

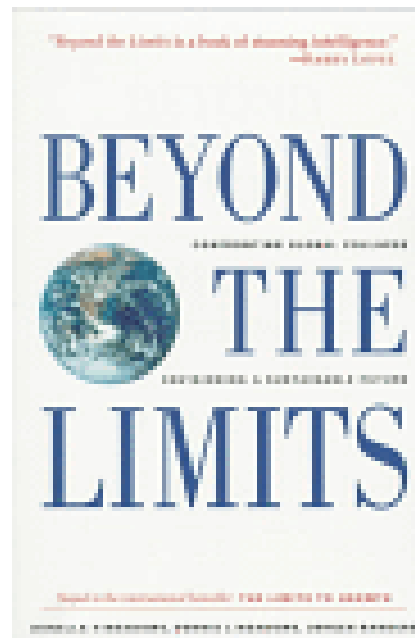
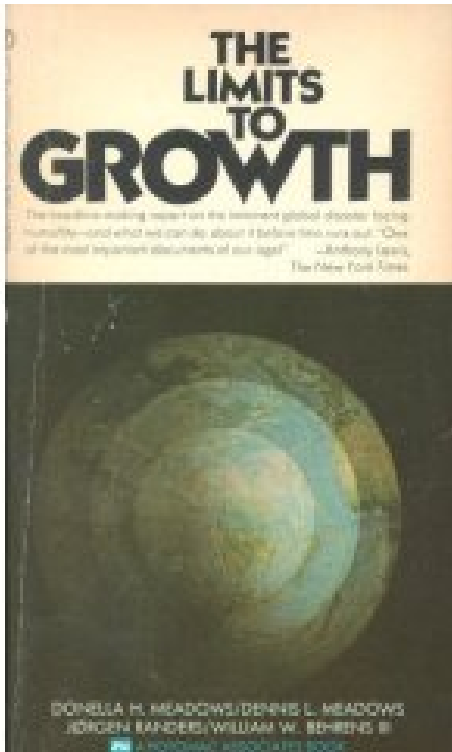


CENTER FOR
CLIMATE STRATEGY

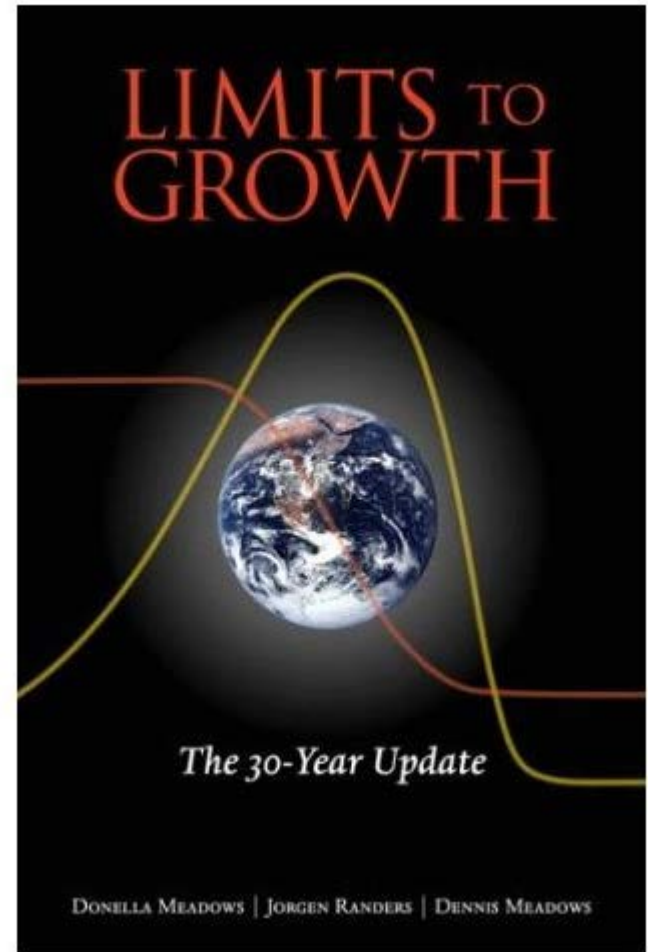
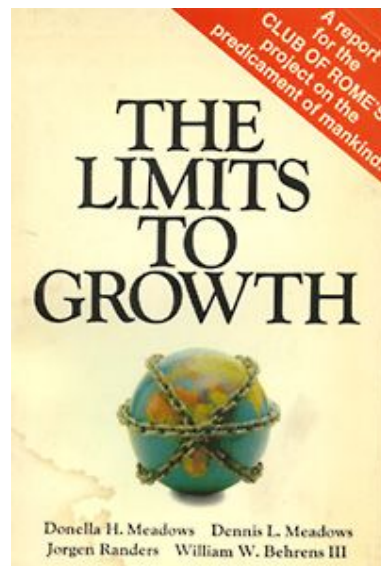
**2052 –
A Global Forecast
for the Next Forty Years**

Jorgen Randers
Professor
Center for Climate Strategy
Norwegian Business School BI

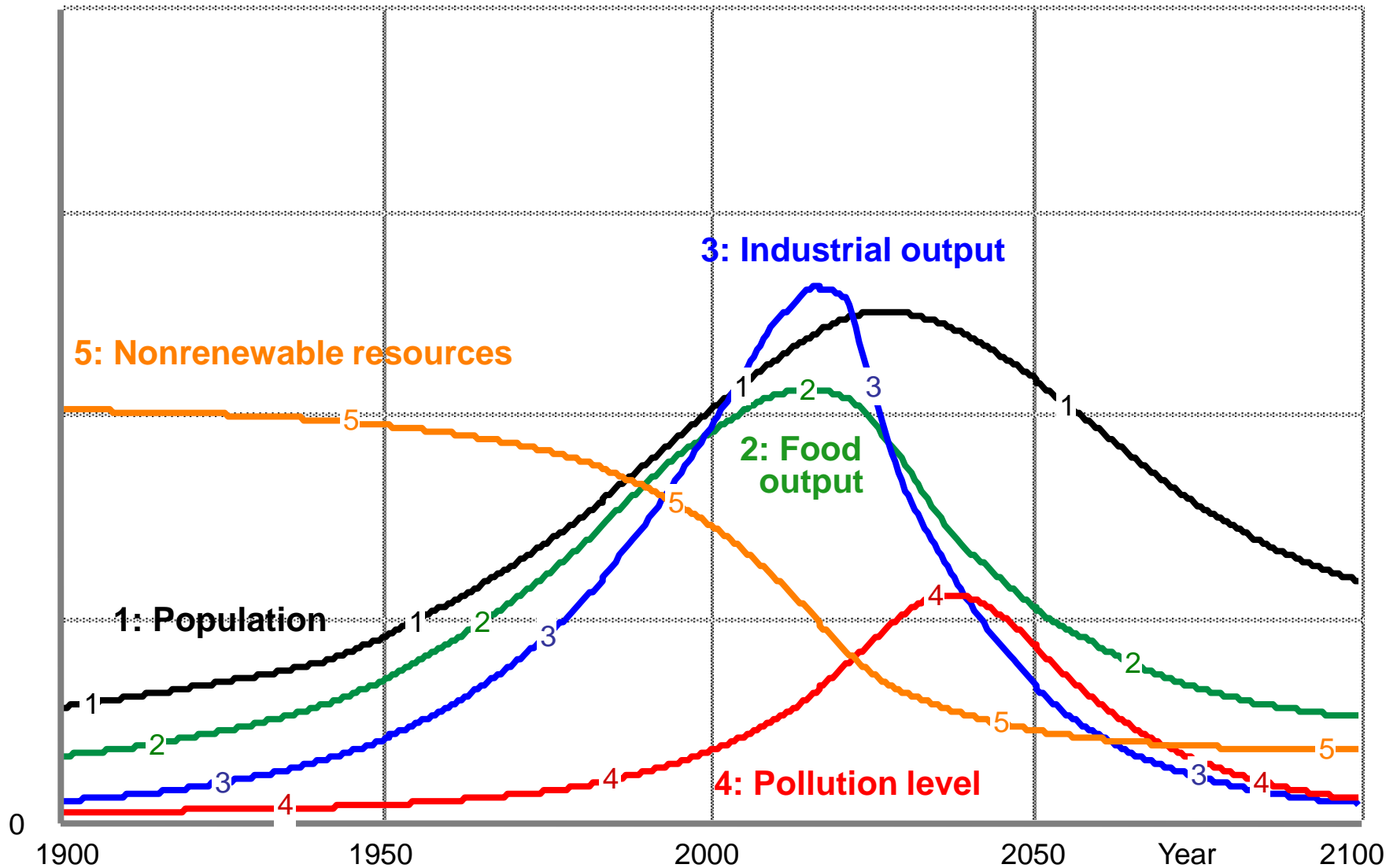
50 minutes lecture
January 1st, 2014



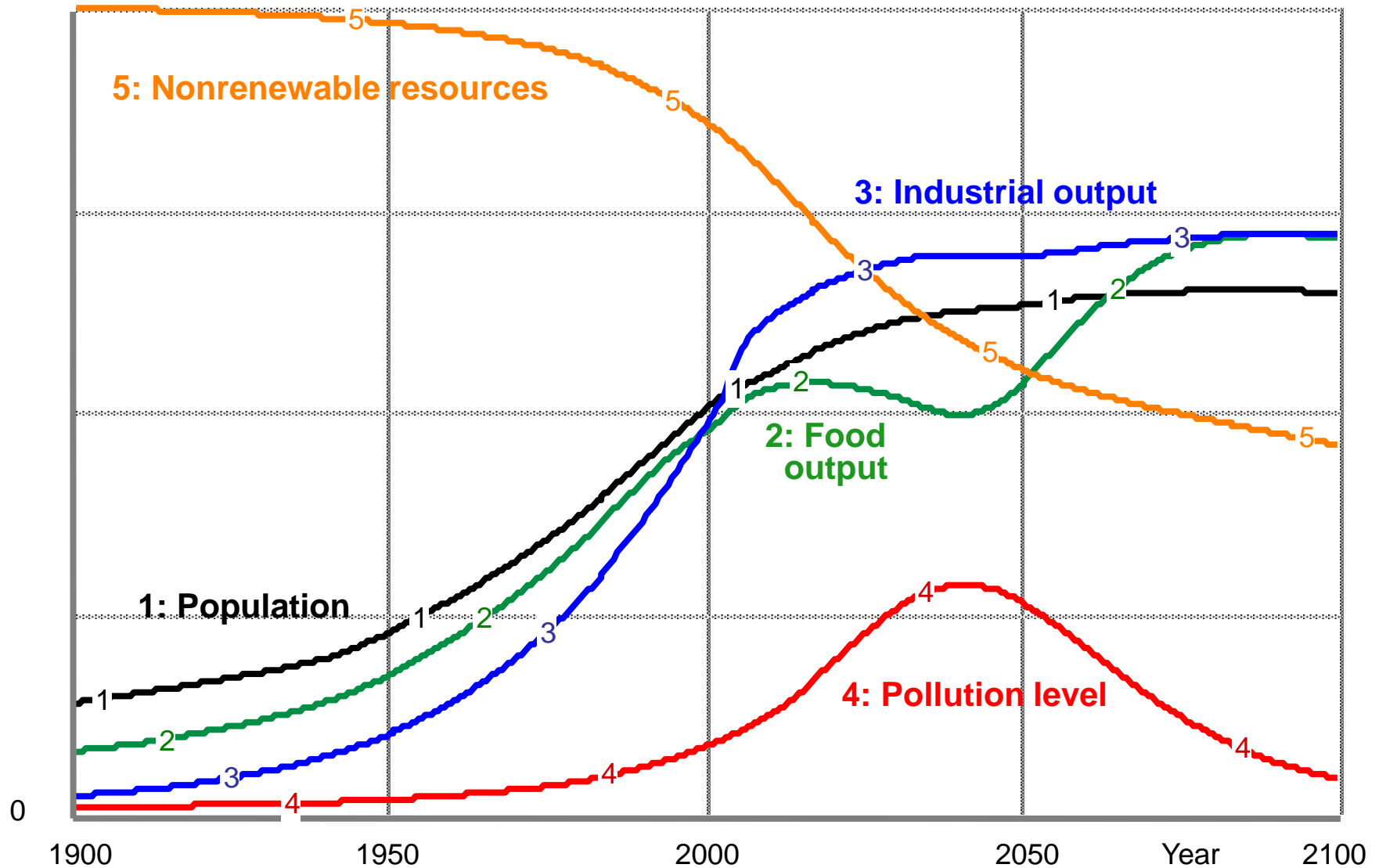
12 scenarios for the 21st century



Limits Scenario 1: Resource crisis



Limits Scenario 9: Sustainability



The 3 conclusions of The Limits to Growth

- 1.** The planet is small
(Resource constraints are likely within 100 years if growth continue)
- 2.** Overshoot is likely
(Current systems of governance are likely to allow human activity to grow beyond the finite carrying capacity of the planet)
- 3.** Once in overshoot, physical contraction is unavoidable
(Either managed or by the forces of nature or the market)

A Global Forecast
for the **Next Forty Years**

2052

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

EINE GLOBALE PROGNOSE
FÜR DIE NÄCHSTEN 40 JAHRE

2052

JORGEN RANDERS

Der neue Bericht an den Club of Rome
40 Jahre nach »Die Grenzen des Wachstums«

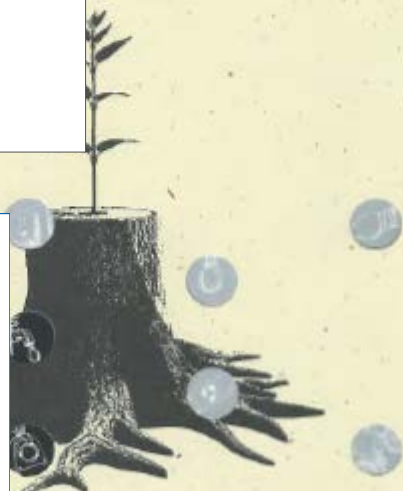
oekom

더 나은 미래는
쉬게 오지 않는다

for the Next Forty Years

어떤 하루를 살고 있을까

요르겐 란더스 지음 | 김대웅 옮김



A GLOBAL FORECAST FOR
THE NEXT FORTY YEARS

2052

今後40年のグローバル予測

ヨルゲン・ランダース著
野中浩子訳
竹中平蔵監訳

A REPORT TO THE CLUB OF ROME
COMMEMORATING THE 40TH ANNIVERSARY OF
THE LIMITS TO GROWTH

日経BP社

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

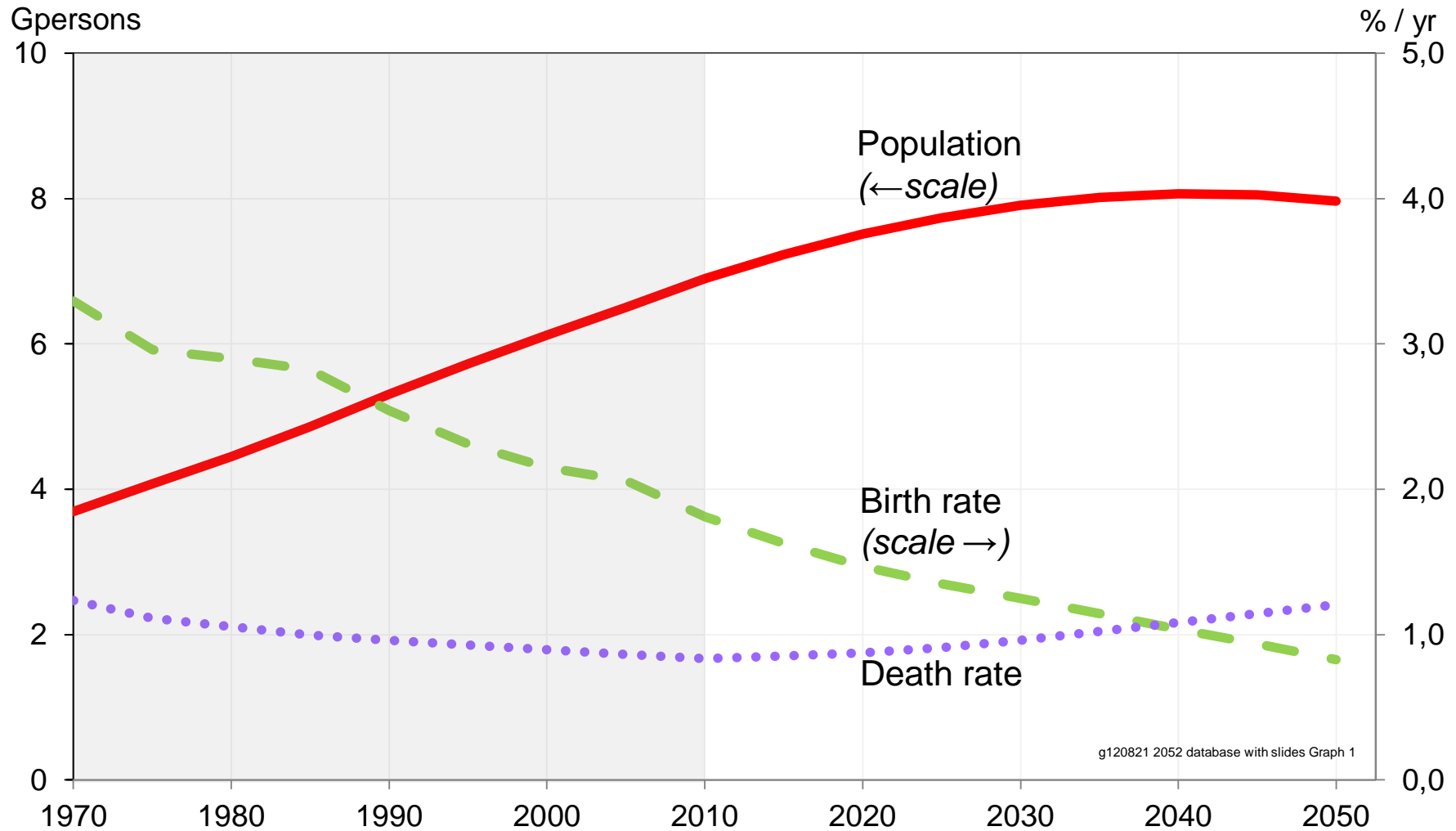


Figure 4-1 Population – World 1970 to 2050

World GDP growth will slow down

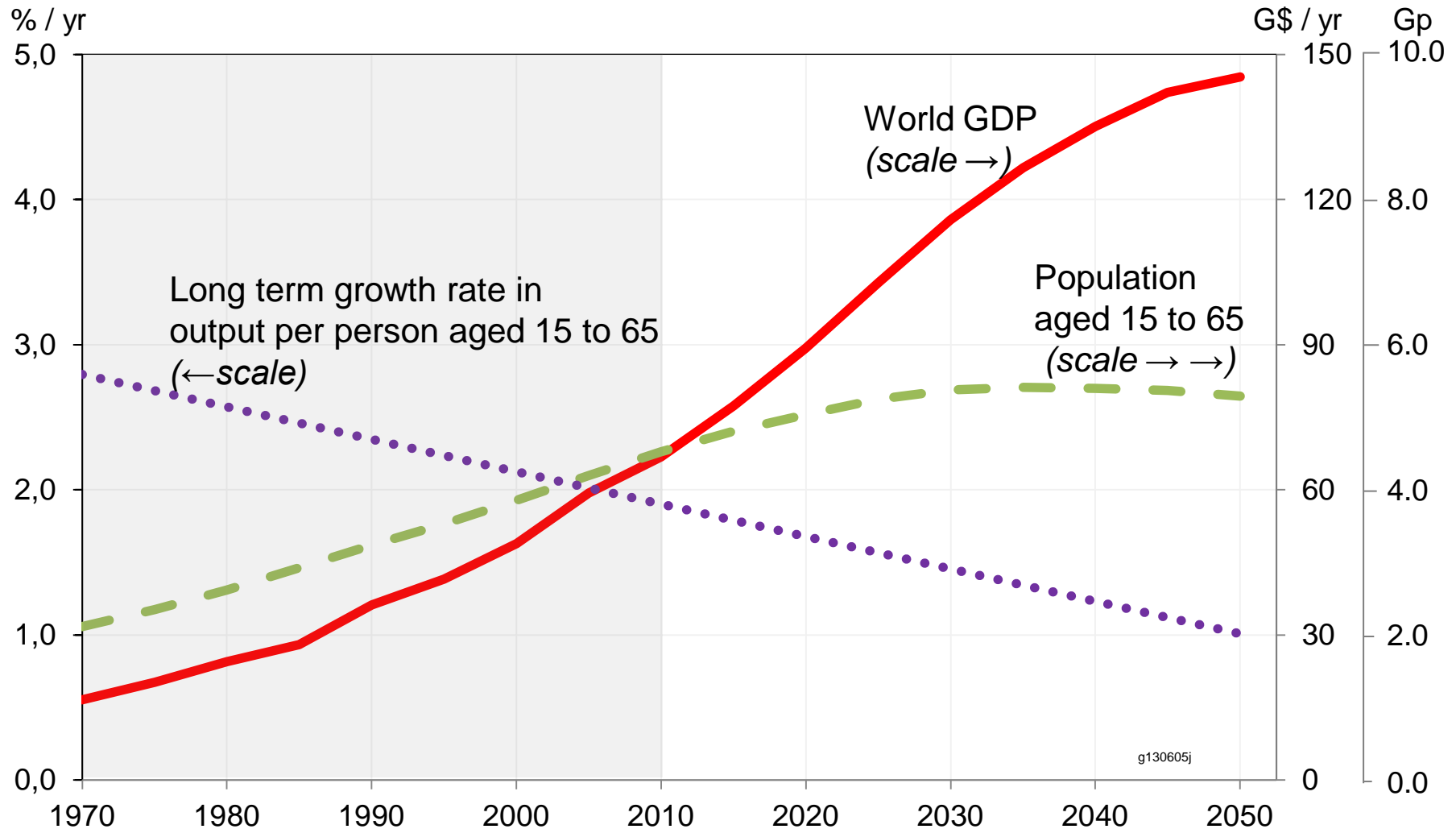


Figure 4-3b: Gross Domestic product – World 1970 to 2050

Definition: GDP = Population aged 15 to 65 years multiplied with Output per member of potential workforce

Global consumption will peak in 2045

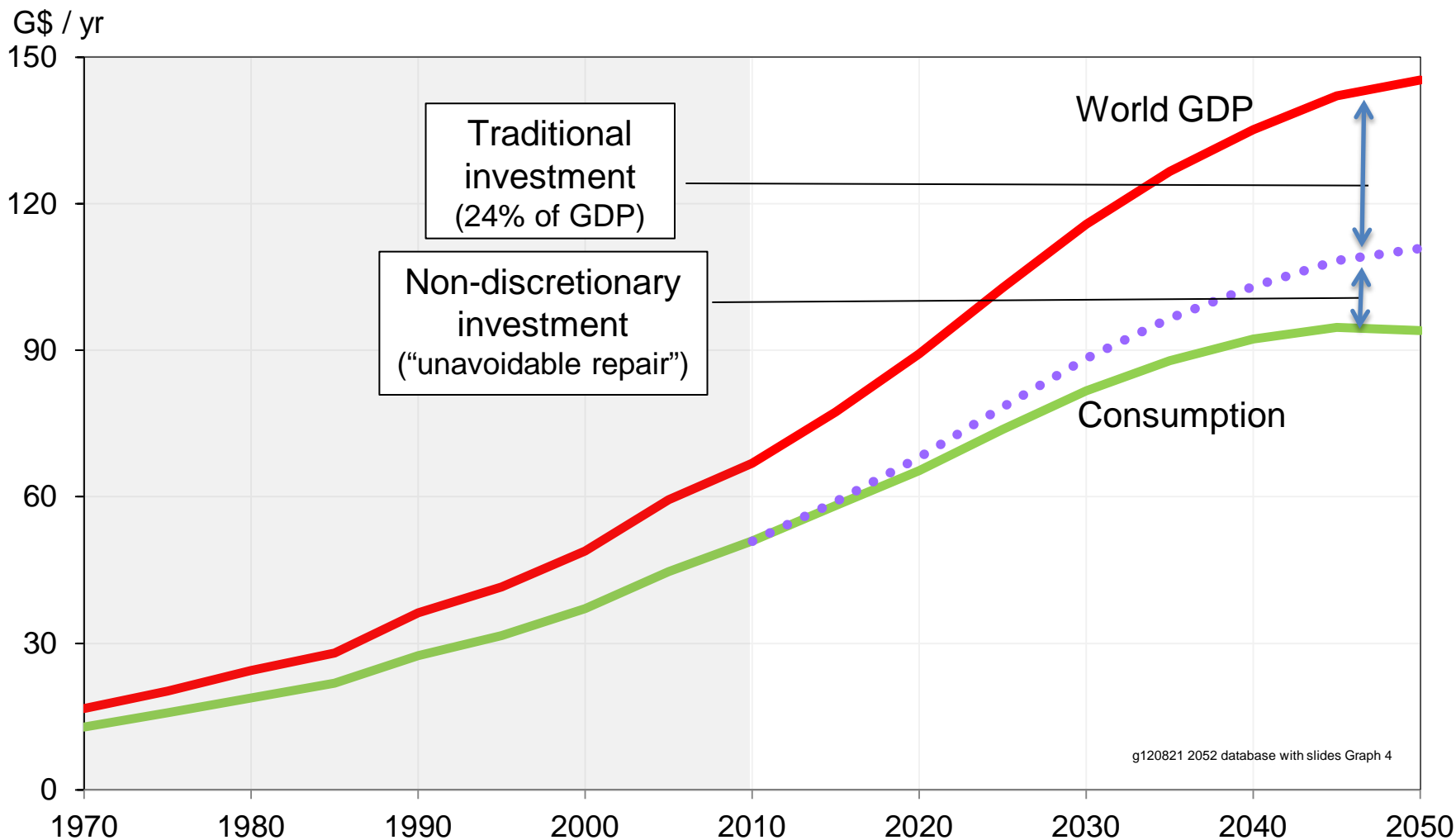


Figure 4-4: Production, Consumption and Investment – World 1970 to 2050

Energy use will peak in 2040

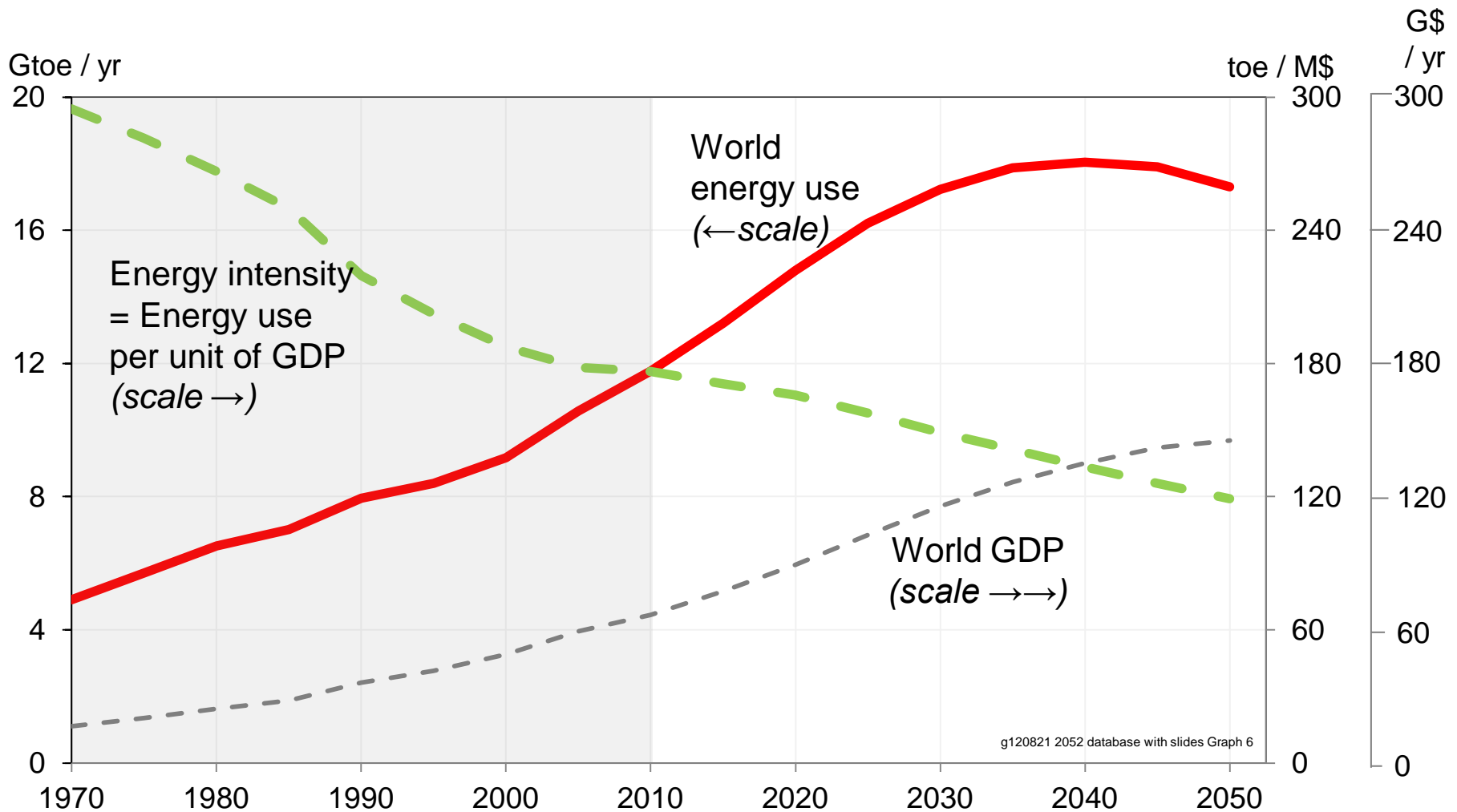


Figure 5-1: Energy Use – World 1970 to 2050

Fossil fuel use will peak around 2030

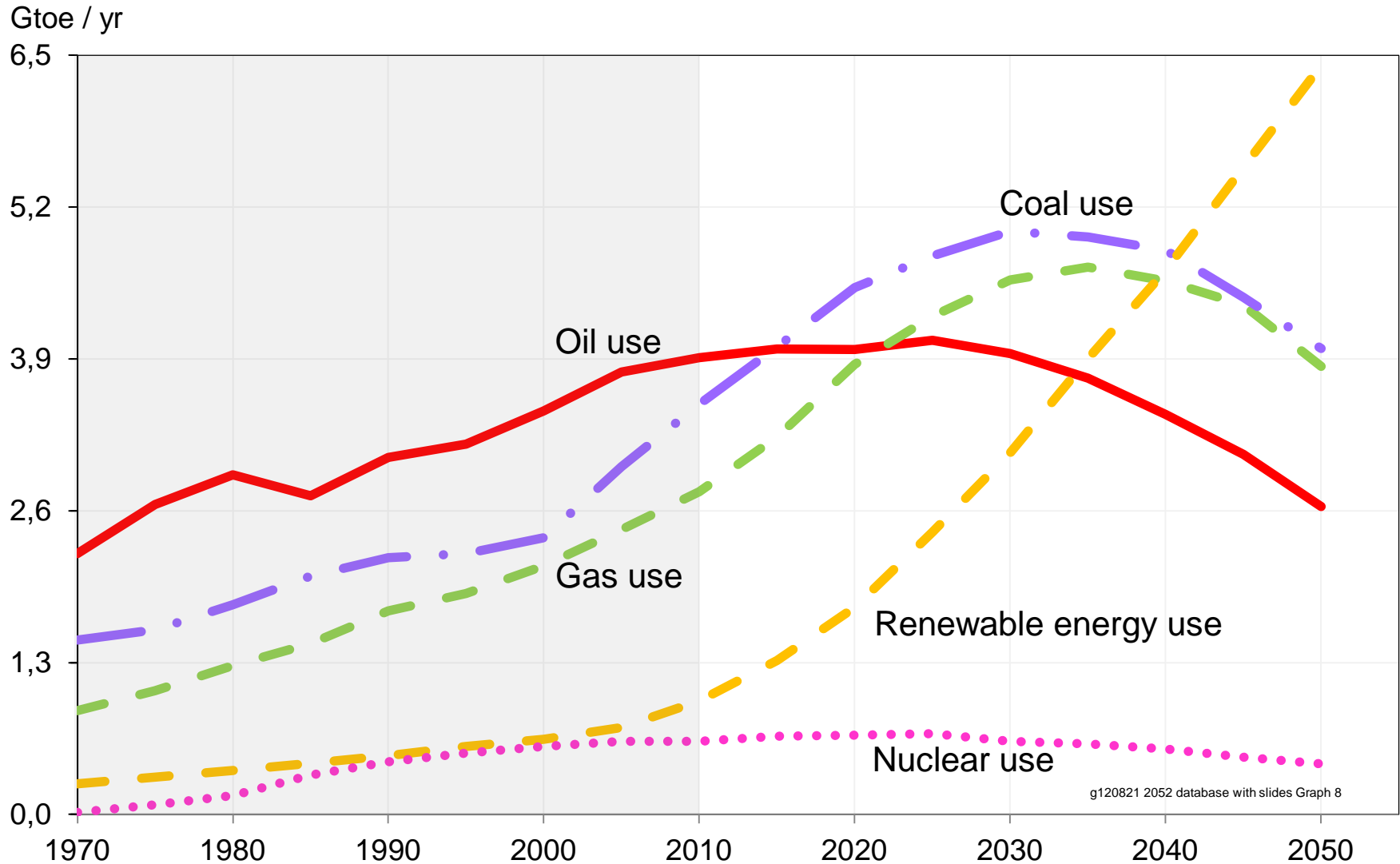


Figure 5-2: Energy Uses – World 1970 to 2052

World CO₂ emissions will peak in 2030

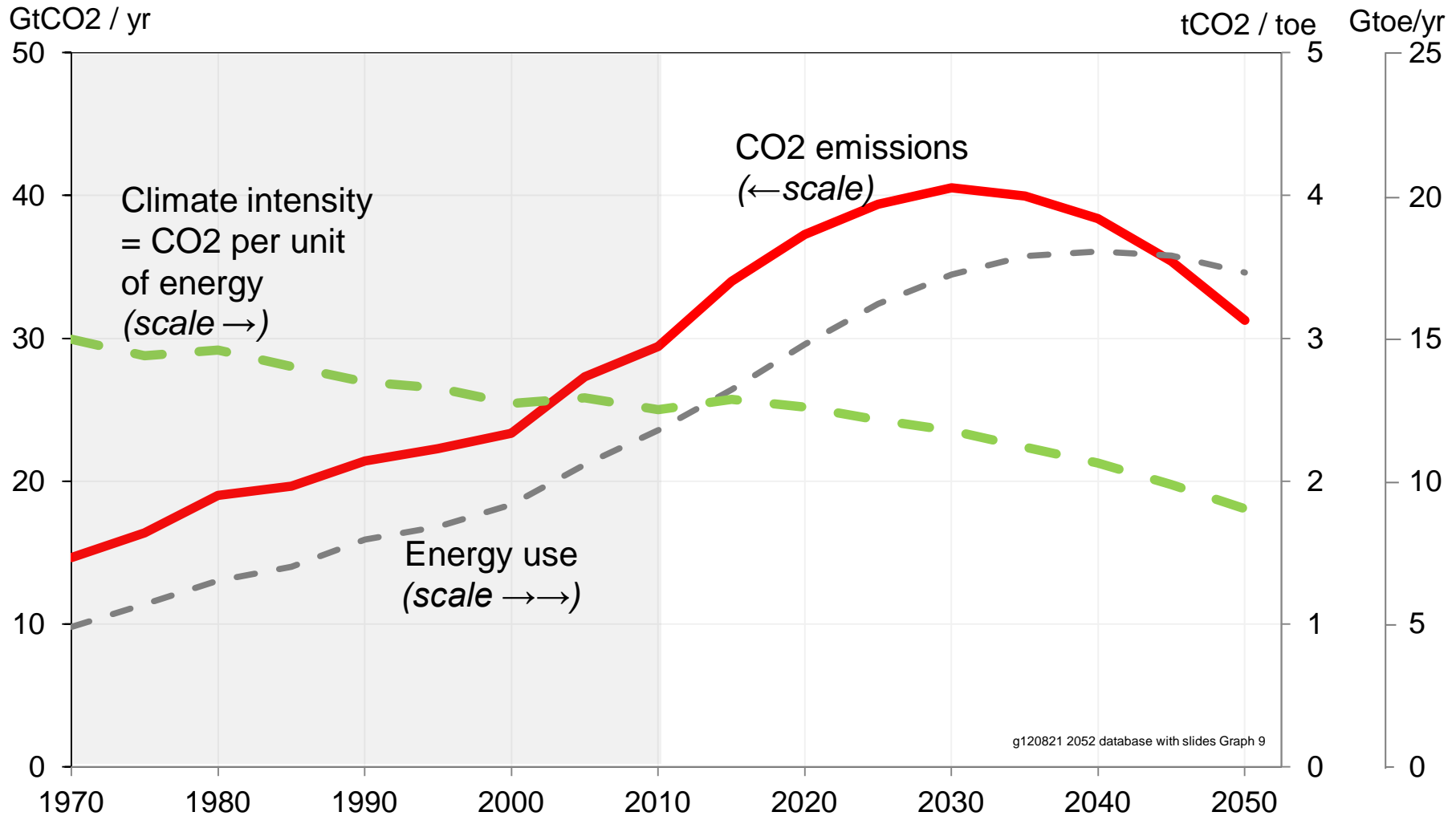


Figure 5-3: CO₂ Emissions from Energy Use – World 1970 to 2050.

Temperature will pass +2 degrees C in 2052

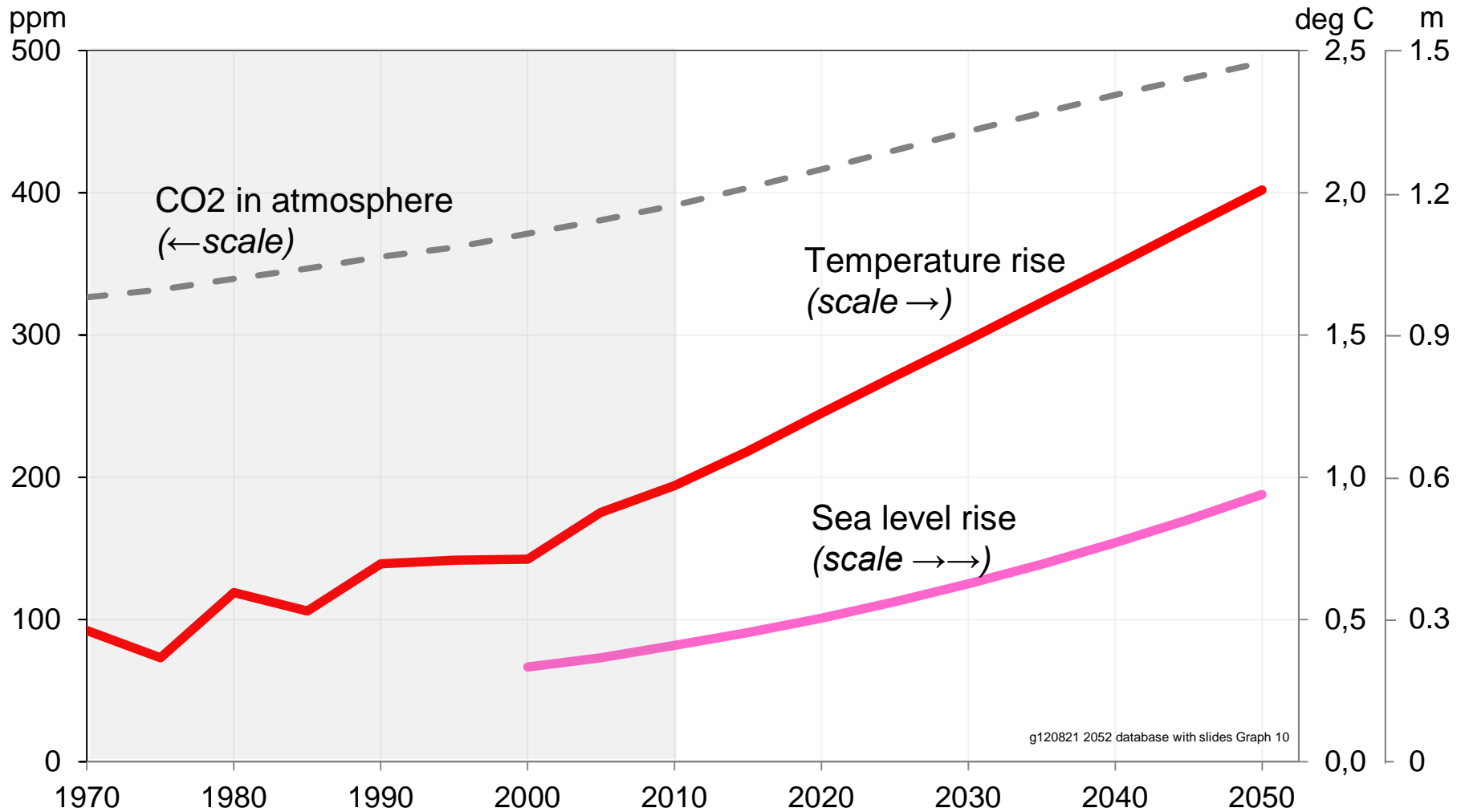


Figure 5-4: Climate Change – World 1970 to 2050

Food will satisfy demand – but not need

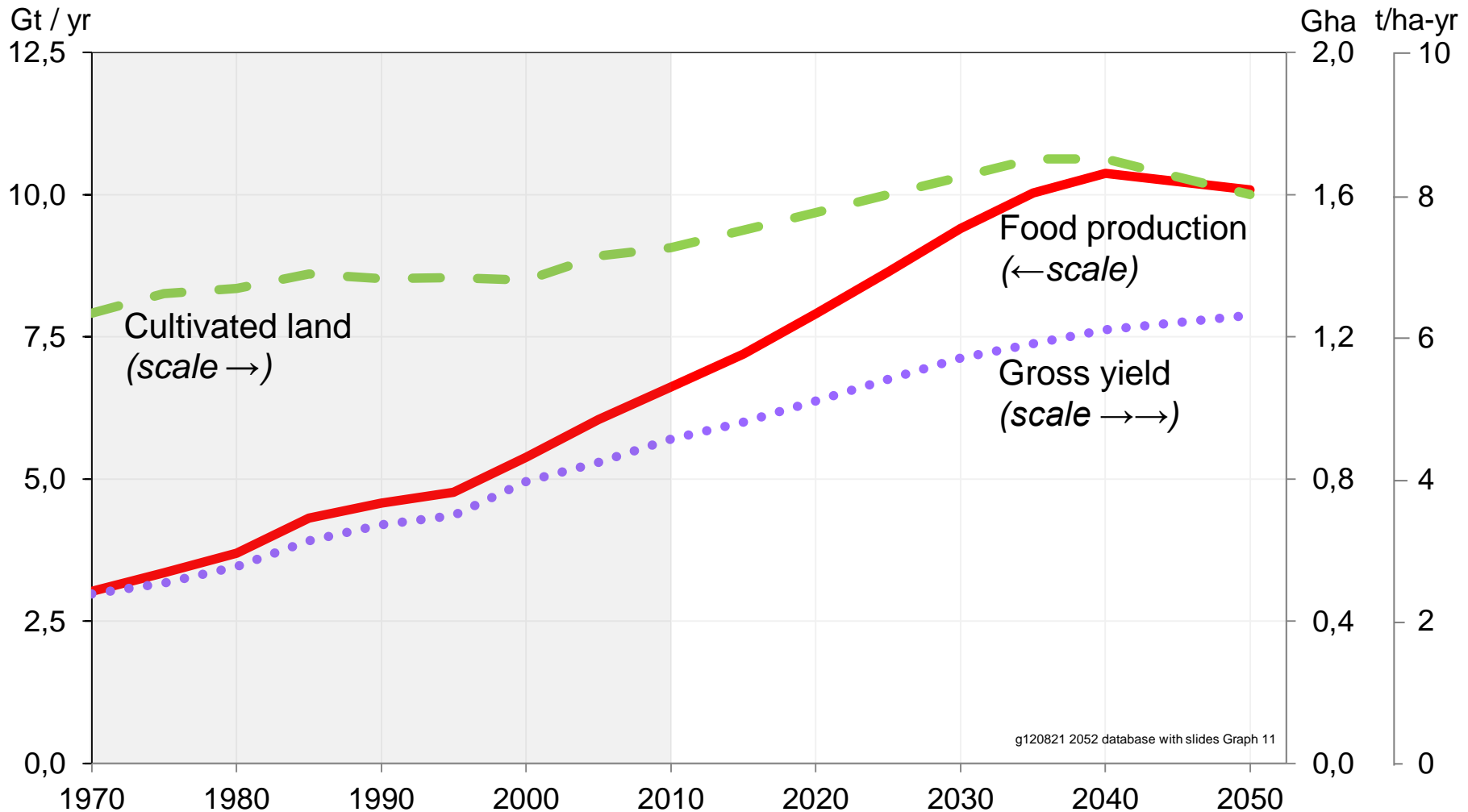
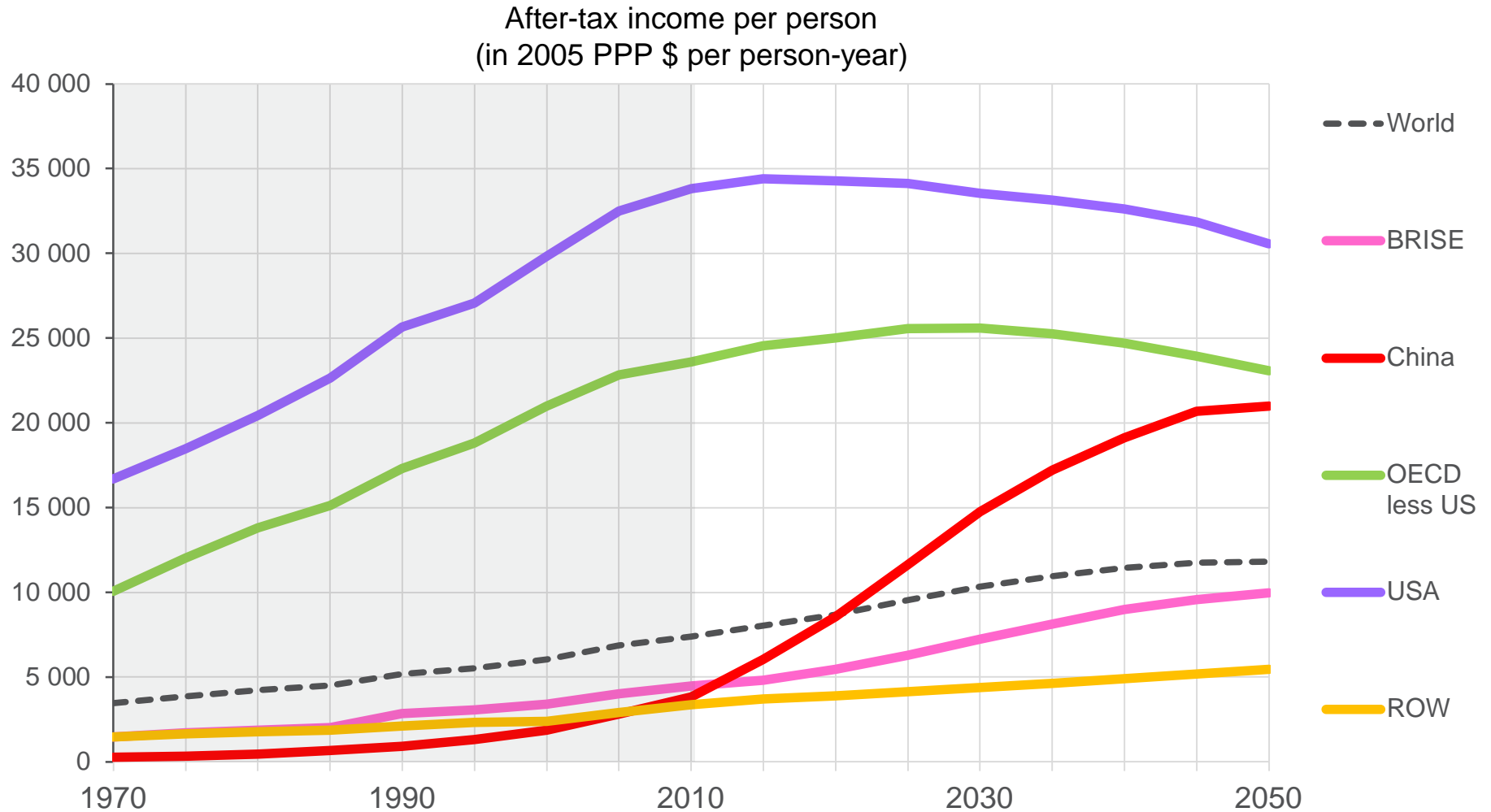


Figure 6-1: Food Production – World 1970 to 2050

Discussion of the 2052 forecast

- 1.** Growth in population and GDP will slow “by itself” – because of human decision making, not because of planetary constraints
- 2.** But growth will not slow fast enough to avoid a climate crisis
- 3.** There will be enough resources – including energy, water and food – to cover demand (which is not the same as need)
- 4.** There will be more poverty – both in the rich and the poor world

There will be huge regional differences



Main conclusions from the 2052 forecast

♣ World population and economy will grow more slowly towards 2052 than most people expect
- but still fast enough to trigger a climate crisis

♣ Consumption will stagnate because world society will have to spend ever more on repair and adaptation

♣ The short-term nature of man
- reflected in the short term focus of democracy and capitalism -
is the root cause of this development

What should be done? - Ideally

- 1.** Further slow population growth
Introduce 1-child policy – first in rich world
- 2.** Cut CO2 emissions – first in the rich world
Ban the use of coal, oil and gas from 2024
- 3.** Reduce poverty in the poor world
Give them a climate-friendly energy system
- 4.** Reduce the ecological footprint of the rich world
Legislate compulsory vacation
- 5.** Temper national short termism
Establish supra-national institutions
- 6.** Reduce the focus on income growth
Establish “increase in well-being” as a new goal

What should be done? – Realistically (1 of 2)

- 1.** Further slow population growth
 - Give moral support to women with < 2.1 children*
 - Increase the pension age*
 - Explain that support burden will stay constant*
- 2.** Cut CO2 emissions – first in the rich world
 - Subsidize energy efficiency in all sectors*
 - Build no new fossil capacity in the rich world*
 - Introduce a high carbon price*
- 3.** Reduce poverty in the poor world
 - Use most development aid to build renewable energy capacity*
 - Copy the rise of Japan, South Korea, and China – and their use of strong government*

What should be done? – Realistically (2 of 2)

4. Reduce the ecological footprint of the rich world
 - Legislate more compulsory vacation*
 - Give each person the right to a certain amount of paid work (“ration paid work”)*
5. Temper national short termism
 - Establish a global agreement where all nations promise to emit less CO2 than the US*
 - Evolve IPCC to IPCC3 (funded to execute the most effective cuts)*
6. Reduce the focus on income growth
 - Start measuring change in well-being alongside change in GDP*

Time to turn!



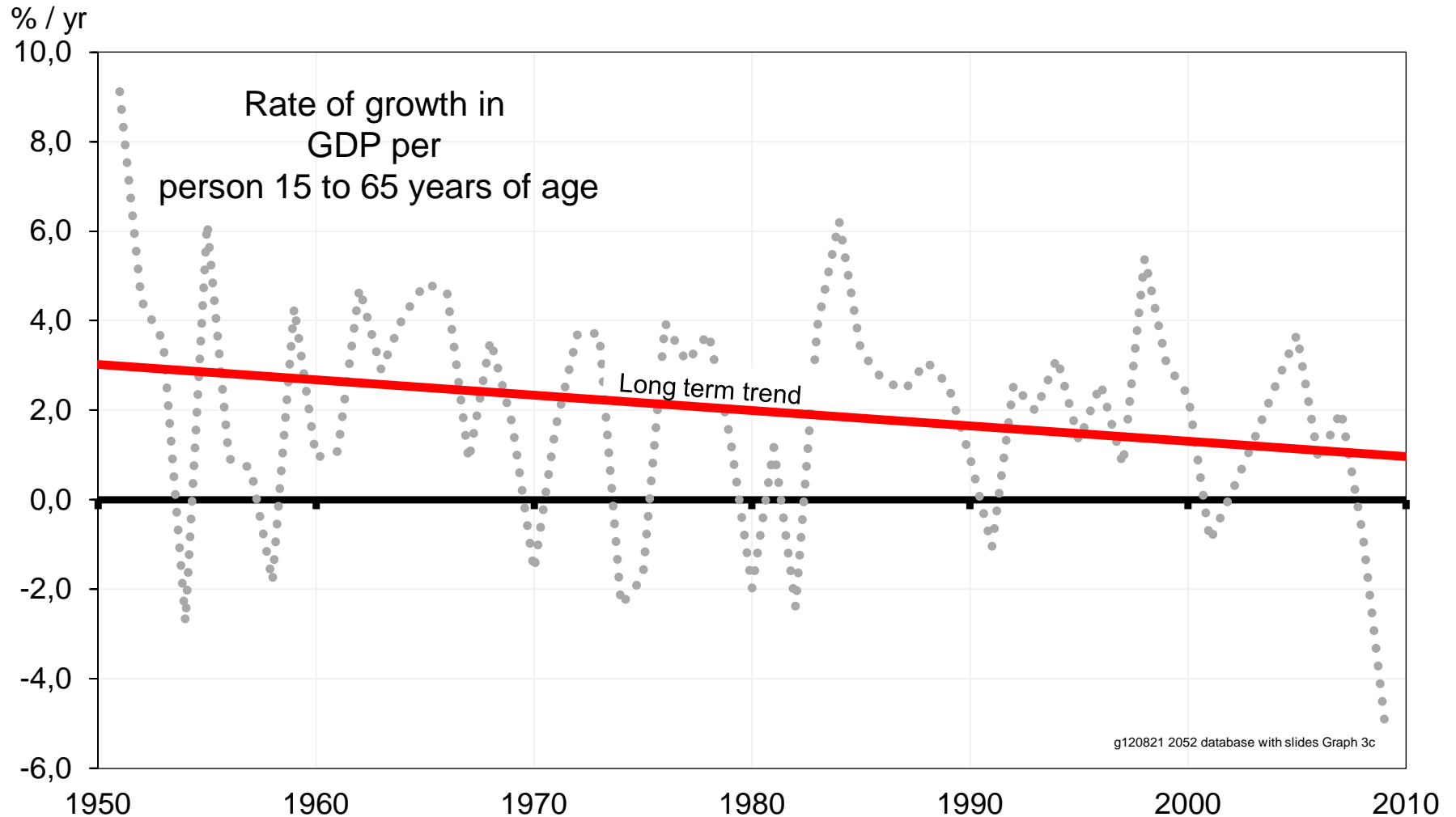
What can you do on your own?

Fight short-termism in the following ways:

- 1. Accept that the root problem is human short-termism**
“My greed today damages my grandchildren!”
- 2. Tell the world that you will do your fair share once the majority agrees to act**
“I am ready if you are!”
- 3. Admit that the simplest solution is strong government**
“I am in favour of tax-financed, collective action!”

Or at the very least: **0. Buy CO2 emission rights in the European quota trading system and burn them!**

Slowing growth in total productivity - USA



Fertility decline in EU-15 – 1950 to 2010

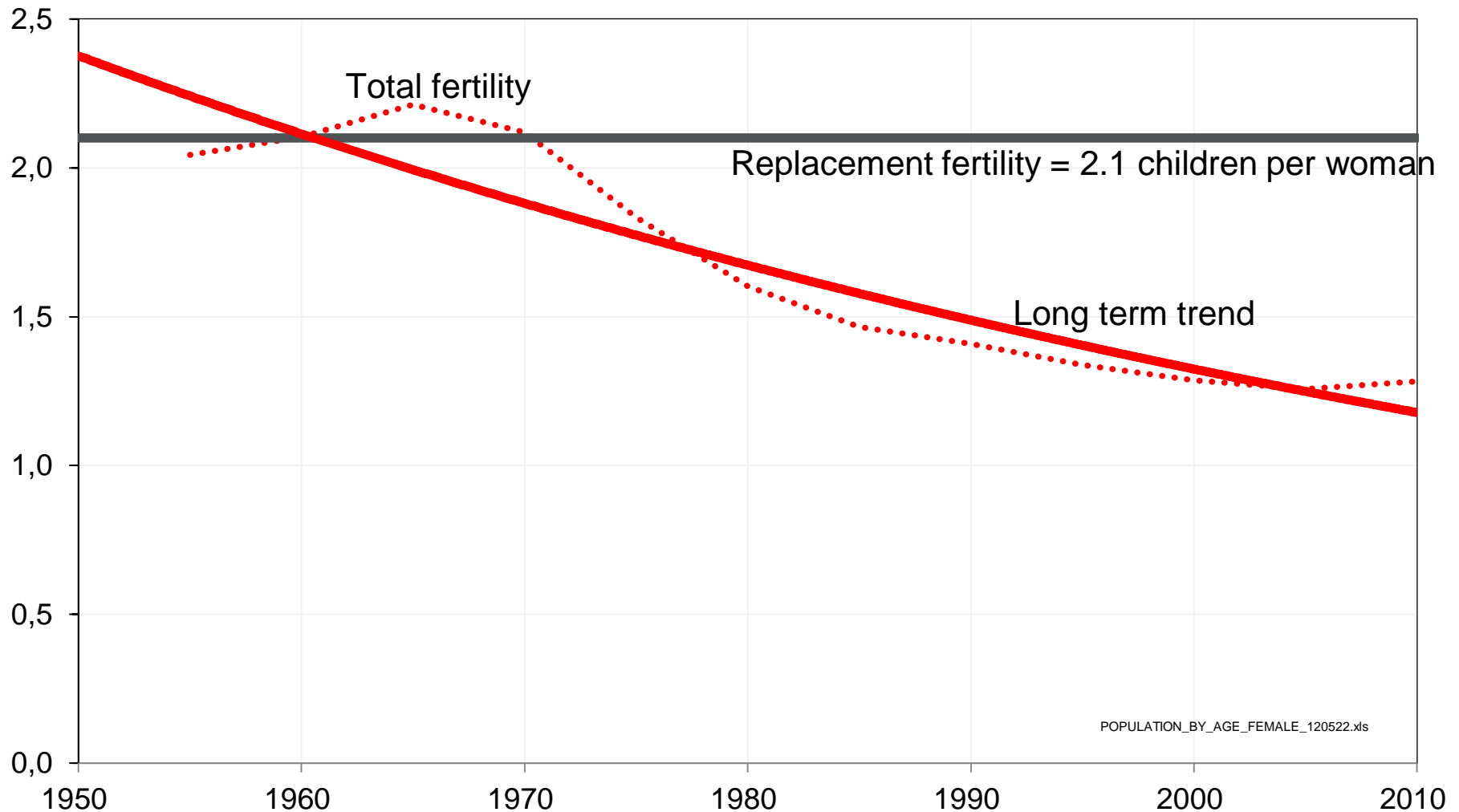


Figure A4-1 Total Fertility – EU15 1950 to 2010

Definition: Total fertility = Number of children per woman during reproductive age

Enough land – but less of it undisturbed

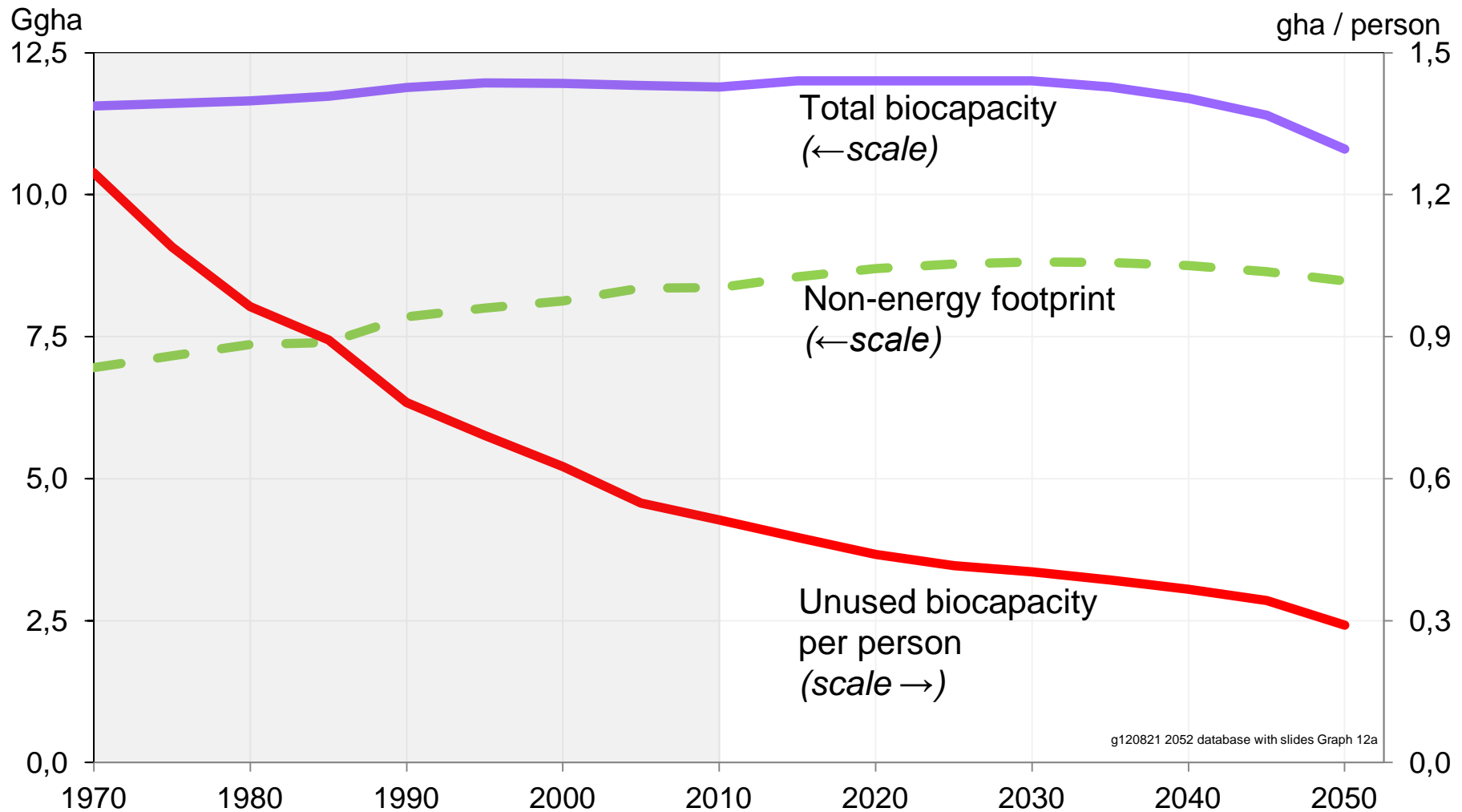
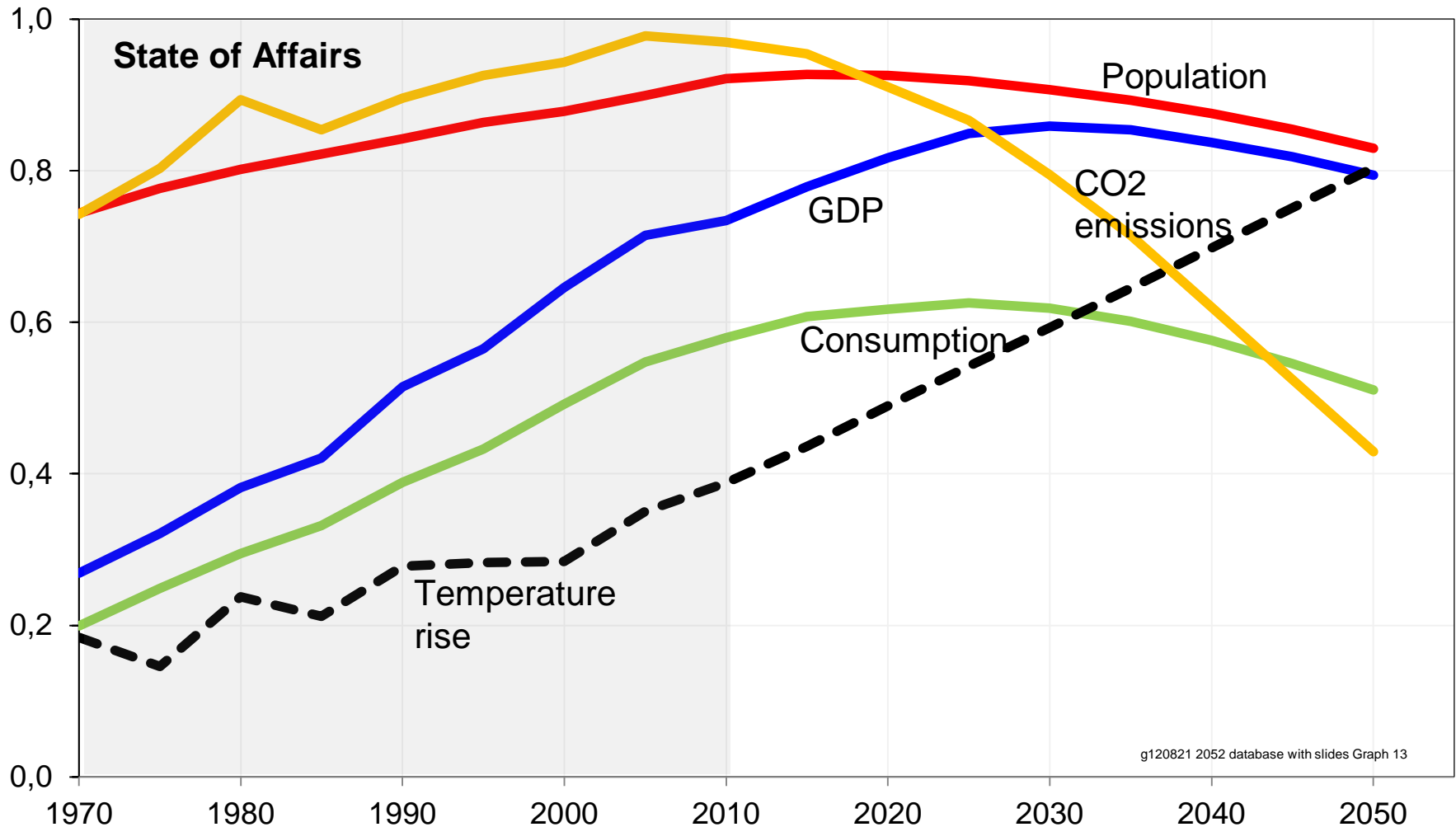


Figure 6-2: Biological Capacity – World 1970 to 2050

g120821 2052 database with slides Graph 12a

OECD outside the US – 1970 to 2050

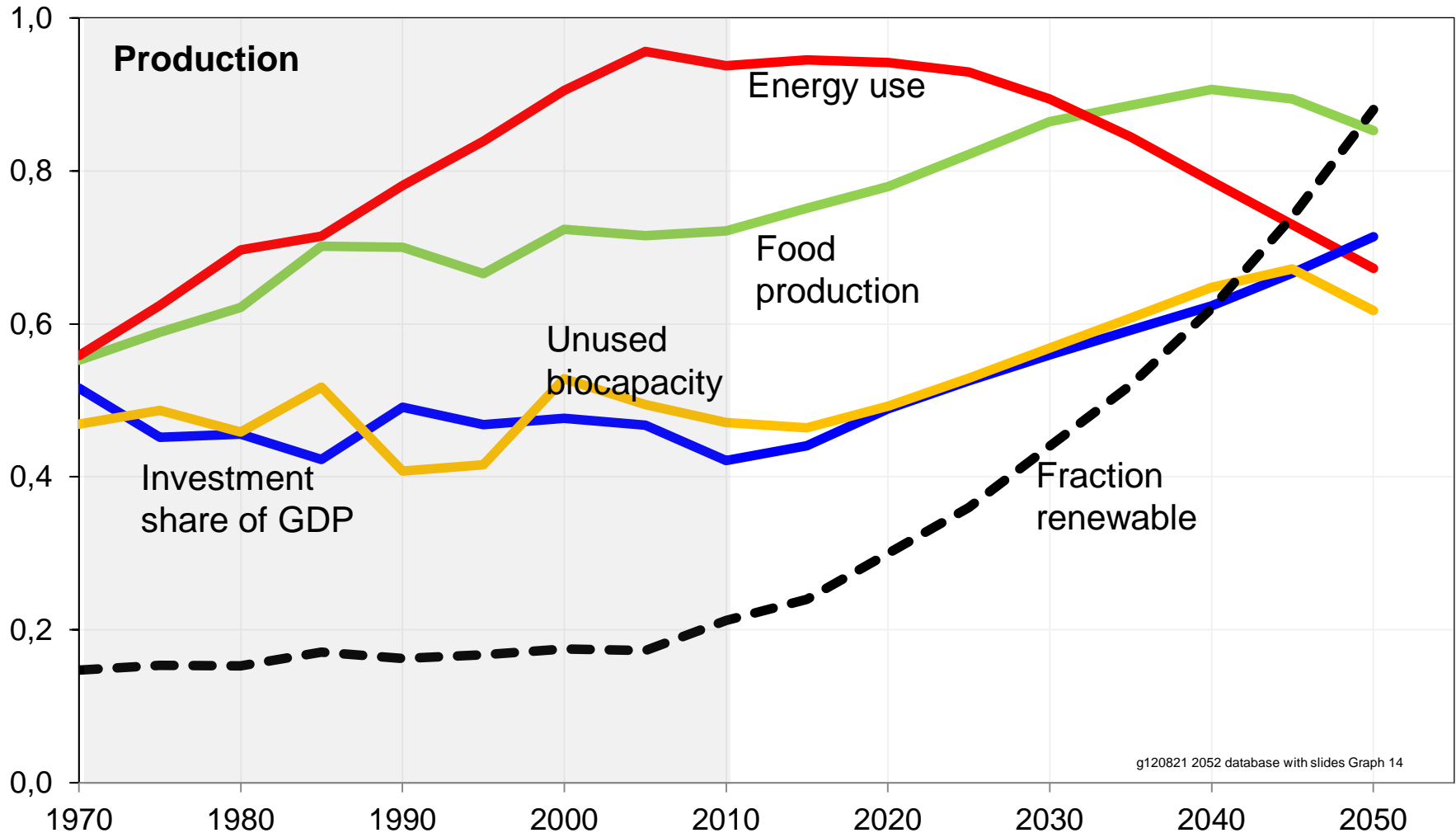


g120821 2052 database with slides Graph 13

Max values **0.8 Gp**, **30 G\$/yr**, **7 GtCO₂/yr**, **30 G\$/yr**, **2.5 deg C**

Figure 8-1_o: Past and future OECD-less-US – State of Affairs – 1970 to 2050

OECD outside the US – 1970 to 2050

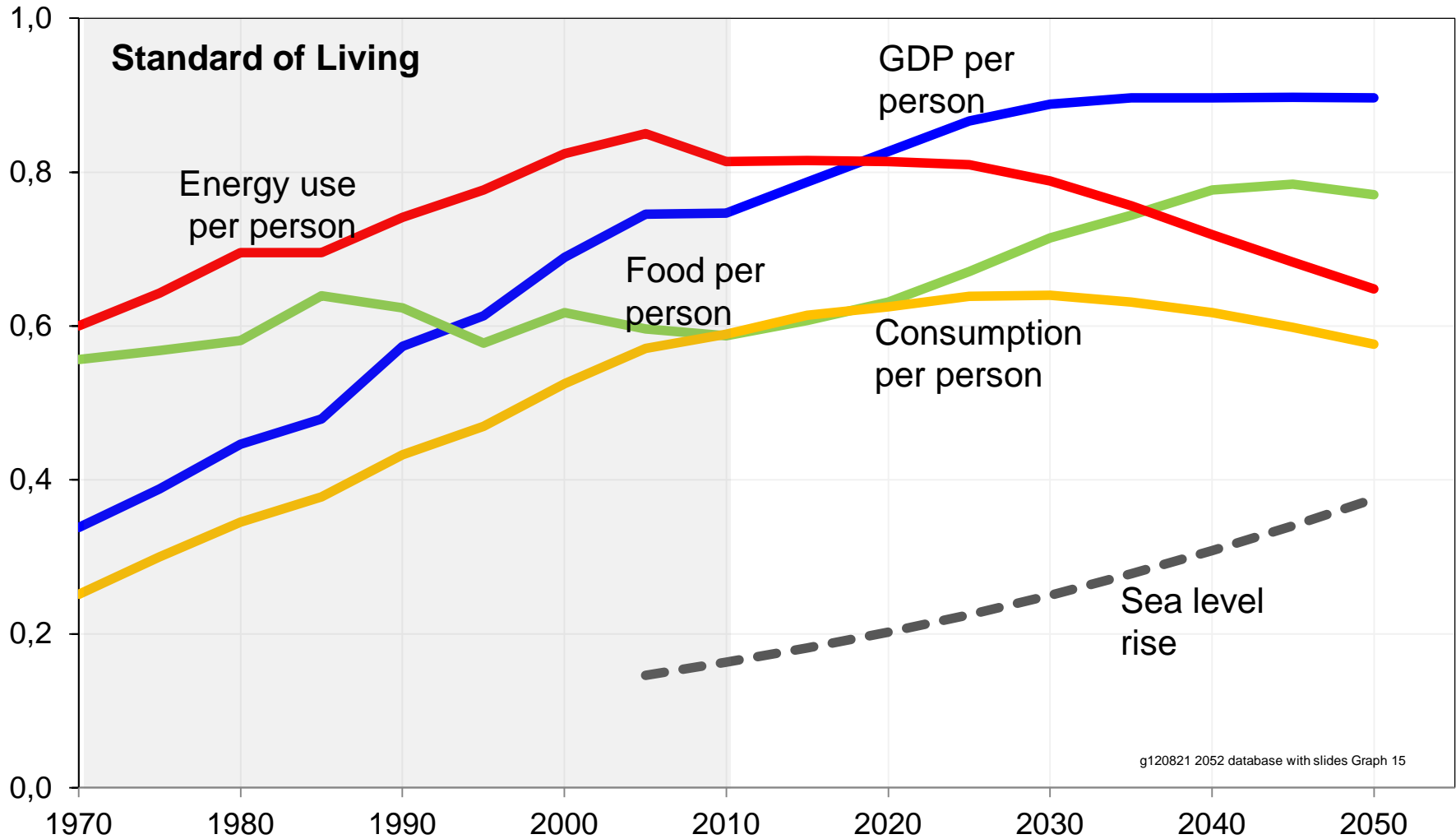


g120821 2052 database with slides Graph 14

Max values **3.2 Gtoe/yr**, **50%**, **40%**, **1.2 Gt/yr**, **50%**

Figure 8-2_o: Past and future OECD-less-US – Production – 1970 to 2050

OECD outside the US – 1970 to 2050



Max values **5 toe/person-yr**, **40,000 \$/person-yr**, **40,000 \$/person-yr**, **2 t/person-yr**, **1.5 m**

Figure 8-3_o: Past and future OECD-less-US – Standard of Living – 1970 to 2052