Moore’s law for climate stability
THE CARBON LAW
Annual global CO₂ emissions (GtCO₂ yr⁻¹)

- Fossil fuel and industry
- Land use and land-use change

human carbon emissions

Rockström, Gaffney, Joeri, Meinshausen, Nakicenovic, Schellnhuber. Science 24 March 2017
Rockström, Gaffney, Joeri, Meinshausen, Nakicenovic, Schellnhuber. *Science* 24 March 2017
Rockström, Gaffney, Joeri, Meinshausen, Nakicenovic, Schellnhuber. Science 24 March 2017
A Global Carbon Law
Halving Emissions Every Decade

40 GtCO₂
2020

20 GtCO₂
2030

10 GtCO₂
2040

5 GtCO₂
2050
Planetary Governance
The World In 2050

Radical transformative pathways to meet the SDGs within planetary boundaries
Over 100 companies have set science-based targets

Explore the data

Setting greenhouse gas emission reduction targets in line with climate science is a great way to future-proof growth.
The Global Commons in the Anthropocene – Biomes, Biogeochemical cycles and Biodiversity
Science Based Targets for the Earth System
Unprecedented Risk
We can no longer exclude destabilizing the entire Earth system

Unprecedented Opportunity
We must, we can and we gain social benefits and economic development from a world transformation to global sustainability

Sustainable Development
Prosperous and socially inclusive world within safe operating space of Planetary Boundaries on Stable and Resilient Earth
Thank you

www.stockholmresilience.su.se