CLIMATE INTERACTIVE
Tools for a thriving future

Global Models from Malthus to C-ROADS and Beyond

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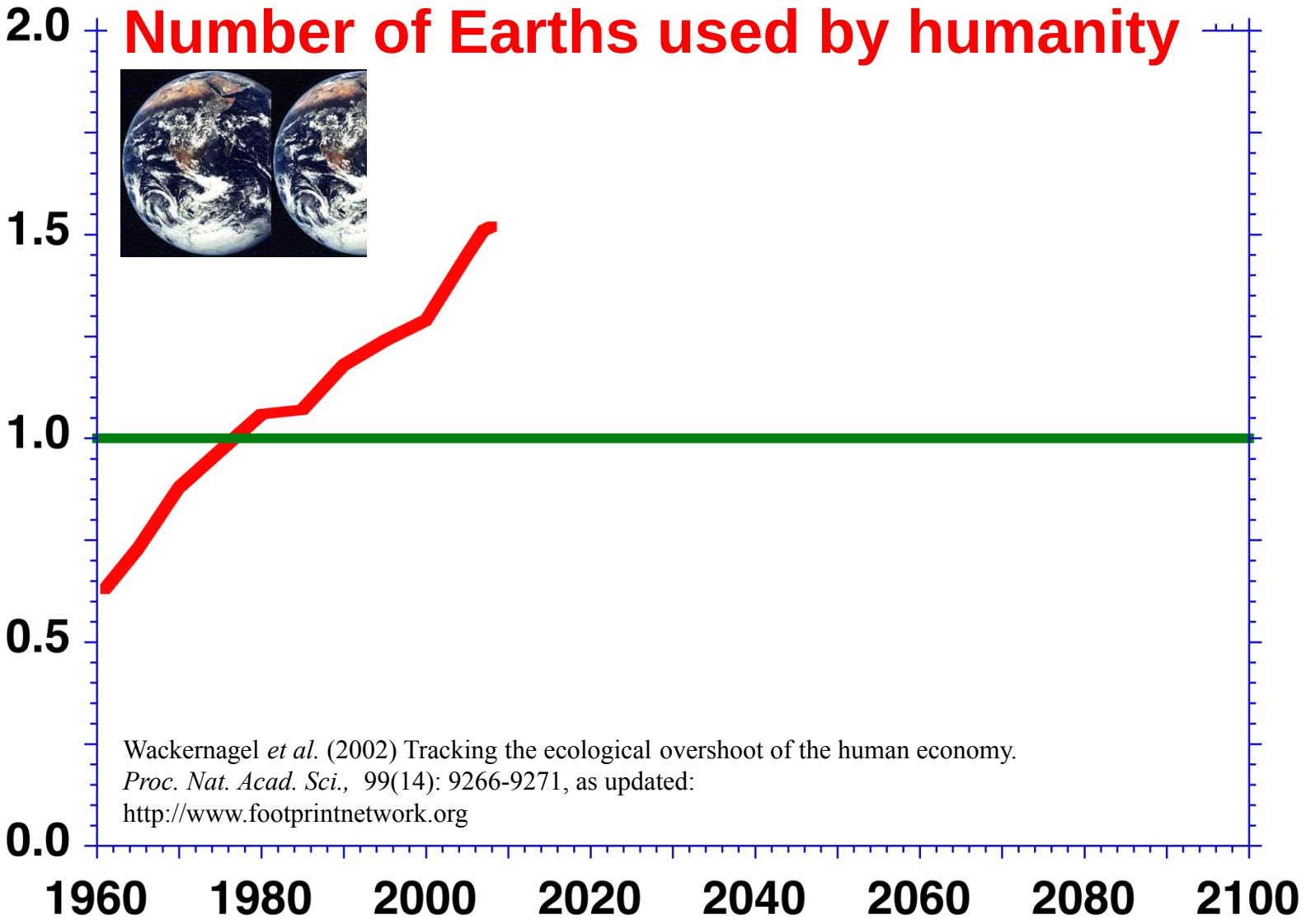
Tom Fiddaman, Ventana Systems
Drew Jones, Climate Interactive

Global Human Ecological Footprint



Impact of Global Modeling on Mental Models, Institutions, and Policy

Before **After**

World Dynamics

Before

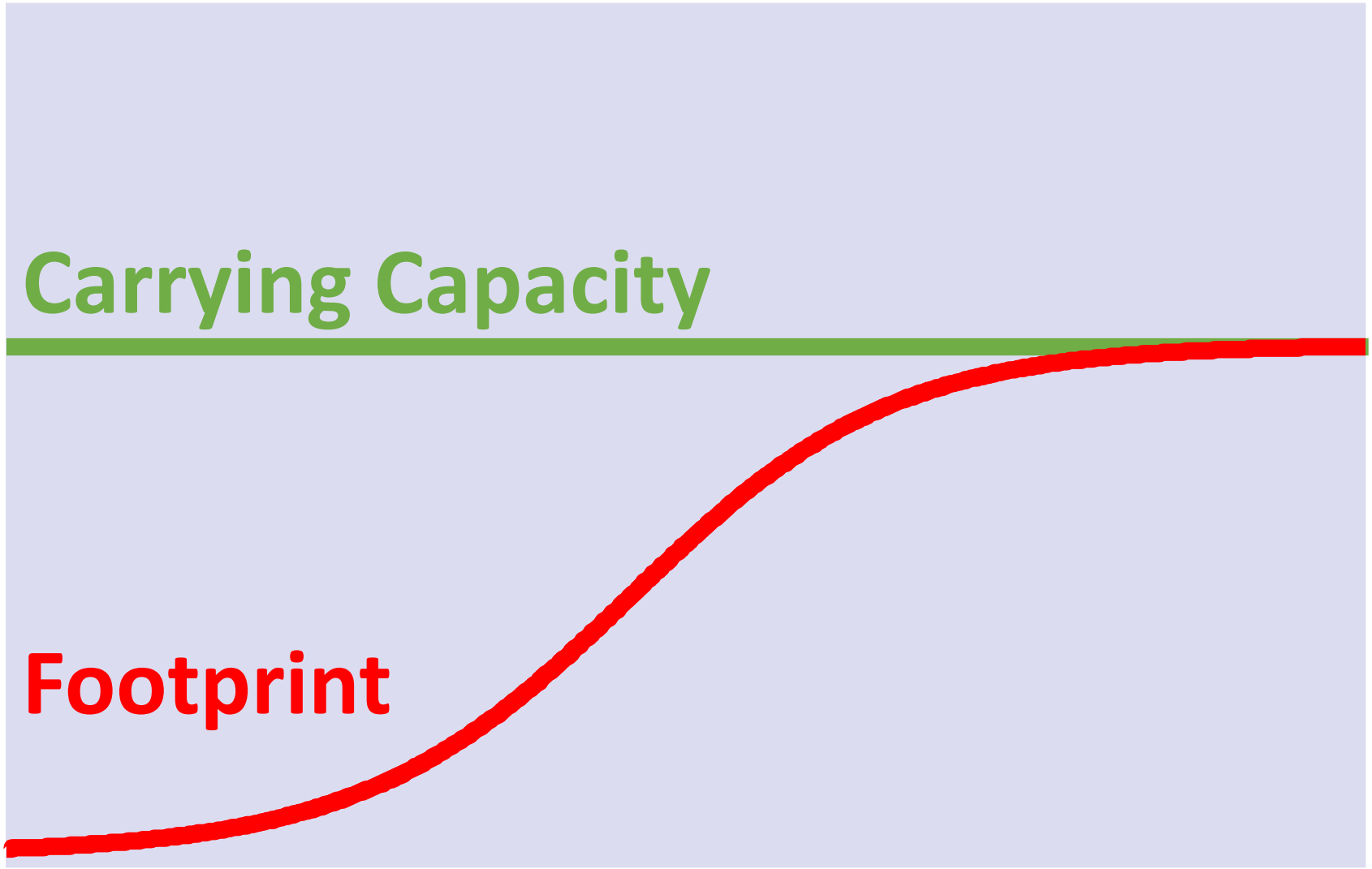
Limits are remote

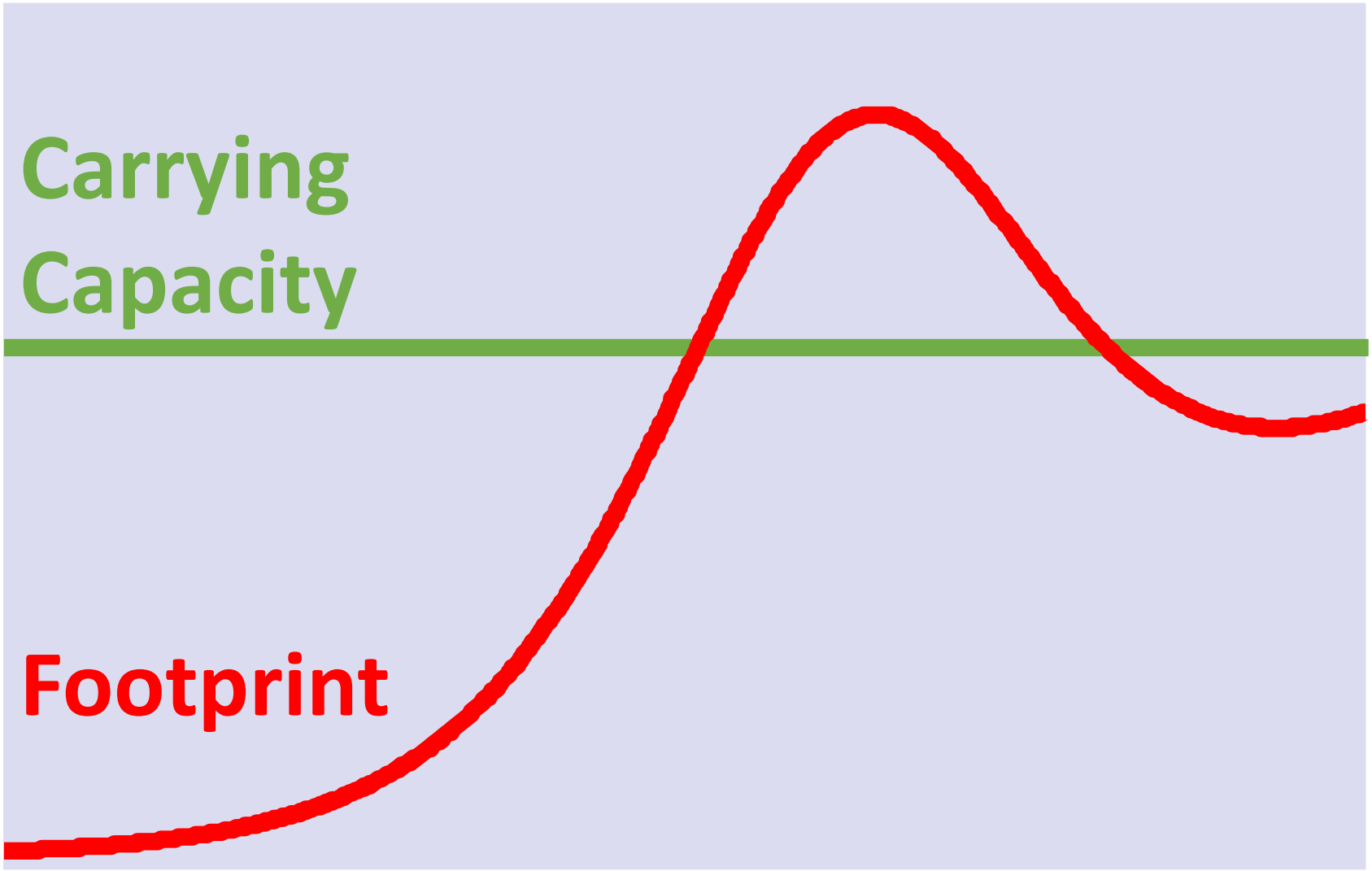
Growth is good

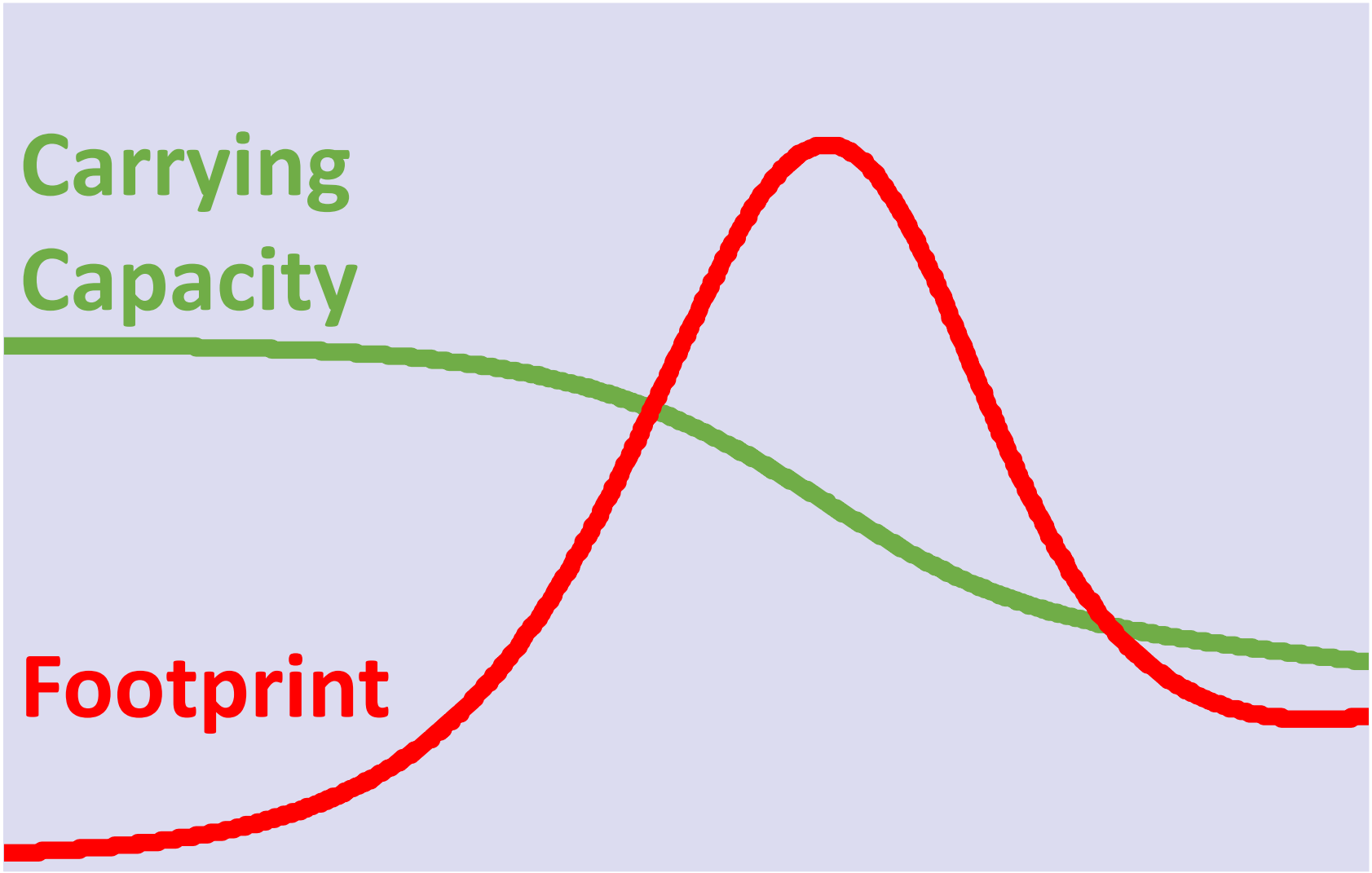
The very idea of modeling global systems is suspect

No measurement system to assess limits

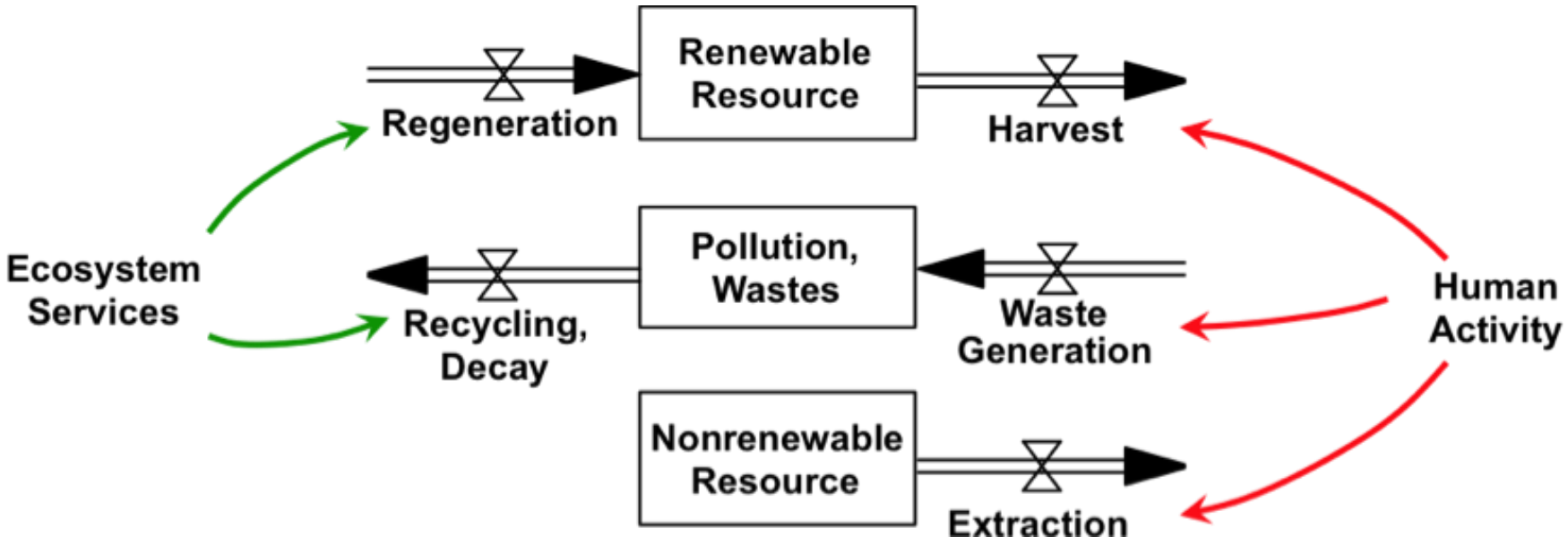

Carrying Capacity
Global Ecological Footprint


Carrying Capacity
Footprint


Carrying
Capacity
Footprint


Carrying
Capacity
Footprint

Necessary Conditions for Sustainability



1. **Renewable resources**

   can be used no faster than the rate at which they regenerate.

2. **Pollution and wastes**

   can be emitted no faster than they can be recycled or rendered harmless.

3. **Nonrenewable resources**

   cannot, in the long run, be used at all.

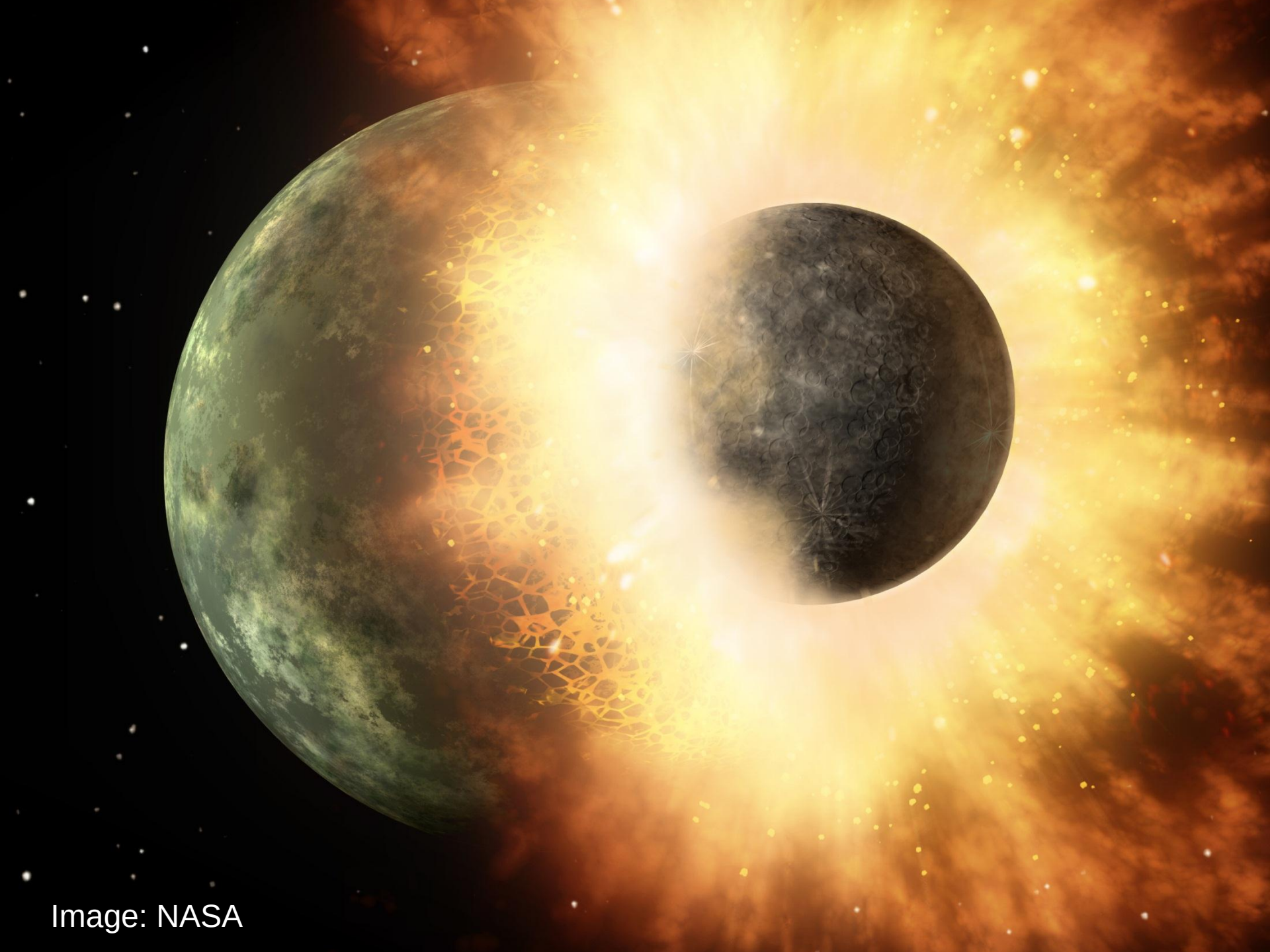


Image: NASA

These thresholds are well beyond current levels of human activity. Moreover, our limited supply of fossil fuels limits the production of CO_2 to acceptable levels.

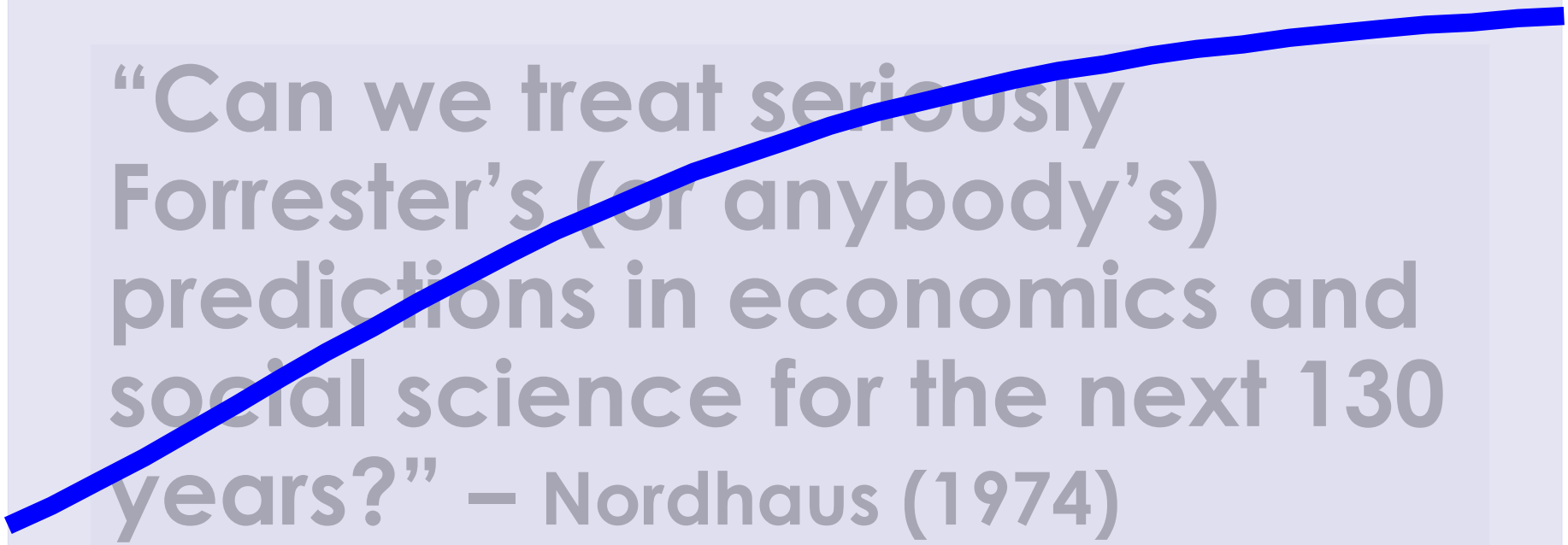
W. D. Nordhaus (1974) "Resources as a Constraint on Growth" *AER* 64(2)

Yet mankind is playing dice with its natural environment through a multitude of interventions--injecting trace atmospheric gases like the greenhouse gases or ozone-depleting chemicals, engineering massive land-use changes such as deforestation, …

Nordhaus (1994) *Managing the Global Commons*

Consumption per capita

(DICE, Nordhaus (1992) *Science*)



"Can we treat seriously Forrester's (or anybody's) predictions in economics and social science for the next 130 years?" – Nordhaus (1974)

1965 **2305**

World Dynamics

After

ipcc

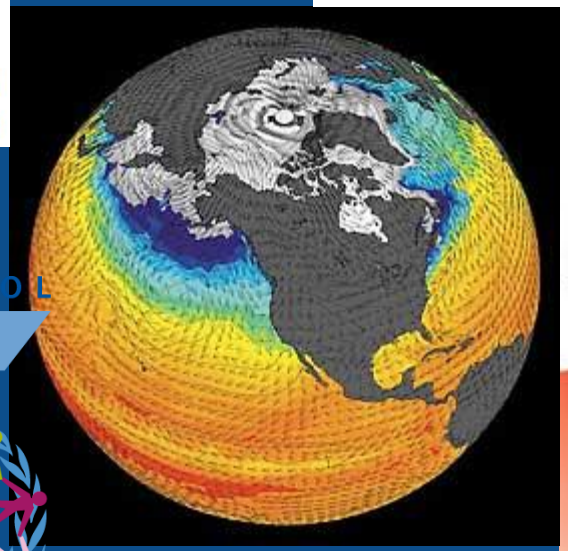
INTERGOVERNMENTAL PANEL ON climate change

UNFCCC

Global Footprint Network®

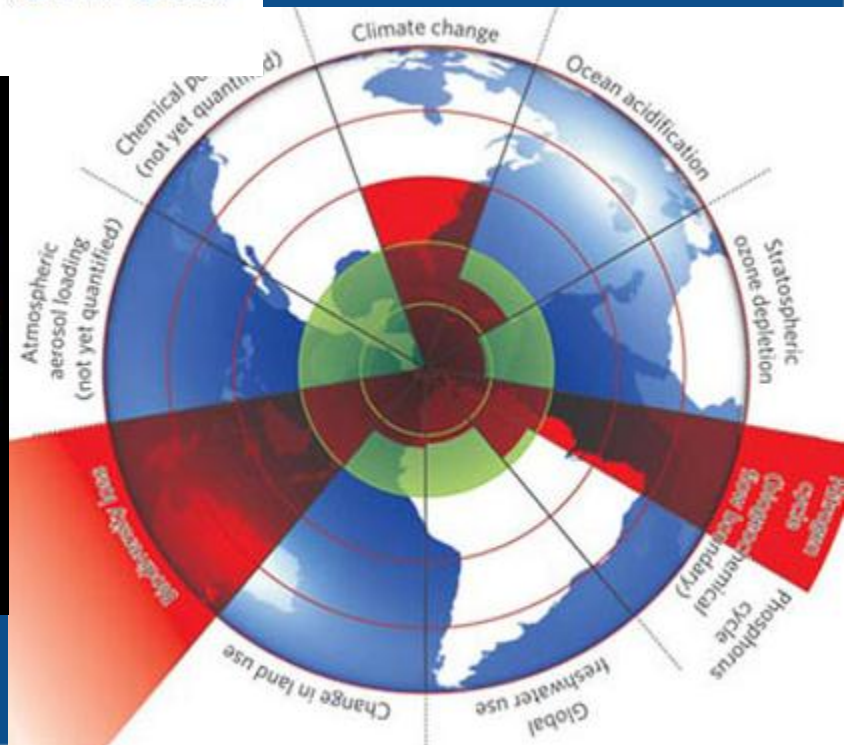
7 ENSURE ENVIRONMENTAL SUSTAINABILITY

DJSI Diversified Starting Universe (S&P Global BMI)	Assessed Universe (approx 2600)	Eligible Universe (approx 1300)	DJSI World Diversified
			677 Components 24 GICS Industries 43 Countries



MONTREAL PROTOCOL

1987-2012



UN Climate

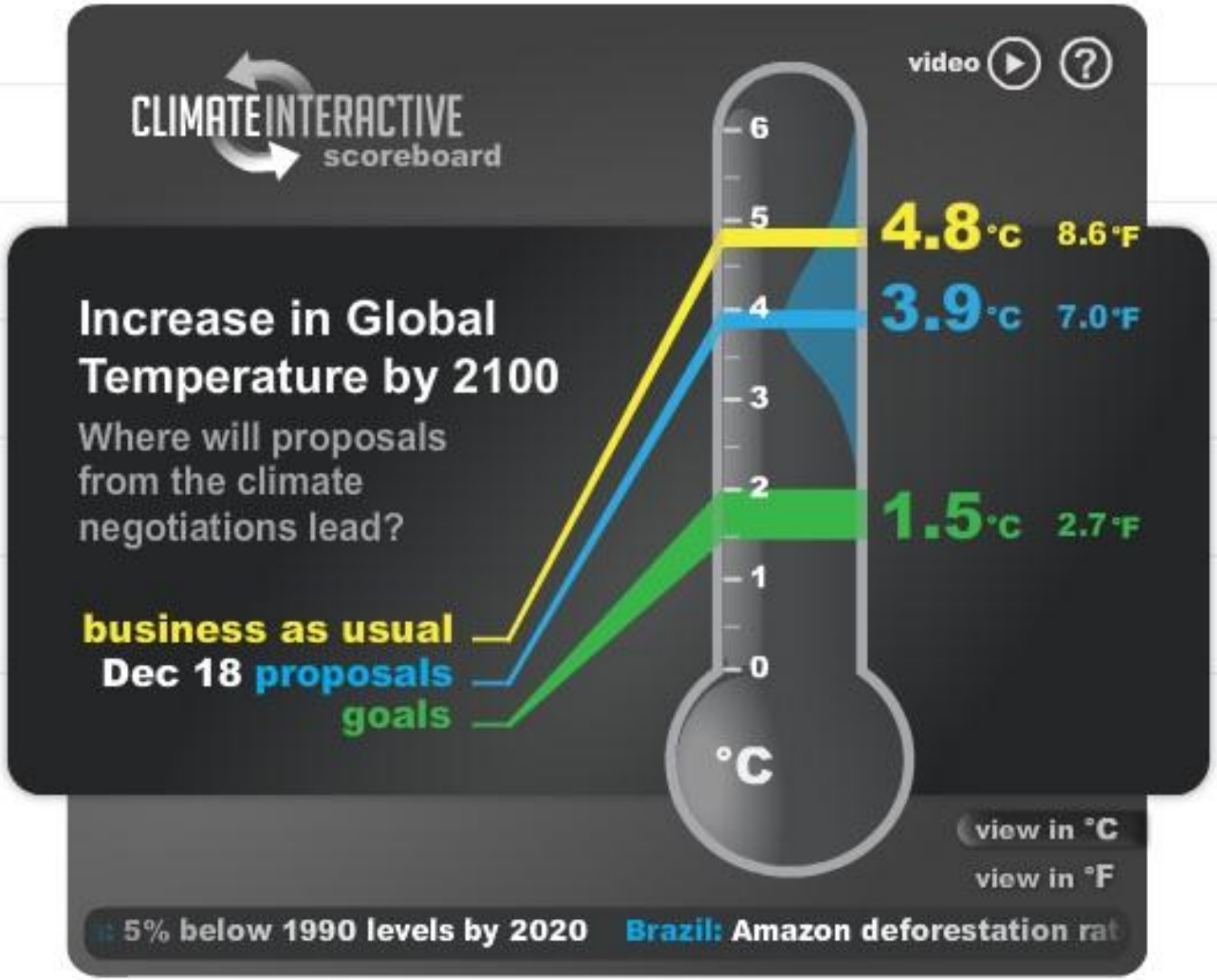
Before

Country pledges to the UN are good enough

CONFIDENTIAL VERY INITIAL DRAFT
Do not distribute
DRAFT, 15/12/09, 23.00

Preliminary assessment of pledges made by Annex I Parties and voluntary actions and policy goals announced by a number of non-Annex I Parties

Internal Note by the Secretariat


CLIMATE INTERACTIVE
scoreboard
video
Increase in Global Temperature by 2100
Where will proposals from the climate negotiations lead?
business as usual
Dec 18 proposals
goals
6
5
4
3
2
1
0
°C
4.8 °C 8.6 °F
3.9 °C 7.0 °F
1.5 °C 2.7 °F
view in °C
view in °F
5% below 1990 levels by 2020
Brazil: Amazon deforestation rat

UN Climate

After

- Country pledges to the UN are not enough

- Process for tracking using C-ROADS & other models

Mr. X

Before

- Energy efficiency is "Cute"
- Renewable energy is "Inconsequential"
- Only real answer = New zero-carbon energy technology

After Mr. X

"[Mr. X] emphasized the need for investment and research in five areas – carbon capture, nuclear, solar, wind, and biofuels – and a concurrent focus on efficiency."

- CNET

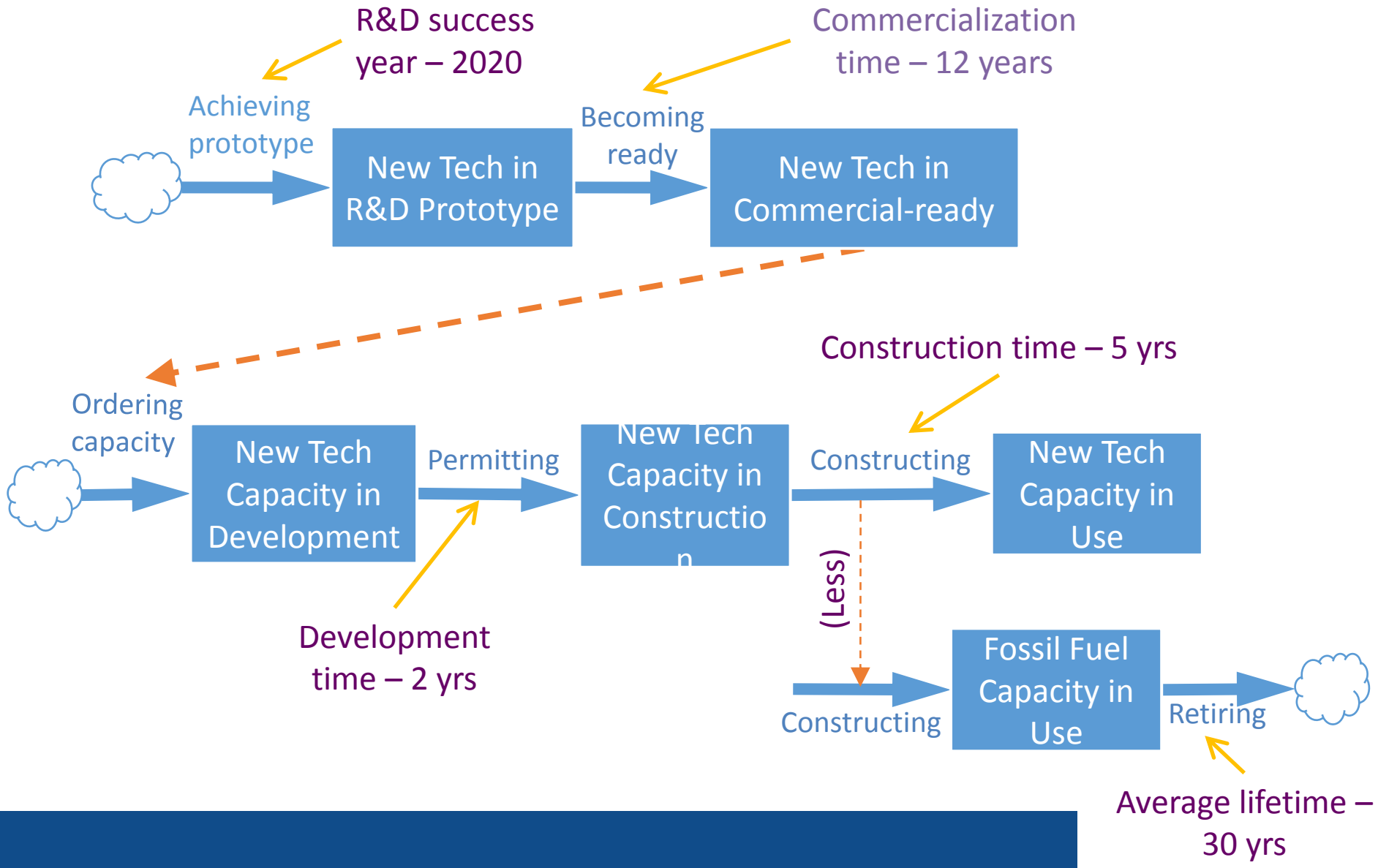
"[Mr. X] said energy moves slowly just by its nature. Unlike IT, … its underlying hardware… takes decades to swap out."

- CNET

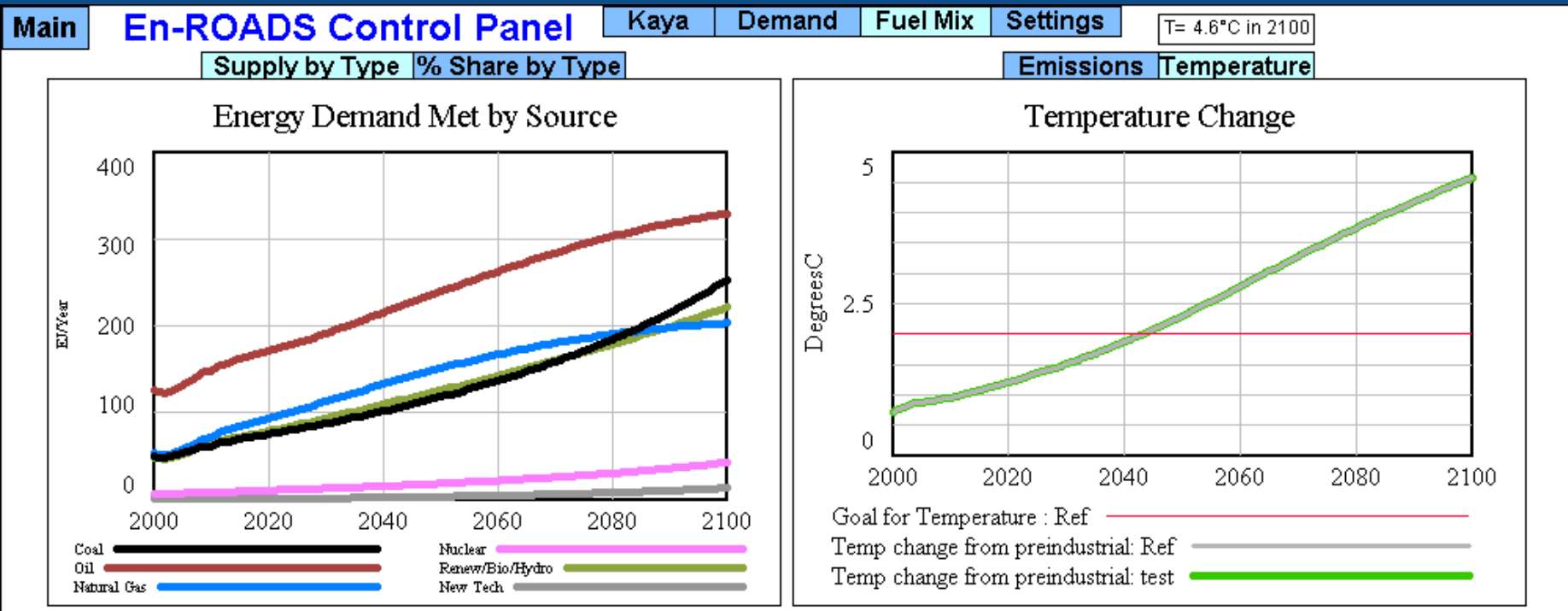
Backup slides

System Dynamics models of global dynamics have improved mental models, catalyzed the creation of new institutions and processes at all scales, and helped move the world towards effective action.

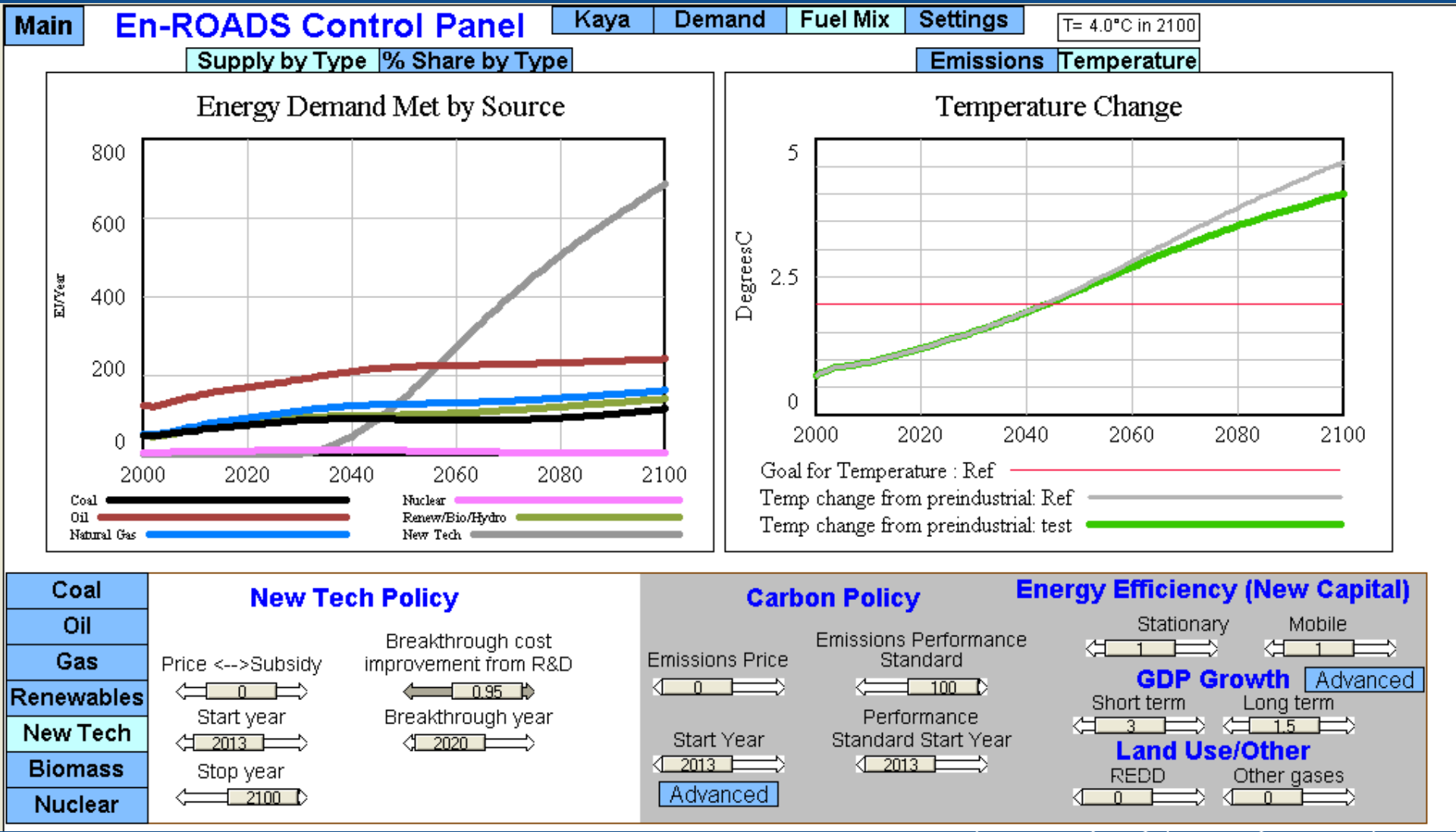
Transition Delays to New Tech



Our “Reference Scenario”



“New Tech” Alone



Silver Buckshot