



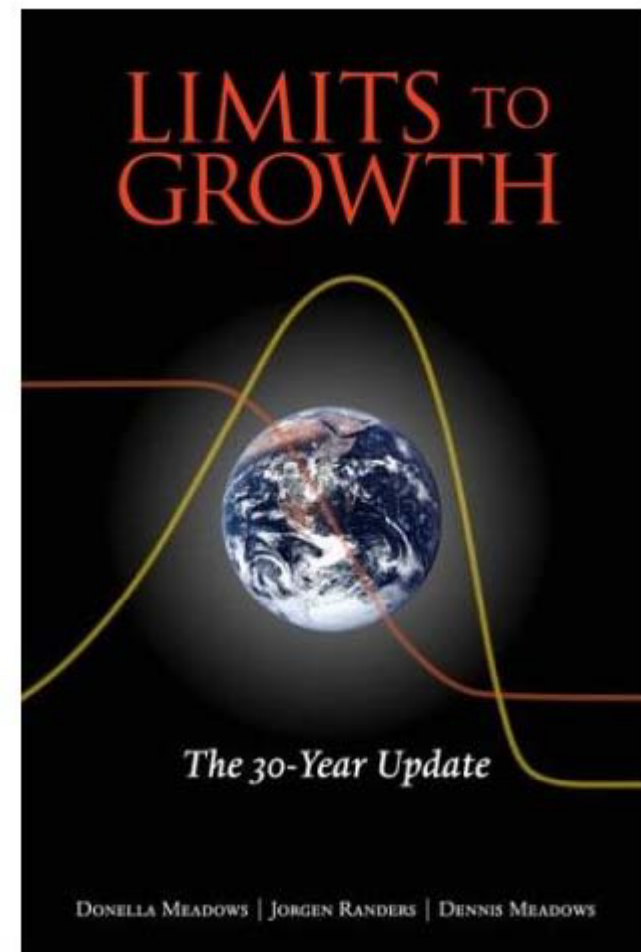
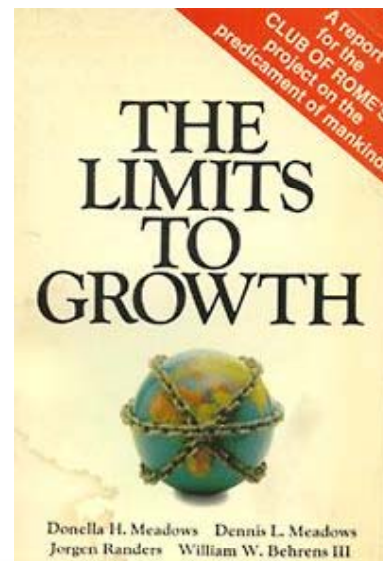
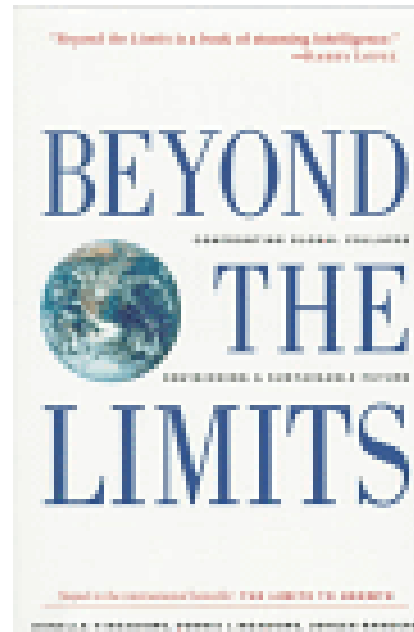
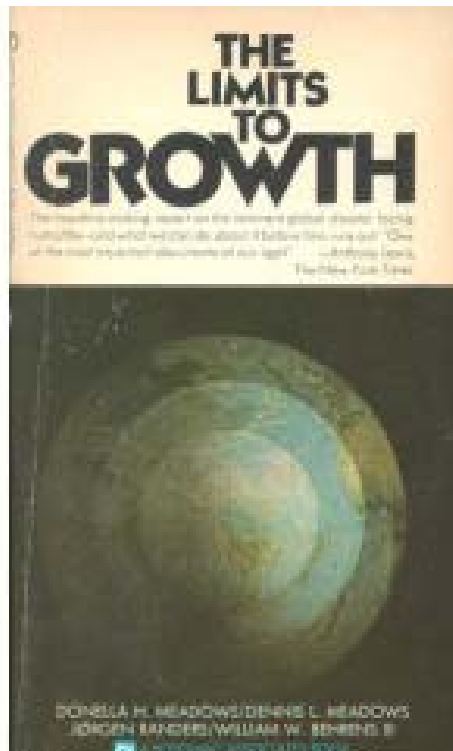
CENTER FOR
CLIMATE STRATEGY

2052 - A Global Forecast for the Next Forty Years

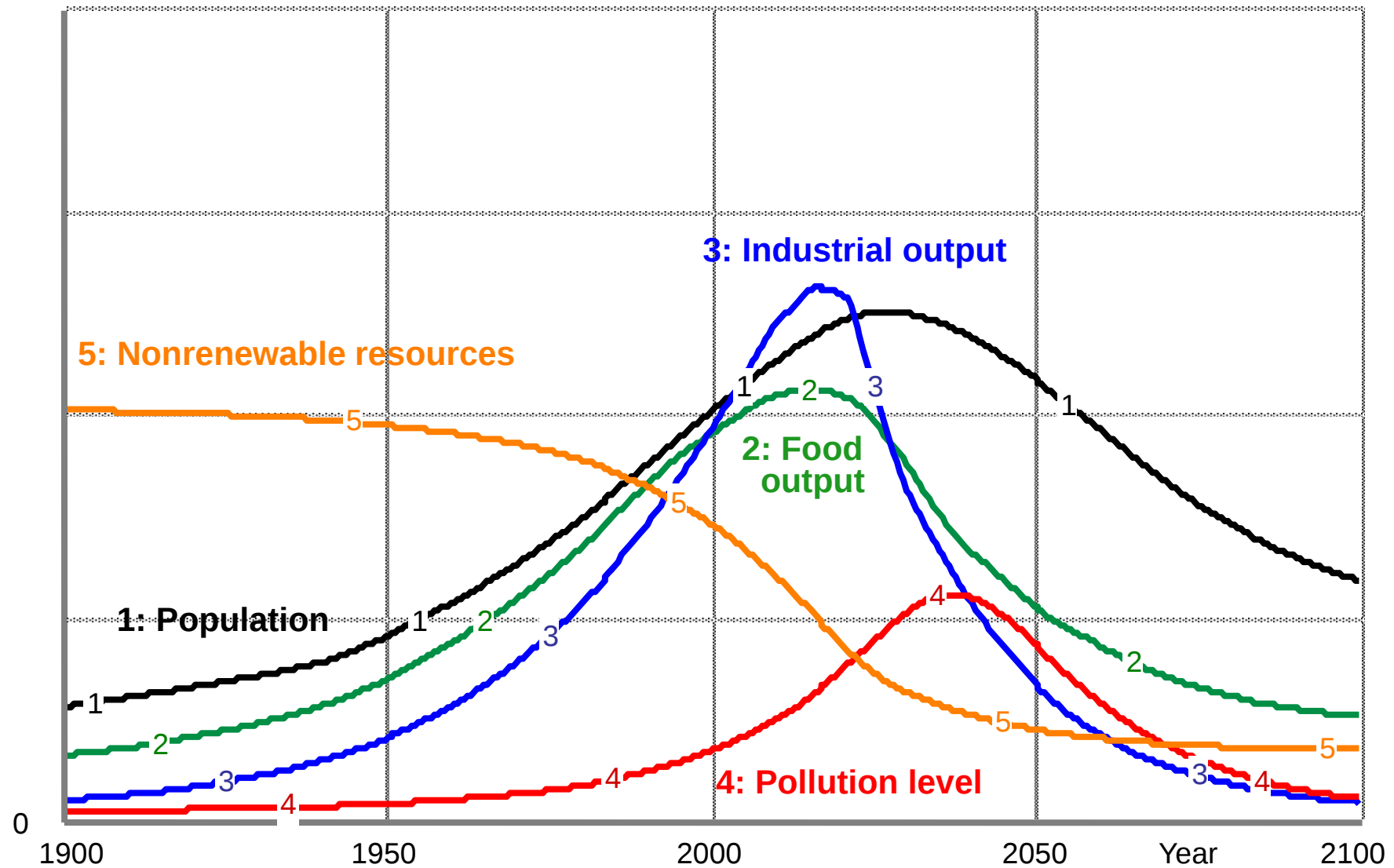
Jorgen Randers
Professor
Center for Climate Strategy
Norwegian Business School BI

Pioneers of Energy Transition - Conference
Vienna, Austria
October 10th, 2012

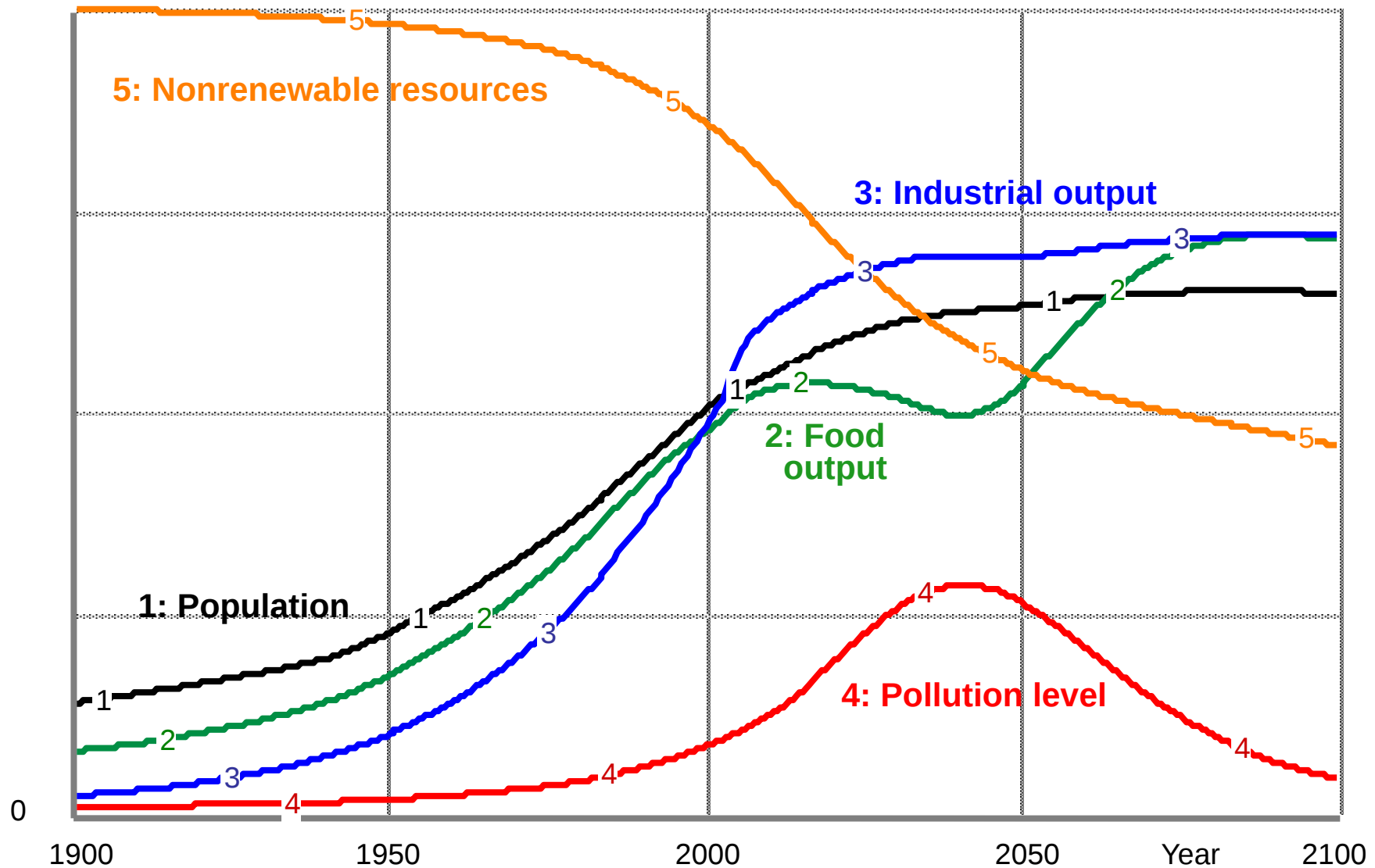
12 scenarios for the 21st century



Limits Scenario 1: Resource crisis



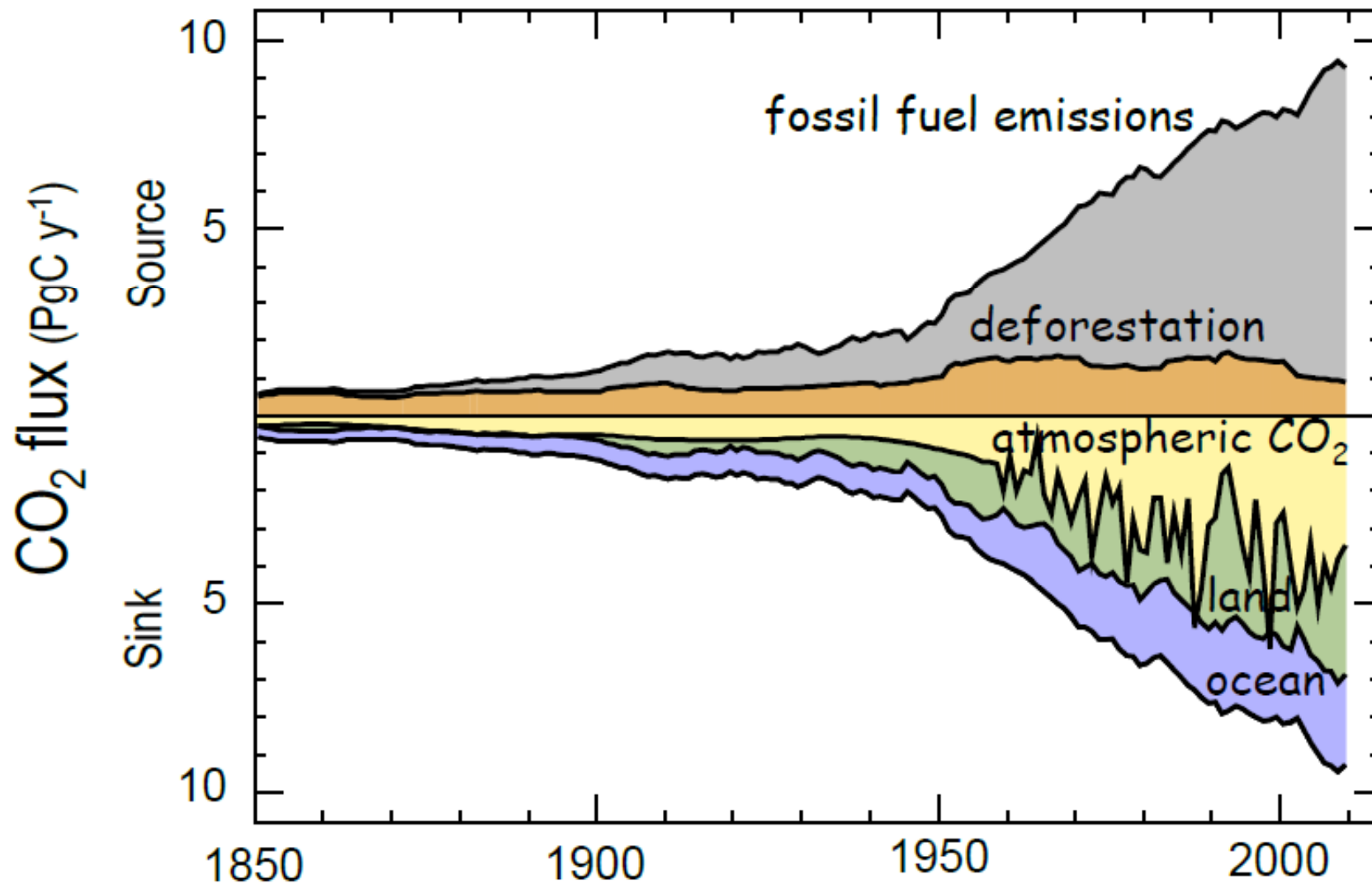
Limits Scenario 9: Sustainability



Limits to Growth: A small and fragile world



Overshoot: Emissions is twice absorption



A Global Forecast
for the Next Forty Years



Jorgen Randers

A REPORT TO THE CLUB OF ROME
COMMEMORATING THE 40TH ANNIVERSARY OF
The Limits to Growth

For all numerical data
and the forecast model,
consult
the book website
www.2052.info

The five regions used in the 2052 forecast

Region	Population 2010 (billion people)	GDP 2010 (trillion \$ pr year)	GDP per person 2010 (1000 \$ pr person-year)
US	0,3	13	41
China	1,3	10	7
OECD-less-US (1)	0,7	22	30
BRISE (2)	2,4	14	6
ROW (3)	2,1	8	4
Sum world	6,9	67	10

(1) Old industrial world, including EU, Japan, Canada, Australia, New Zealand etc

(2) Brazil, Russia, India, South Africa and the ten biggest emerging economies

(3) The remaining ca 140 countries of the world

World population will peak in 2040

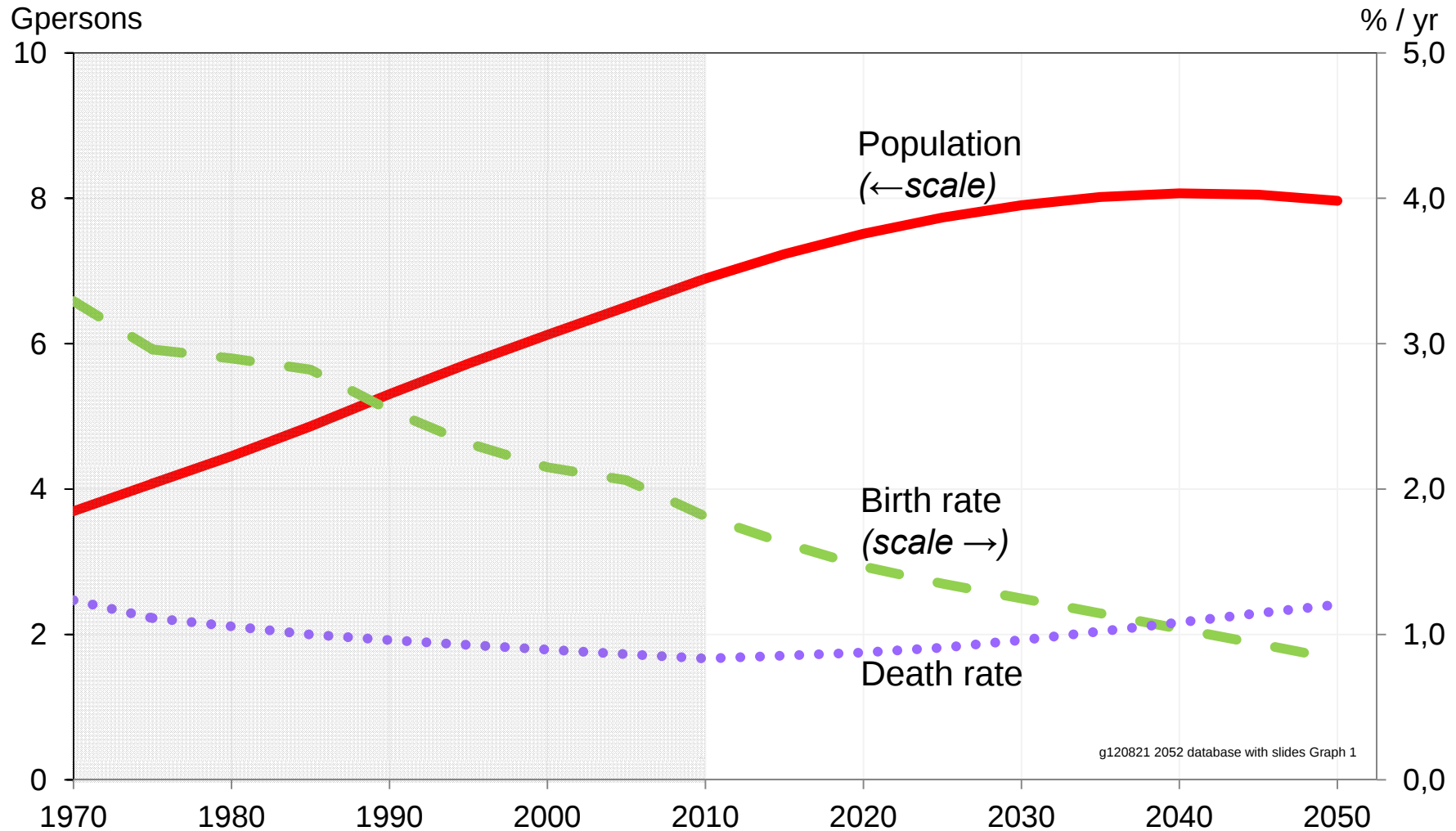


Figure 4-1 Population – World 1970 to 2050

World GDP growth will slow down

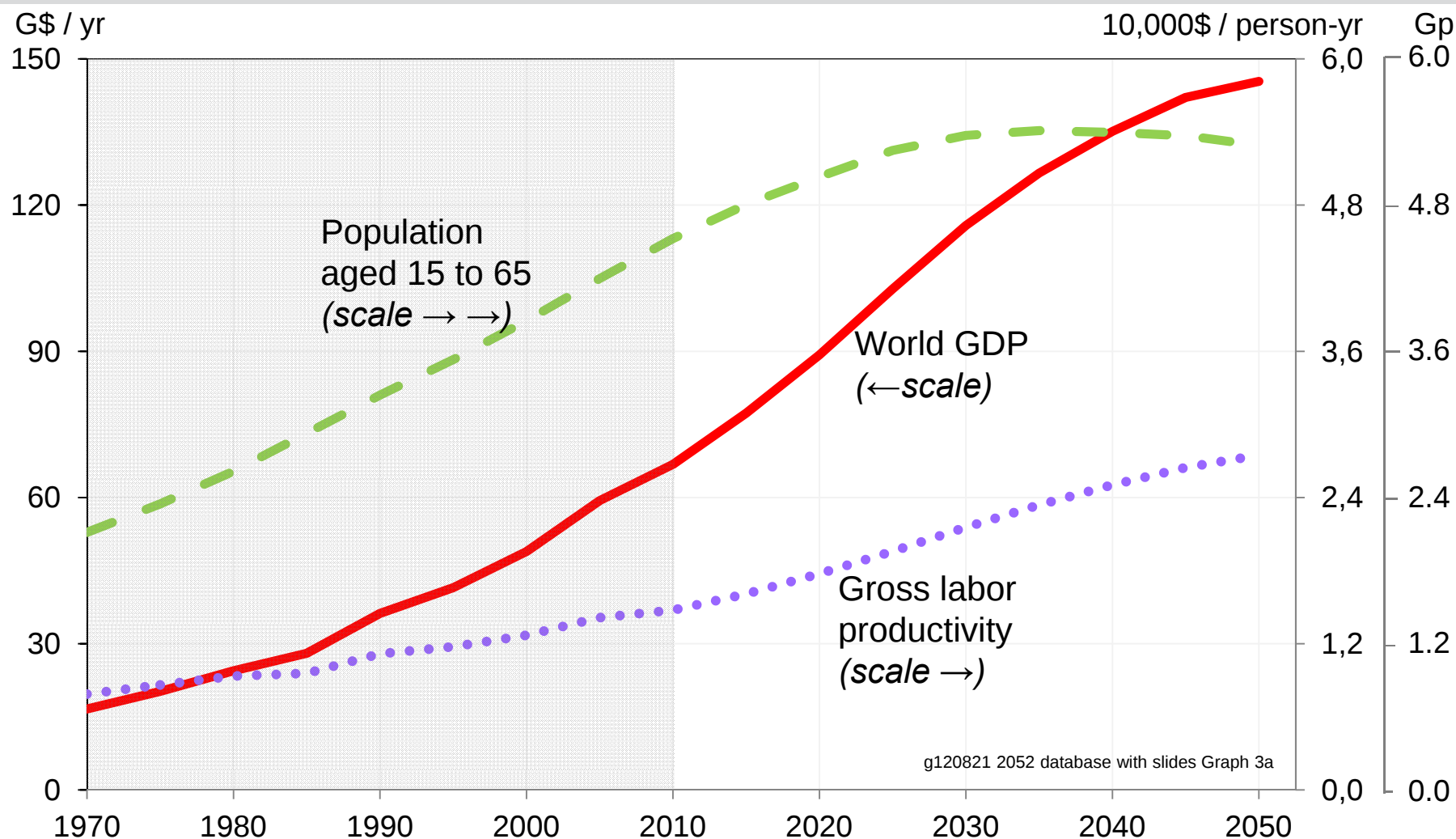


Figure 4-3b: Gross Domestic product – World 1970 to 2050
Definition: GDP = Population aged 15 to 65 years multiplied with Gross labour productivity

Share of GDP in investment will grow

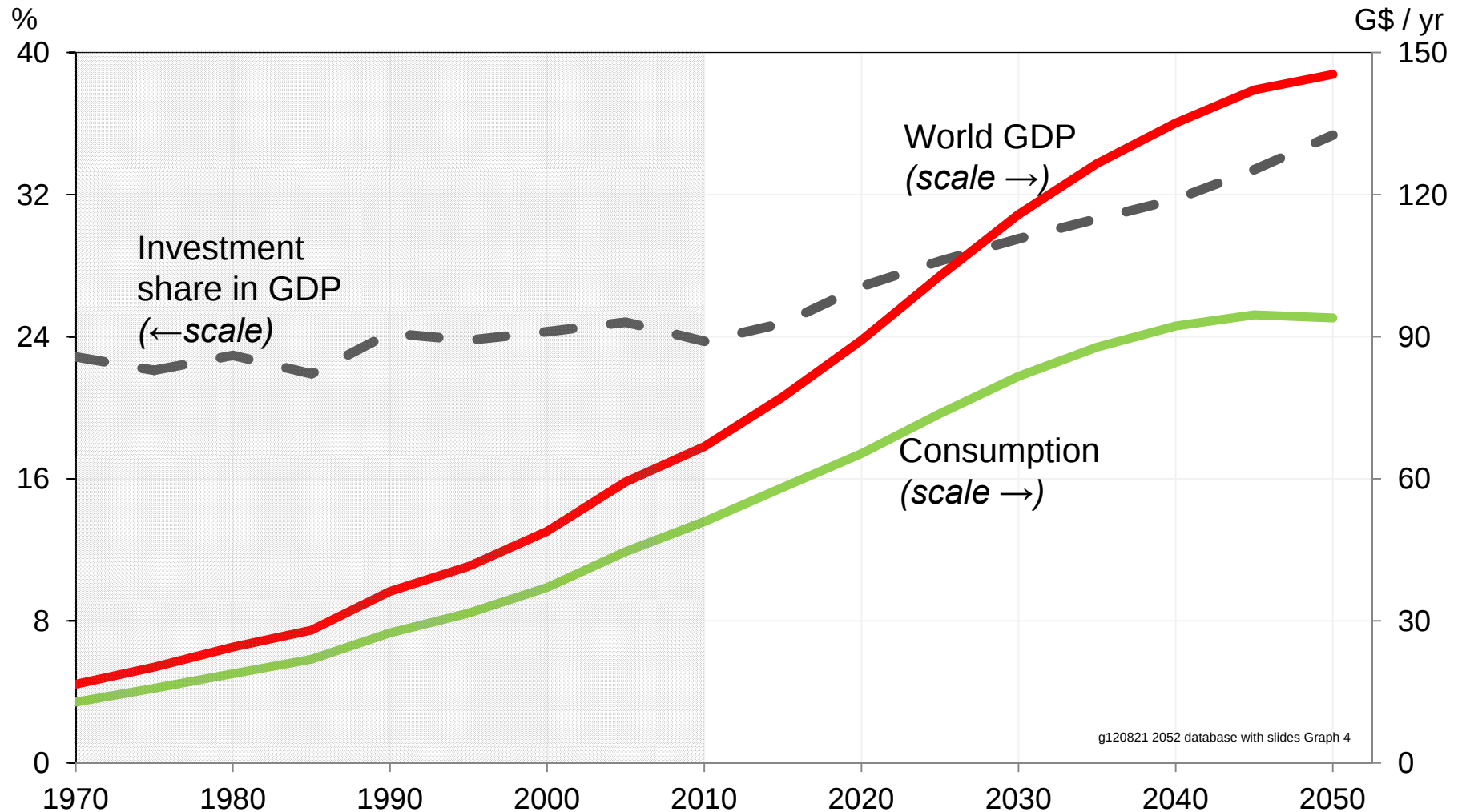


Figure 4-4: Production and Consumption – World 1970 to 2050

Energy use will peak in 2040

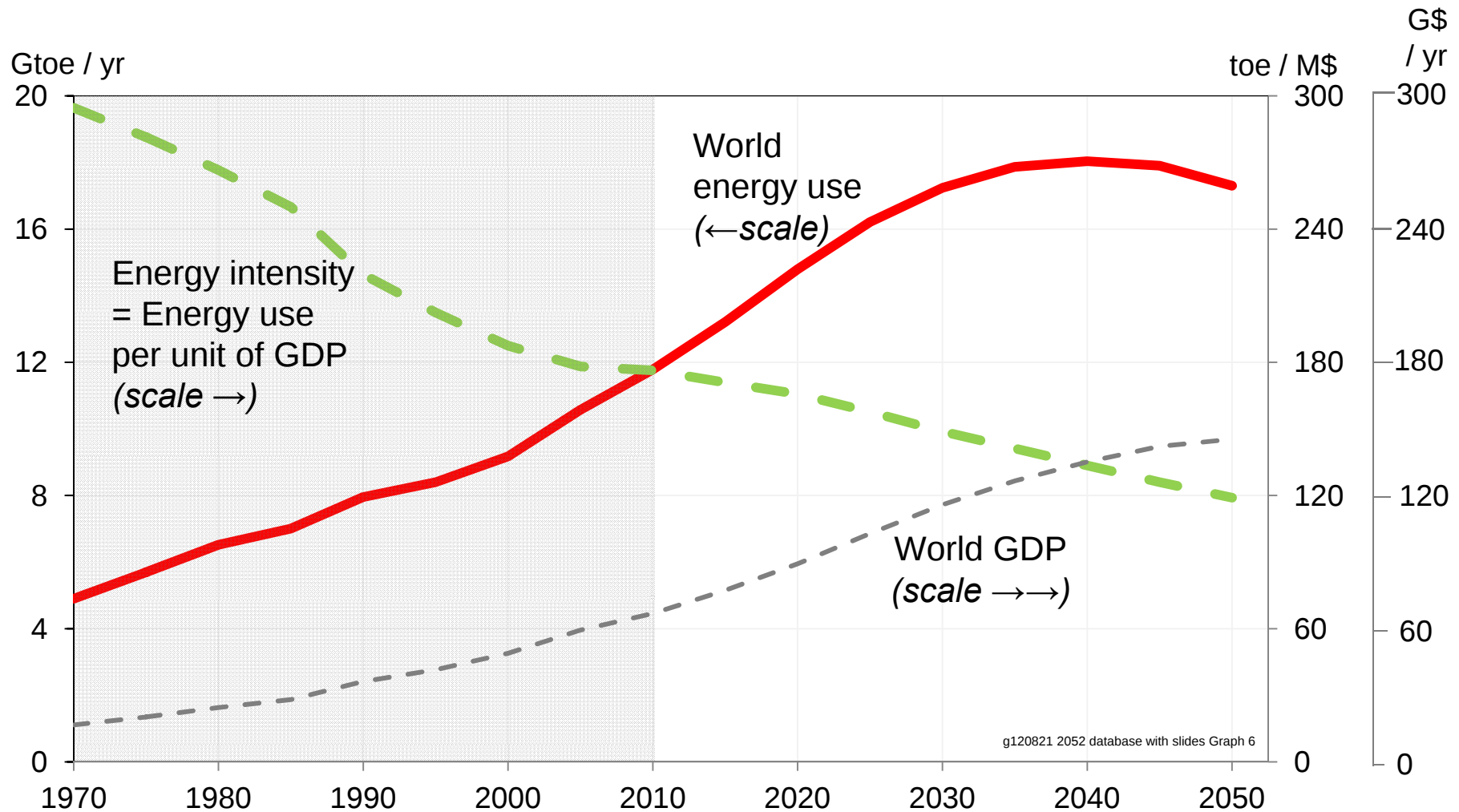


Figure 5-1: Energy Use – World 1970 to 2050

Fossil fuels will prevail

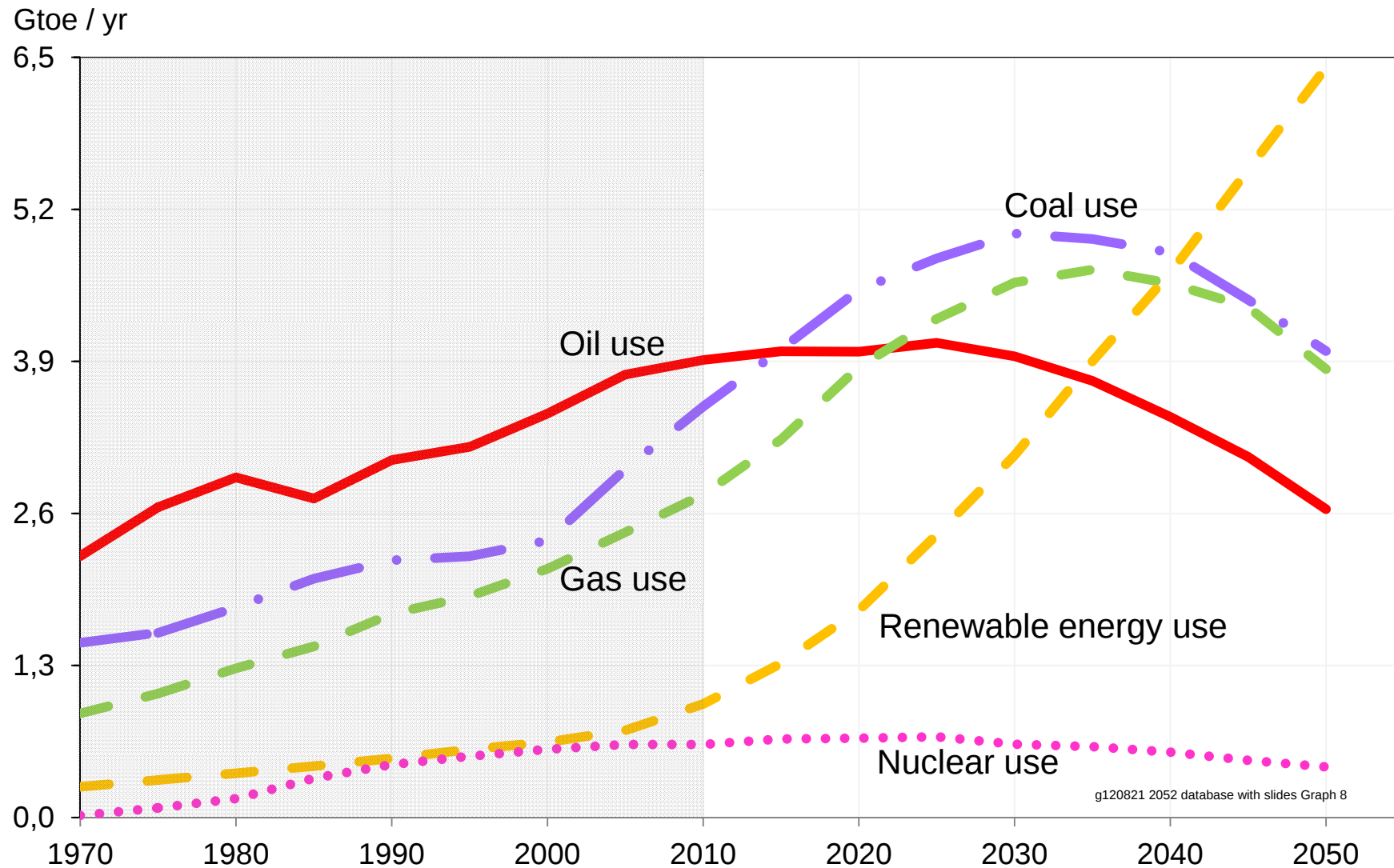


Figure 5-2: Energy Uses – World 1970 to 2052

World CO₂ emissions will peak in 2030

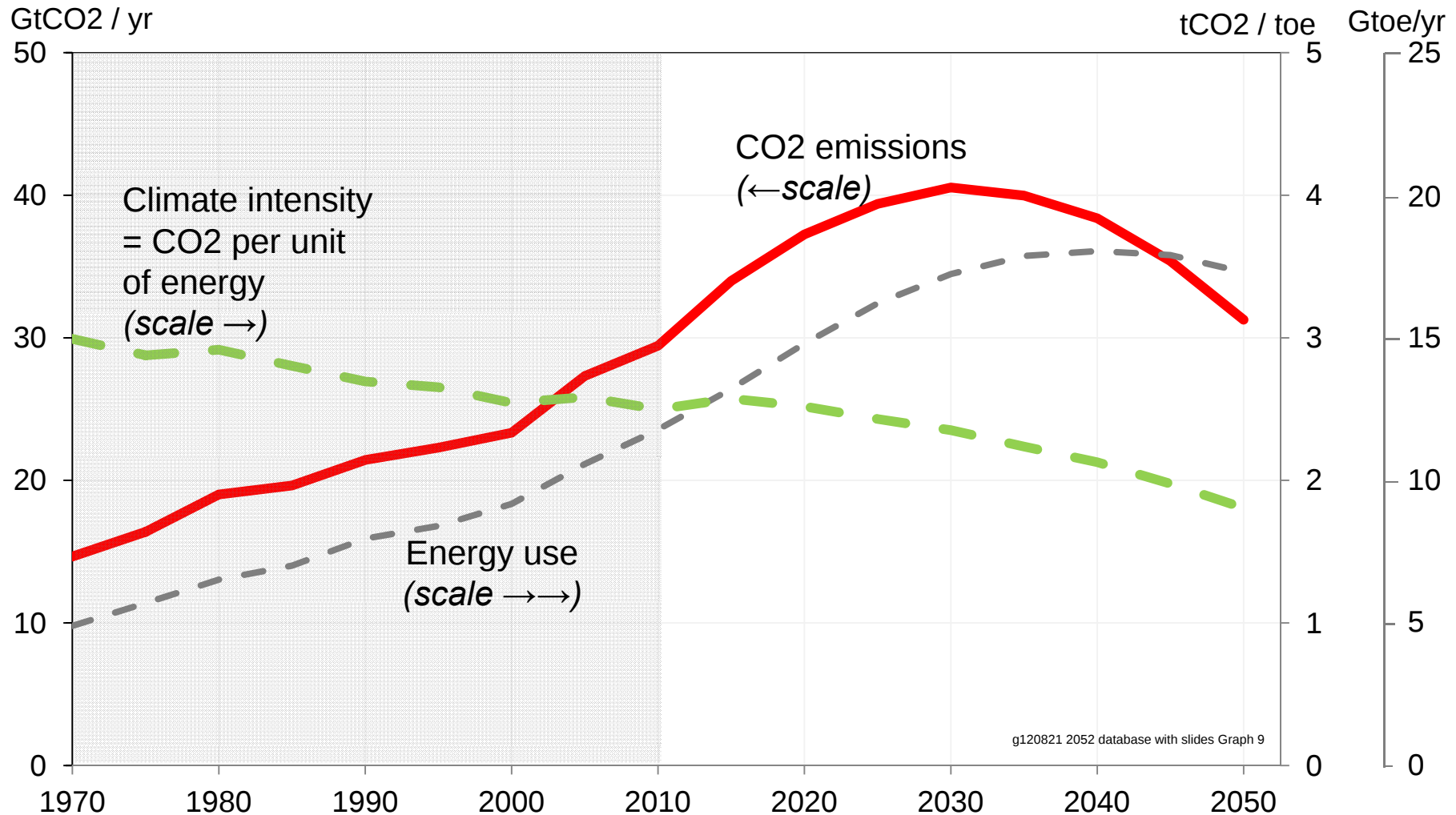


Figure 5-3: CO₂ Emissions from Energy Use – World 1970 to 2050.

Temperature and sea-level will rise

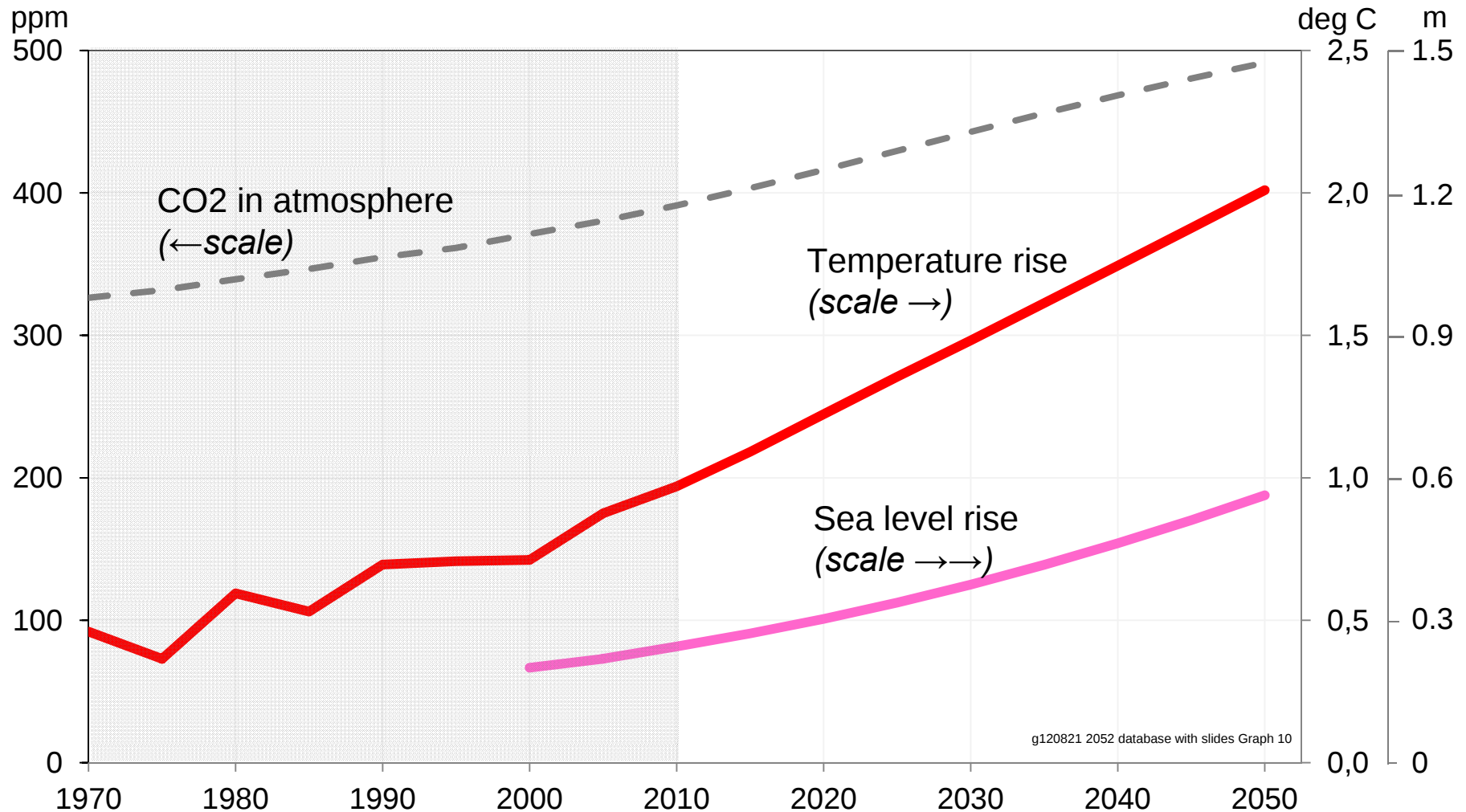
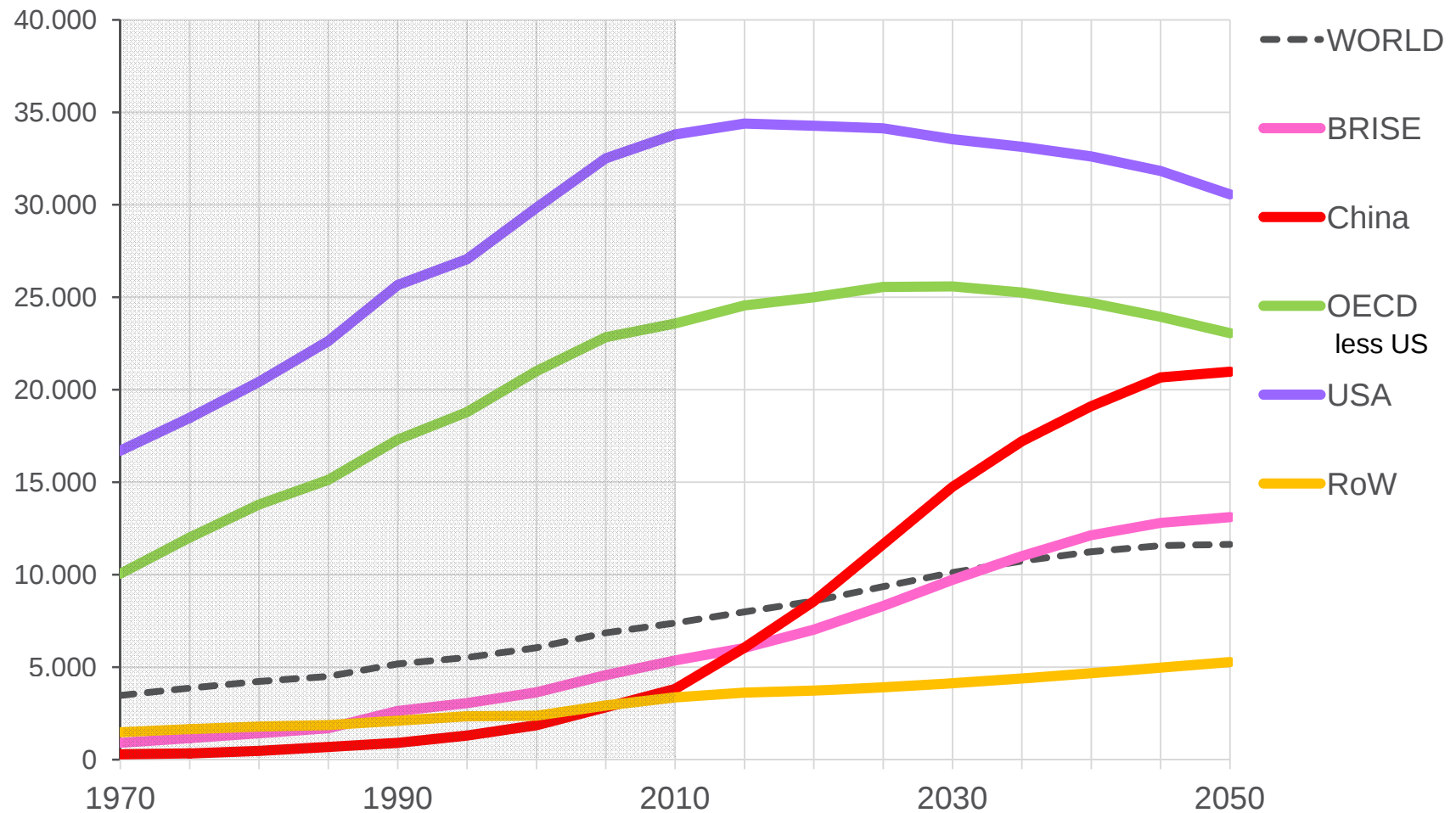


Figure 5-4: Climate Change – World 1970 to 2050

Average disposable income – 1970 to 2050

(in 2005 PPP \$ per person-year)



Democratic decision making takes time



What should be done? – Globally

- 1.** Slow population growth: Have fewer children, particularly in the rich world
- 2.** Reduce the footprint: Eliminate fossil fuels, first in the rich world
- 3.** Help the poor: Build a climate-friendly energy system in the poor world
- 4.** Temper short-termism: Establish supra-national institutions
- 5.** Establish new goals: Increase societal wellbeing in a world without growth

What should be done? – Pioneer regions

- 1.** Be in favour of small families and optimal degree of centralisation
- 2.** Increase energy efficiency (GDP/energy) and fraction renewable energy (GDP/CO₂)
- 3.** Focus on climate-friendly transport, housing and air travel – individually or collectively
- 4.** Remember this is primarily a political challenge: To make voters support wise policy even if expensive in the short term

I don't like what I see!



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