The Four Horsemen of the Apocalypse

The Four Horsemen

1. Oil Supply
2. The Pakistani Nuclear Weapons Programme
3. MENA Population Growth
4. Climate – the 210 year cooling cycle

The First Horseman

I watched as the Lamb opened the first of the seven seals. Then I heard one of the four living creatures say in a voice like thunder, "Come and see!" I looked, and there before me was a white horse! Its rider held a bow, and he was given a crown, and he rode out as a conqueror bent on conquest.
Revelation 6:1-2

Oil Supply

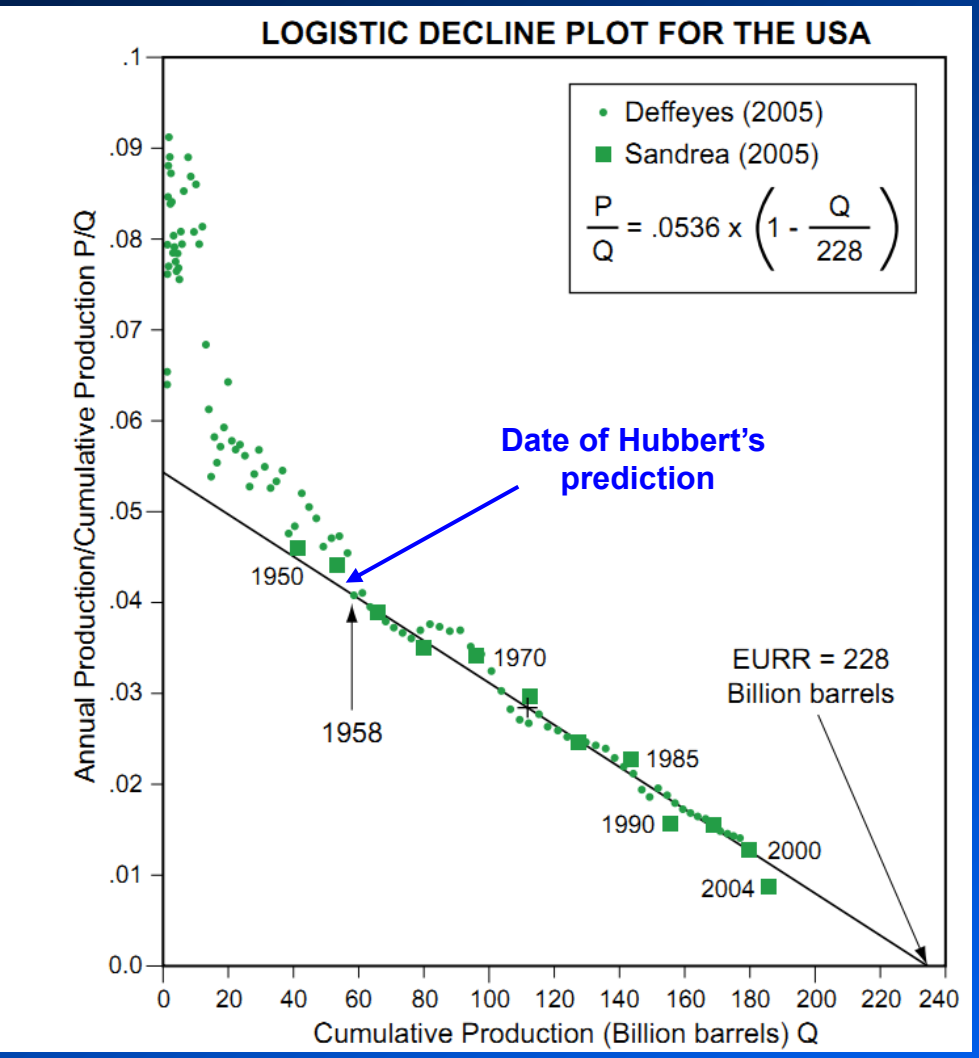
The Oil Price: What will drive everything.

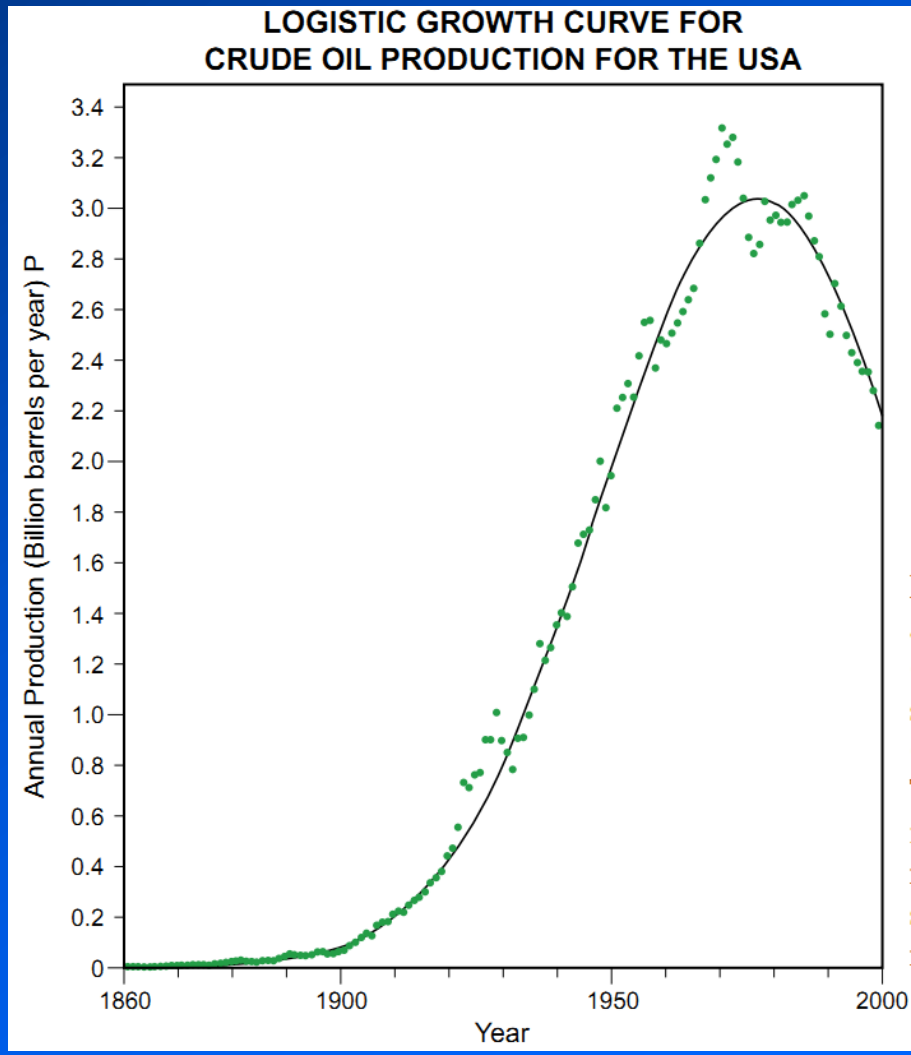
"One day we will run out of oil; it is not today or tomorrow, but one day we will run out of oil and we have to leave oil before oil leaves us, and we have to prepare ourselves for that day."

Fatih Birol, Chief Economist of the International Energy Agency

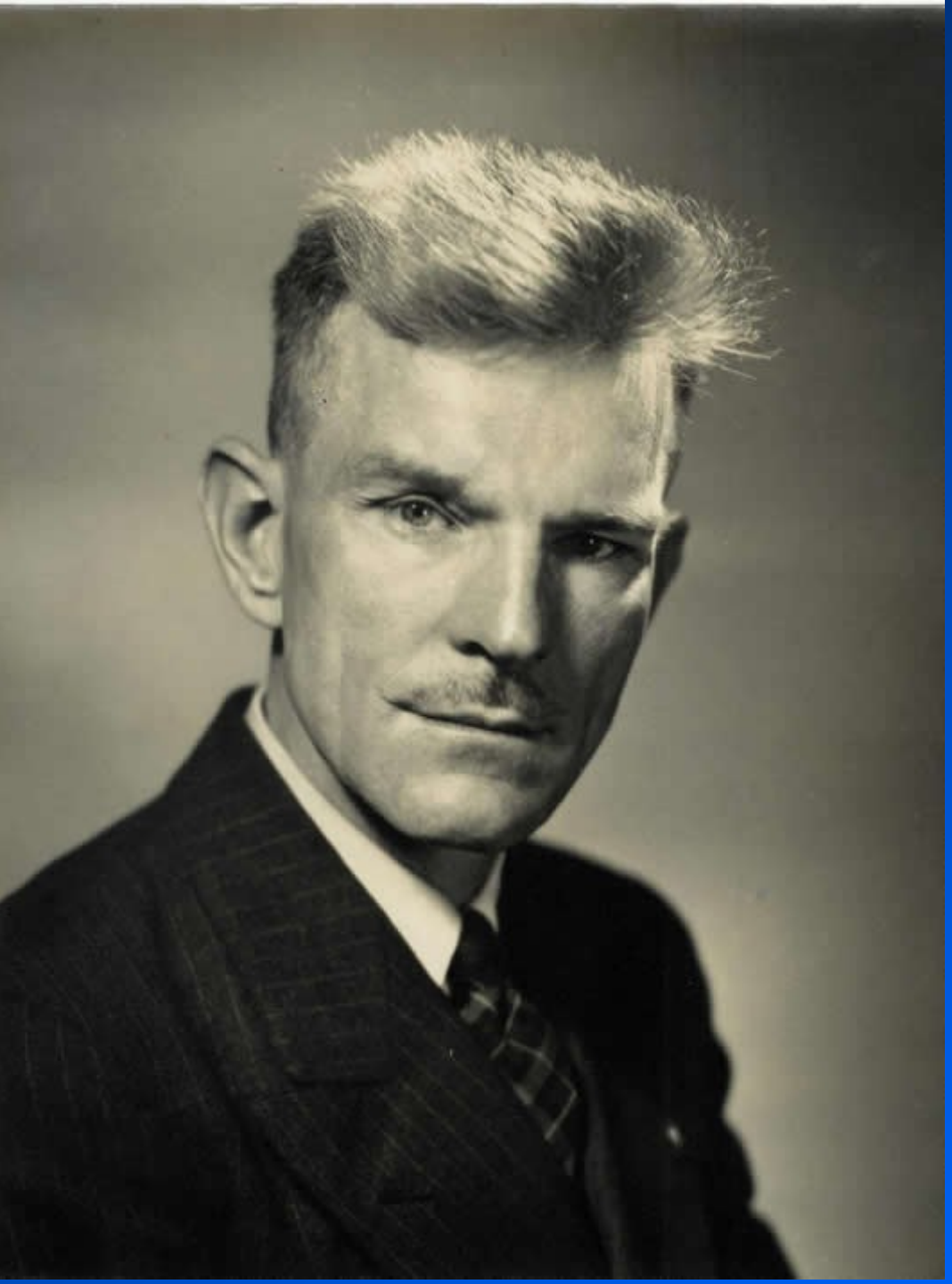
3rd August, 2009

The most successful economic prediction ever made





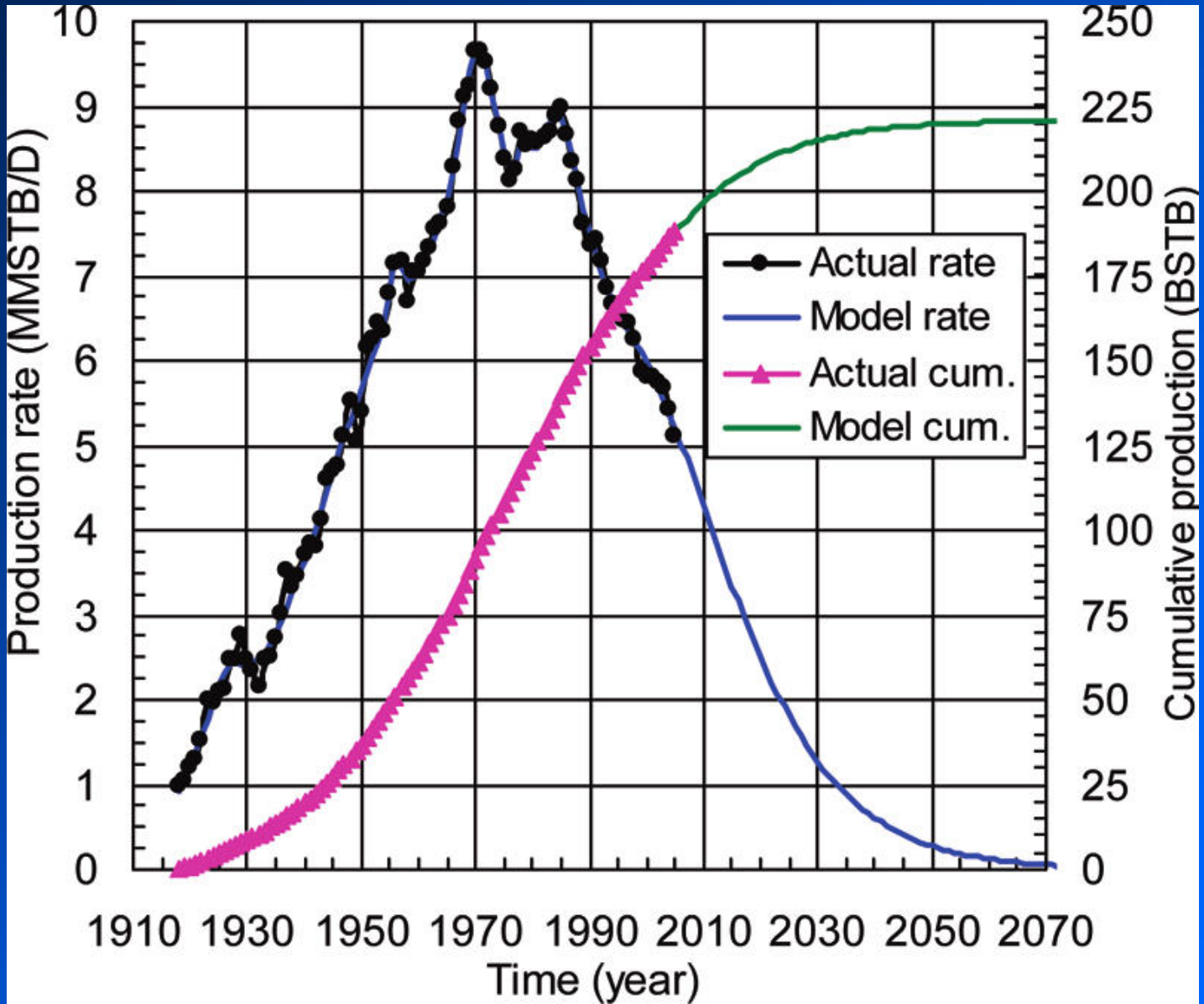
King Hubbert predicted in 1956 that US oil production would peak in 1970.



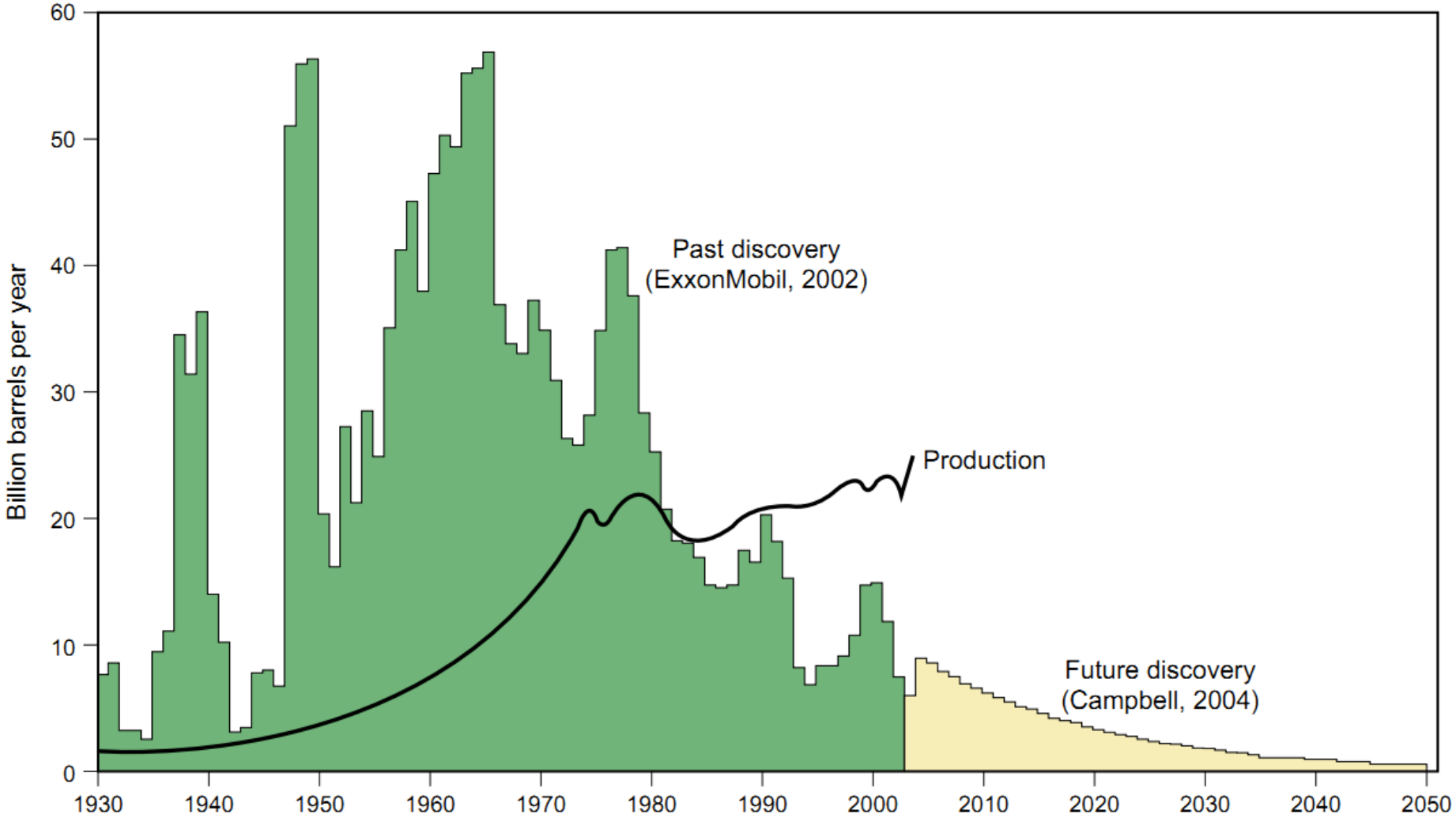
King Hubbert

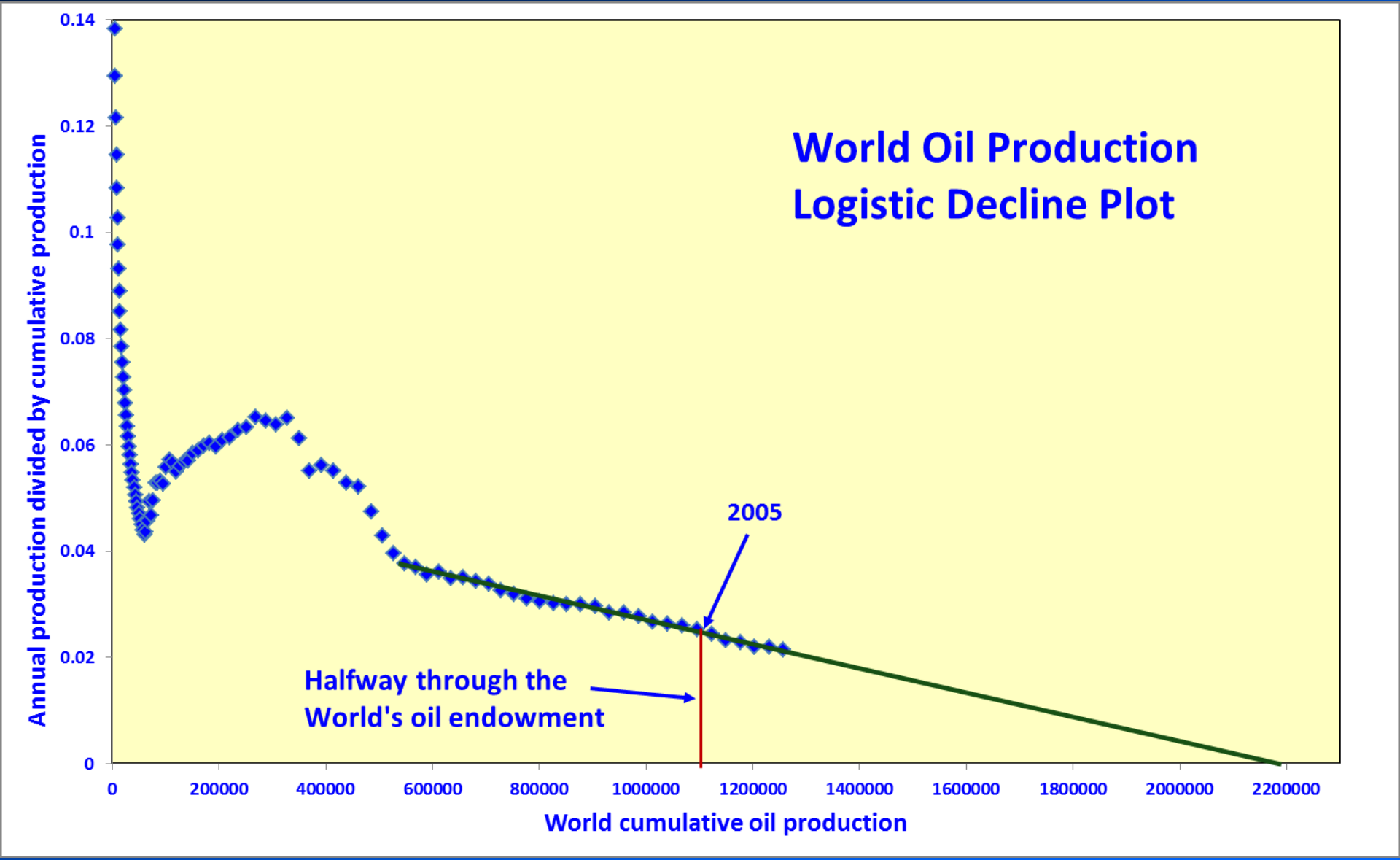
at the peak of his predictive powers

US production decline has entered its fourth decade.



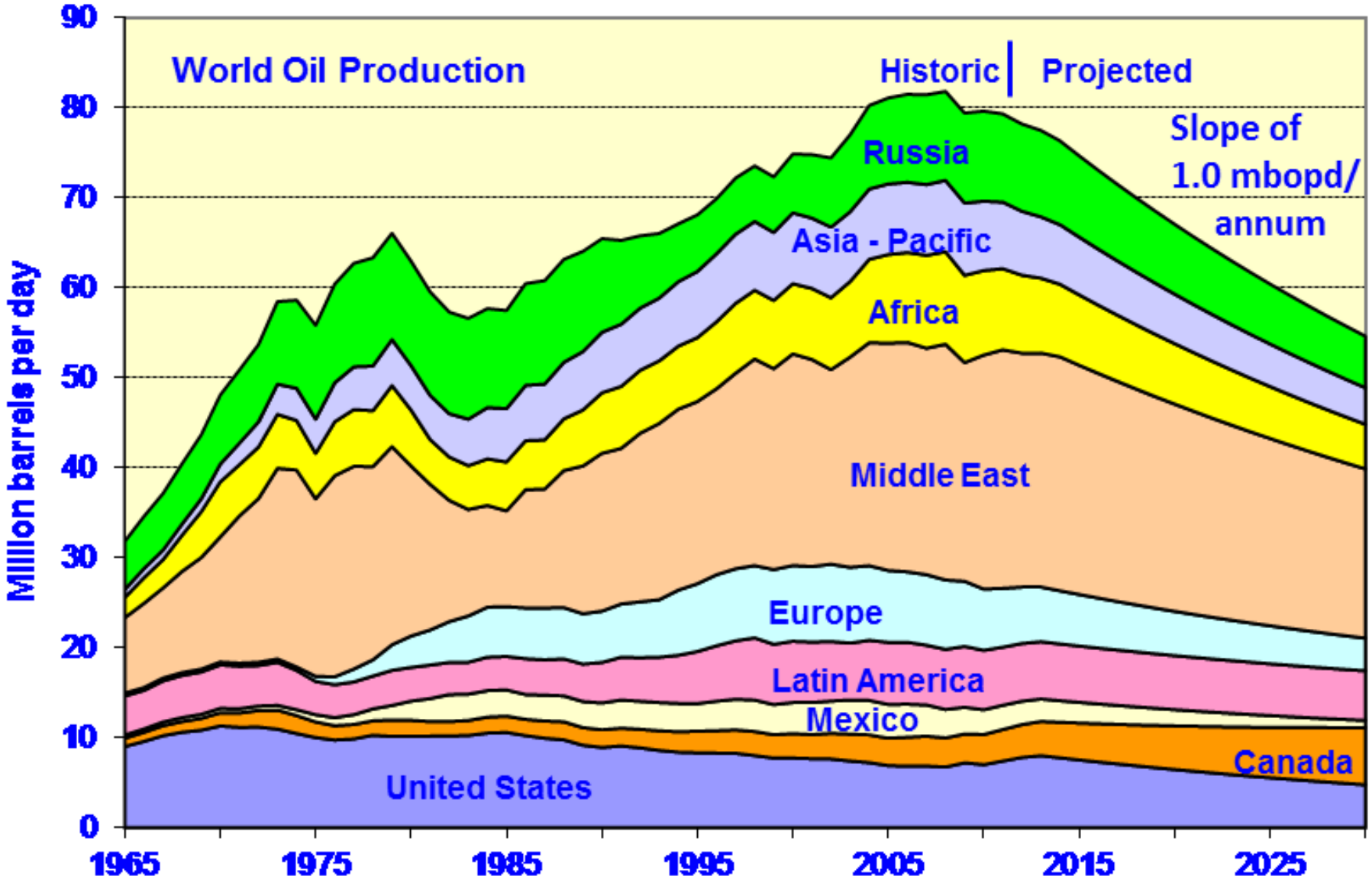
The oil discovery rate peaked 50 years ago.



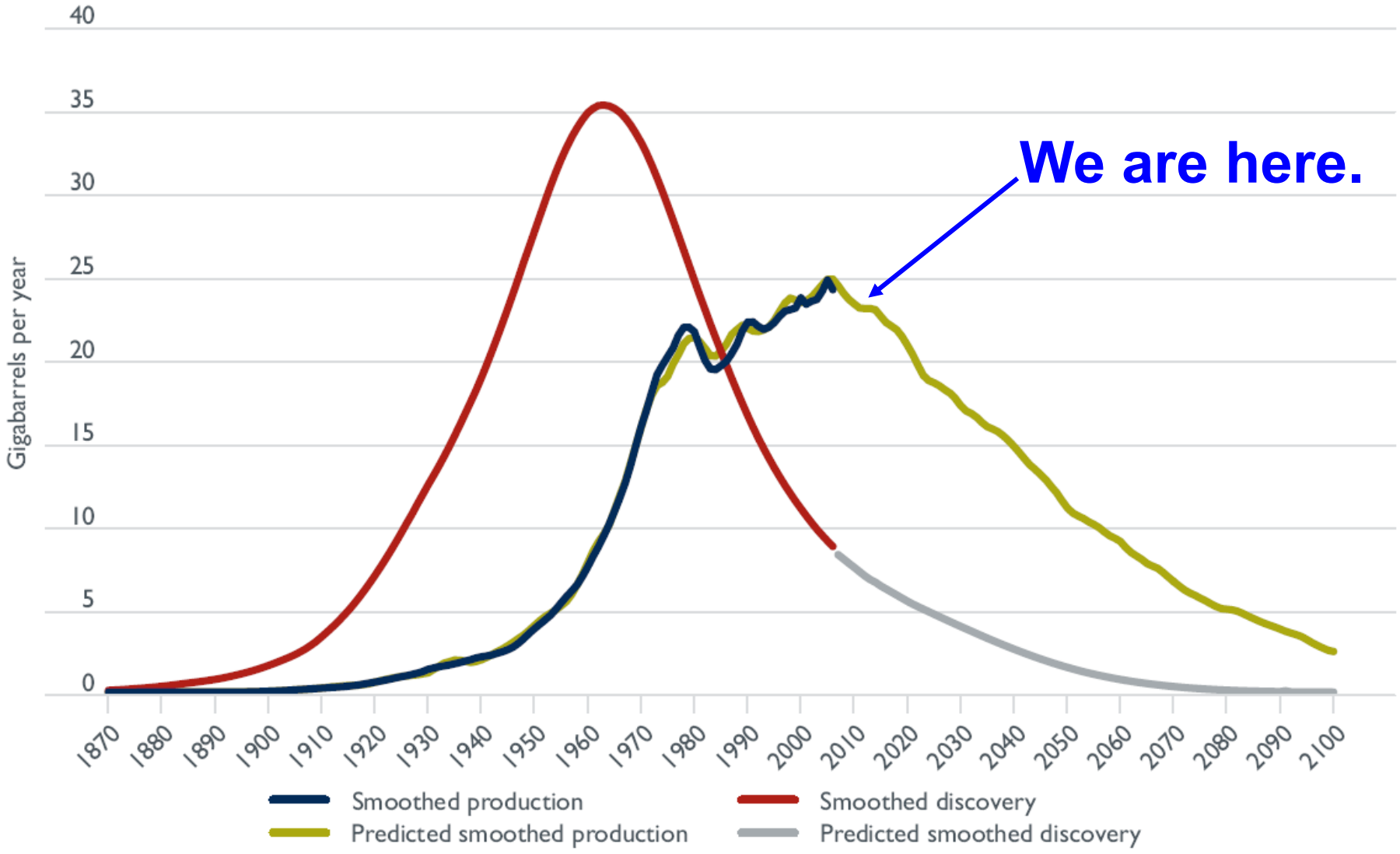


This is the cheap stuff - does not include shale oil, tar sands, natural gas liquids.

The decline will be 1.0 million barrels/day/year.



What the Australian Government doesn't want you to see: Figure 13.9 from Report 117.



Thanks to this Frenchman:

http://www.manicore.com/fichiers/Australian_Govt_Oil_supply_trends.pdf

- Cost of road crashes in Australia 2006 - Report 118 **February 2010**

  Road crashes impose large human and financial costs on society and substantial investments are made in infrastructure and safety programs to reduce road trauma. The cost of road crashes is important to the safety debate in Australia, and the unit values particularly for a fatality, injury or cost of a fatal crash are key inputs into policy development and cost-benefit analysis for safety programs and infrastructure projects.

  This publication will incur a charge of $40.00, which includes postage and handling.

- Bass Strait Passenger Vehicle Equalisation Scheme 2007-09 **December 2009**

  This report presents the results of the Bureau of Infrastructure, Transport and Regional Economics' (BITRE) twelfth review of the Bass Strait Passenger Vehicle Equalisation Scheme. This report covers the operation and impact of the Bass Strait Passenger Vehicle Equalisation Scheme for the period 1 July 2007 to 30 June 2009.

- Report 116 - A regional economy: a case study of Tasmania **November 2008**

  The Department of Infrastructure, Transport, Regional Development and Local Government is committed to the prosperity of Australia's regions. In order to promote economic and social development it is important that we understand the environment in which regional economies operate. This study provides an analytical investigation of the challenges facing regional Australia.
  BITRE's study takes a multifaceted and holistic approach. The underlying principle is that economies do not work in isolation and a complex mix of interacting drivers affects a region's economic performance.
  Tasmania's economic performance has experienced changing fortunes over the past two decades. This development provided a unique opportunity to investigate the drivers of this change and to find out if there are lessons for regional policy.

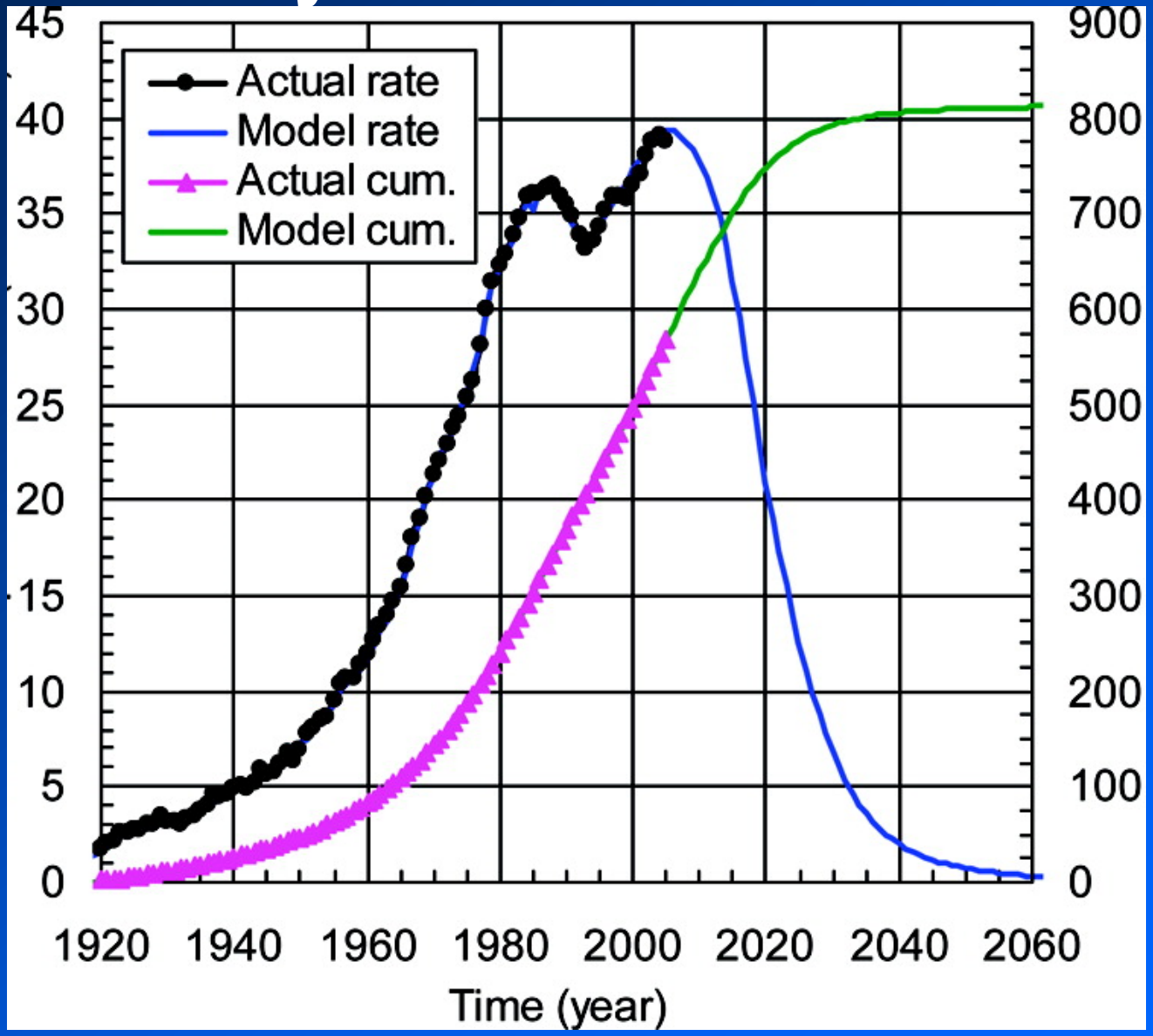
- Report 115: Air transport services in regional Australia: trends and access **July 2008**

Report 117 is Missing.

– killed by Anthony Albanese

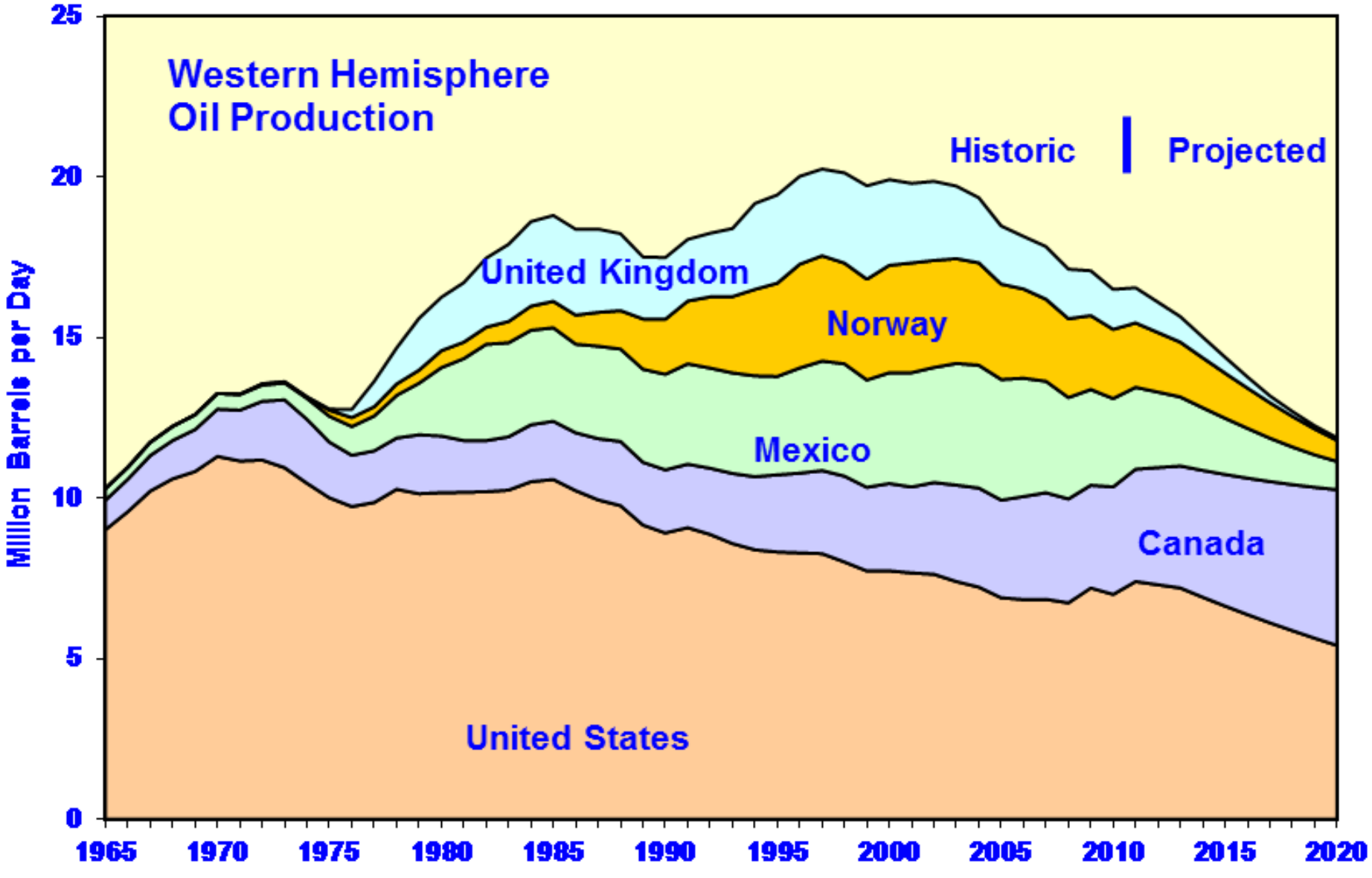
From: http://www.btre.gov.au/Info.aspx?NodeId=58

Non-OPEC production will fall 20 million BOPD by the end of the decade.

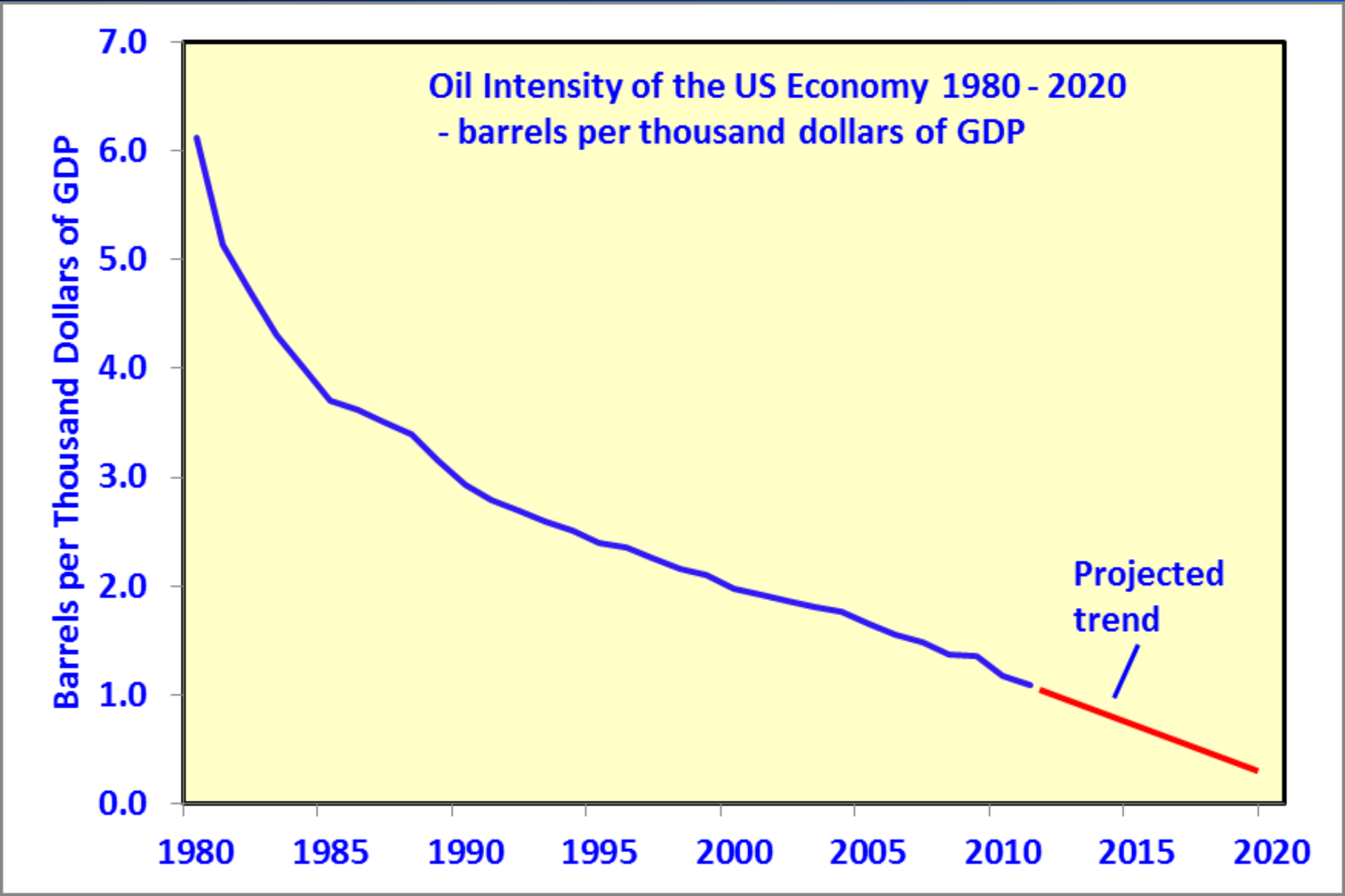


Source: http://pubs.acs.org/stoken/presspac/presspac/full/10.1021/ef901240p

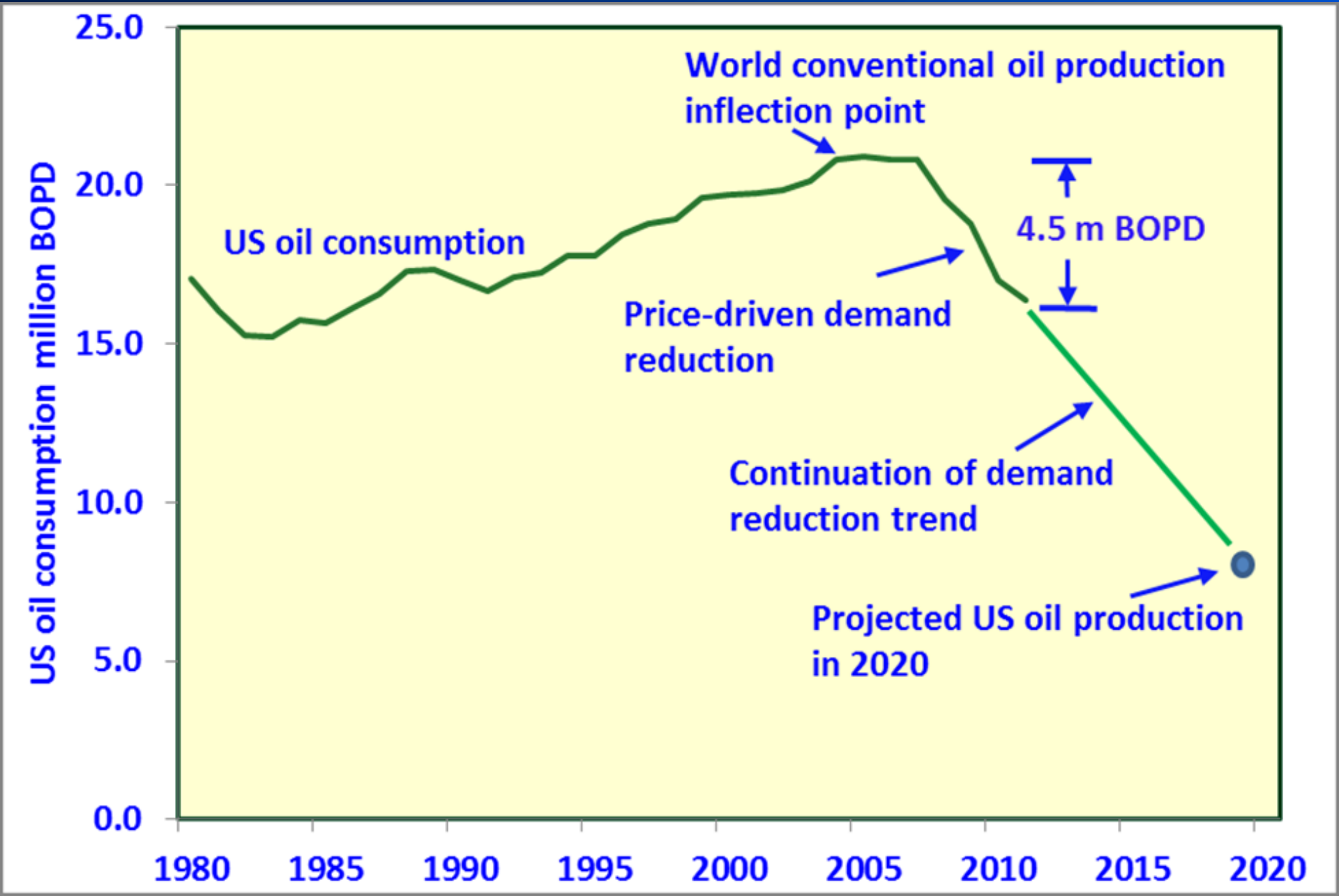
Western Hemisphere production contracts



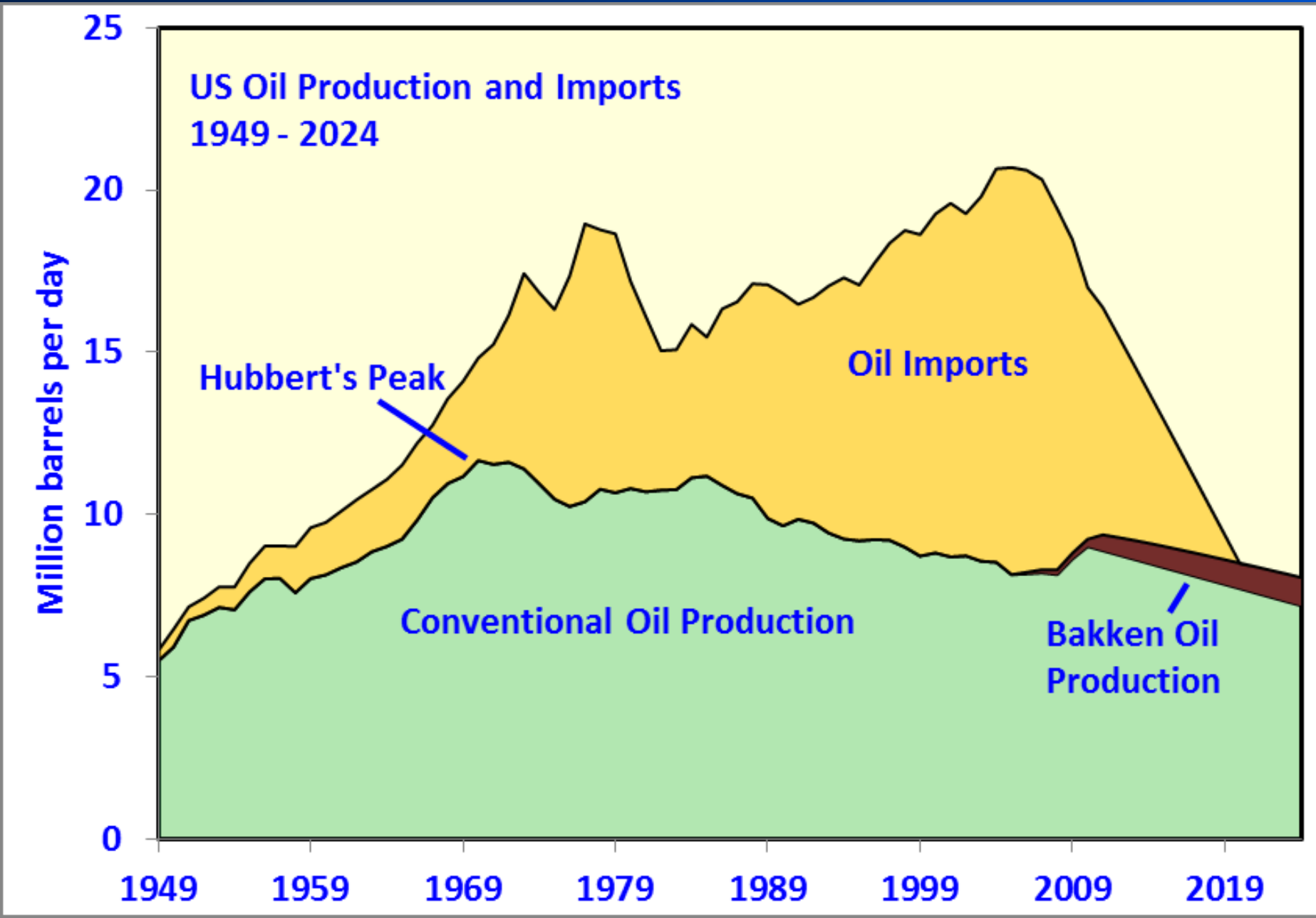
Oil Intensity of the US Economy continues to drop.



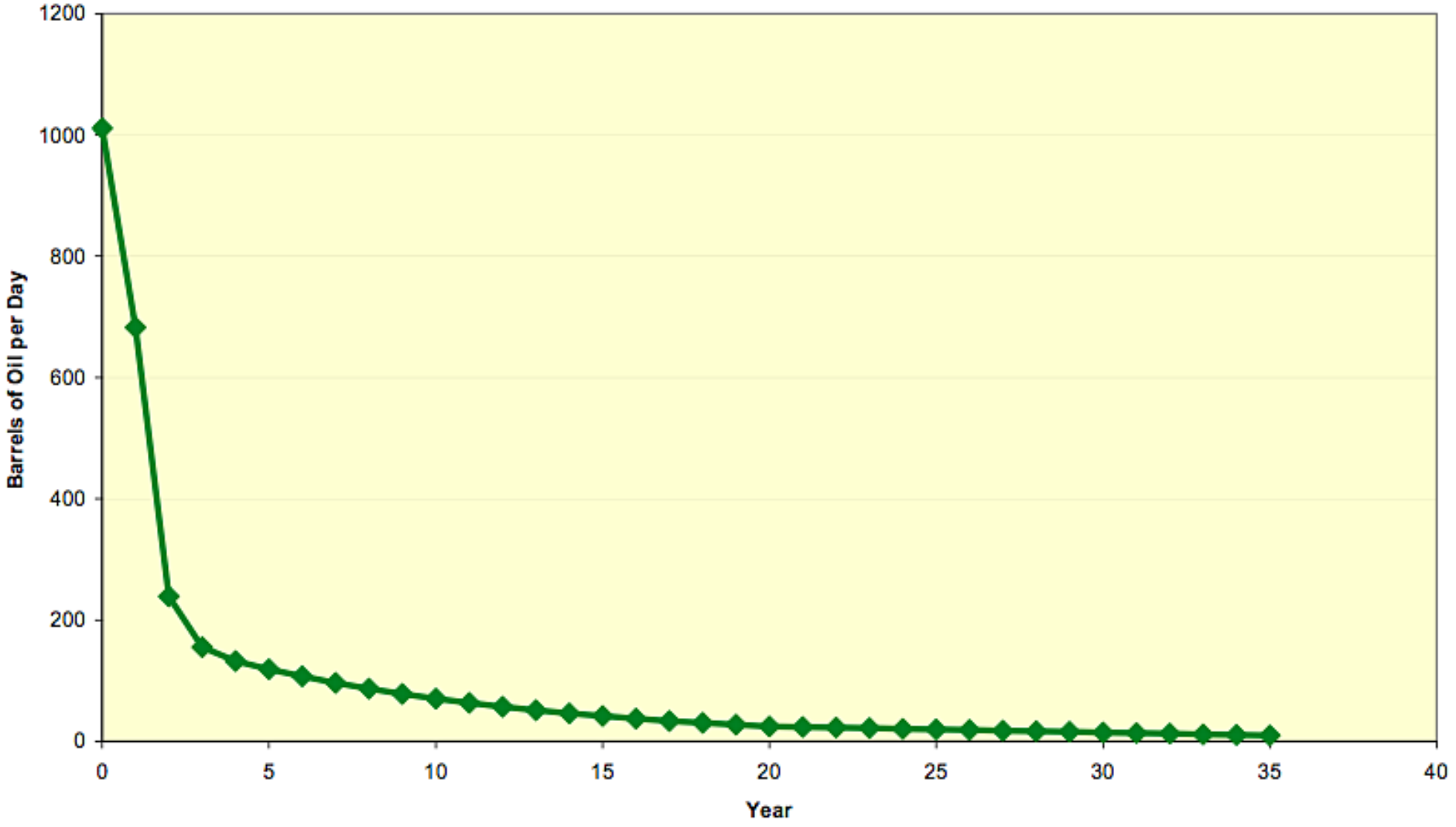
If the demand reduction trend continues



Price-Driven US Energy Independence

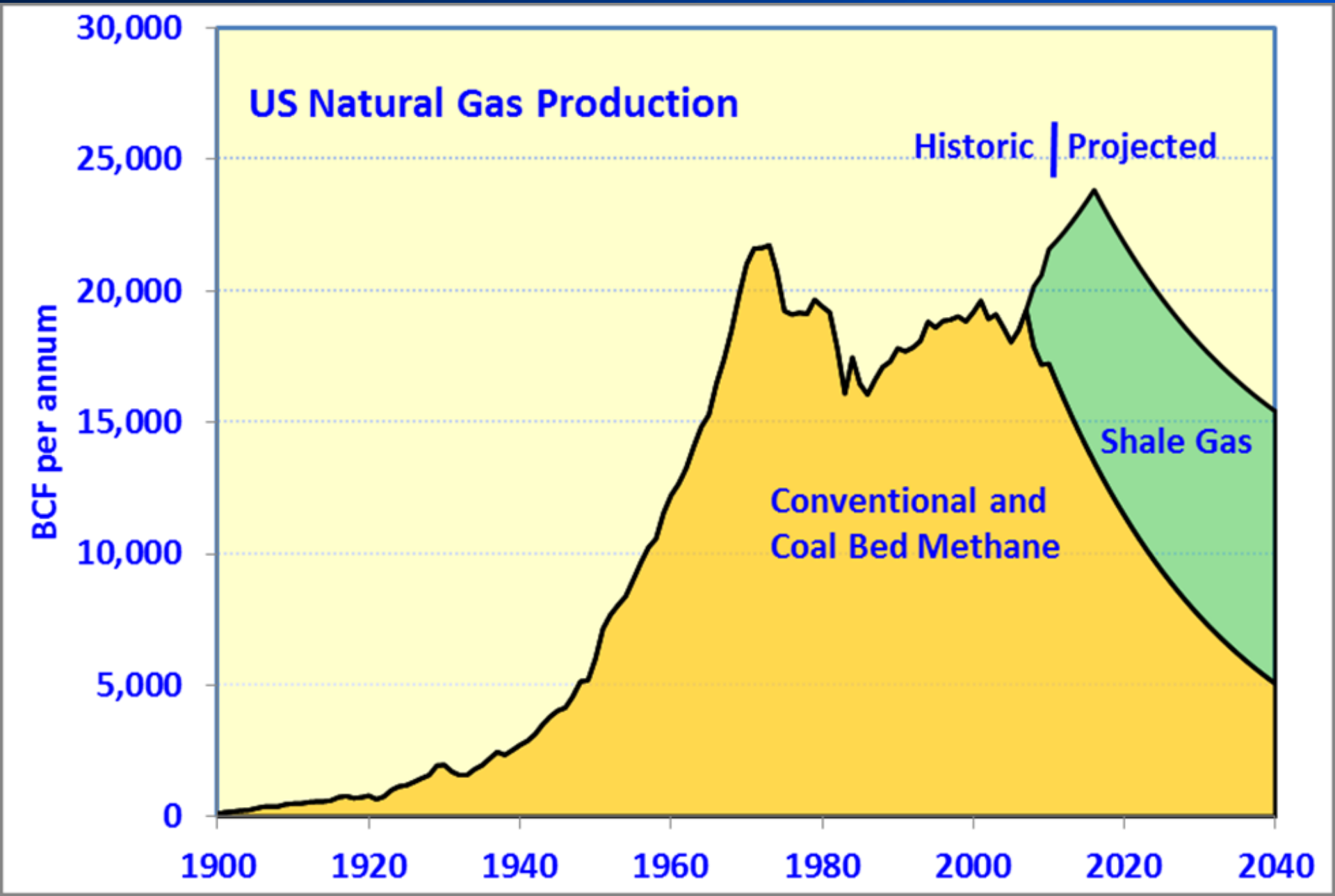


Typical Bakken shale oil production decline

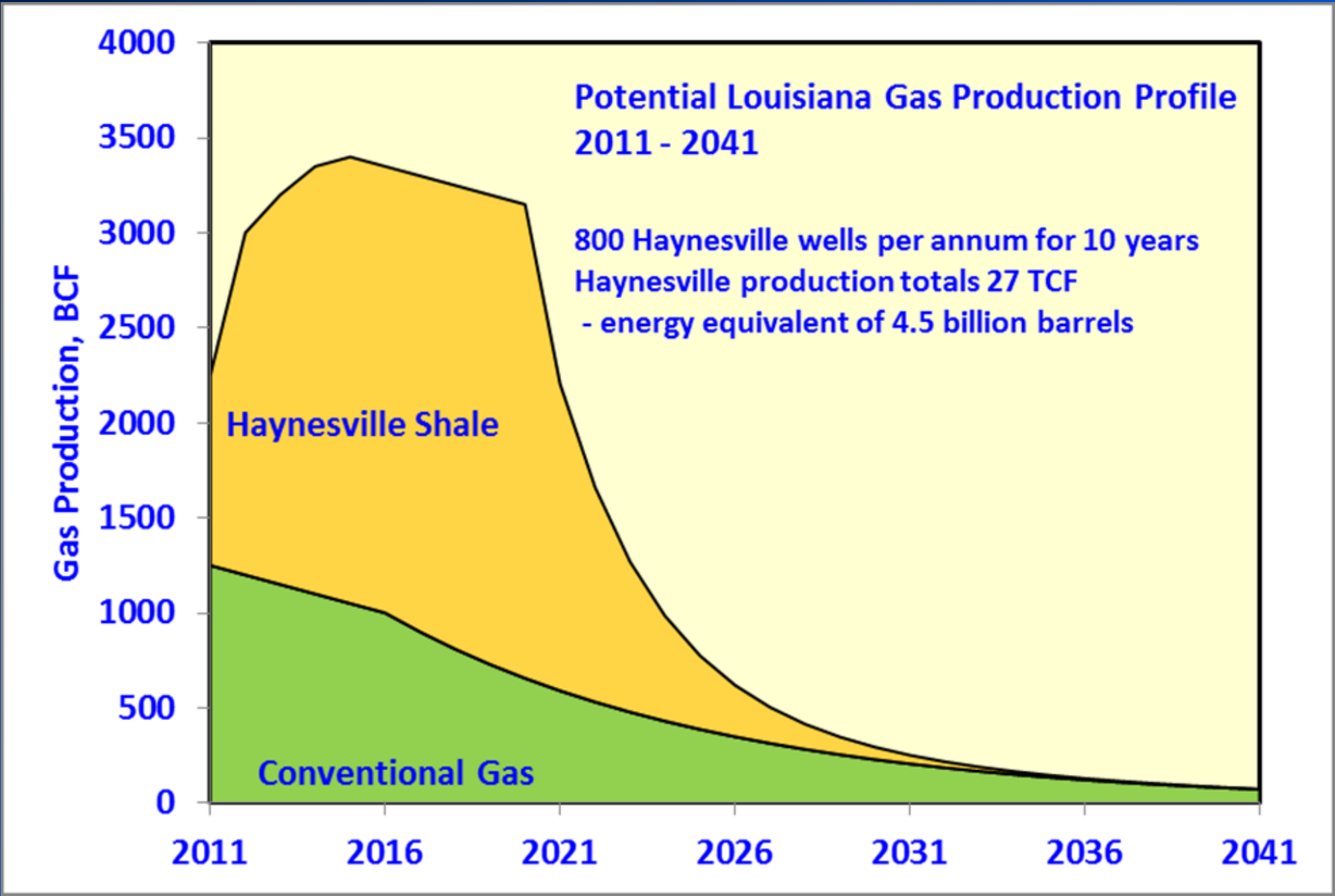


Down to 15% by year three

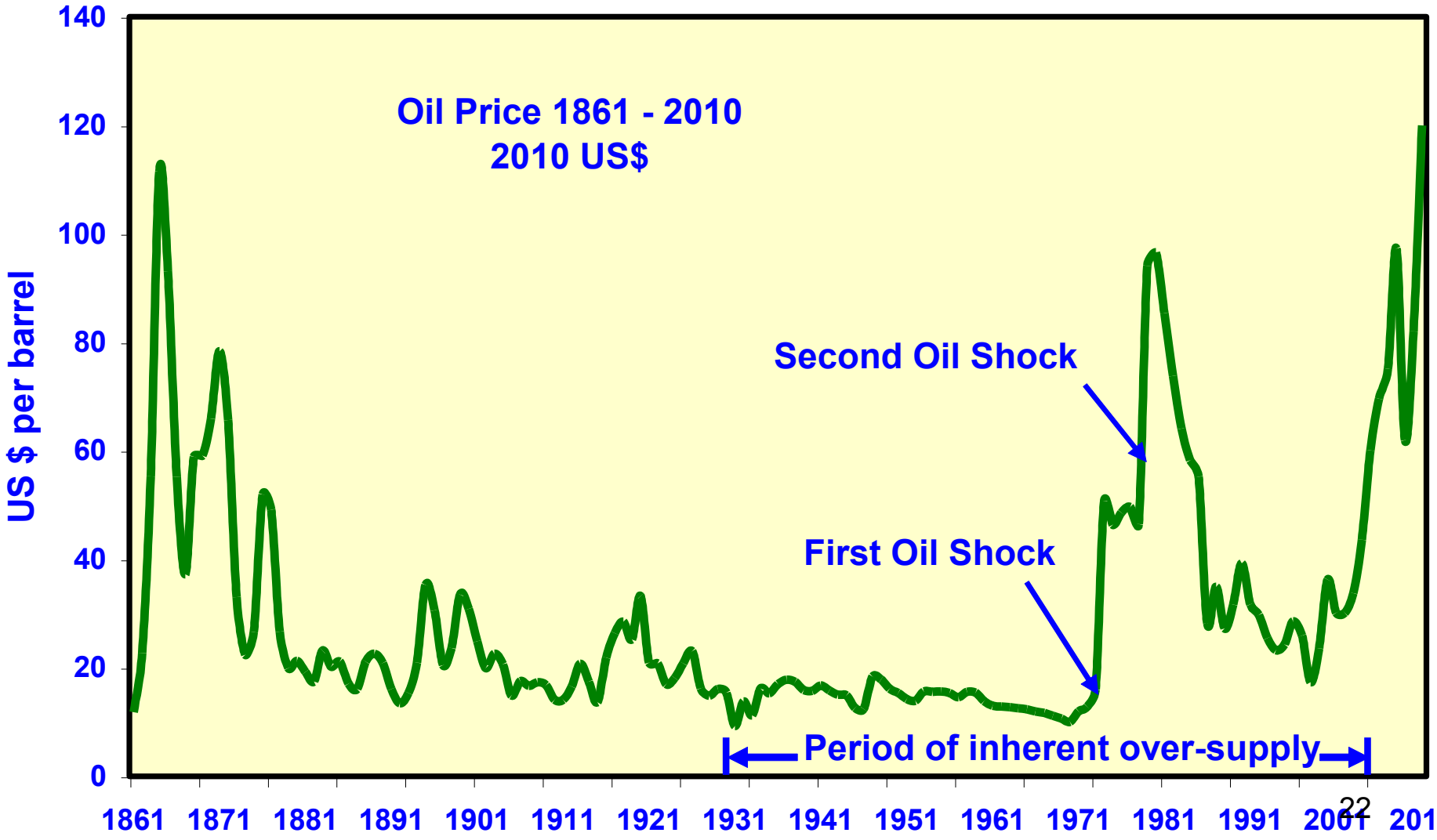
The average production cost of shale gas is $5.20 per gj.



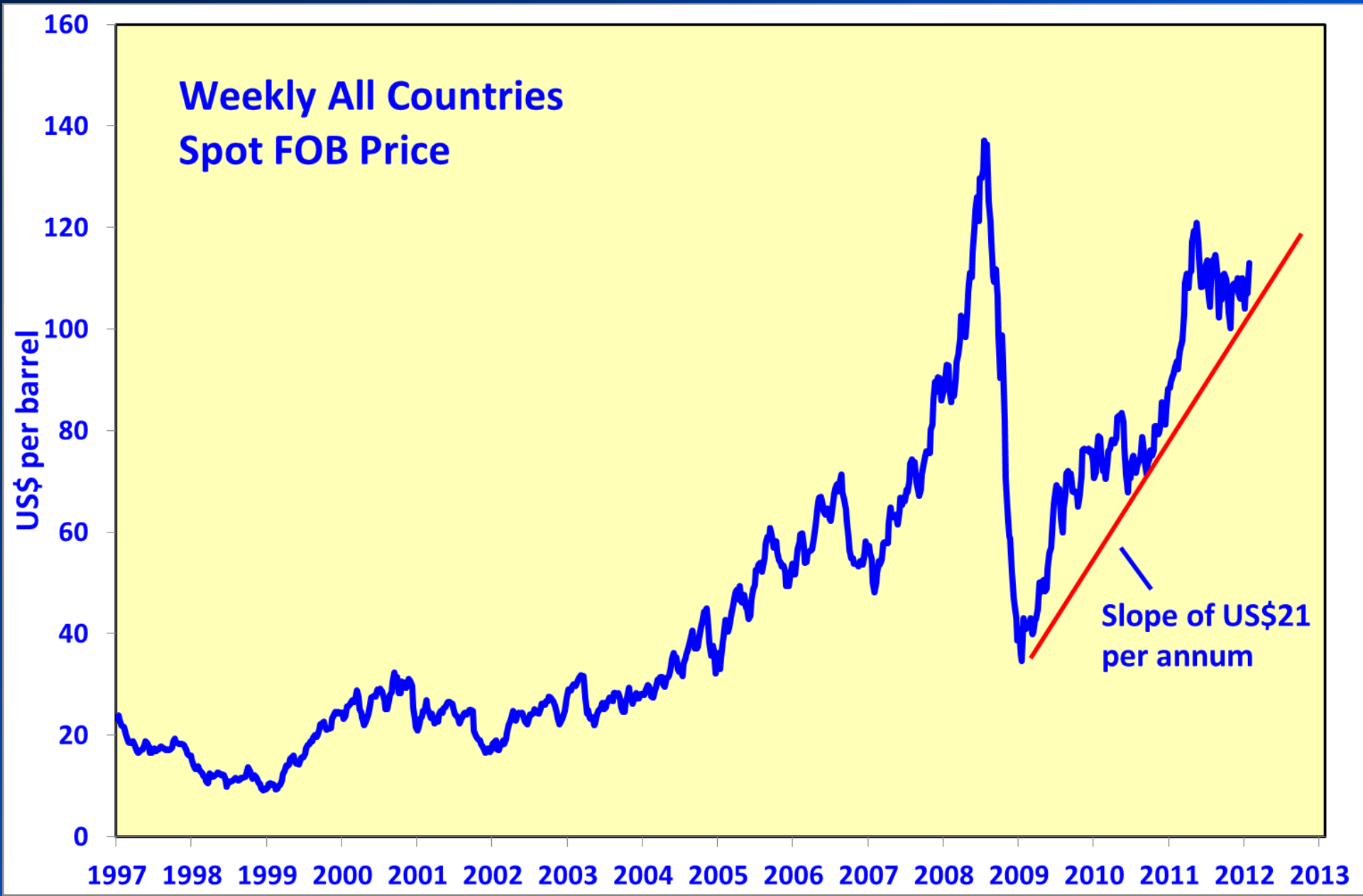
The shale gale will blow for about 20 years.



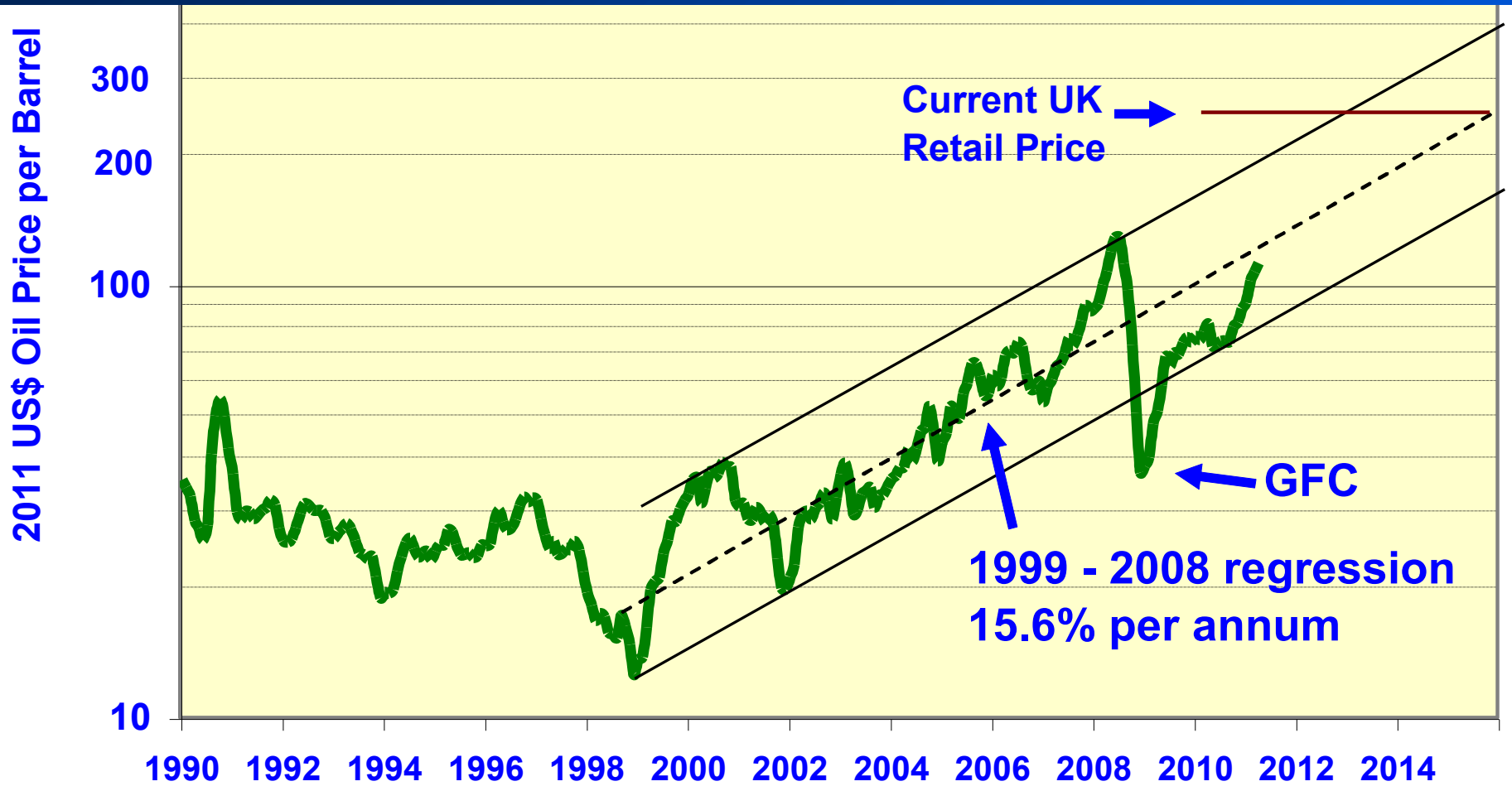
Historic Oil Price



The oil price is up despite the weak economy.

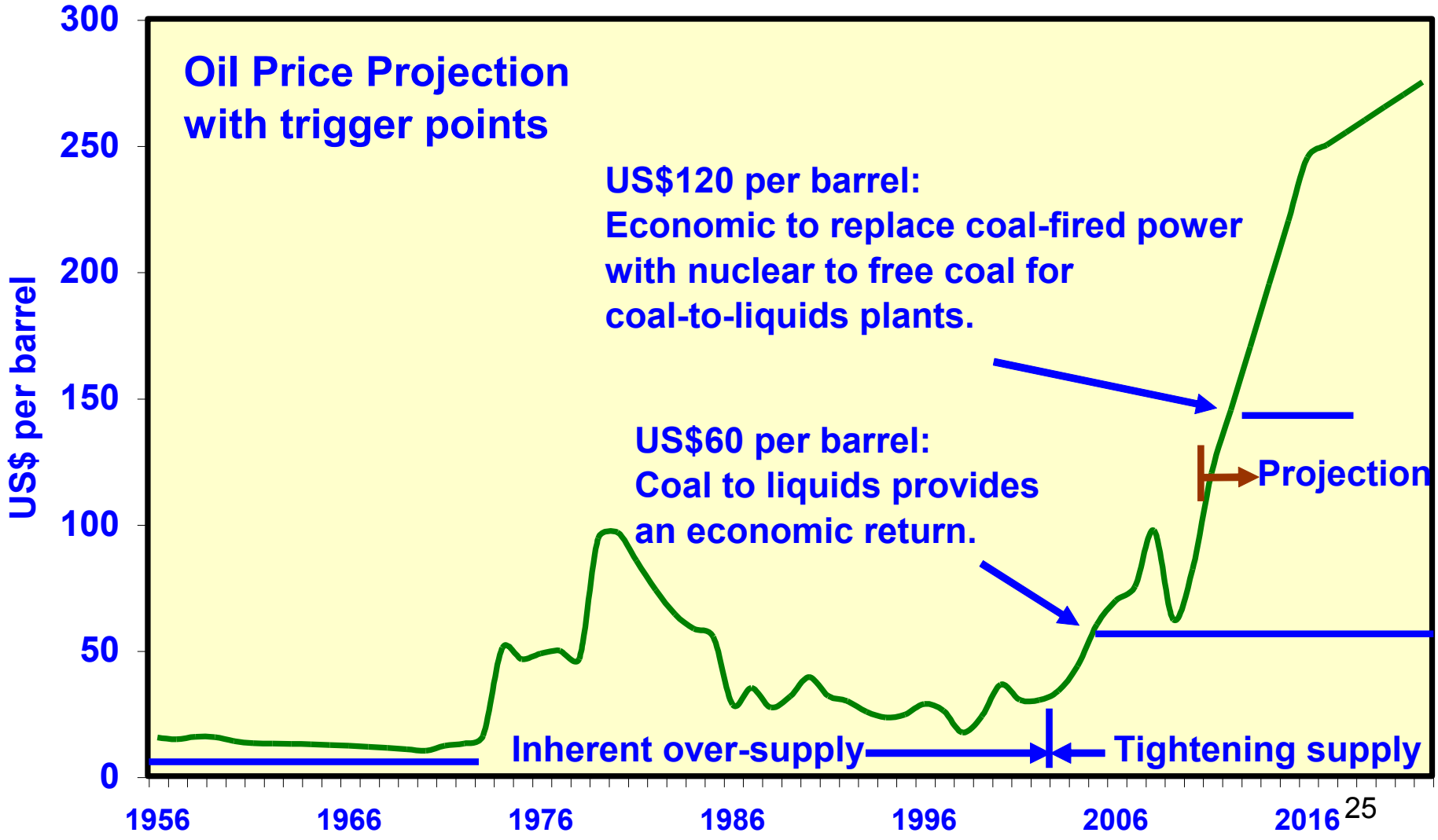


Oil Price Logarithmic Chart

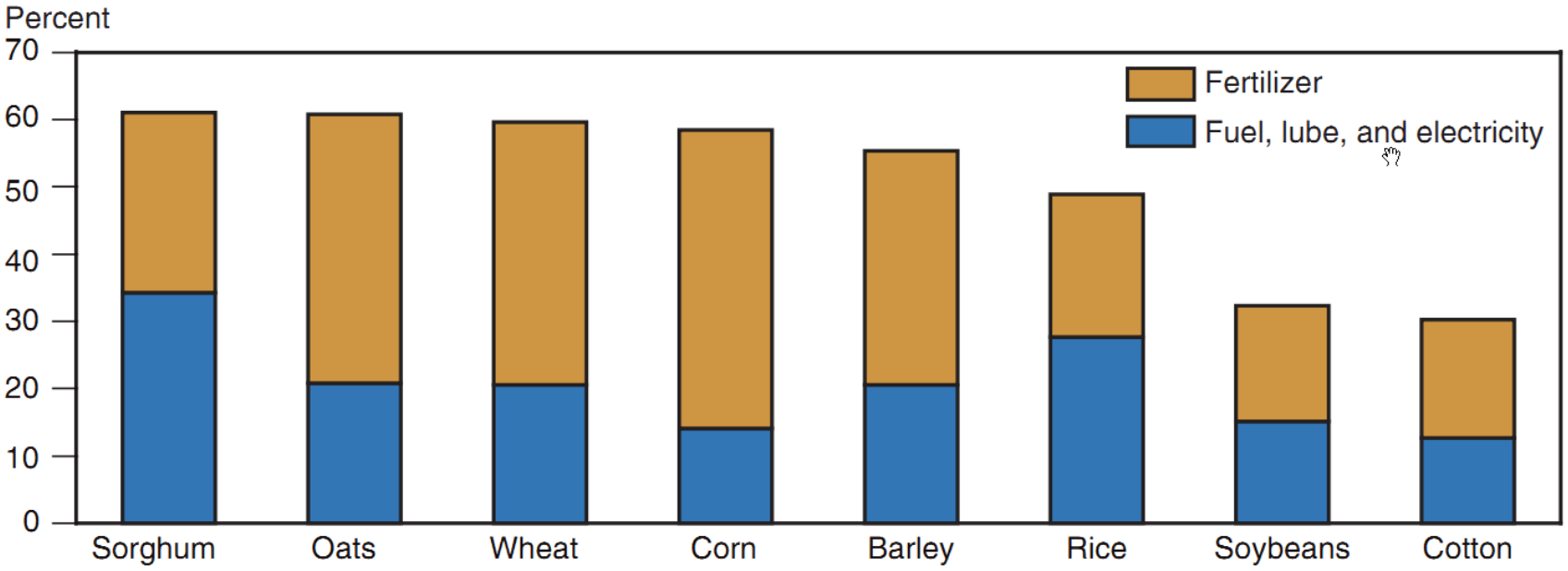


Will the established trend hold - $200/bbl by 2014?

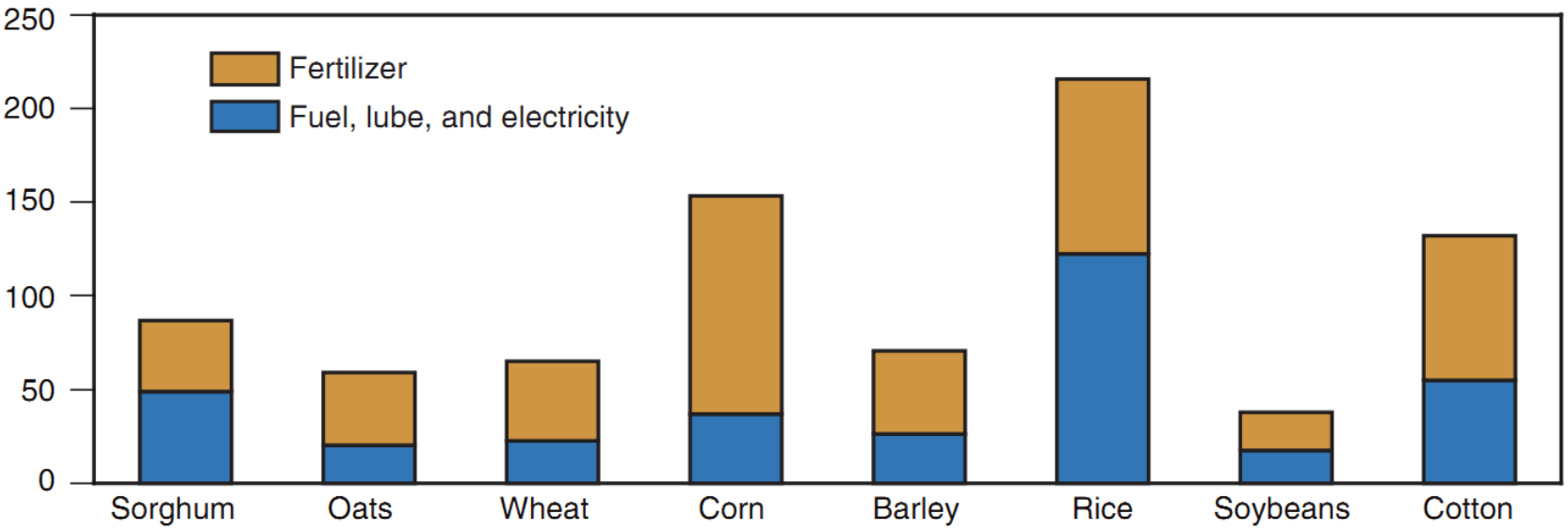
The oil price will drive nuclear plant building.



Energy-related inputs relative to total operating expenses, 2007-08 average



Energy-related expenses, selected crops, 2007-08 average

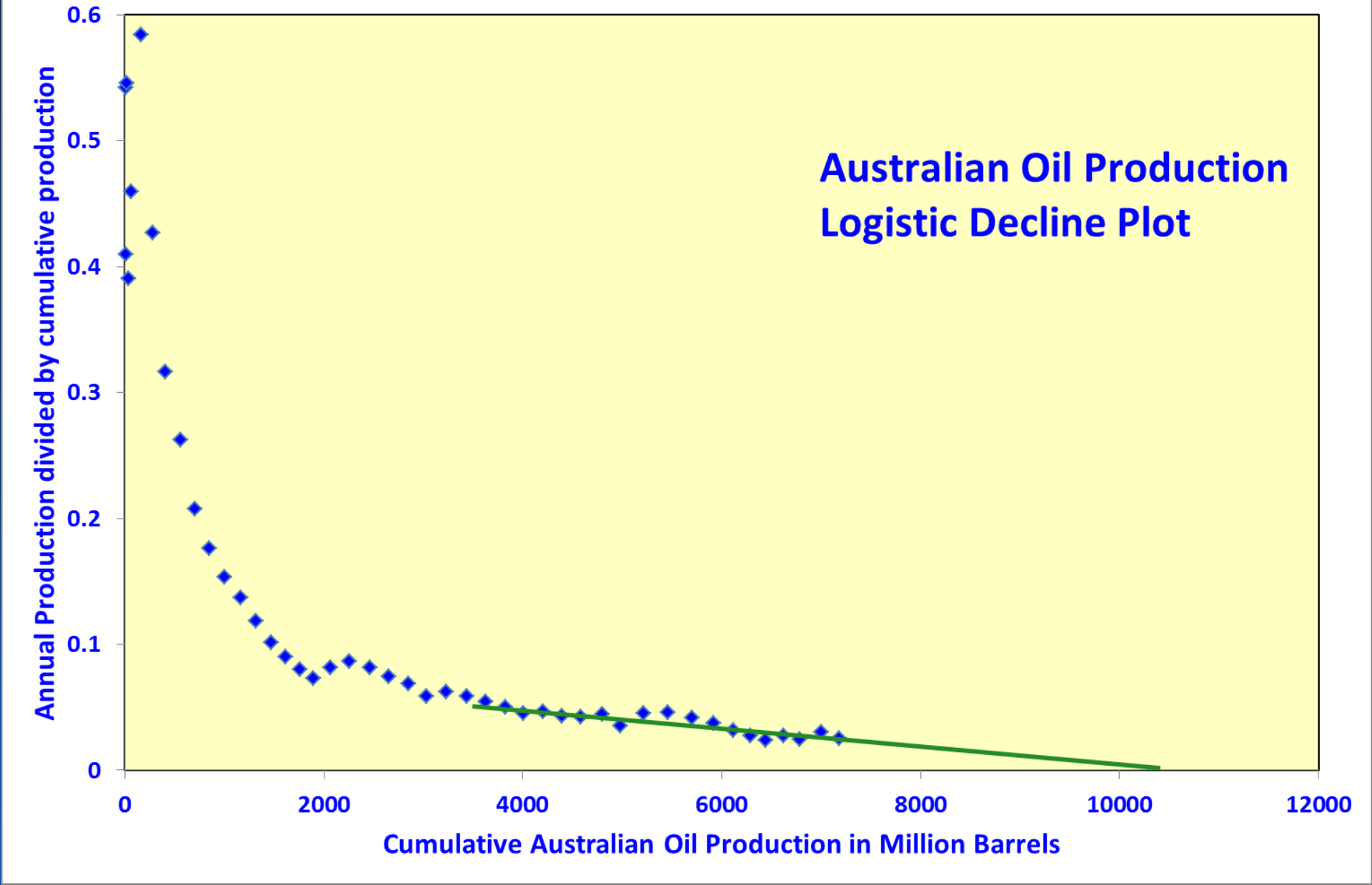


"Impacts of Higher Energy Prices on Agriculture and Rural Economies"
by Ronald Sands and Paul Westcott. ***USDA***

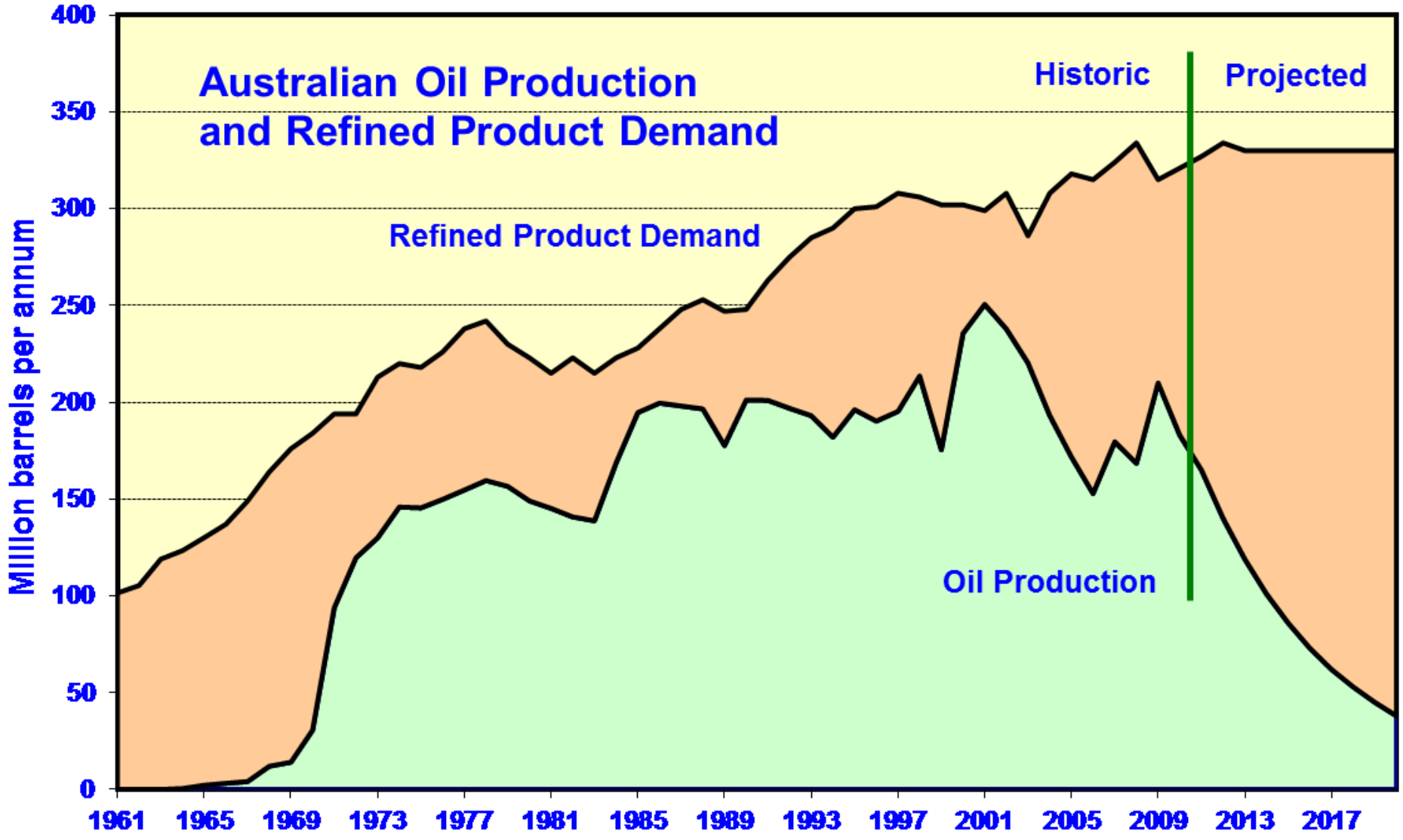
Based on the USDA figures and a US$200/bbl oil price:

Wheat and corn operating costs will be 60% higher in 2014.

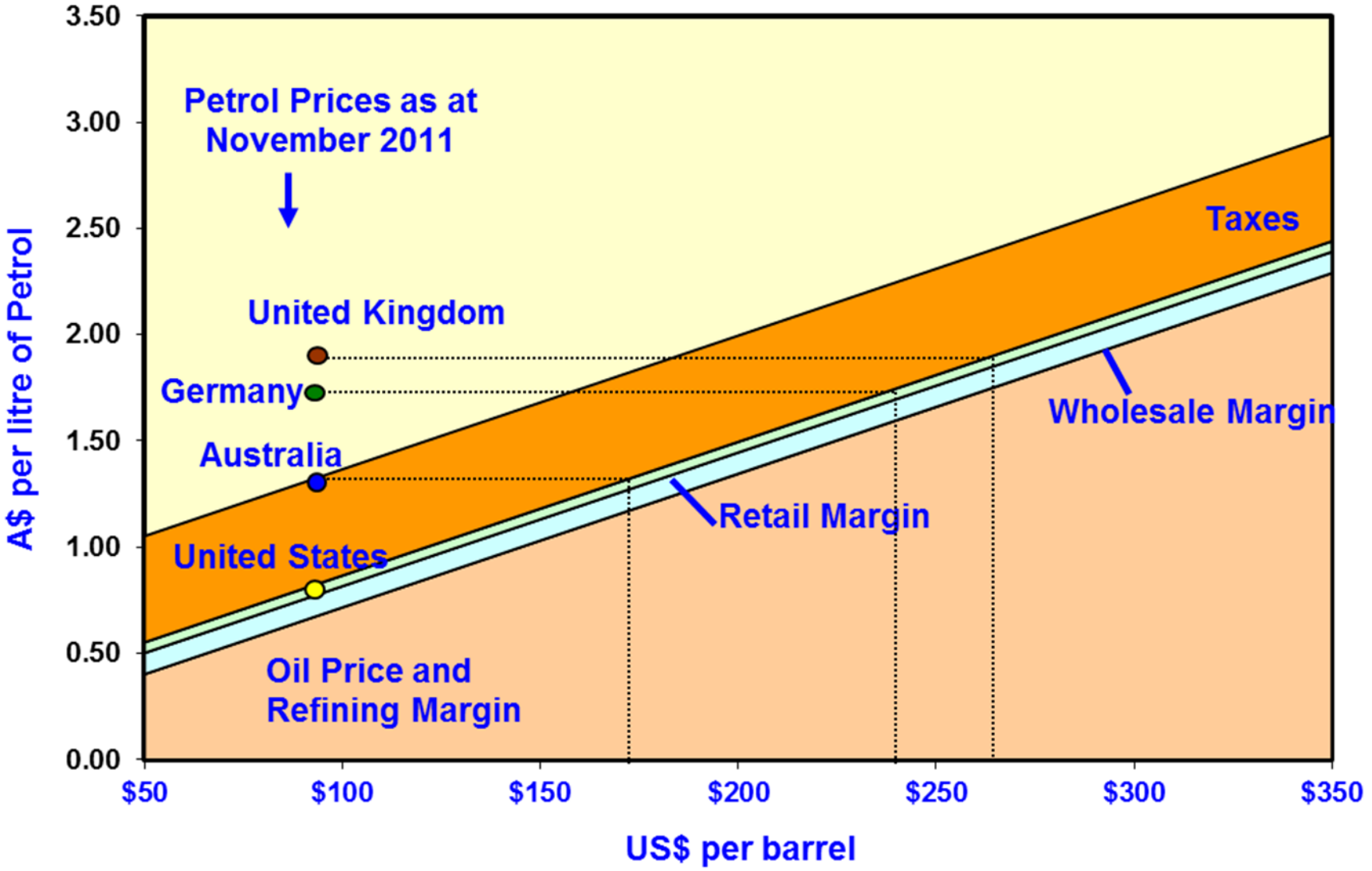
We have produced 75% of the oil Australia will ever produce.



Australian oil production falling off a cliff



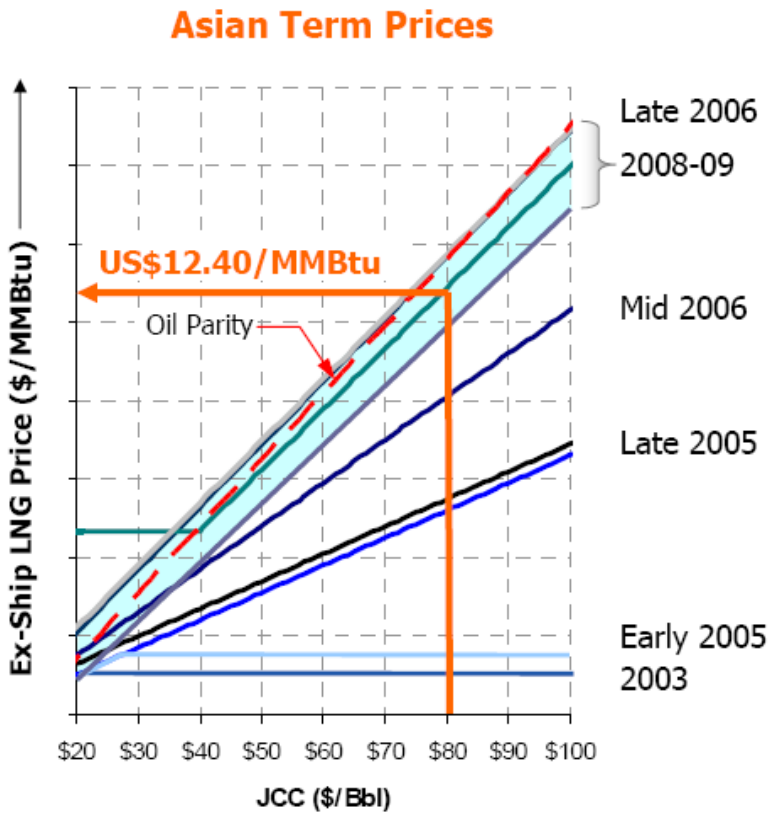
Variation with Oil Price



Australians are paying US$190/bbl for petrol, Germany US$340/bbl

The stupidity of displacing coal with natural gas to make electric power.

Continue to See Strong Long Term LNG Pricing



Source: Poten & Partners

- Recent contracts point to strong underlying demand
- Pricing reflects new supply-demand equilibrium
- Long-term Asia-Pacific pricing remains oil-linked

Might as well be burning oil.

Santos 4th March 2010

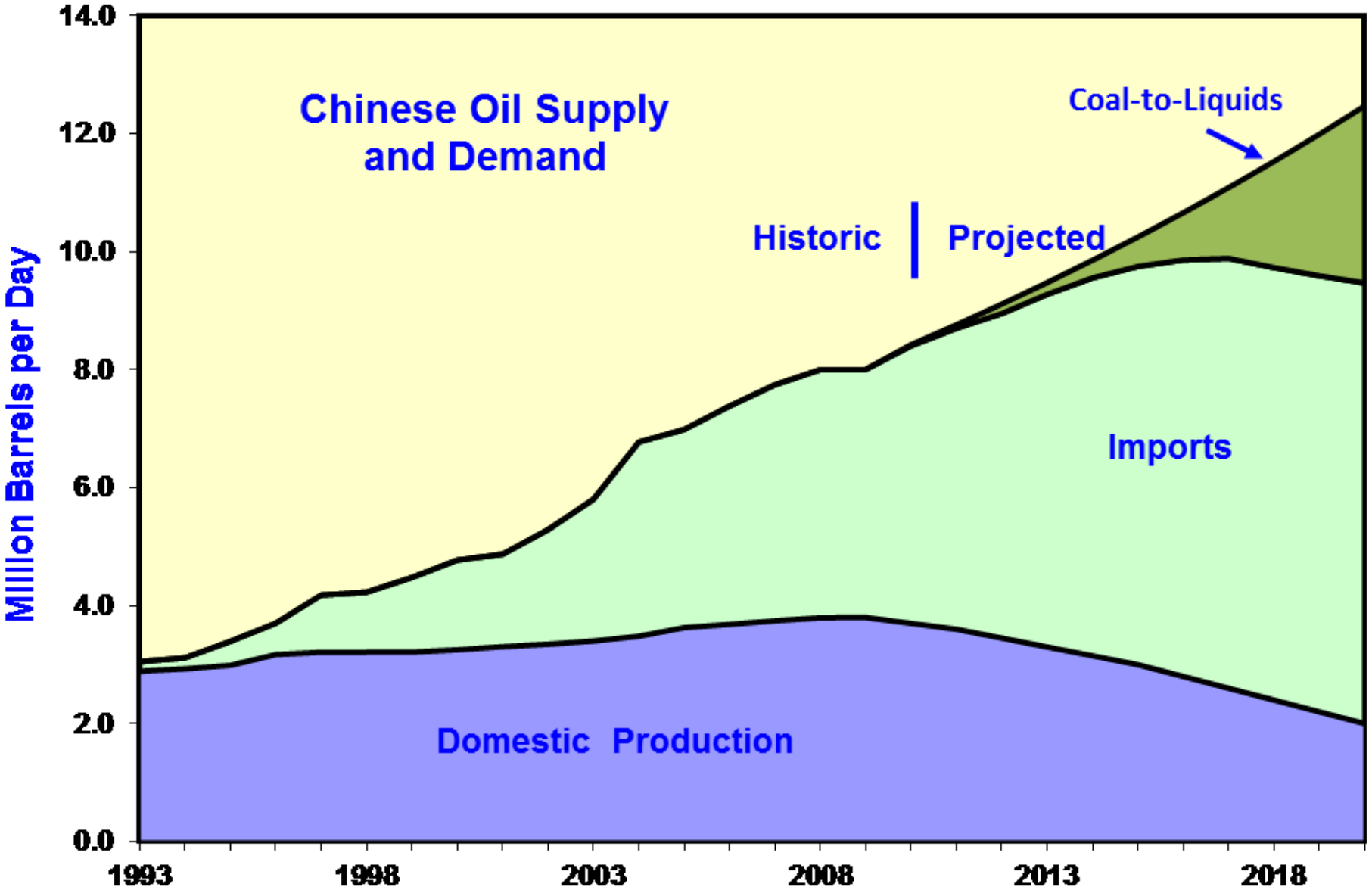
Santos
We have the energy.

The optimal solution

Rebuild the energy sector:

1. **Coal-to-Liquids (CTL) and compressed natural gas (CNG) replaces declining oil production.**
2. **Nuclear replaces coal for power generation as coal becomes too valuable as CTL feedstock.**
3. **Develop thorium reactors to replace uranium in nuclear energy.**

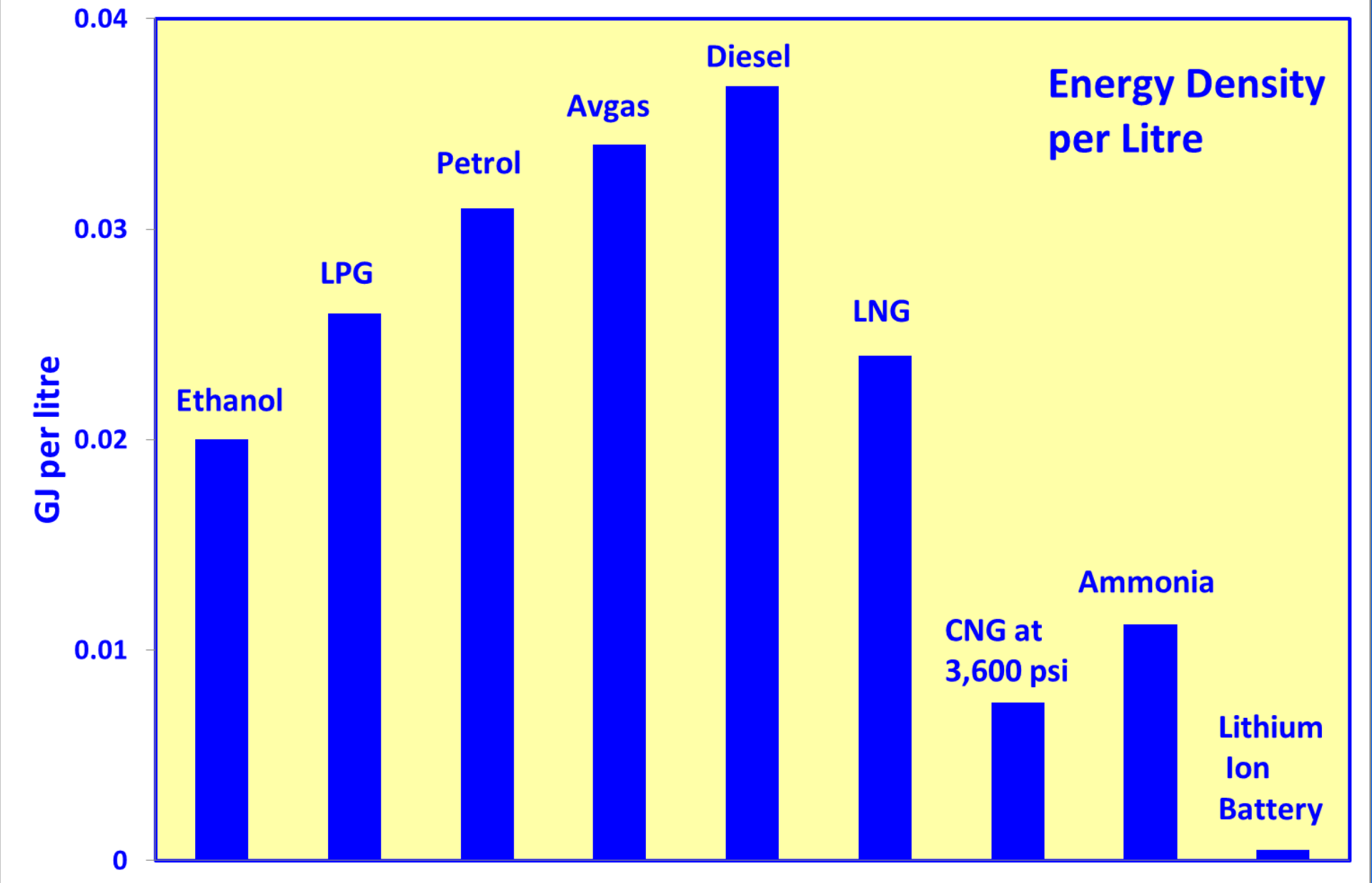
China is leaving oil before the rest of us.



Coal-to-Liquids in China is advancing rapidly.

- Three Fischer-Tropsch and one liquefaction plant commissioned.
- A further three Fischer-Tropsch plants under construction.
- Total planned production in excess of 600,000 barrels per day.
- From ASIACHEM 2011: “Chinese CTL investors will pay active efforts in preliminary works for mega size CTL projects starting from 2011 and may realise commissioning of such projects before the year 2015”

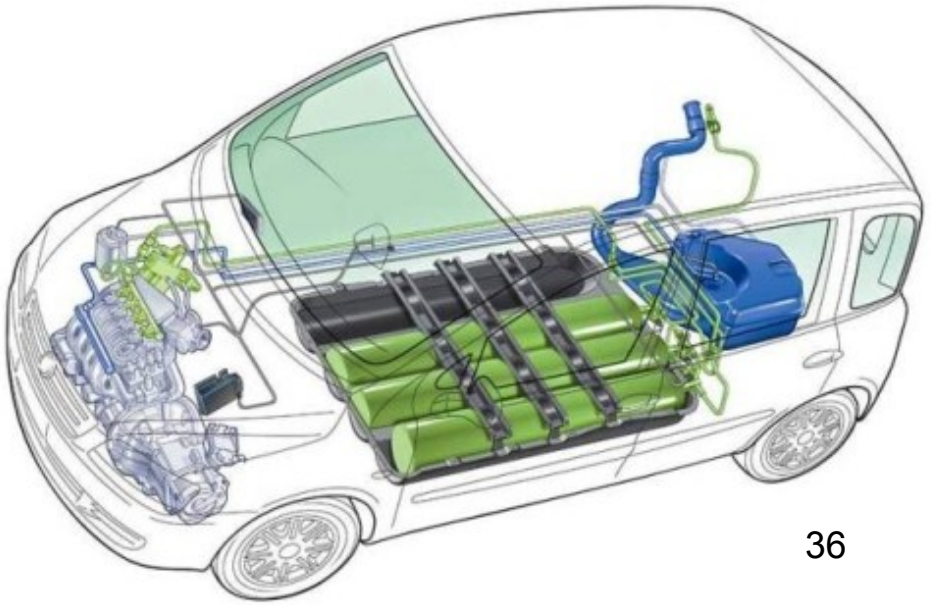
Energy Density of Transport Fuels



Natural gas vehicles – the electric car alternative

Fiat Panda with capacity for 12 kg of natural gas and has 30 litres of petrol backup

In a recent test in Europe, it did 720 km on €30 of natural gas - €0.04 per km



Relative efficiency of use of natural gas

	Natural Gas Vehicle		Electric Vehicle
1.0	unit of energy	1.00	unit of energy
0.5	four stroke engine	0.40	conversion to electric power
		0.36	delivered after transmission loss
		0.25	after charge/discharge loss
0.5	power to wheels	0.25	power to wheels

Therefore the electric car future should be nuclear-powered.

CTL will take our coal endowment 30% further than the power station / electric car route.

Coal-to-Liquids	Electric Vehicles
1.00 unit of energy	1.00 unit of energy
0.60 conversion to diesel	0.36 conversion to electric power
	0.32 delivered after transmission loss
	0.23 after charge/discharge loss
0.30 power to wheels	0.23 power to wheels

Diesel is storable, electric power isn't.

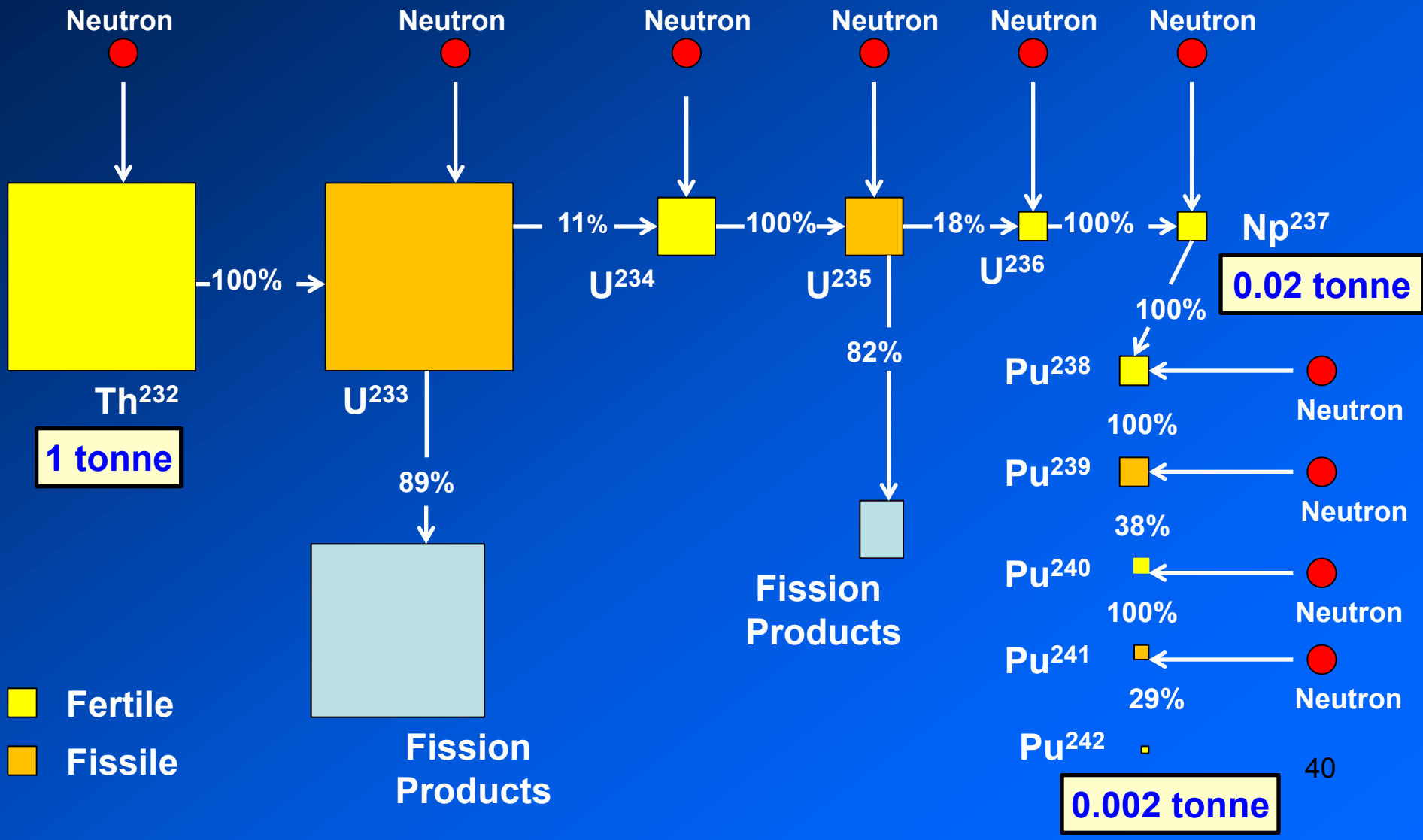
Thorium's Two Compelling Reasons:

1. A Thorium molten salt reactor is walk-away safe – Uranium can't be.

2. Thorium has one ten-thousandth the rate of high level waste production of the Uranium route.

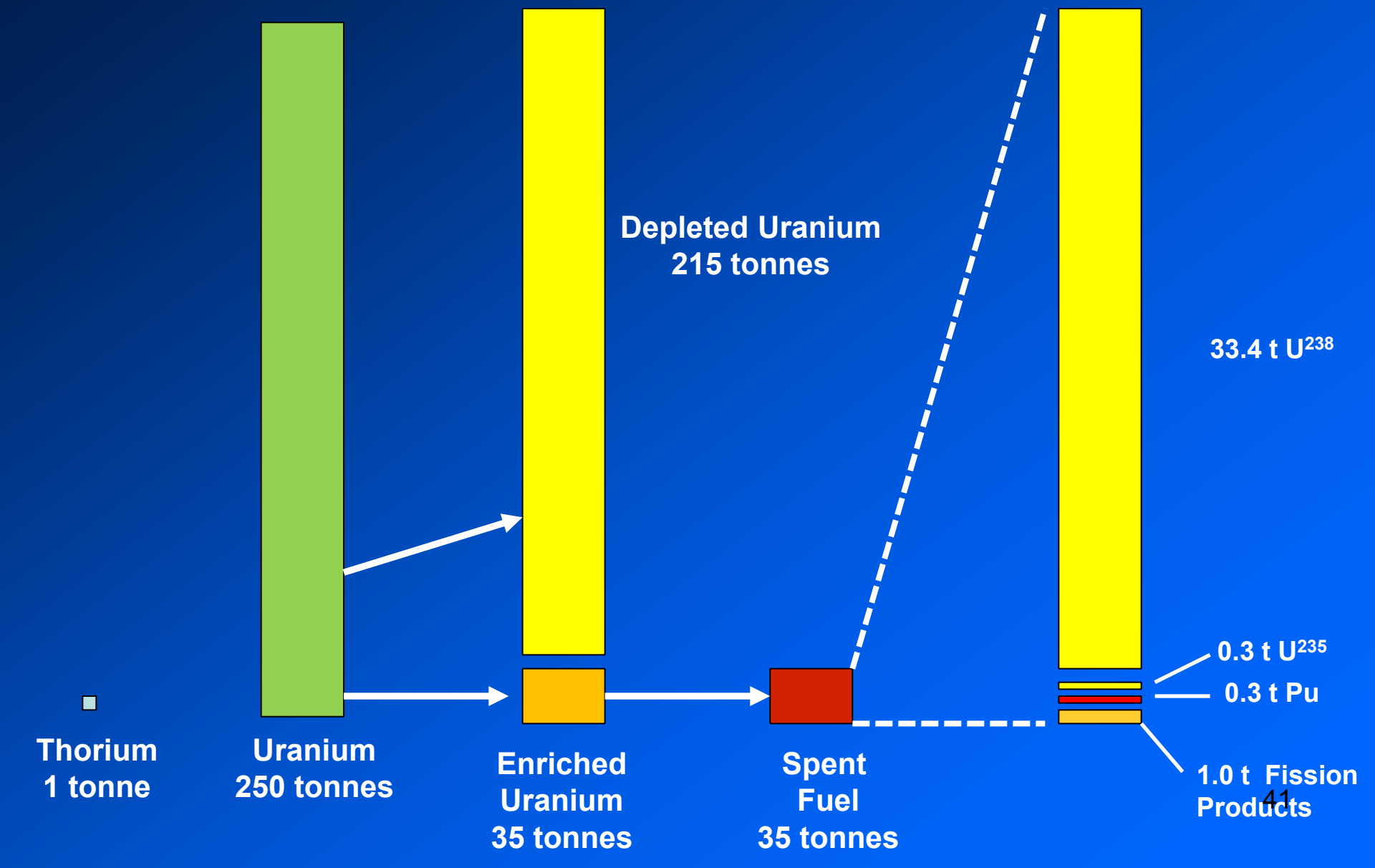
Thorium Process Route

1 GWe year

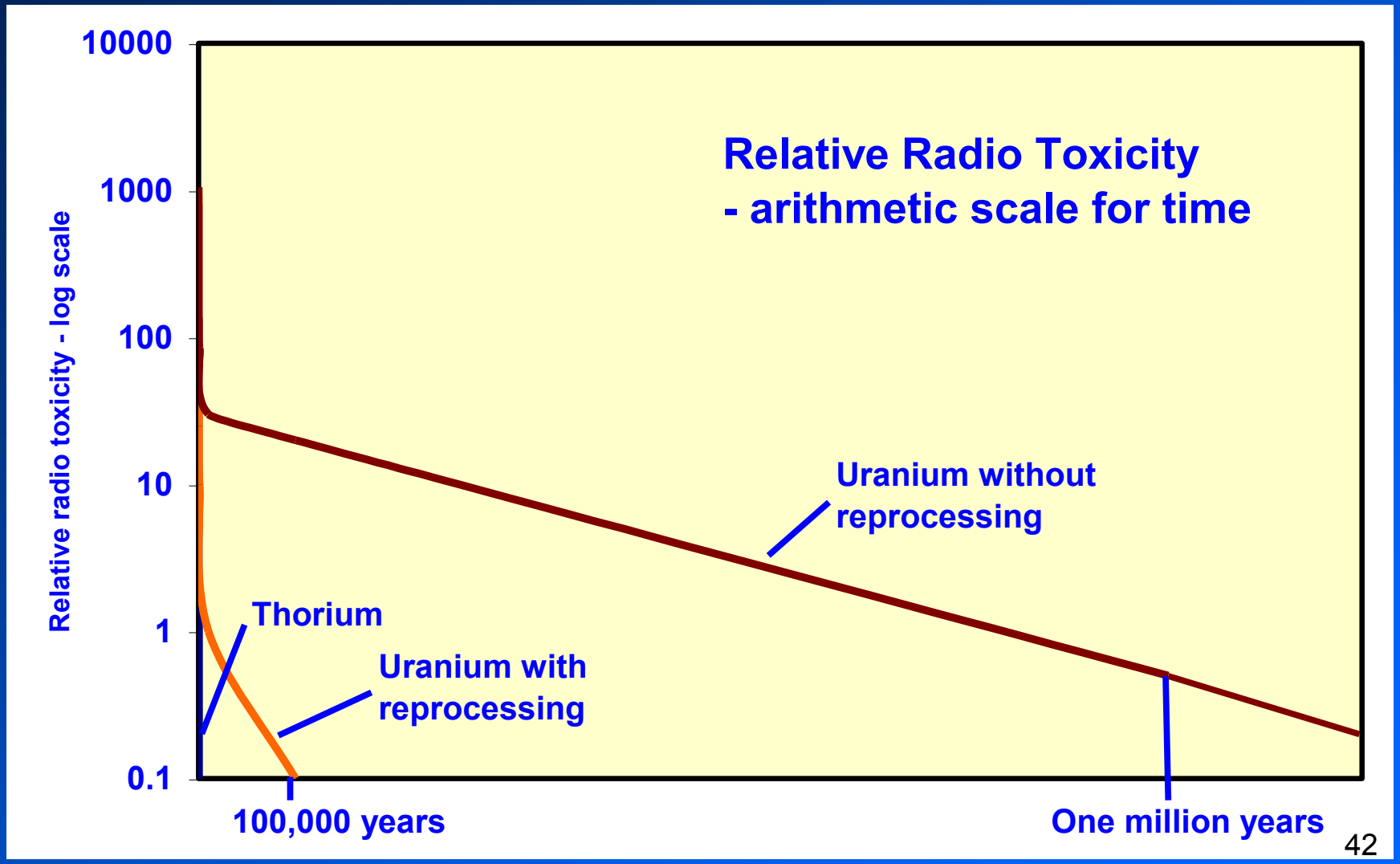


Uranium Light Water Reactor Route

1 GWe year



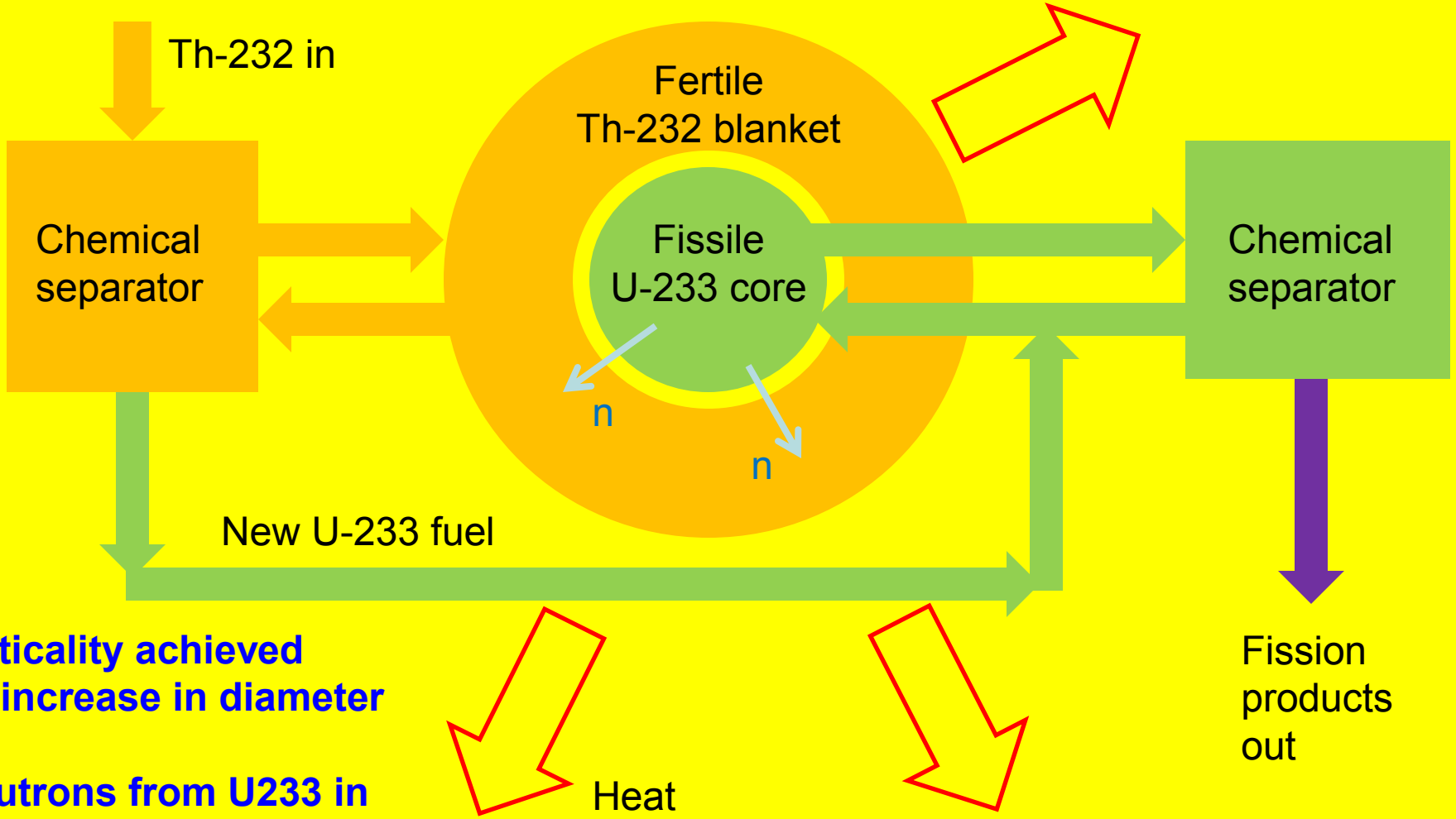
Relative Radio Toxicity
- time is arithmetic



Thorium

- Fertile but not fissile – needs a breeder reactor
- Four times as abundant as uranium.
- Half life of 14 billion years.
- By-product of mineral sands mining.
- The molten salt breeder reactor has the promise to provide low cost power with no long term, high level waste.
- The Chinese Government announced a molten salt thorium reactor project on 25th January 2011 – and specifically stated its intention to capture and control global IP on thorium reactors.

Two Fluid Thorium Reactor

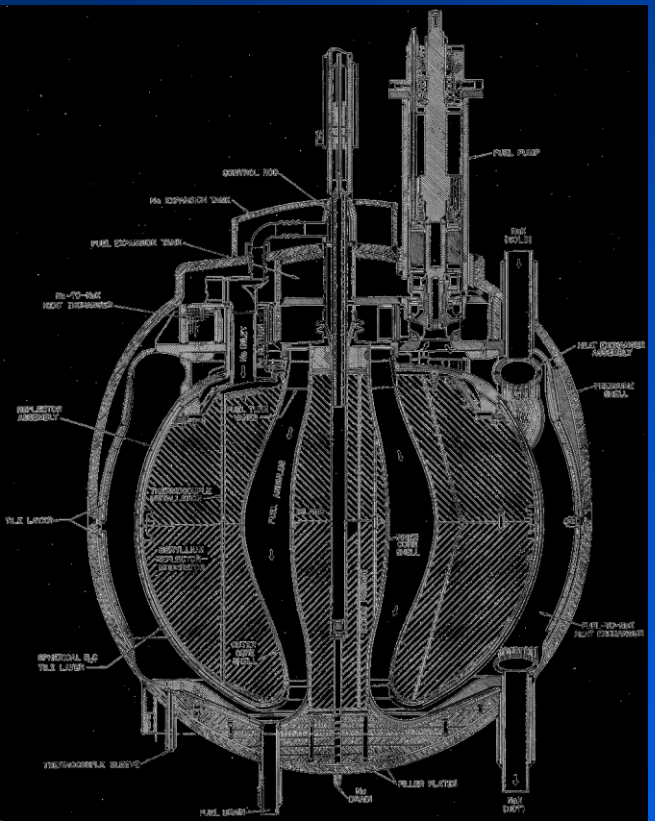


Criticality achieved by increase in diameter

Neutrons from U233 in the fuel salt irradiate thorium in the blanket salt

History: Aircraft Nuclear Program

Flew with an operating reactor 1955 – 1957 as a test bed. The reactor was not connected to the engines.



- The “Fireball”, or Aircraft Reactor Test, was the culmination of the ANP effort at ORNL.
- 235UF4 dissolved in NaF-ZrF4
- Designed to produce 60 MW of thermal power
- Core power density was 1.3 MW/litre
- NaK used to transport heat to jet engines at 1150 K
- The “Fireball” pressure shell was only 1.4 meters in diameter!

The future nuclear fleet might be floating

Akademik Lomonosov, 75 MWe

Concept

Hull launch
St Petersburg 30th June, 2010
Fuel loading into the two Reactors by 2012

What coal-based production would require per tonne of wheat

50 kg for urea

2 kg for phosphate fertiliser

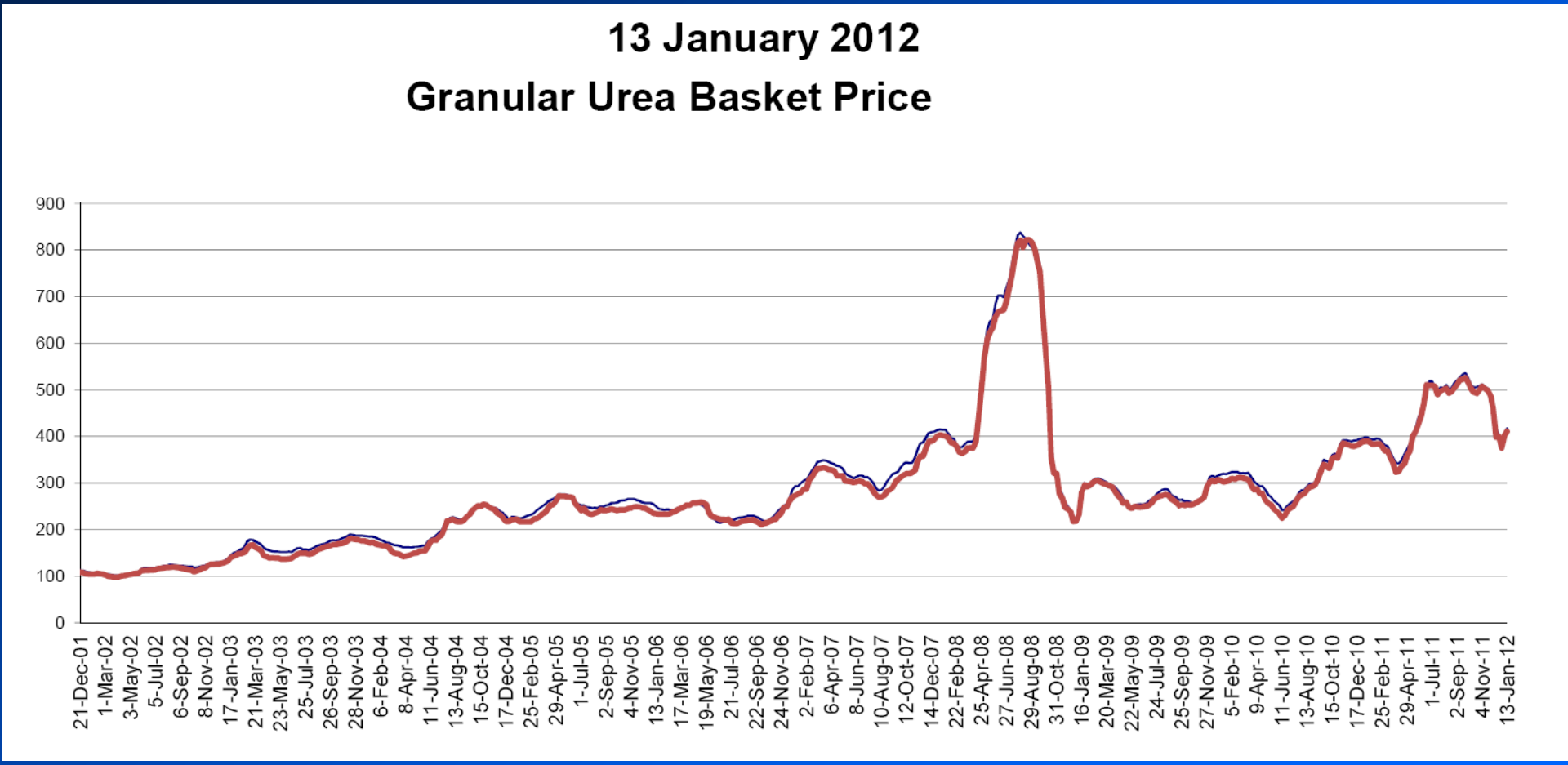
10 kg for pesticide

26 kg for diesel

88 kg total of coal

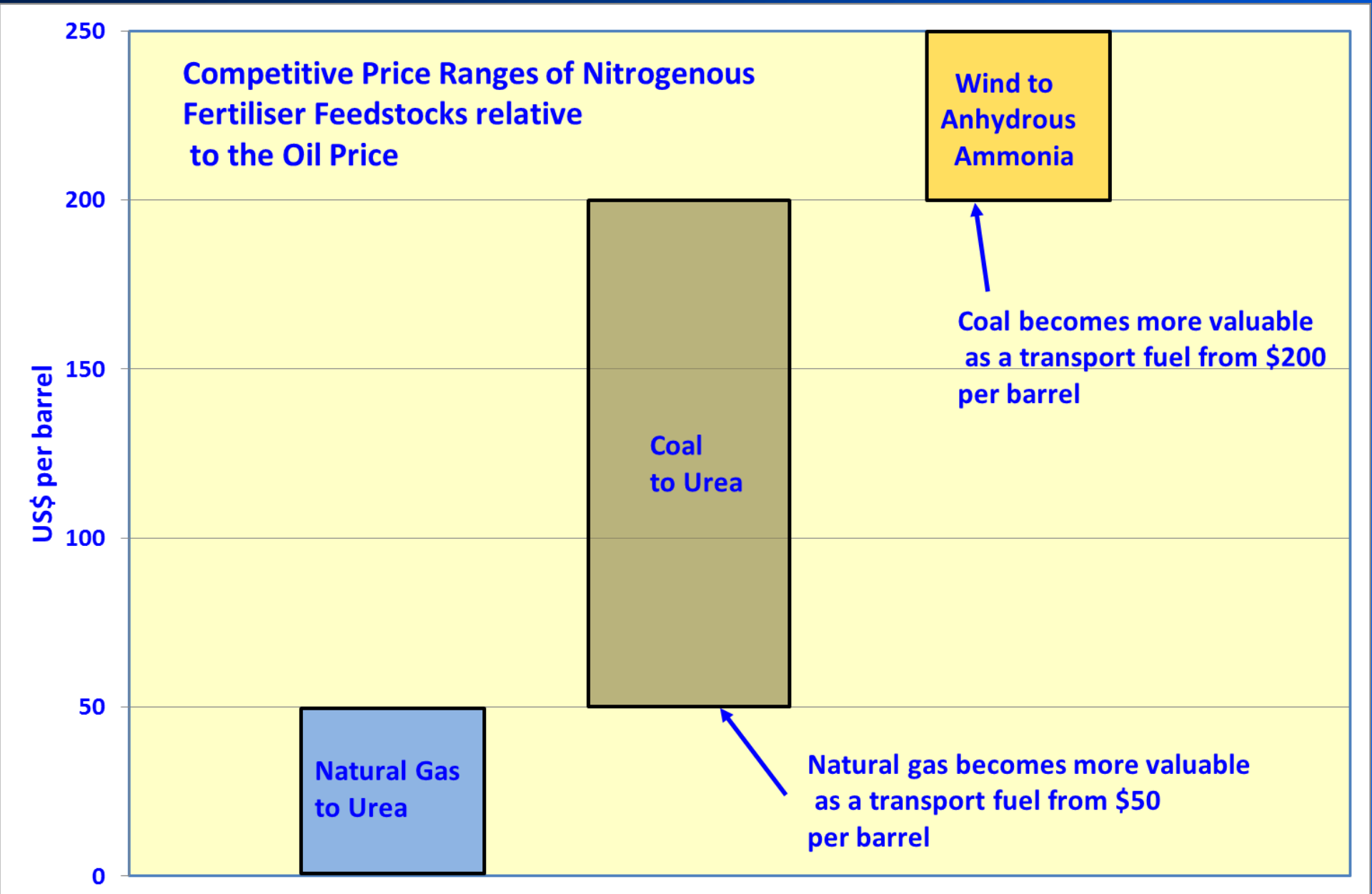
The WA crop of 9 million tonnes would require 800,000 tpa of coal.

The current urea price equates to $70/barrel.

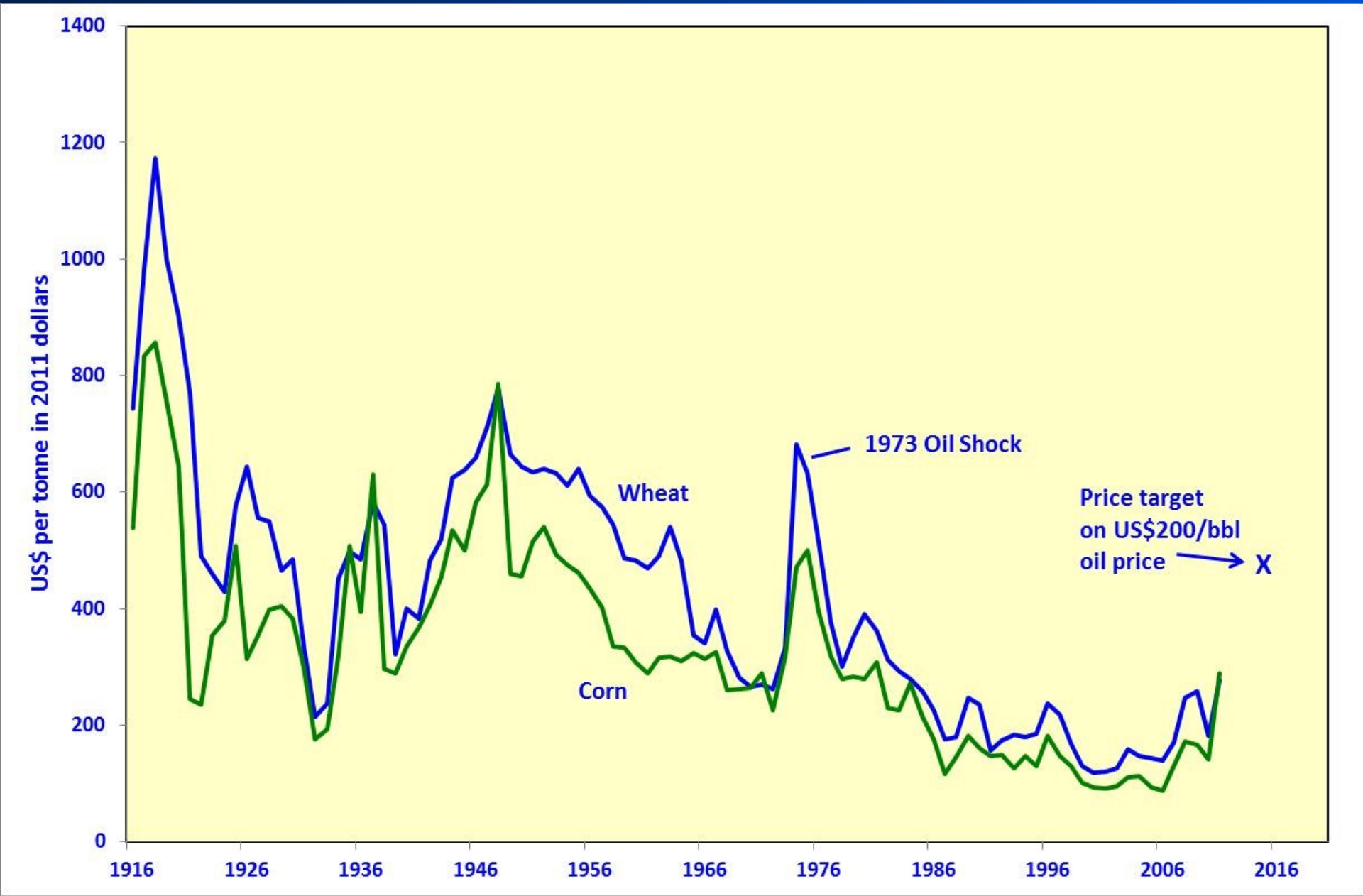


Wind power for anhydrous ammonia production becomes competitive above $200/barrel.

WA's wind endowment finds a use above $200 per barrel.



Wheat and Corn Prices 1916 - 2011



Why grain prices went down for 70 years.

	1930	1975	2010	2010 vs 1930 % change
Population	2 billion	4 billlion	7 billion	250%
Wheat	127	355	682	437%
Corn	113	324	817	623%
Rice	89	360	679	663%
Barley	41	150	147	259%
Rye	47	24	17	-64%
Oats	64	48	24	-63%
Total	481	1261	2366	392%

Those trends will now cross over.

The Second Horseman

When the Lamb opened the second seal, I heard the second living creature say, "Come and see!" Then another horse came out, a fiery red one. Its rider was given power to take peace from the earth and to make men slay each other. To him was given a large sword.

Revelation 6:3-4

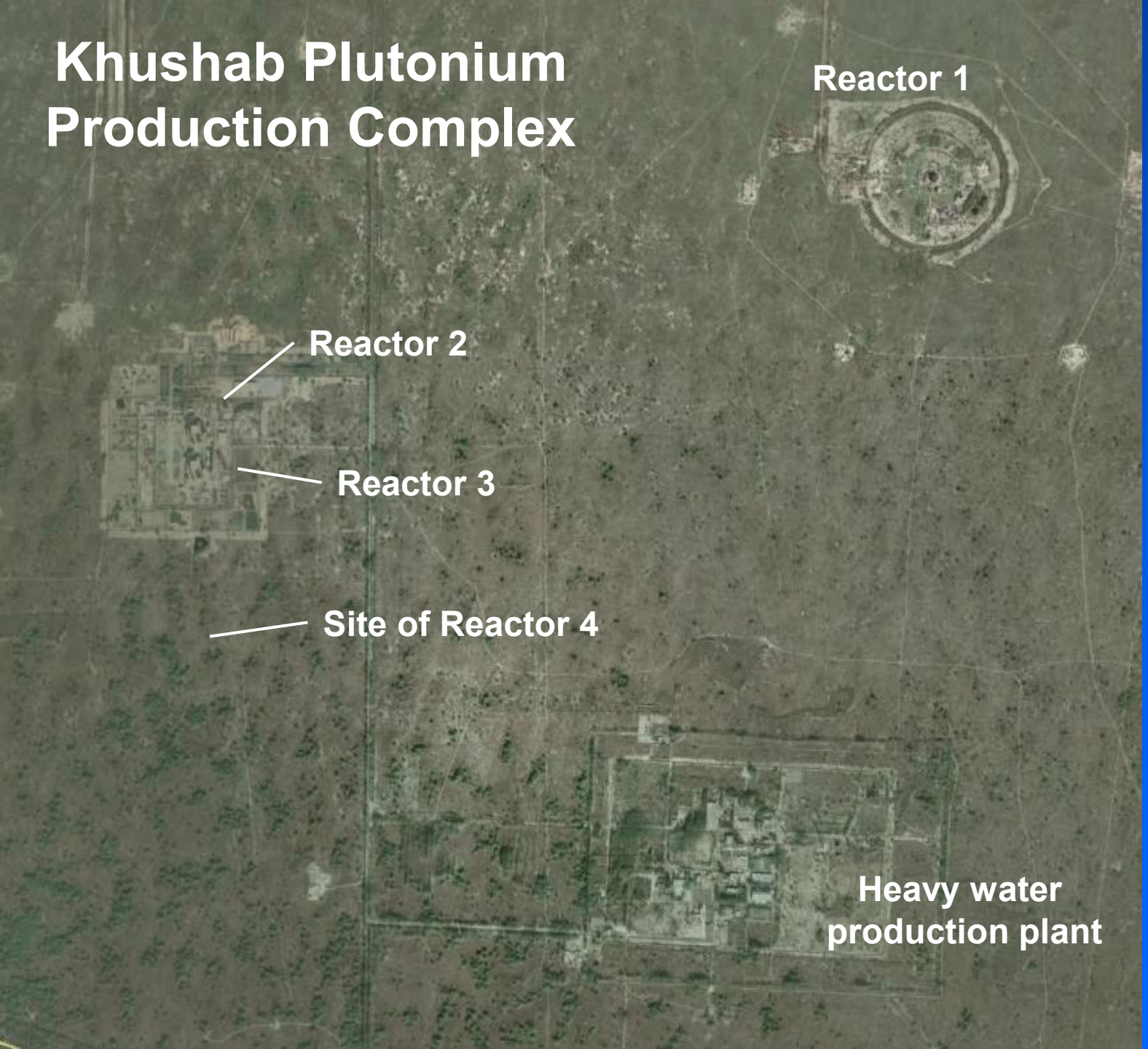
War

-The Pakistani nuclear weapon programme

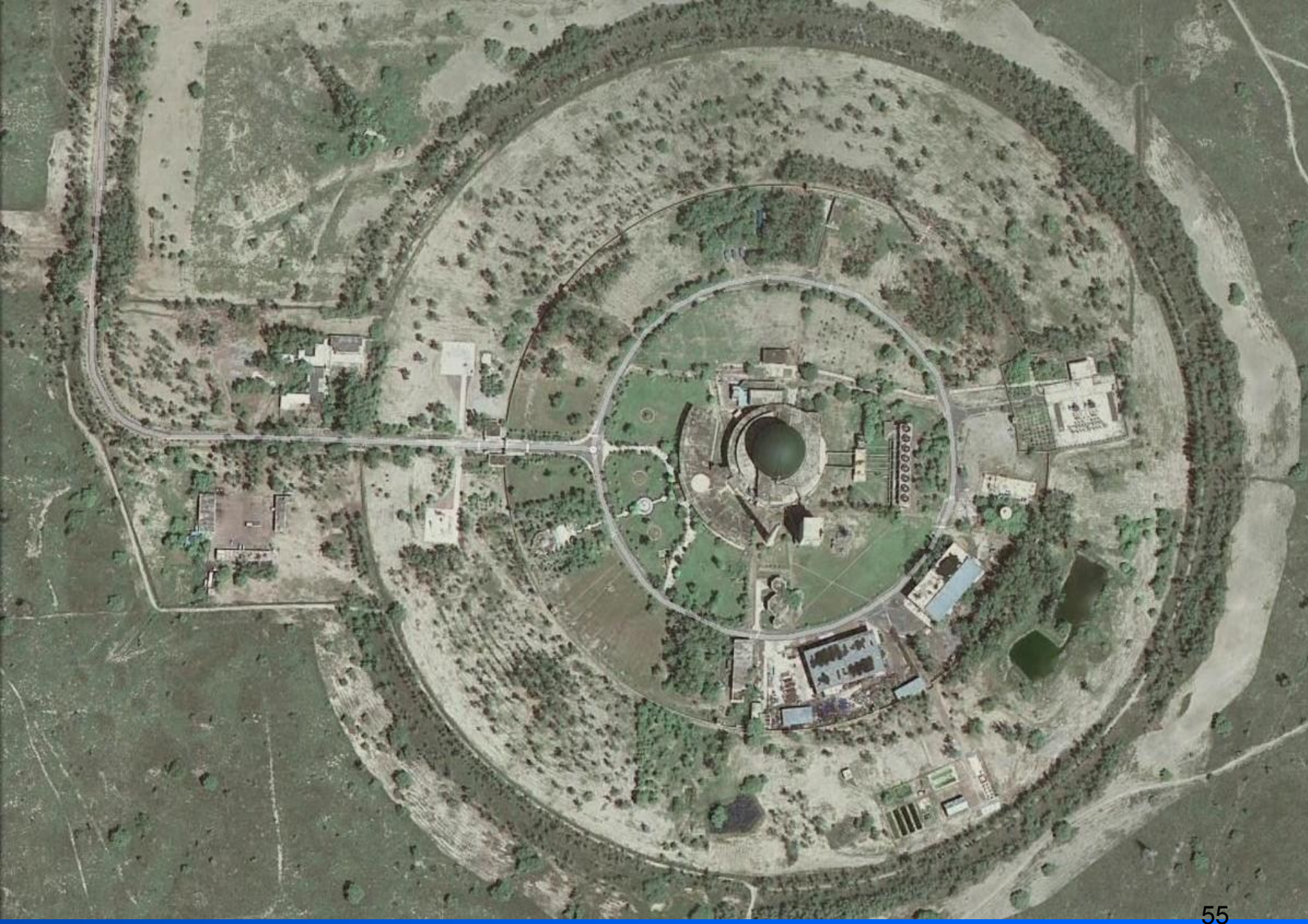
Pakistan Nuclear Timeline

1972	President Bhutto decides to build a bomb
1974	India explodes nuclear device
	Dr Kahn smuggles centifruge blueprints to Pakistan
1978	First enrichment of uranium
1983	90% enrichment achieved
1984	Bomb ready but test delayed due to Afghan war
1988	Missile delivery system developed, technology from China
	First plutonium reactor at the Khushab site
1998	First bomb tests - 6 devices in May
	programme was $20 million/year for 25 years
2001	Pakistan-sponsored attack on Indian Parliament
2002	Construction begins on second reactor at the Khusab site
2006	Construction begins on third reactor at the Khusab site
2008	Pakistan- sponsored attack on Mumbai
2011	Construction begins on fourth reactor at the Khusab site

Khushab Plutonium Production Complex



Location at:
32° 00’ N
72° 12’ E



First reactor at Khushab

Beyond deterrence, a war-fighting capability

Bombs	Missiles	Range
Current arsenal of approx. 100	Hatf 9	60 km
	Hatf 2	180 km
Upon completion of Khusab 4,	Hatf 3 (Ghaznavi)	300 km
build rate of 40 x 20kt bombs	Hatf 4 (Shaheen 1)	700 km
per annum	Shaheen 2	2000 km

Meanwhile, Pakistan has a literacy rate of 55% and frequent power blackouts due to fuel shortages.

Like Pakistan's population growth, there will be no end to Pakistan's bomb-build in the absence of an external event.

Possible Futures

1. Pakistan uses its nuclear weapons in a regional war.
2. Failed state outcome - weapons are sold to regional players with the funds.

Either way – the genie is out of the bottle and middle powers find that they can survive an exchange of low-yielding weapons.

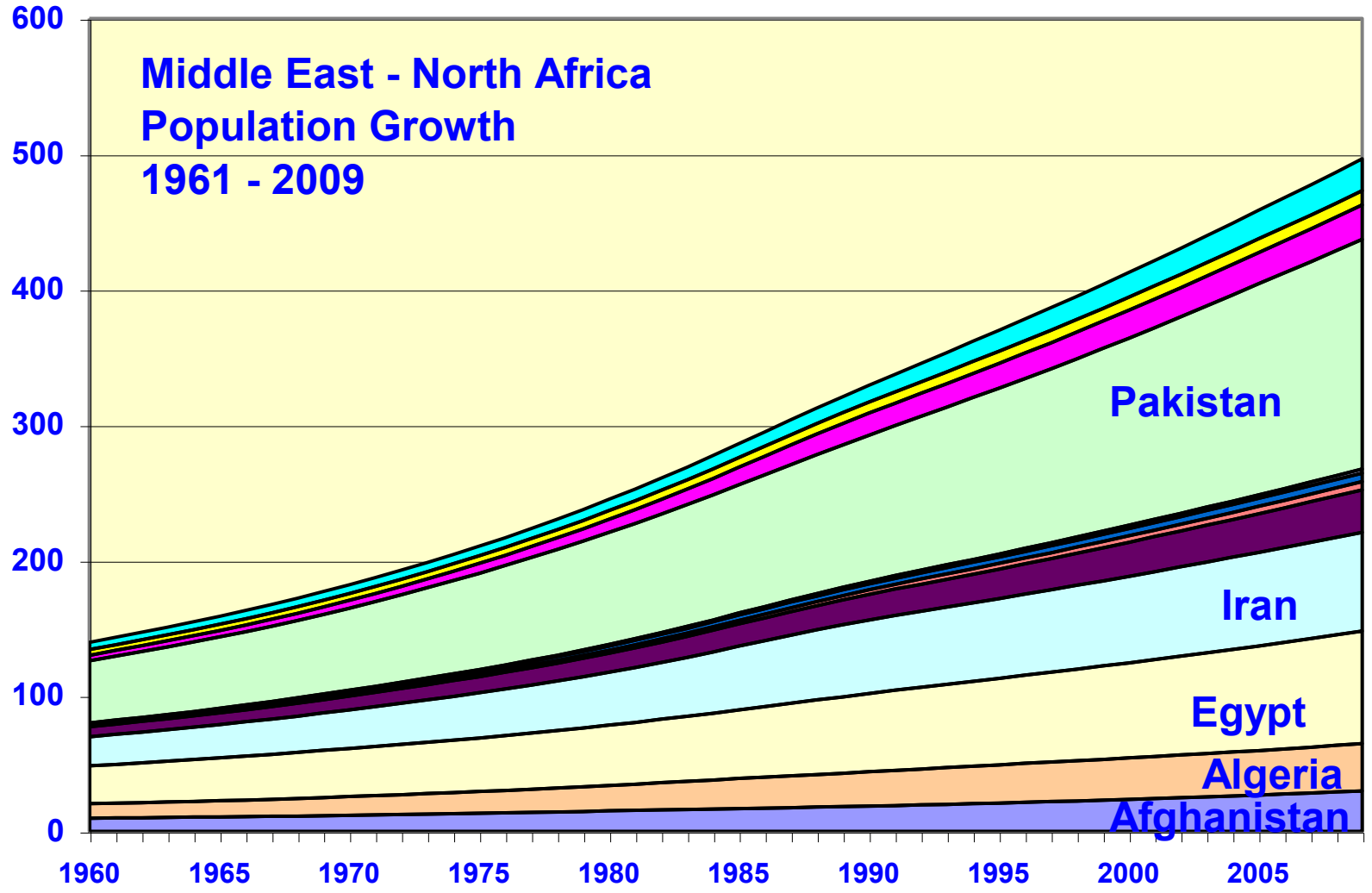
The Third Horseman

When the Lamb opened the third seal, I heard the third living creature say, "Come and see!" I looked, and there before me was a black horse! Its rider was holding a pair of scales in his hand. Then I heard what sounded like a voice among the four living creatures, saying, "A quart of wheat for a day's wages, and three quarts of barley for a day's wages, and do not damage the oil and the wine!"

Revelation 6: 5-6

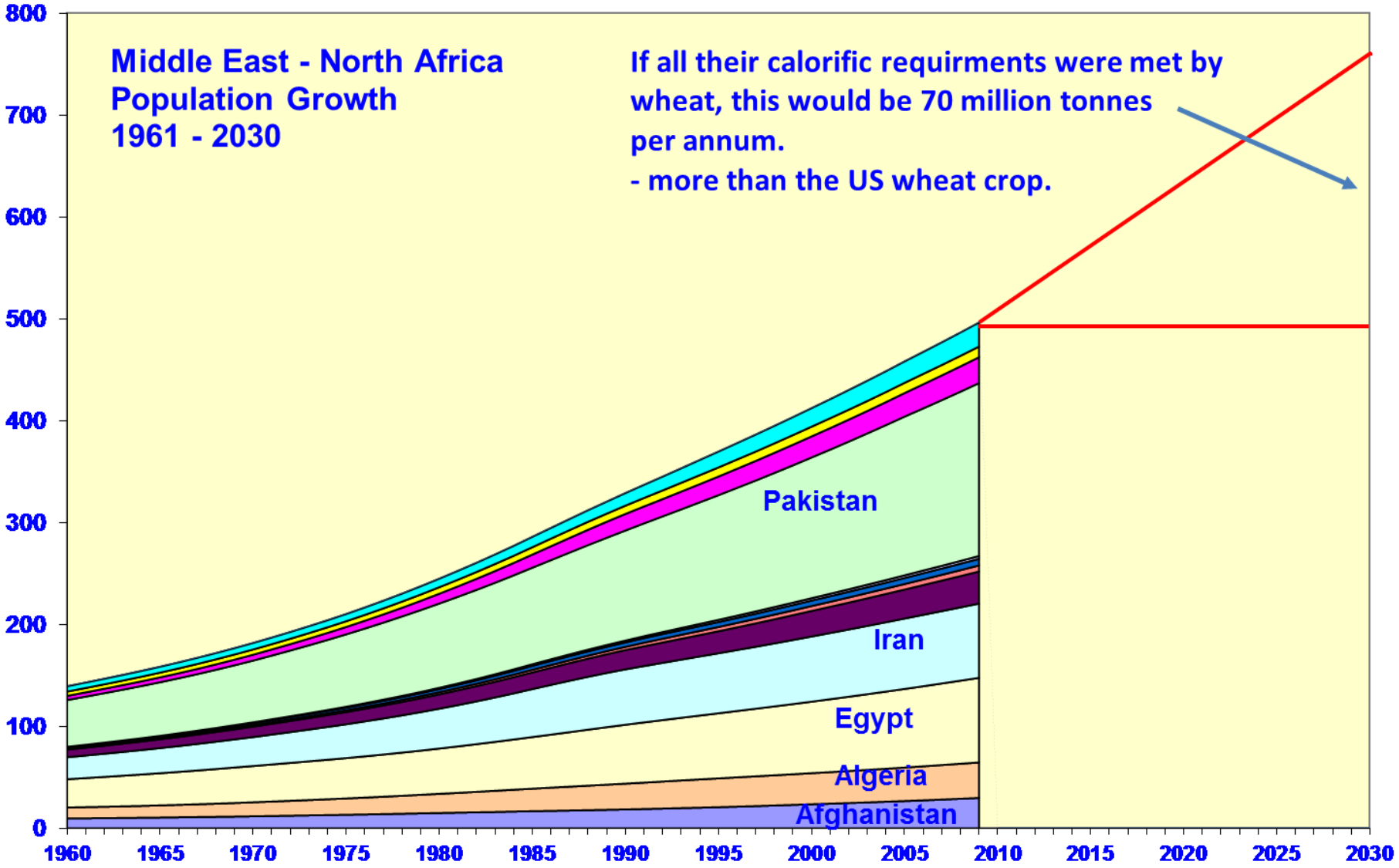
Famine:
MENA Population Growth

Middle East – North Africa

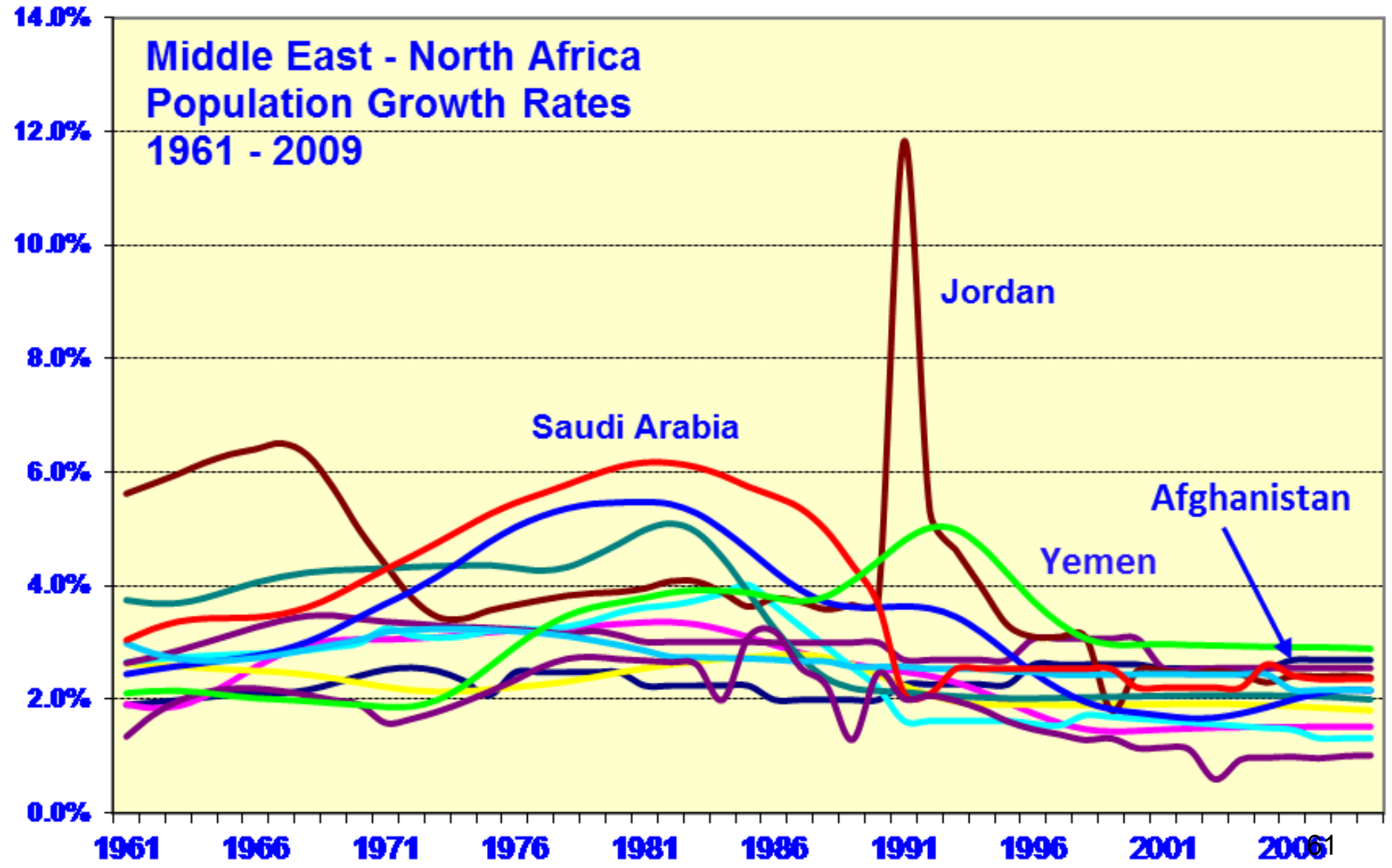


At 2% per annum growth, MENA population will be up by 250 million by 2030.

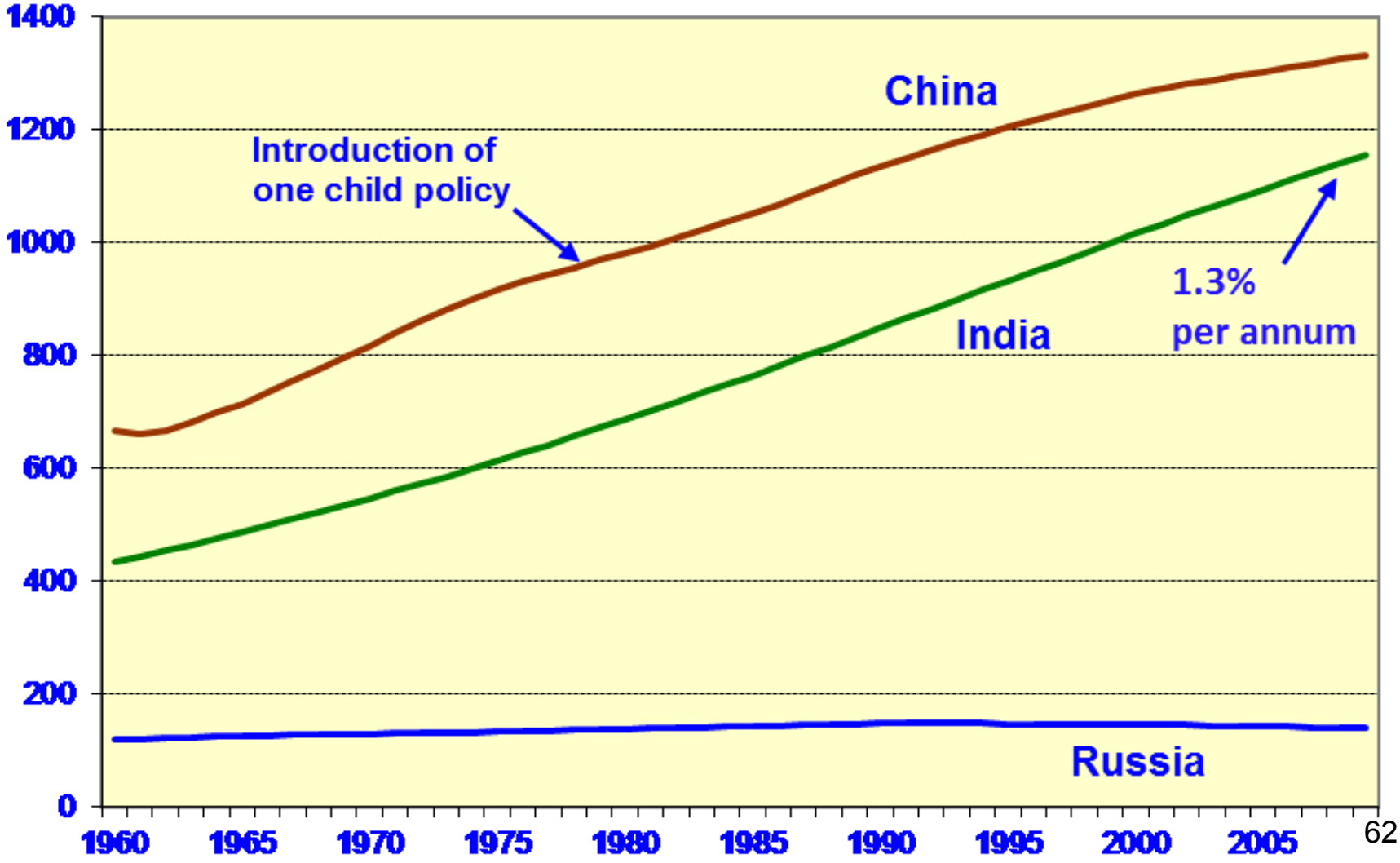
Extending that to 2030



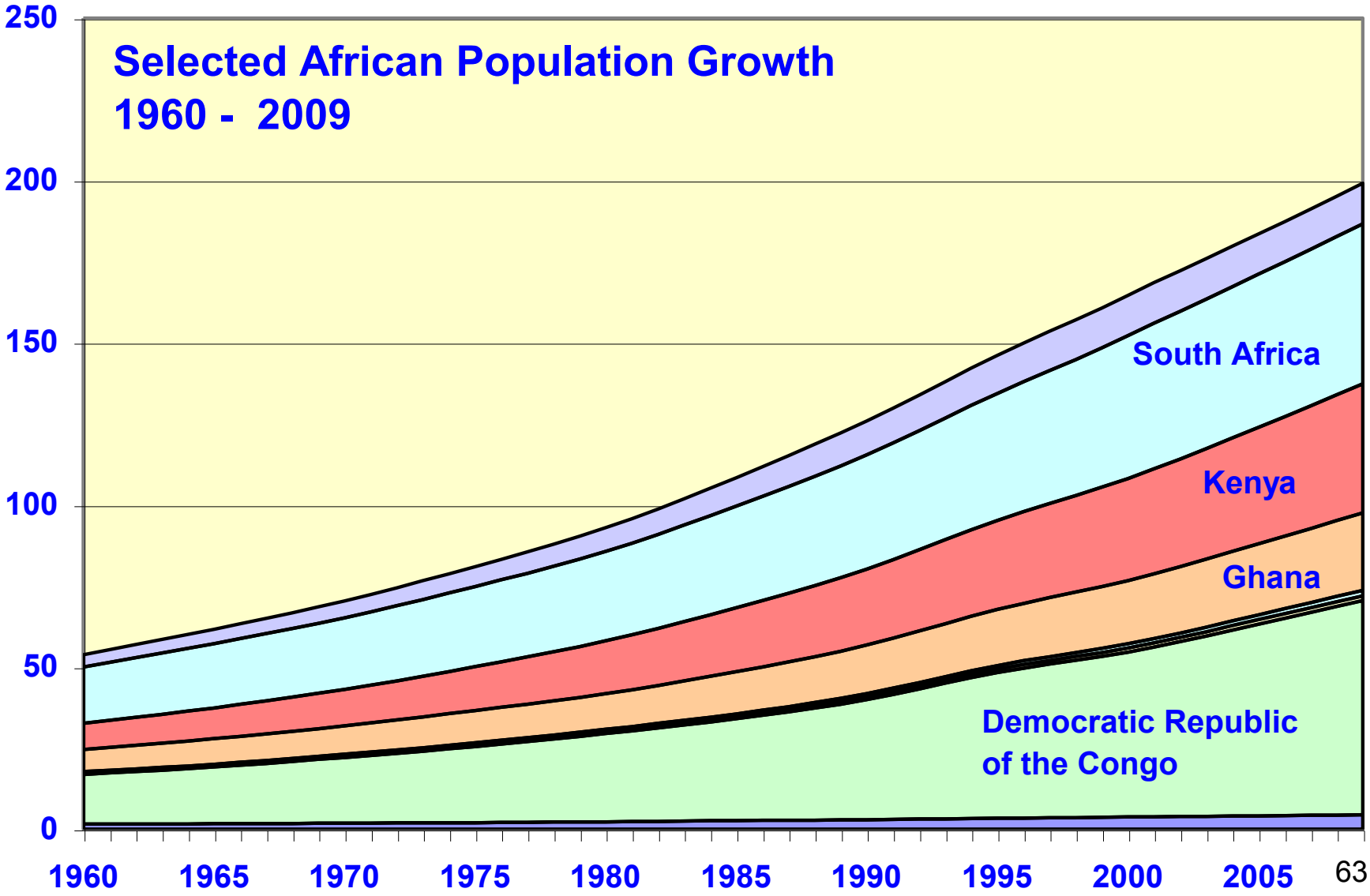
3% growth is doubling every 25 years.



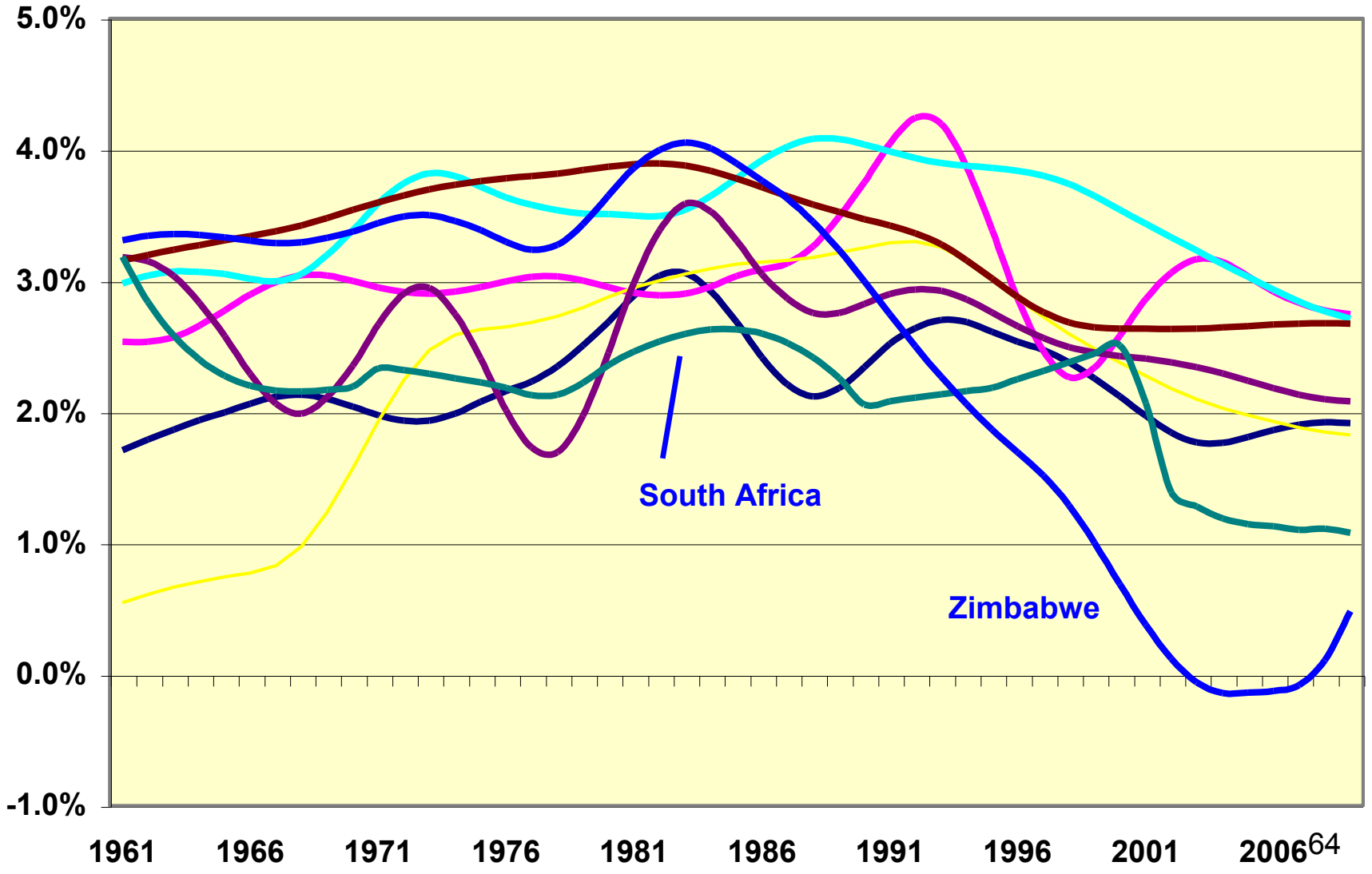
China avoided calamity, India is headed for disaster.



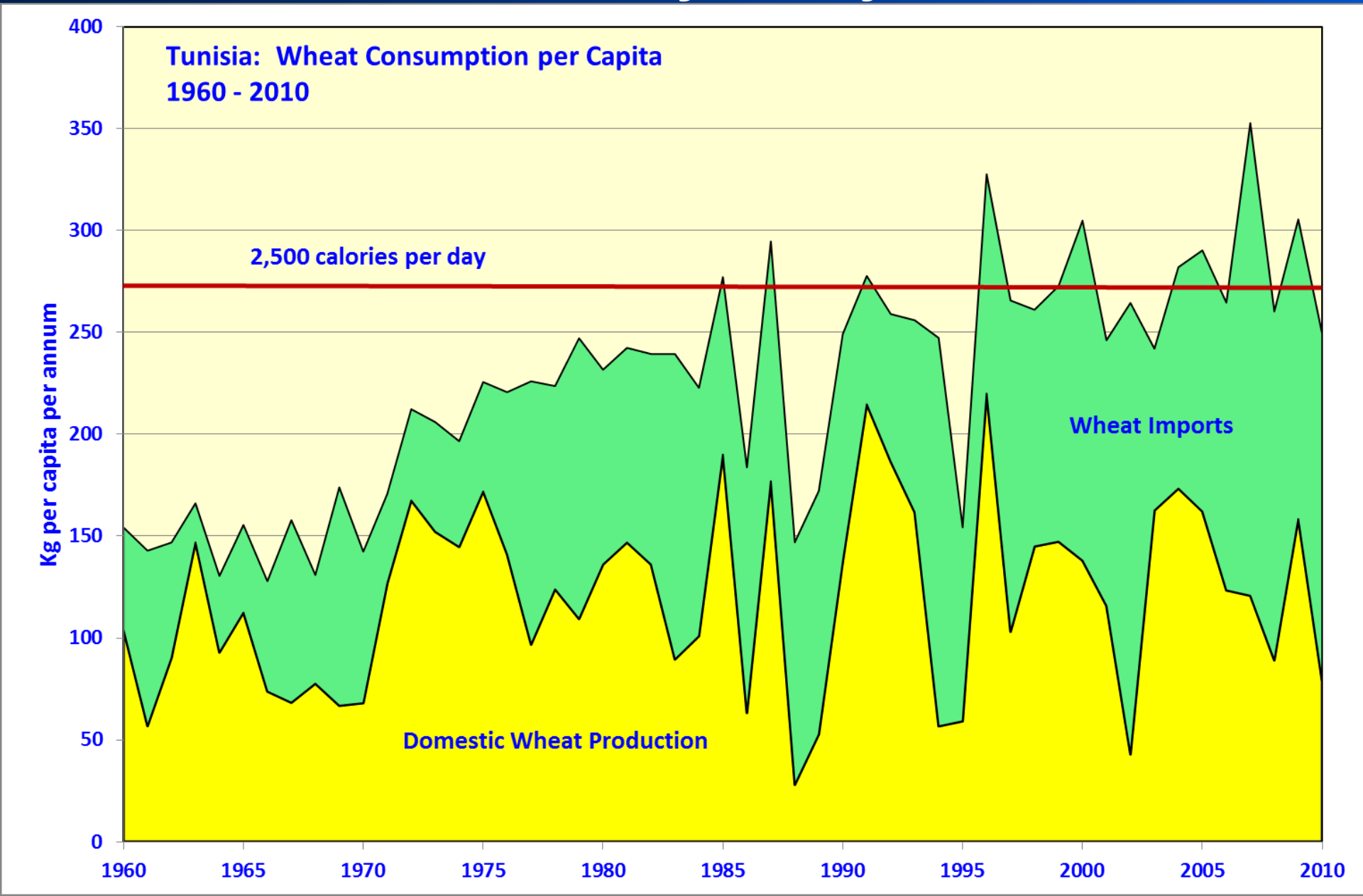
Africa is also headed for trouble.



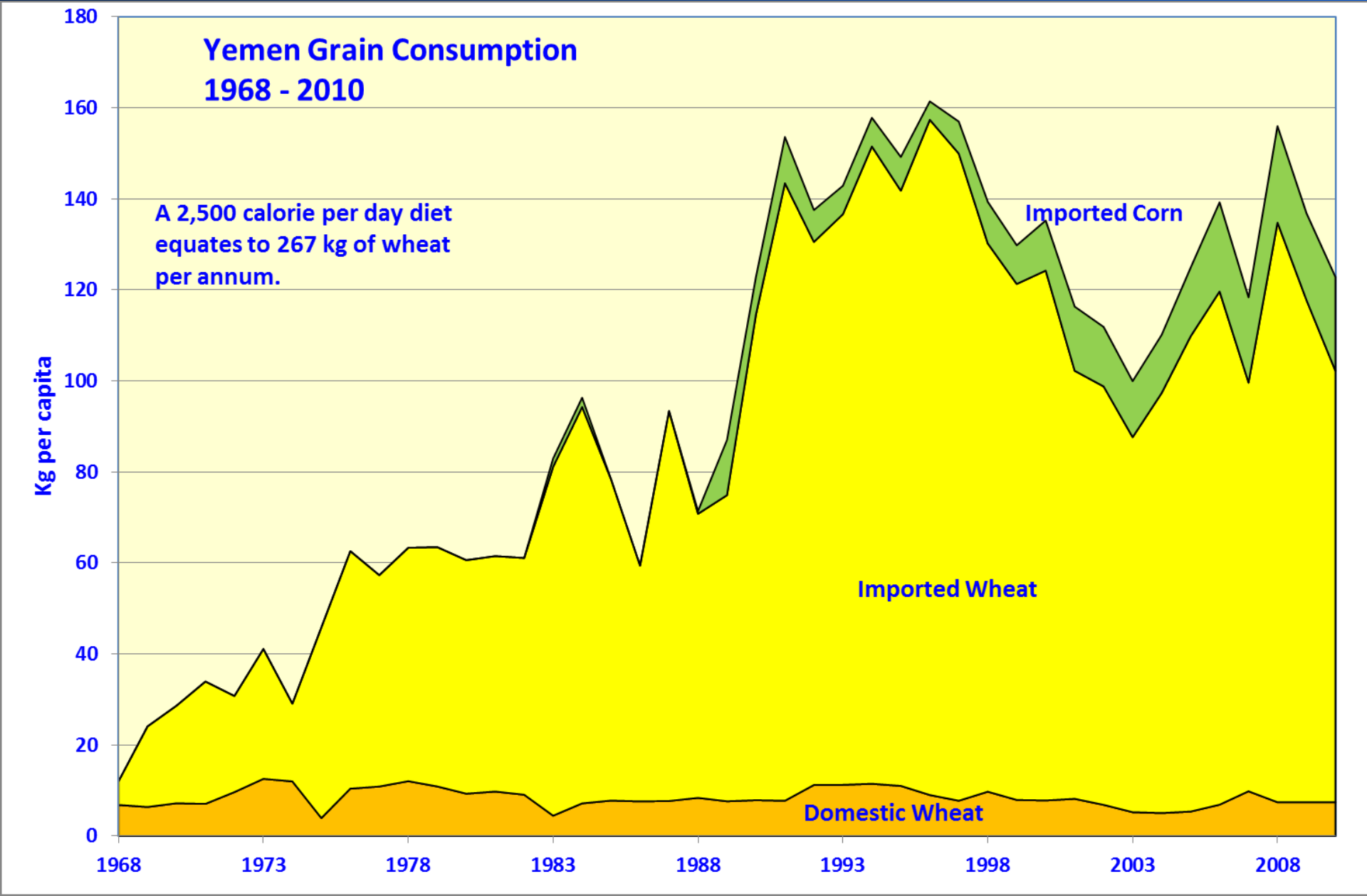
Some African Population Growth Rates



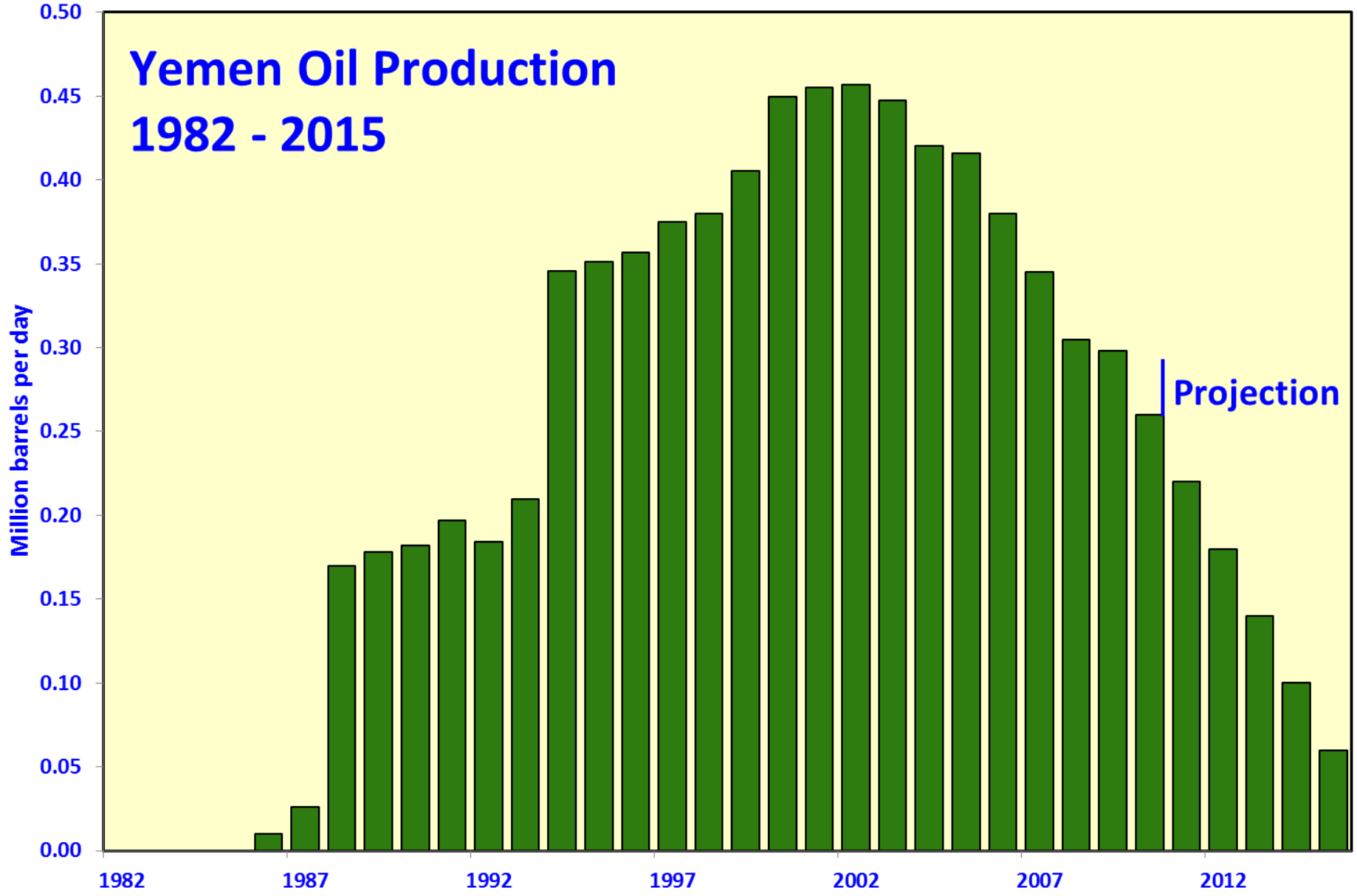
Tunisia: The Arab Spring began with a vegetable vendor, but what they mainly eat is wheat.



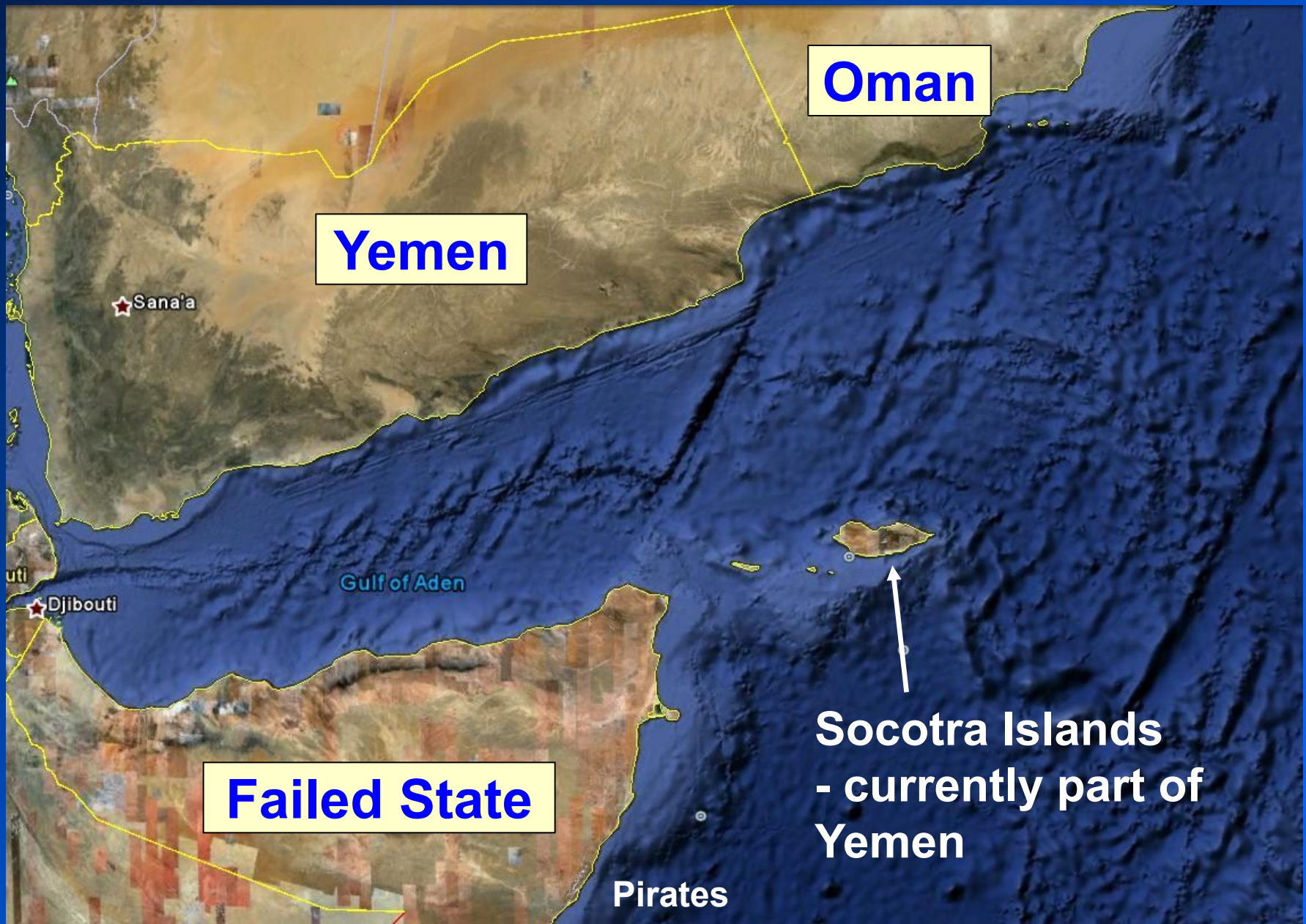
Yemen is on its way to being a failed state.



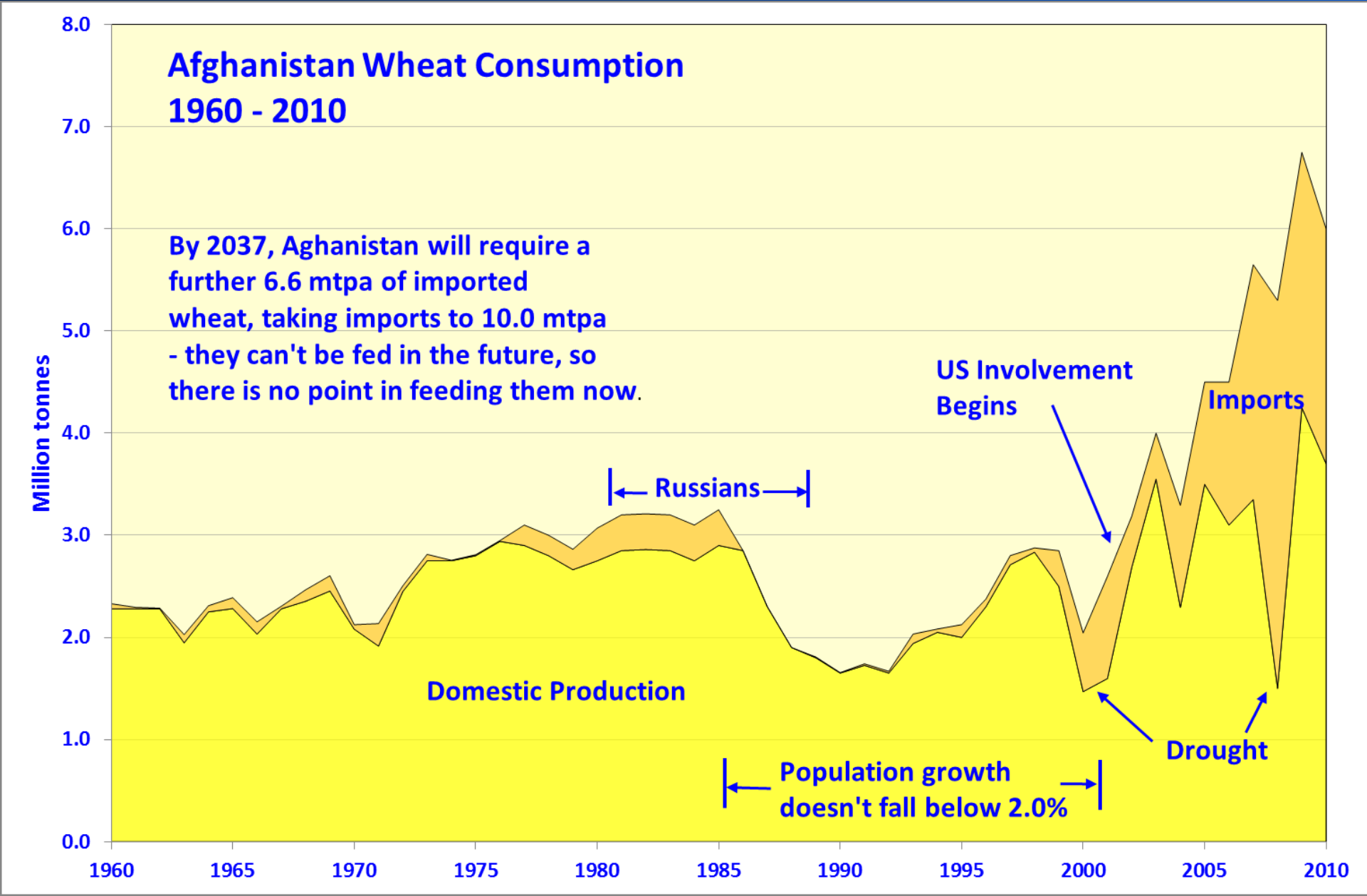
As ability to pay for imported food is declining rapidly.



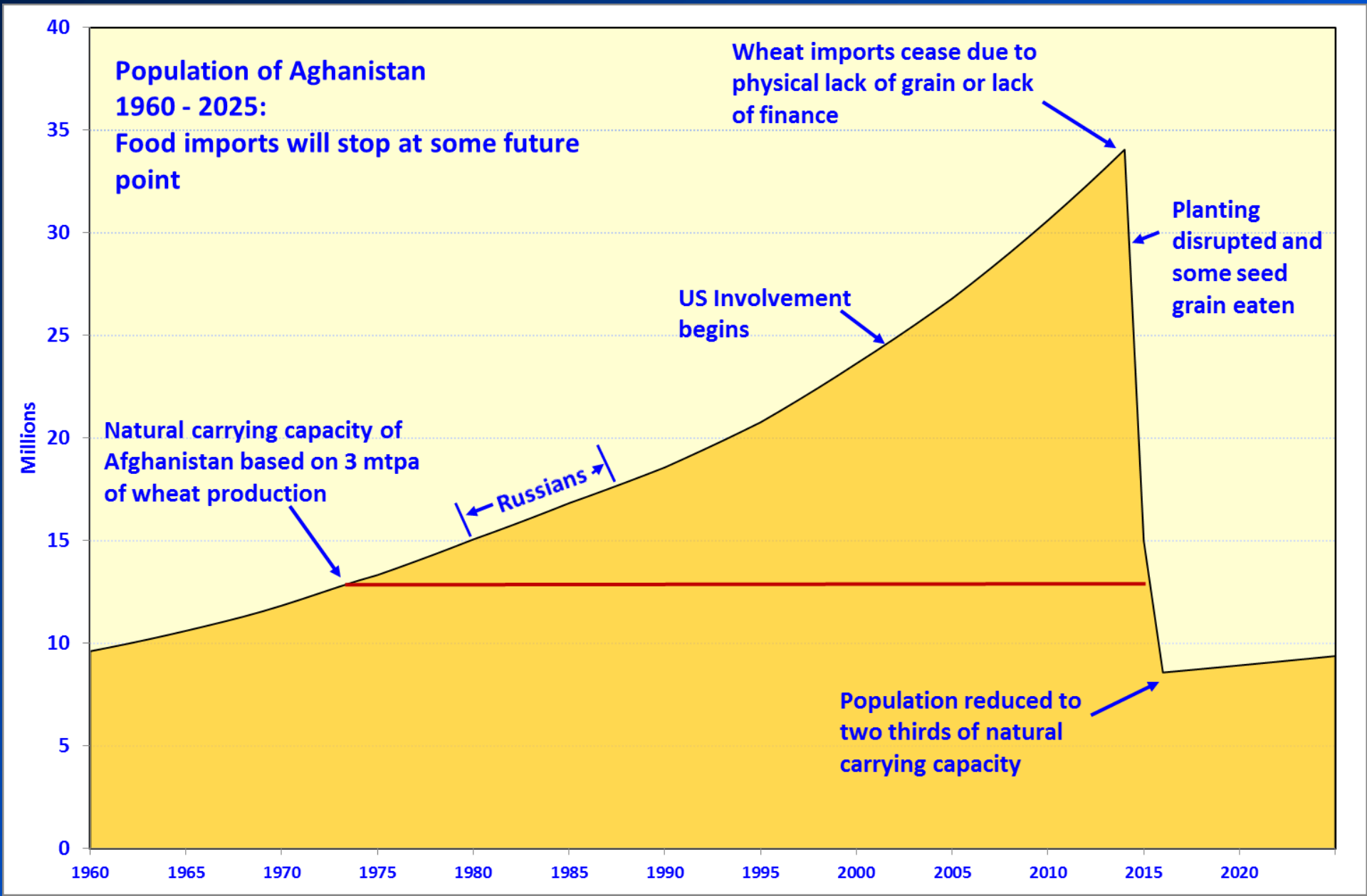
And these islands come up for grabs.



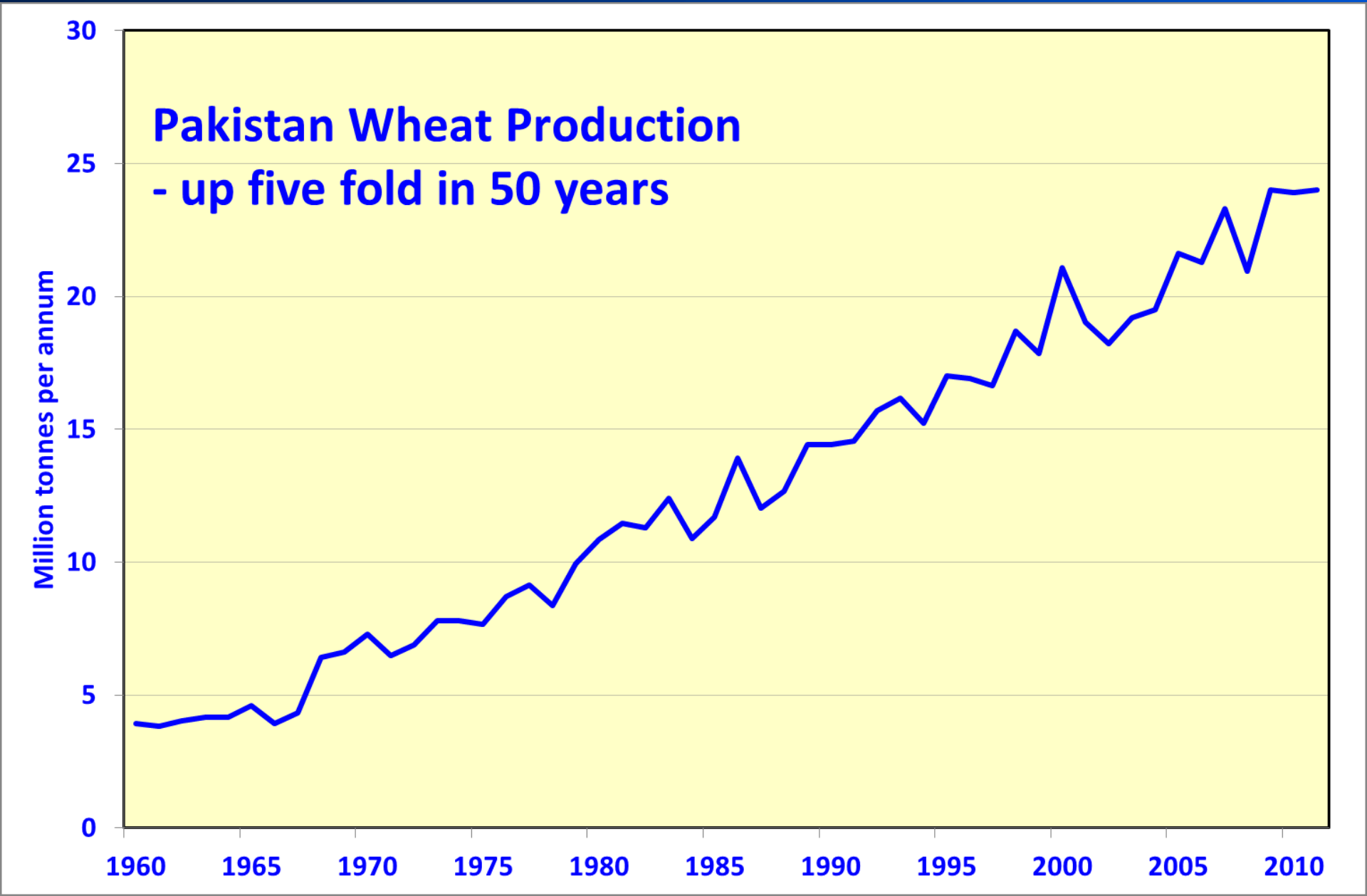
Afghanistan – another basket case



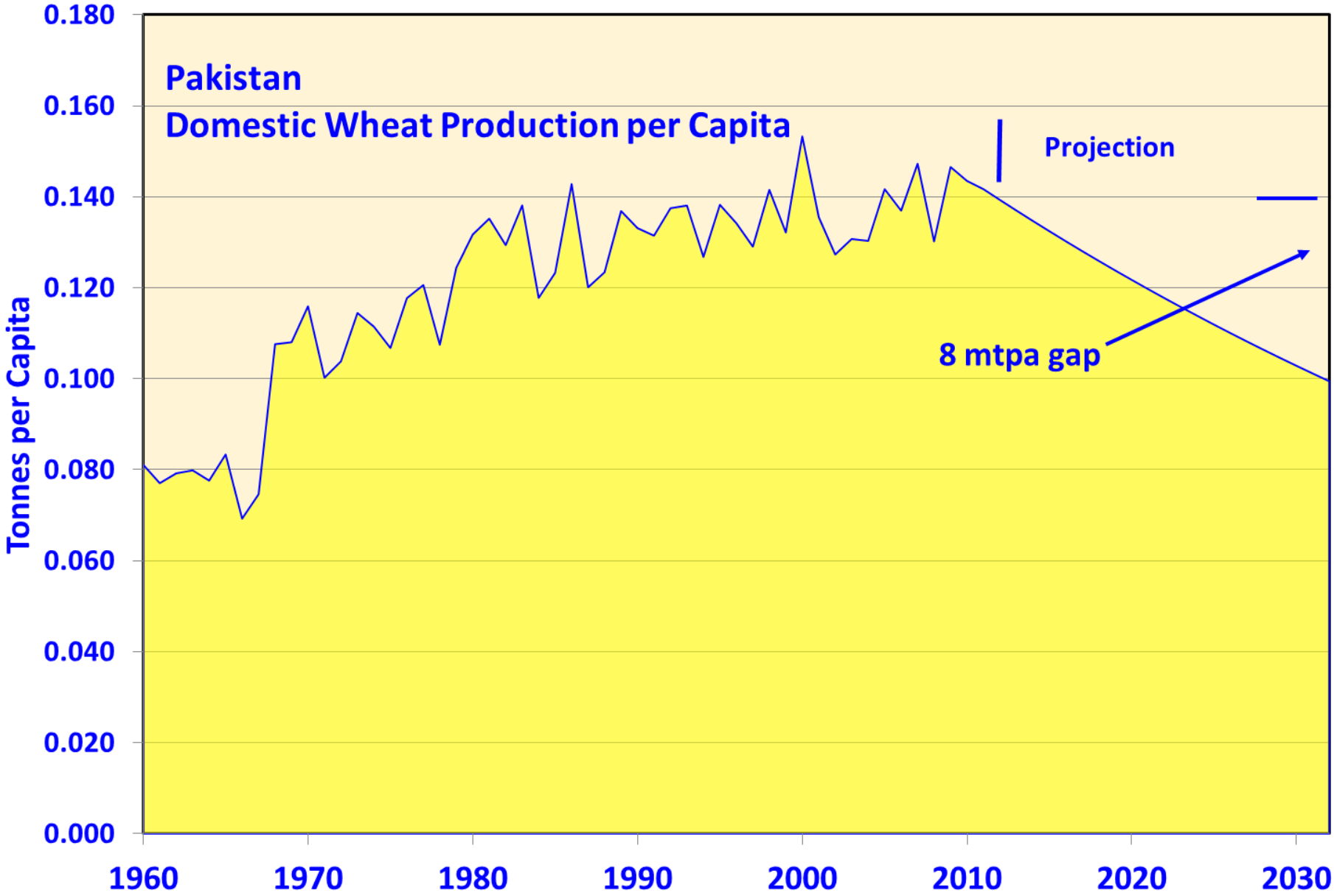
Afghanistan – something like this will happen.



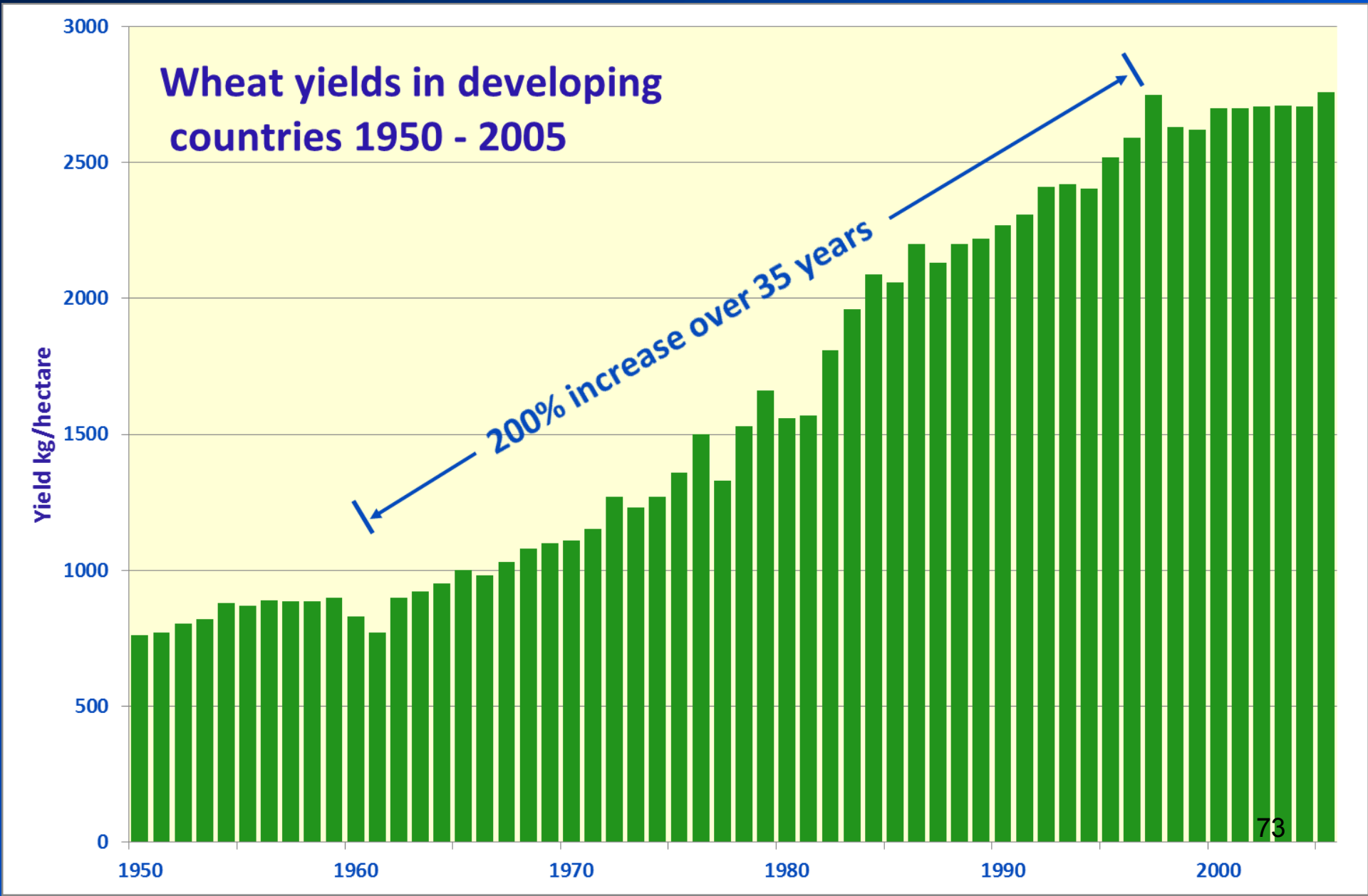
Pakistan


Pakistan Wheat Production
- up five fold in 50 years
Million tonnes per annum
30
25
20
15
10
5
0
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010

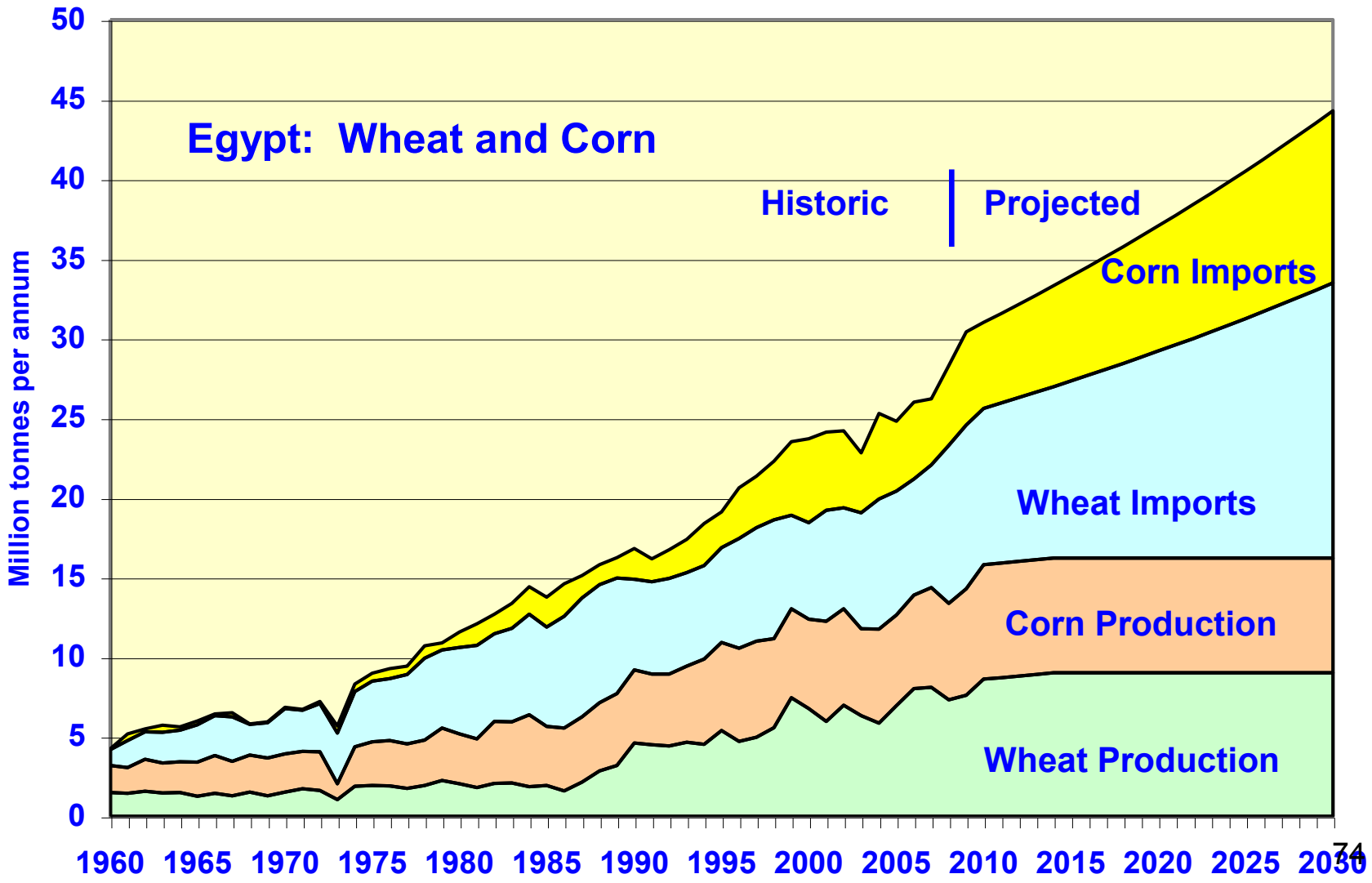
If population growth keeps going



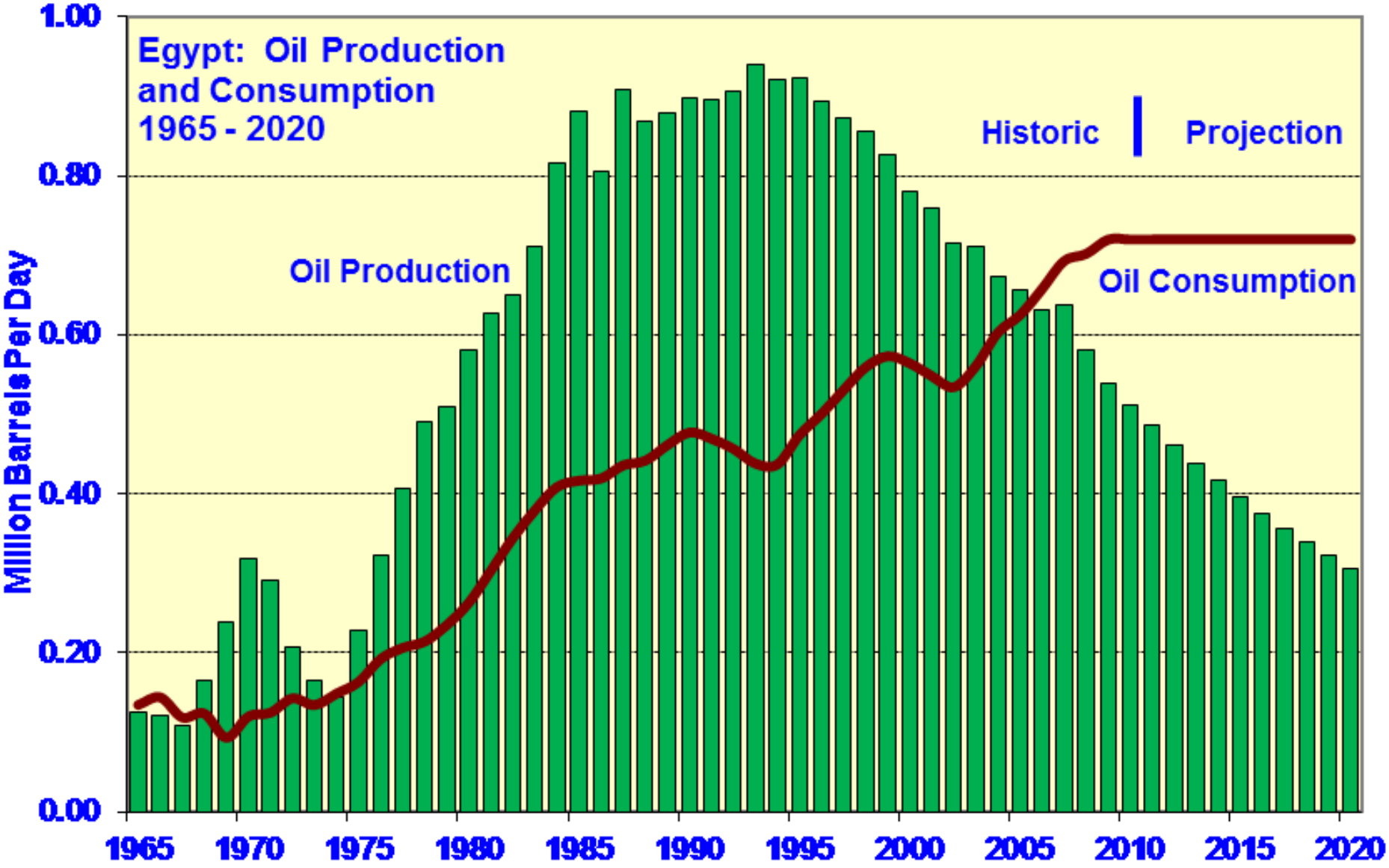
Wheat Yields plateaued from 1996.



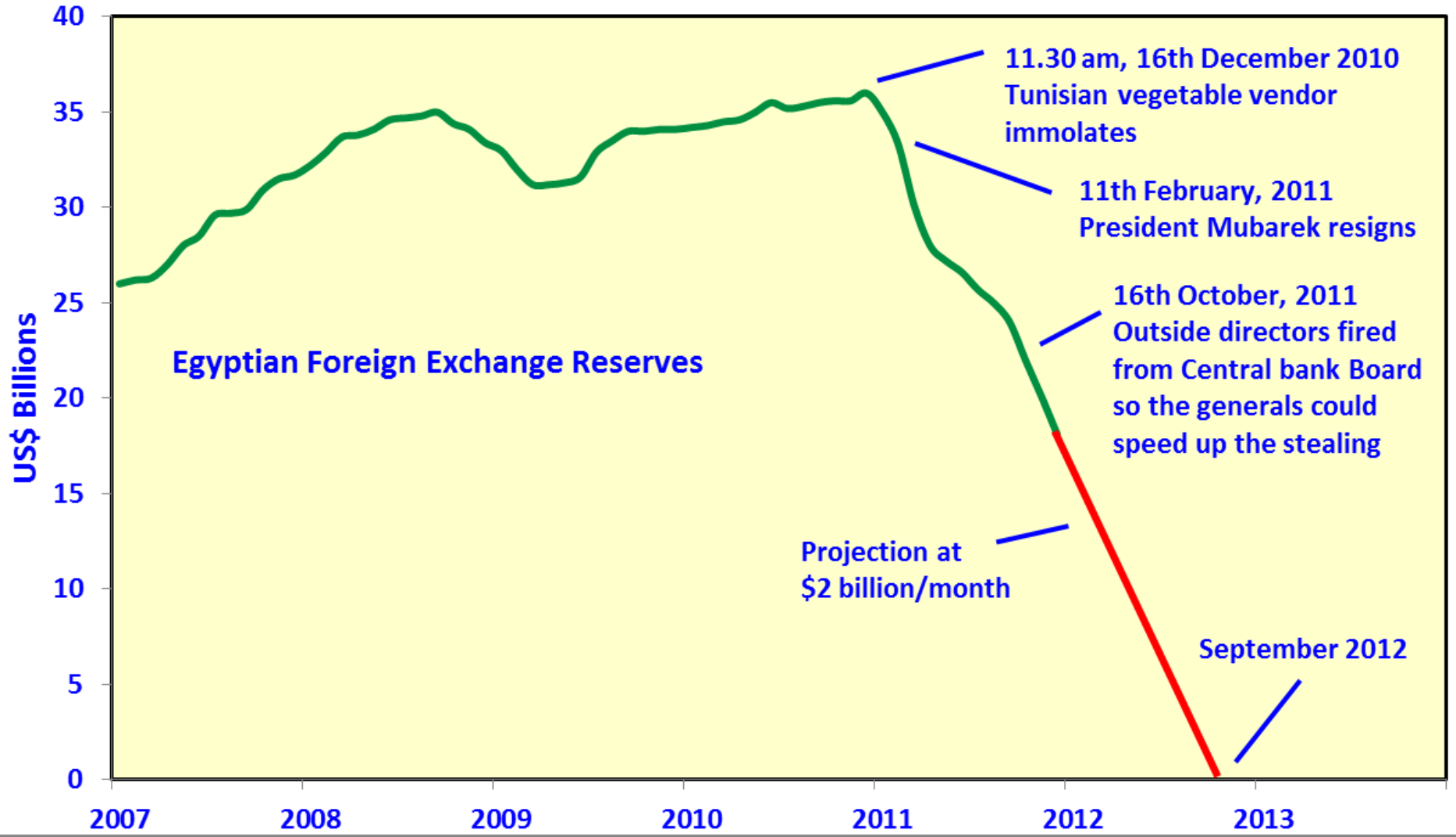
By 2030, Egypt will be importing twice as much grain as it grows.



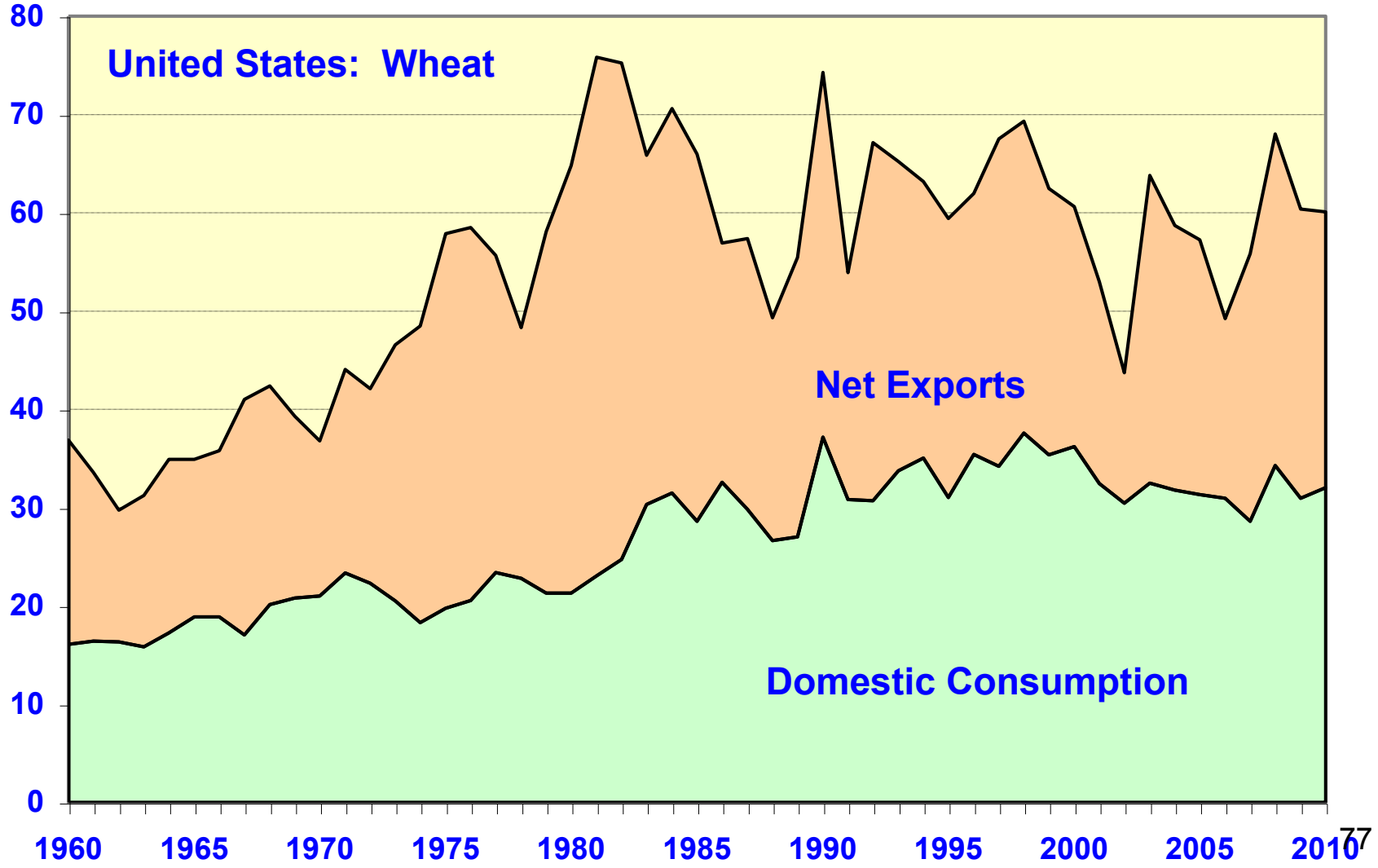
Fuel is also subsidised in Egypt - the Muslim Brotherhood will have a hard time balancing the budget.



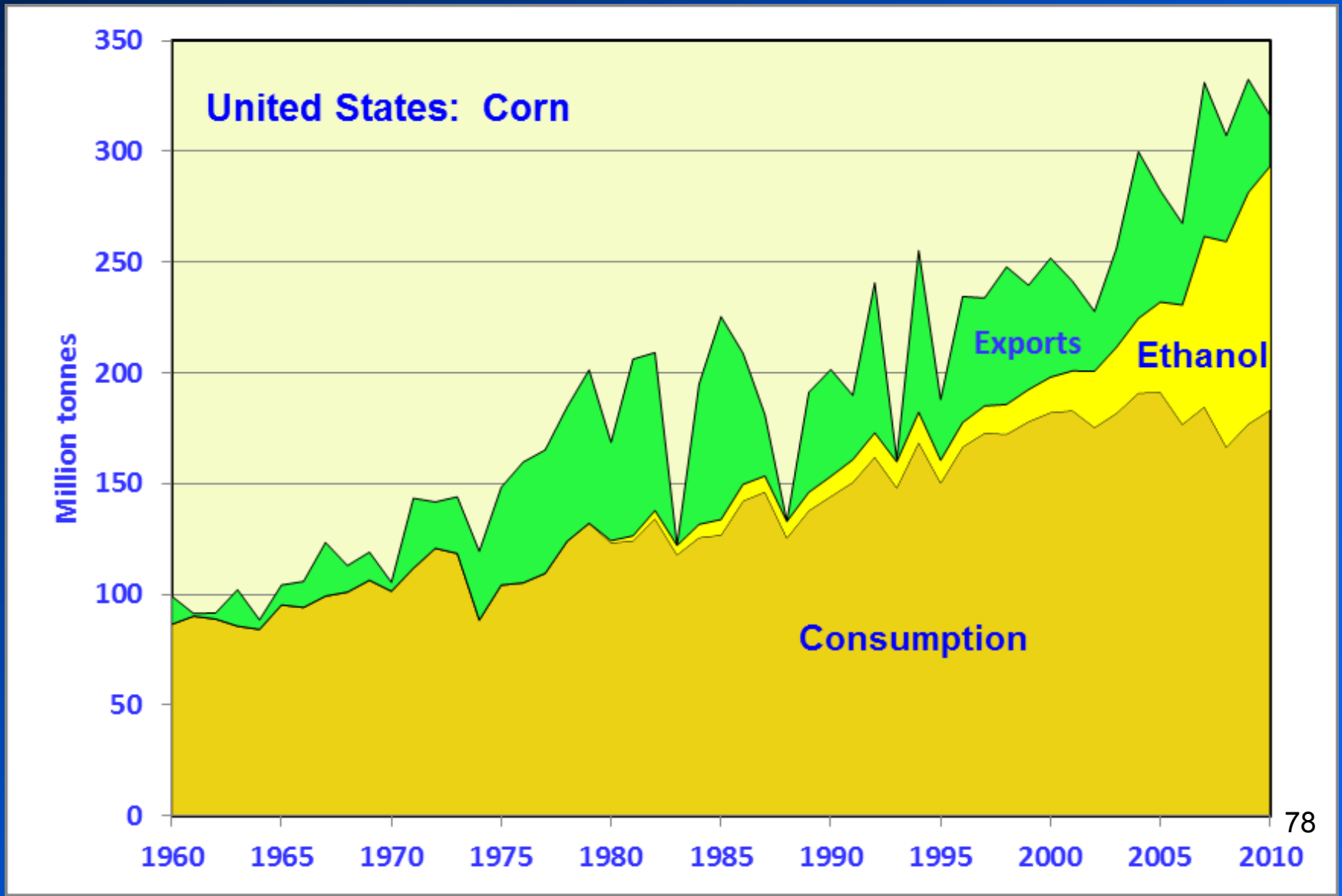
Goodbye Egypt – mass starvation begins in September



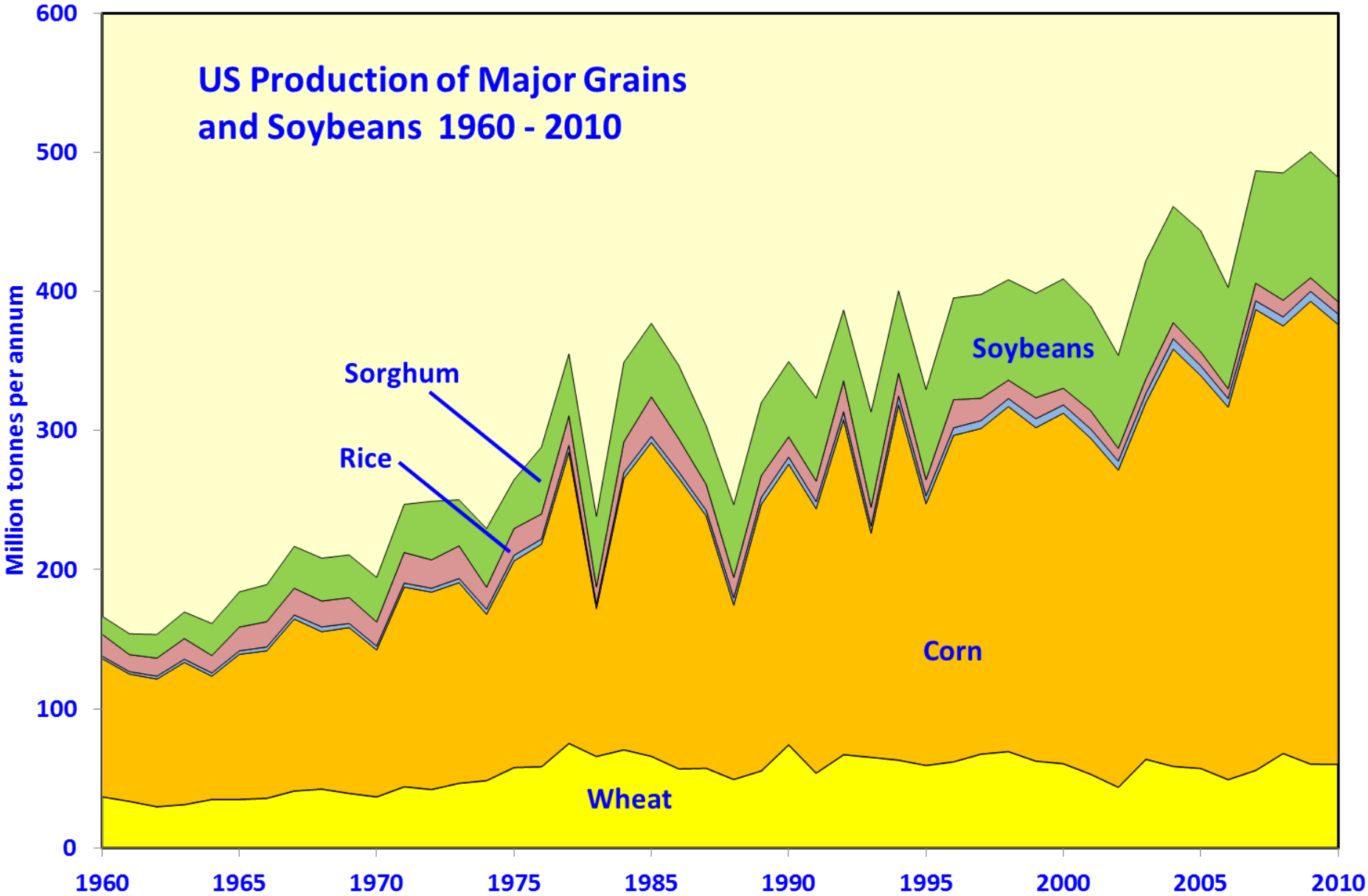
By 2030, Egypt will be needing the equivalent of 100% of US wheat exports.



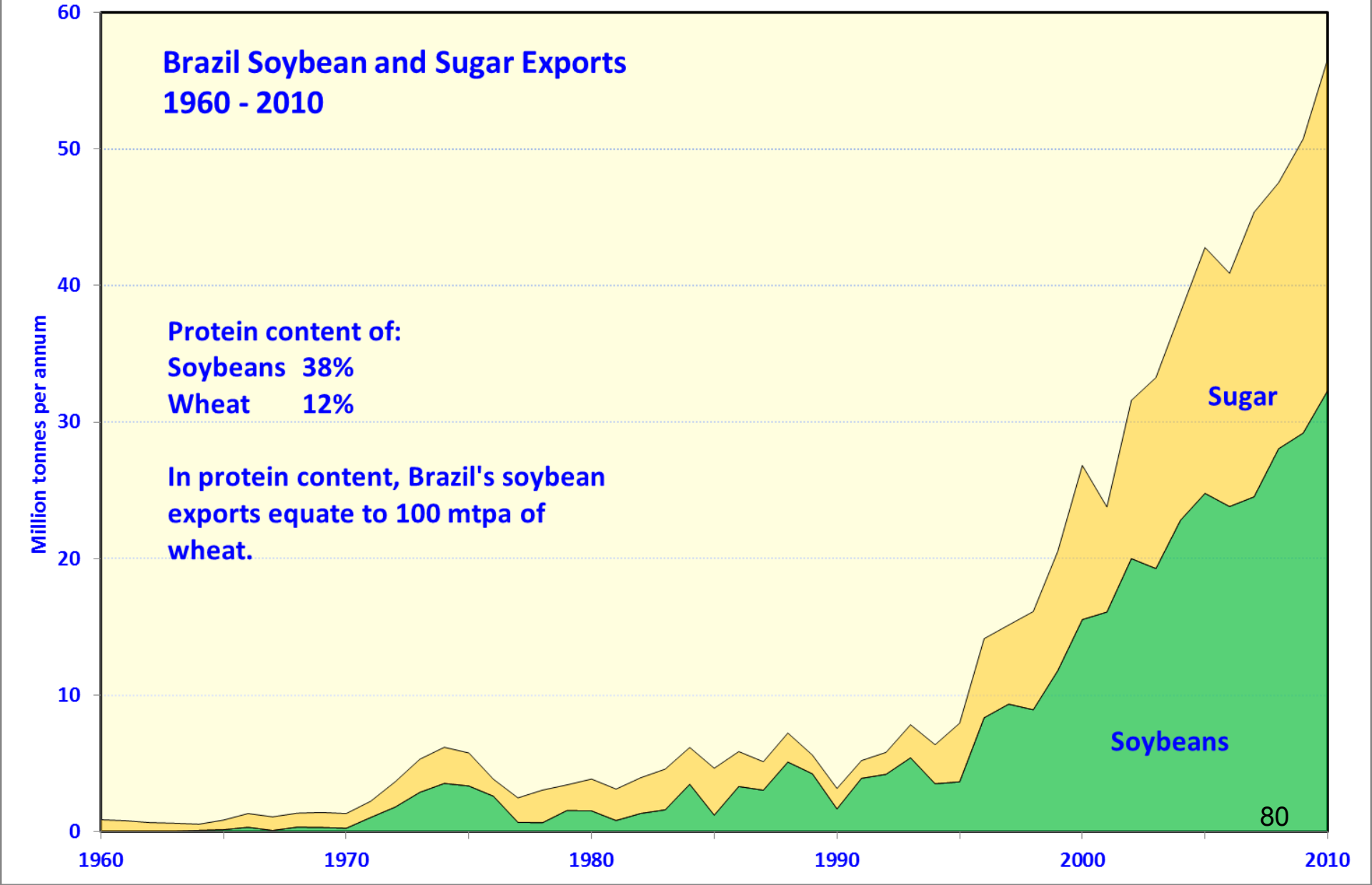
The mandated ethanol requirement has brought the future forward in terms of food scarcity.



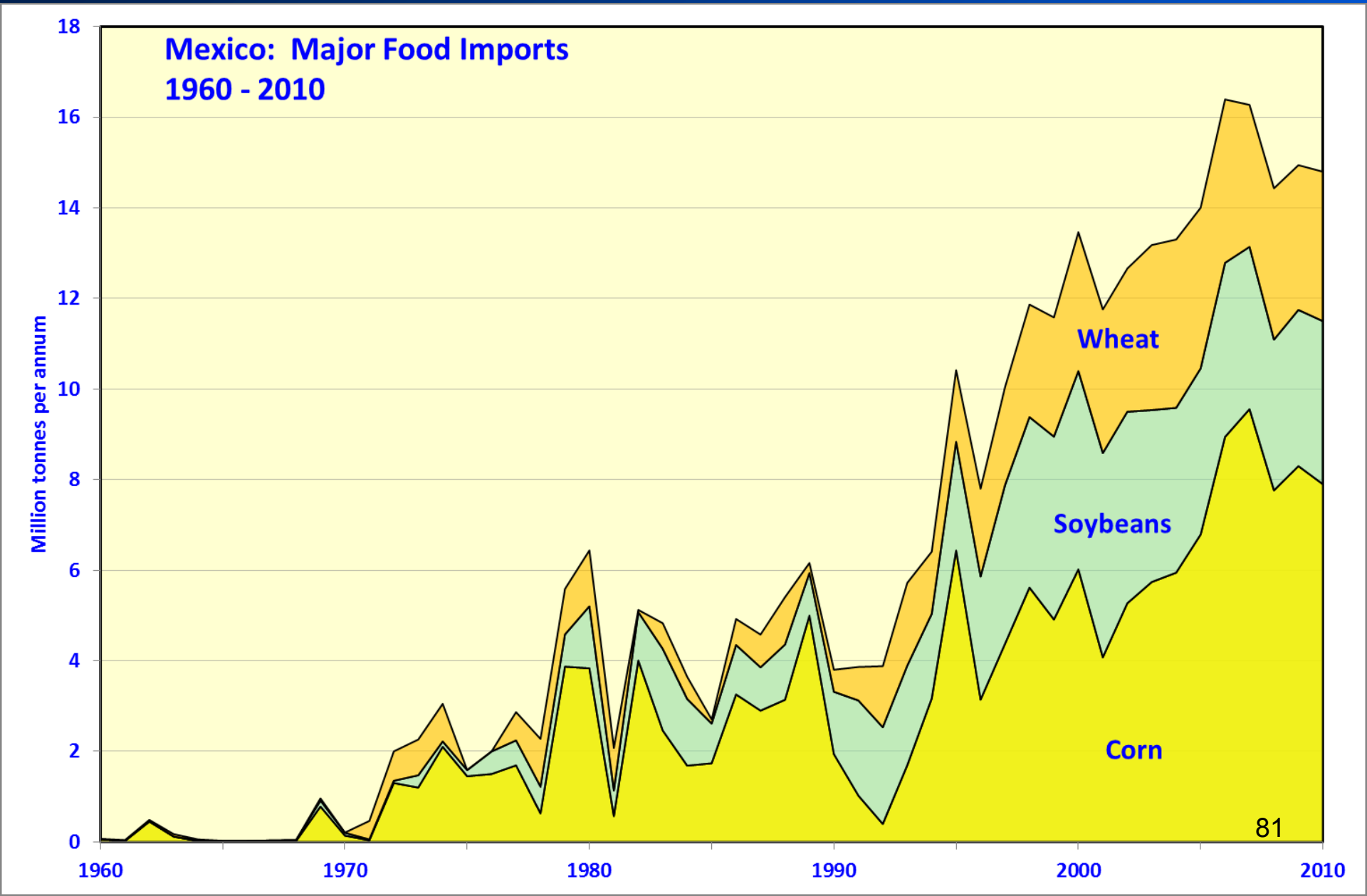
US Production could feed 1.2 billion vegetarians.



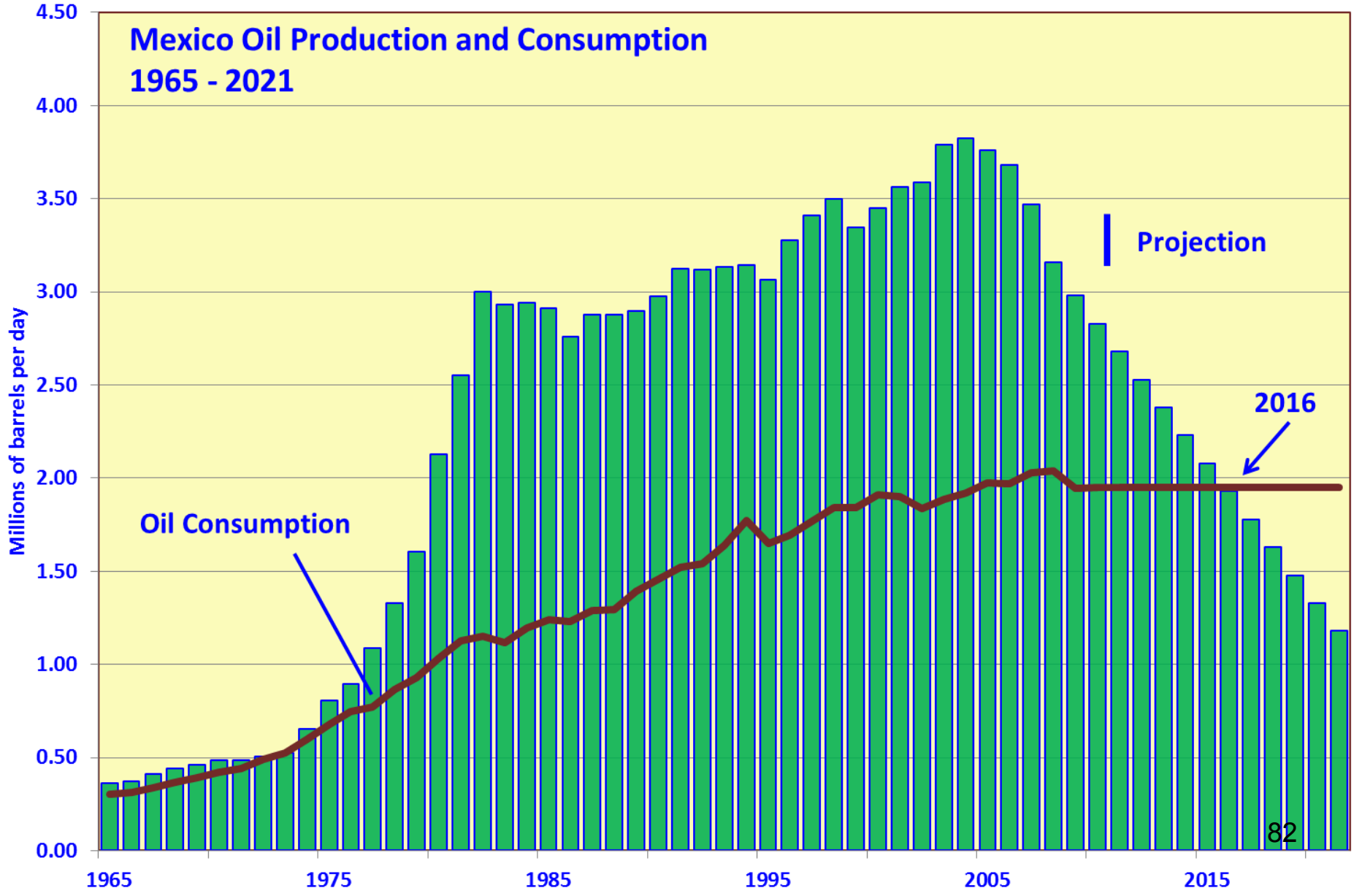
Brazil might outrun its population growth, but how much of the Amazon is left to clear?



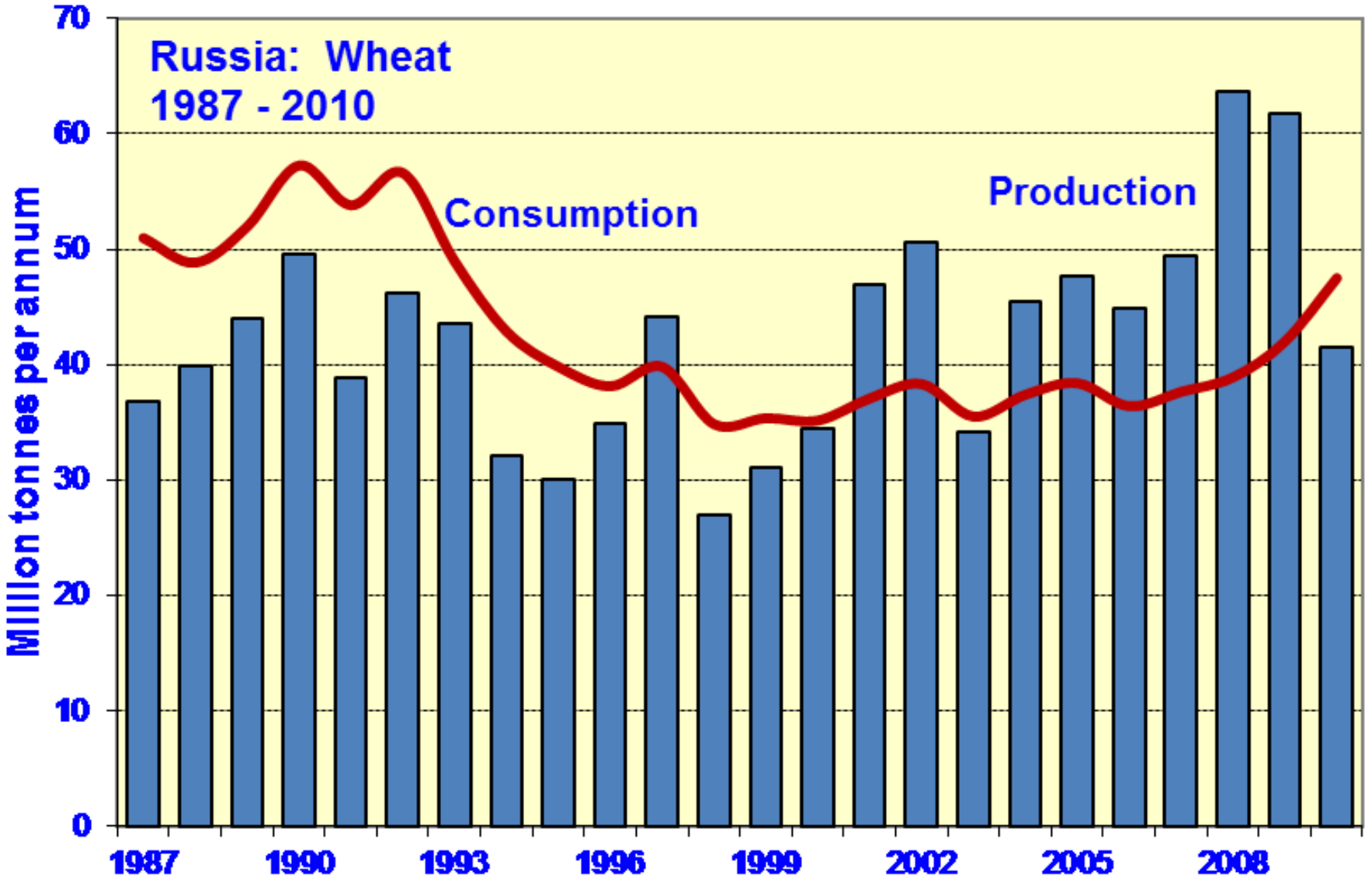
Mexico's population growth rate is down to 1.0% per annum.



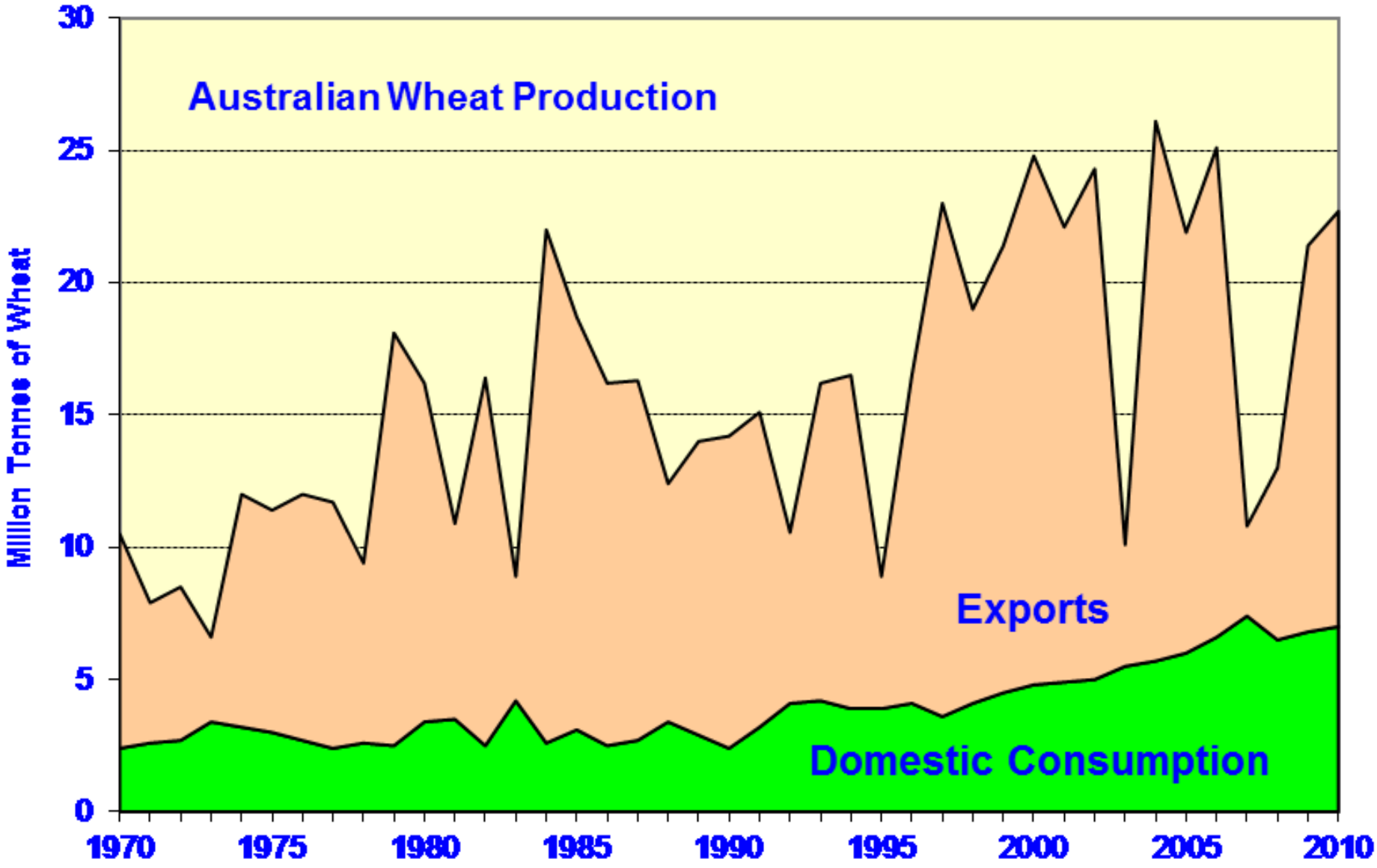
Though ability to pay is falling more rapidly.



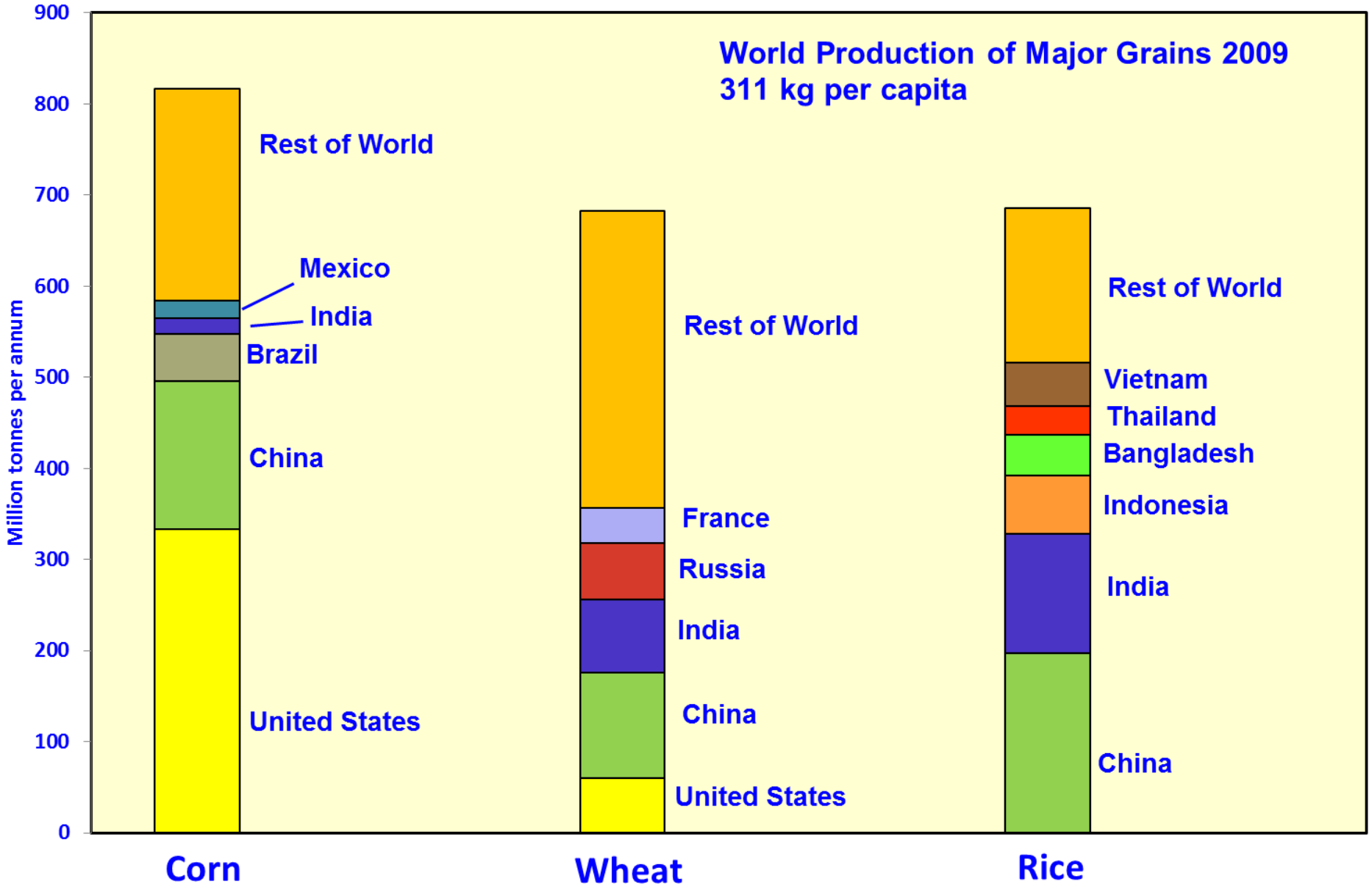
Russia struggles with weather events and a command economy.



Australia doesn't have much of a buffer.

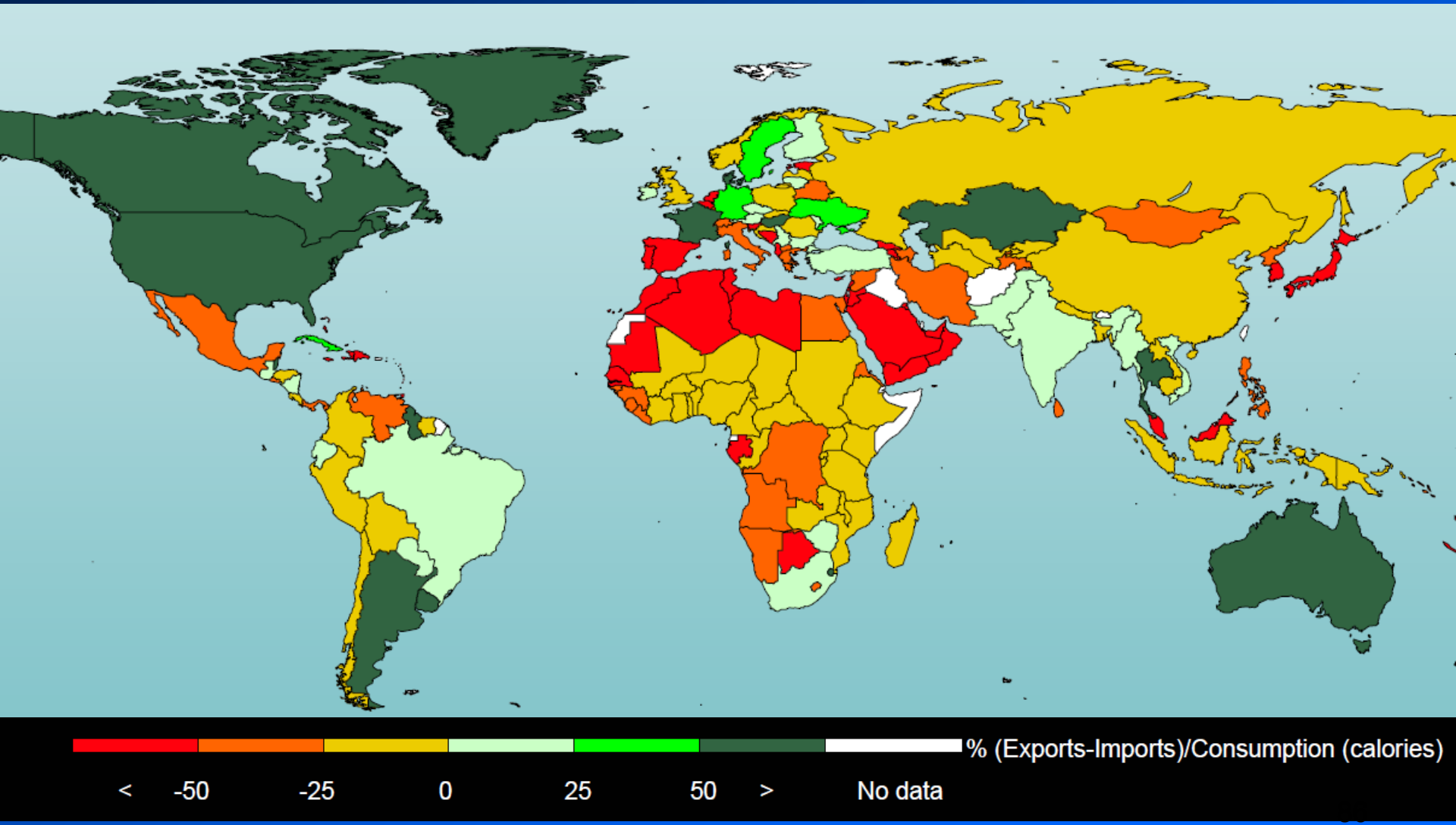


The total is about 2,200 million tonnes.



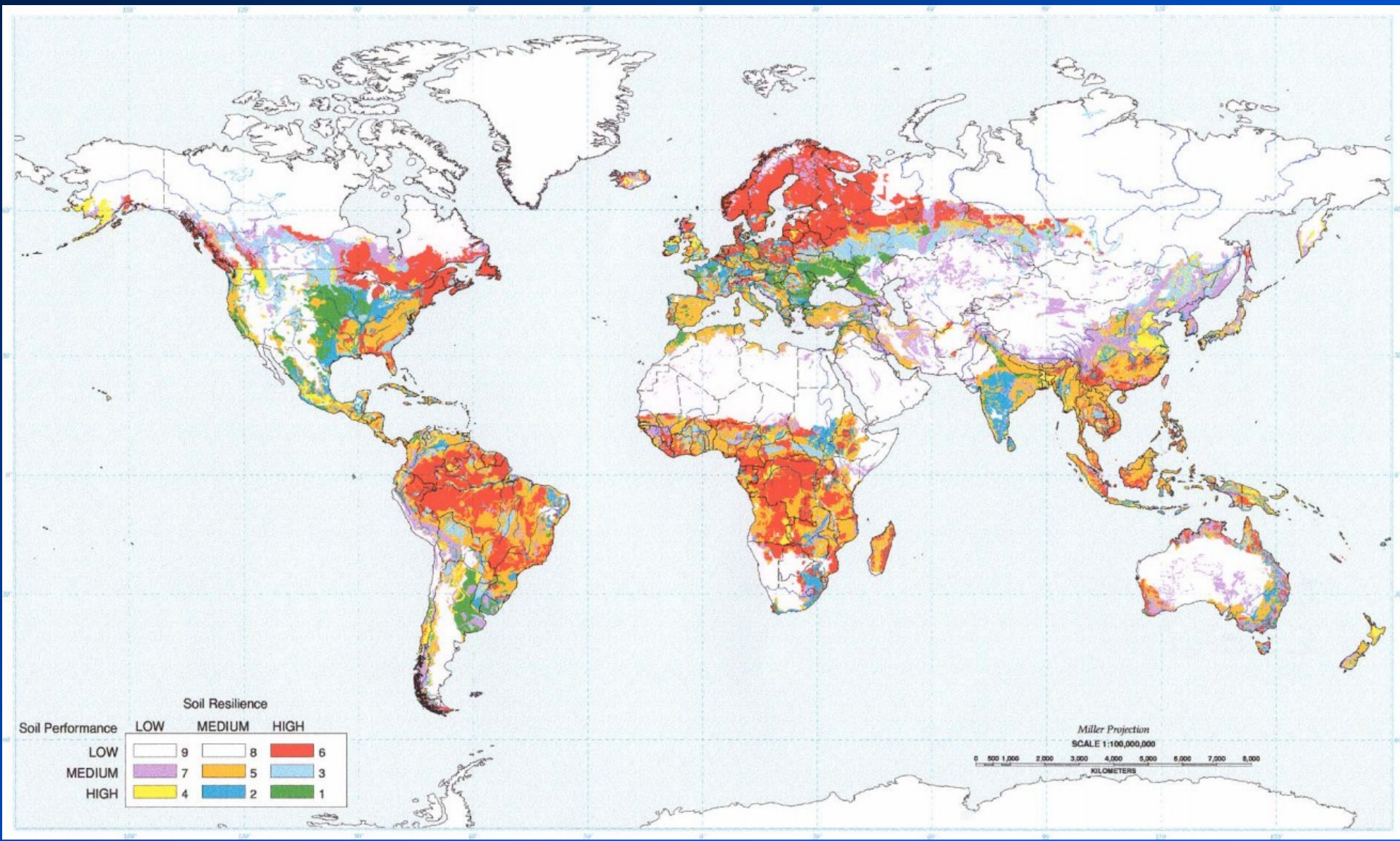
Net Trade in Food

2000 - 2002



Source: UN Food and Agriculture Organisation

Inherent Land Quality Assessment



Brazil will need a lot of fertiliser to remain productive.

Major Potential Sources of Increased Grain Production

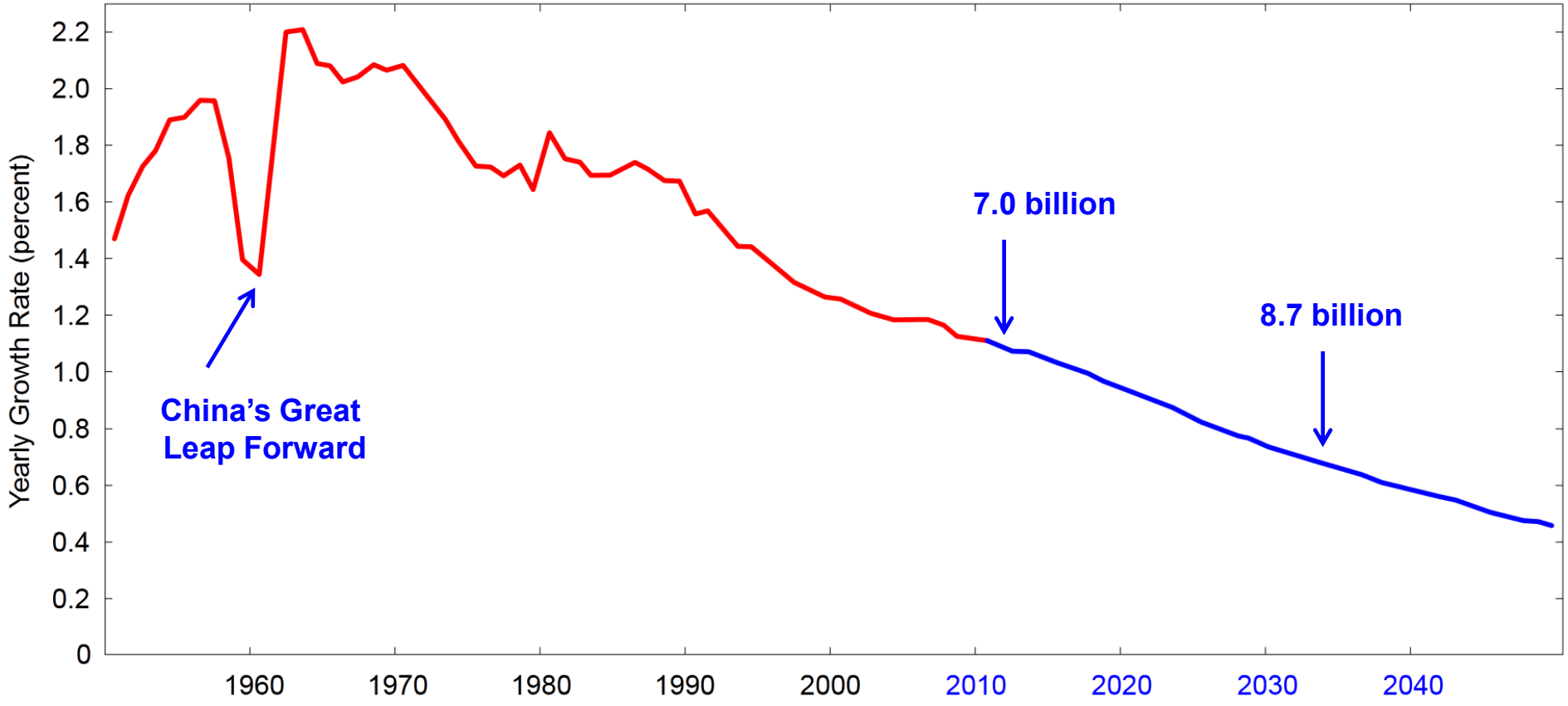
US – mandated ethanol increased corn production by 100 mtpa, total potential may be 200 mtpa.

Russia – 40 m ha currently growing nothing, possibly an extra 90 mtpa of wheat

Brazil – 190 m ha could be put under grain at a yield of 2 tonnes per ha for 380 mtpa of grain.

The total is 670 mtpa which might feed 1,675 million people at 400 kg per capita.

World Population Growth Rates 1950 - 2050



Russia currently imports 46% of its food – will require a big price signal to increase production.

Undeveloped Brazilian land is a long way inland – will require higher prices to support the road and rail buildout.

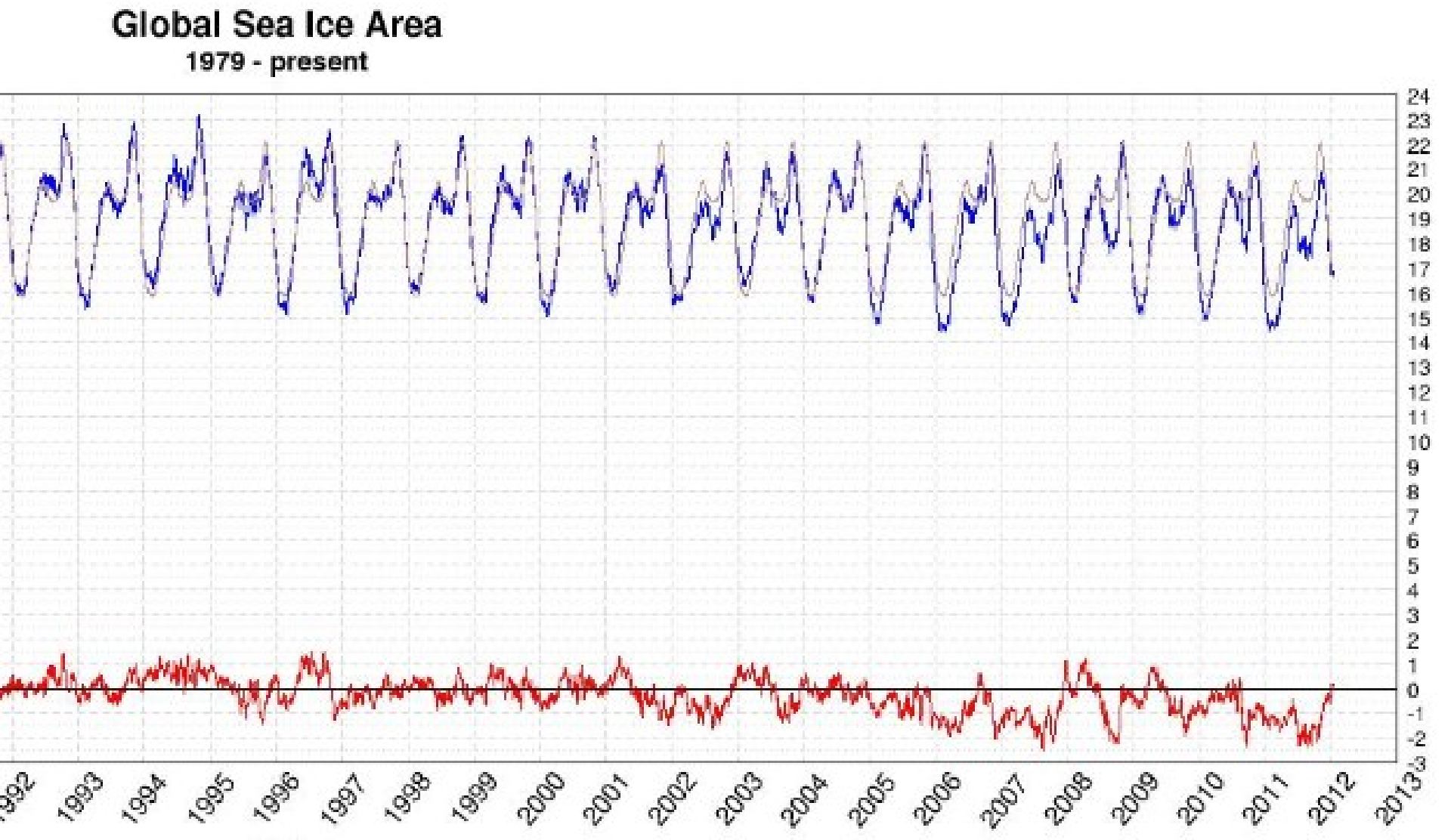
The Fourth Horseman

When the Lamb opened the fourth seal, I heard the voice of the fourth living creature say, "Come and see!" I looked and there before me was a pale horse! Its rider was named Death, and Hell was following close behind him. They were given power over a fourth of the earth to kill by sword, famine and plague, and by the wild beasts of the earth.

Revelation 5:7-8

Death:
Climate – the 210 year cooling cycle

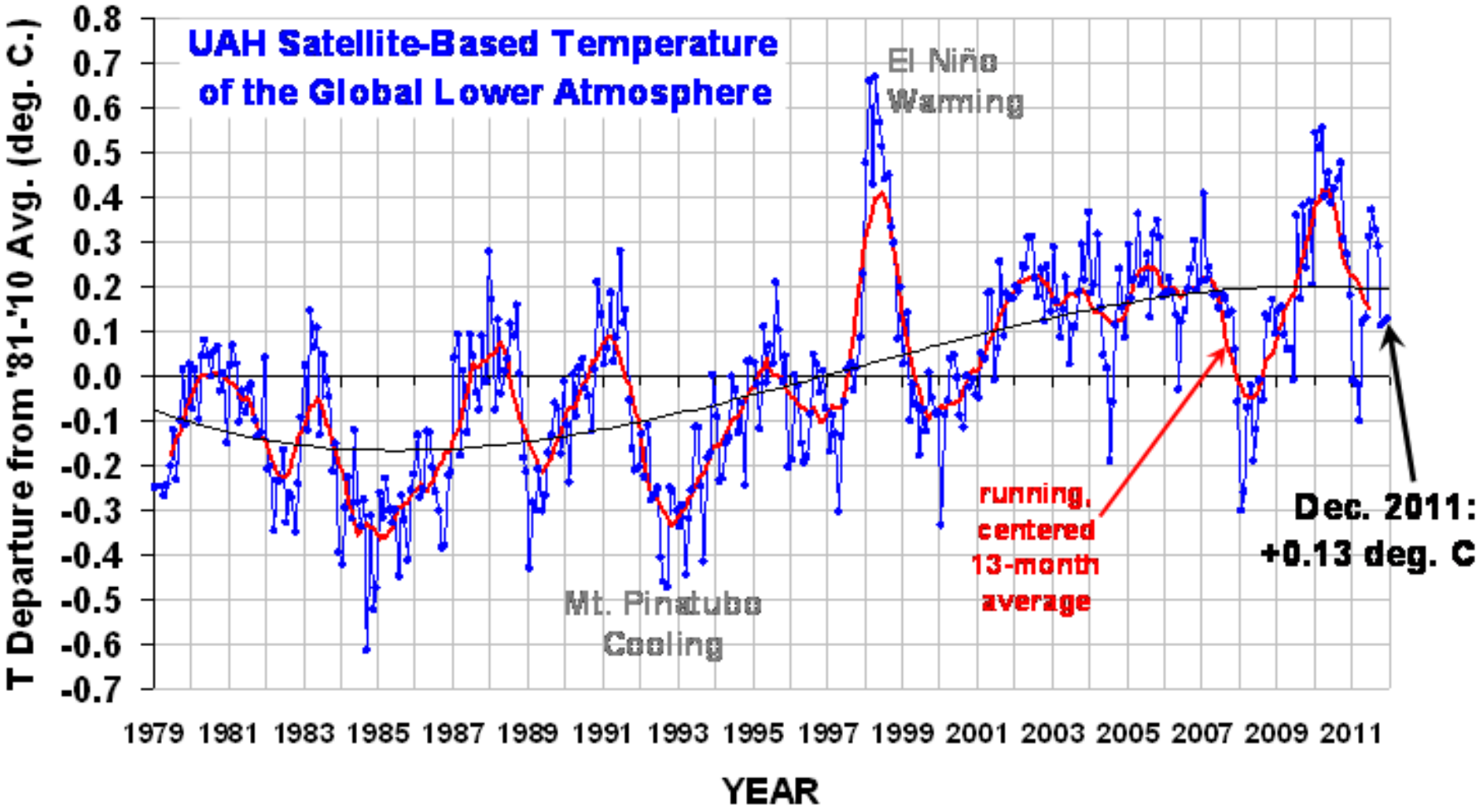
Climate: First of all, the world isn't warming.



Source: Cryosphere Today as at 11th January 2012

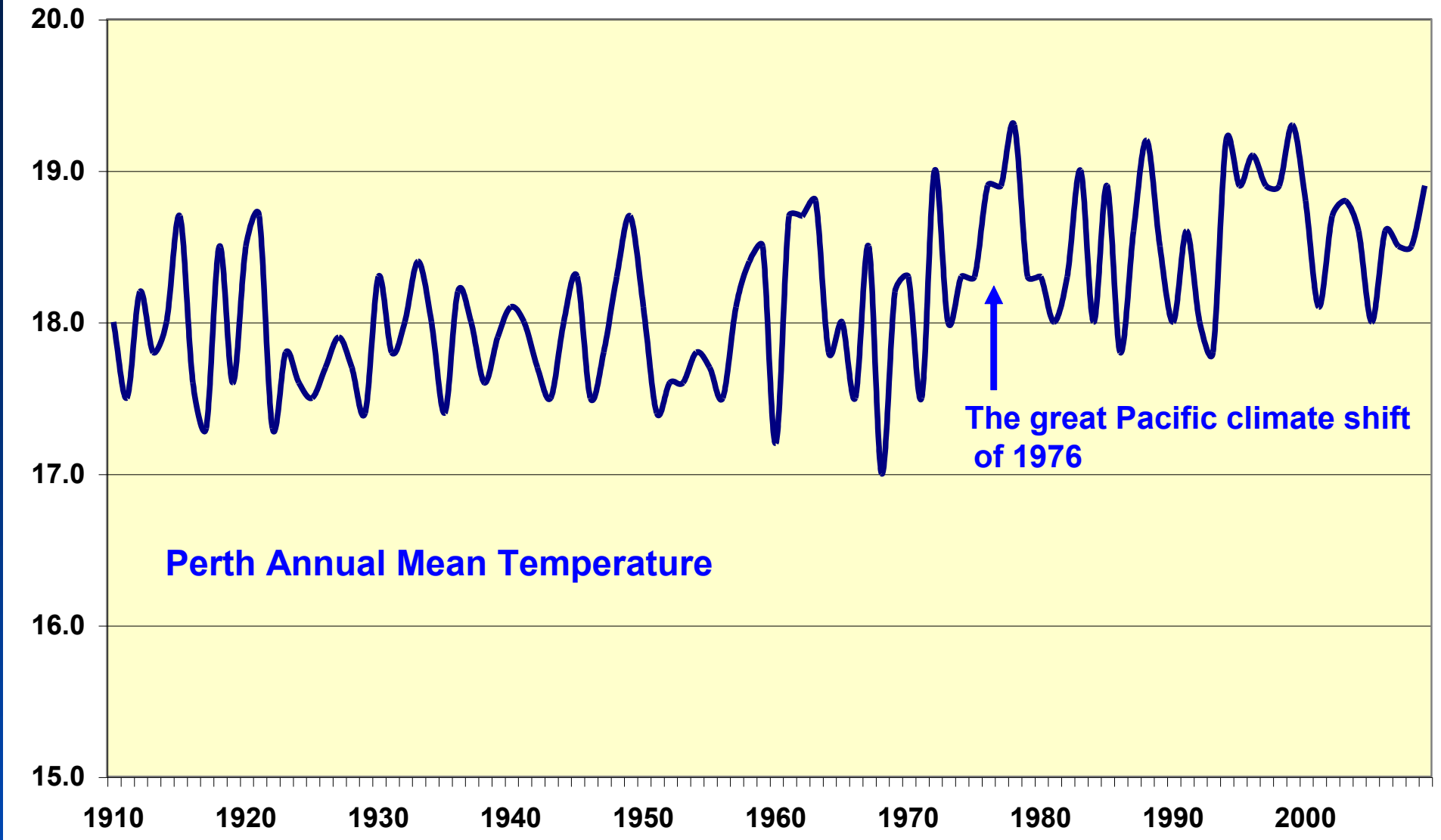
No change over 33 years

The temperature of the planet is the same as it was 30 years ago.



The satellite temperature record from www.drroyspencer.com

Perth 1910 - 2009

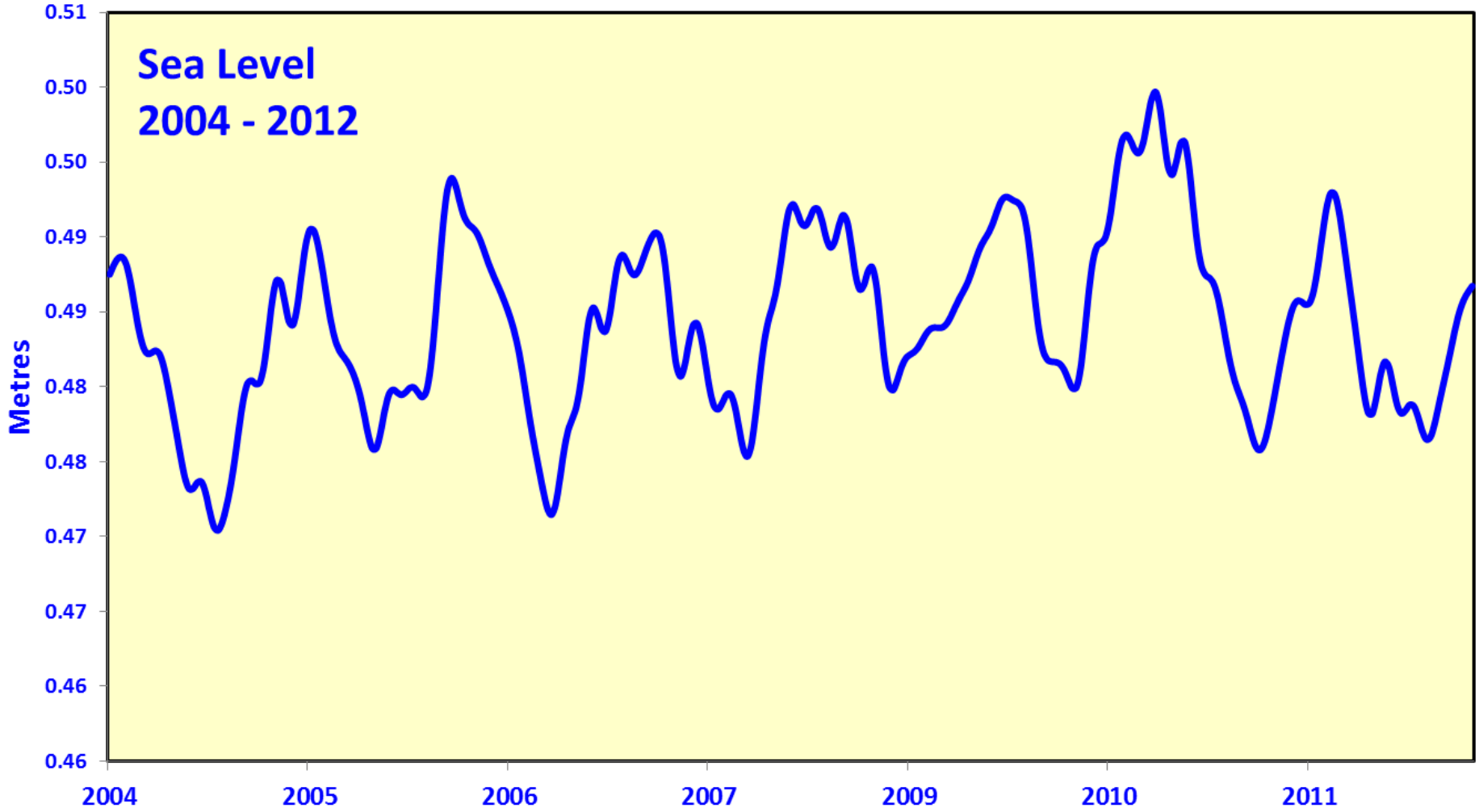


Perth's temperature has not changed for 40 years.

Ocean acidification – the last refuge of the global warming scoundrel

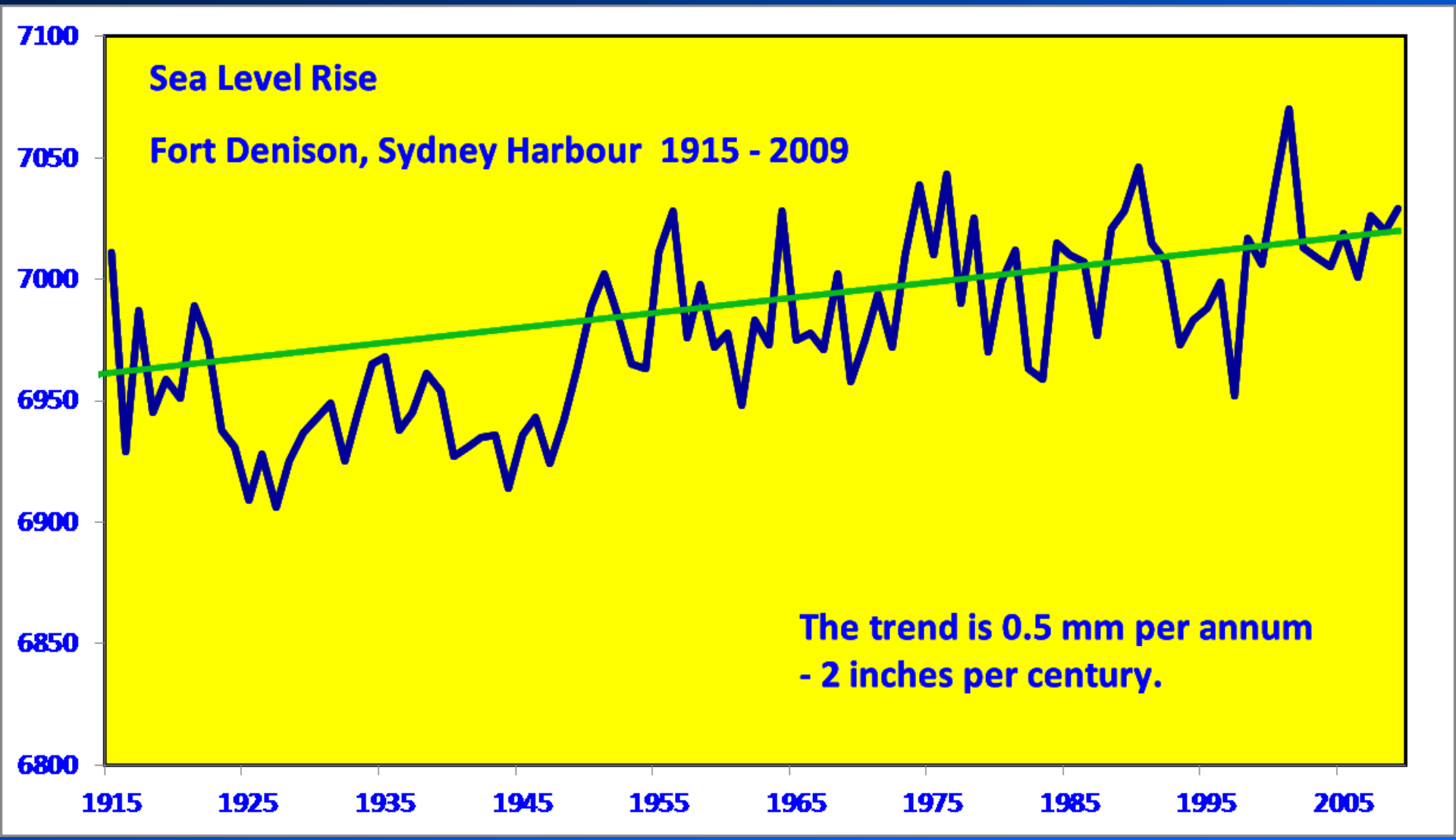
Coral reef and bubbling carbon dioxide, Dobu Island, PNG

Sea level rise – the second last refuge

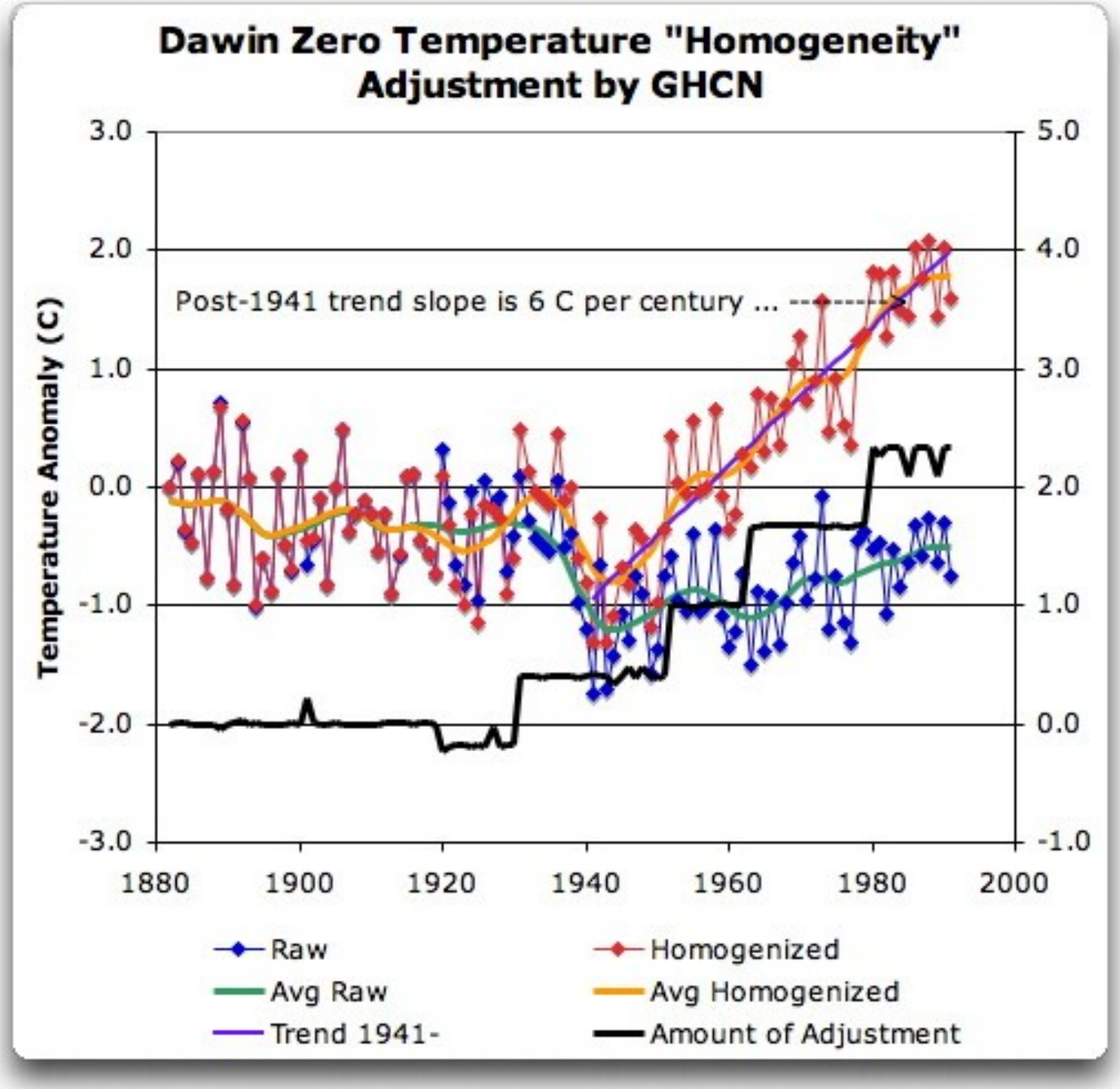


As measured by the Enviosat satellite

Sea level - 100 years in Sydney



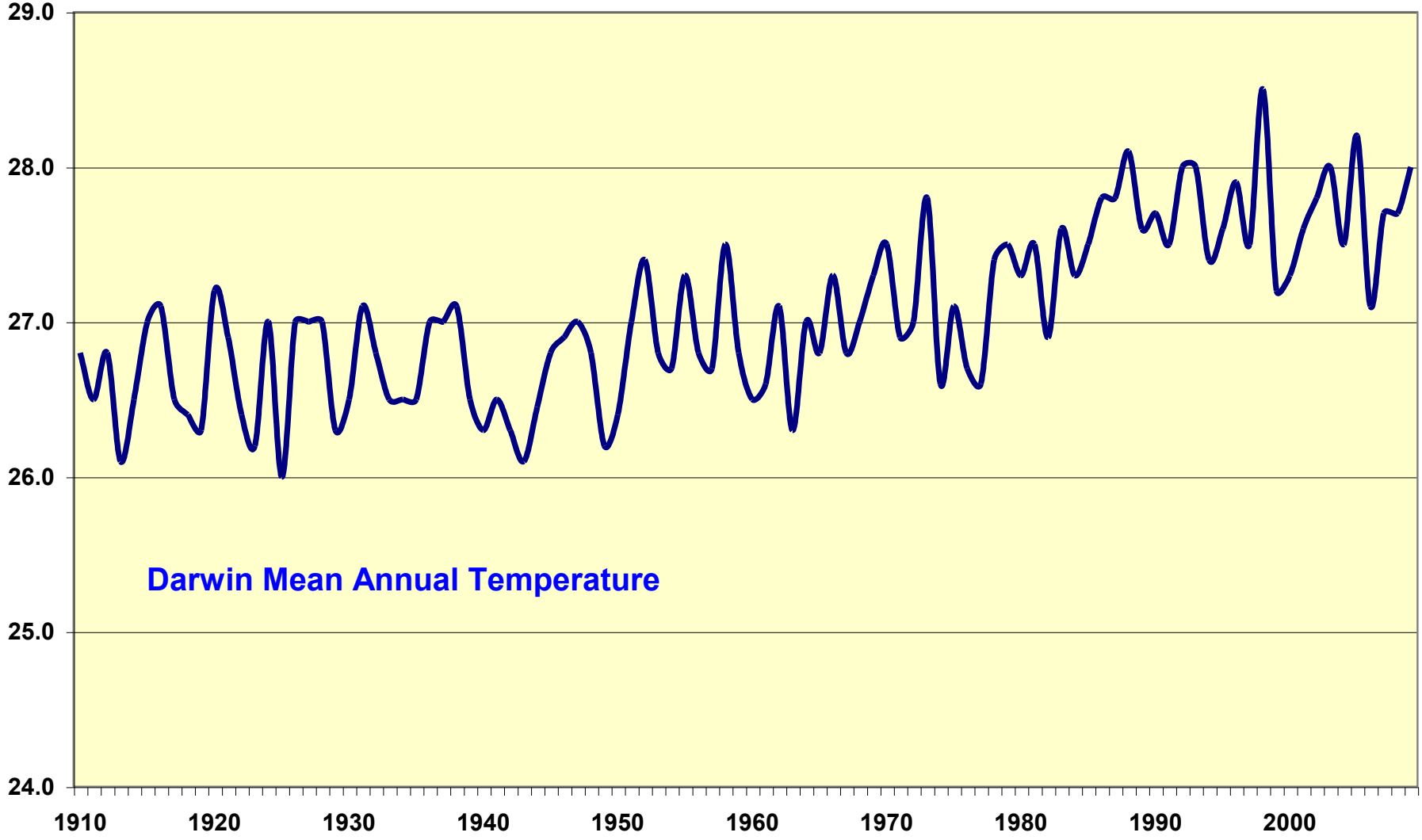
Human hair is 0.1 mm thick.



What the warmers did to Darwin – added 2.5° over 60 years

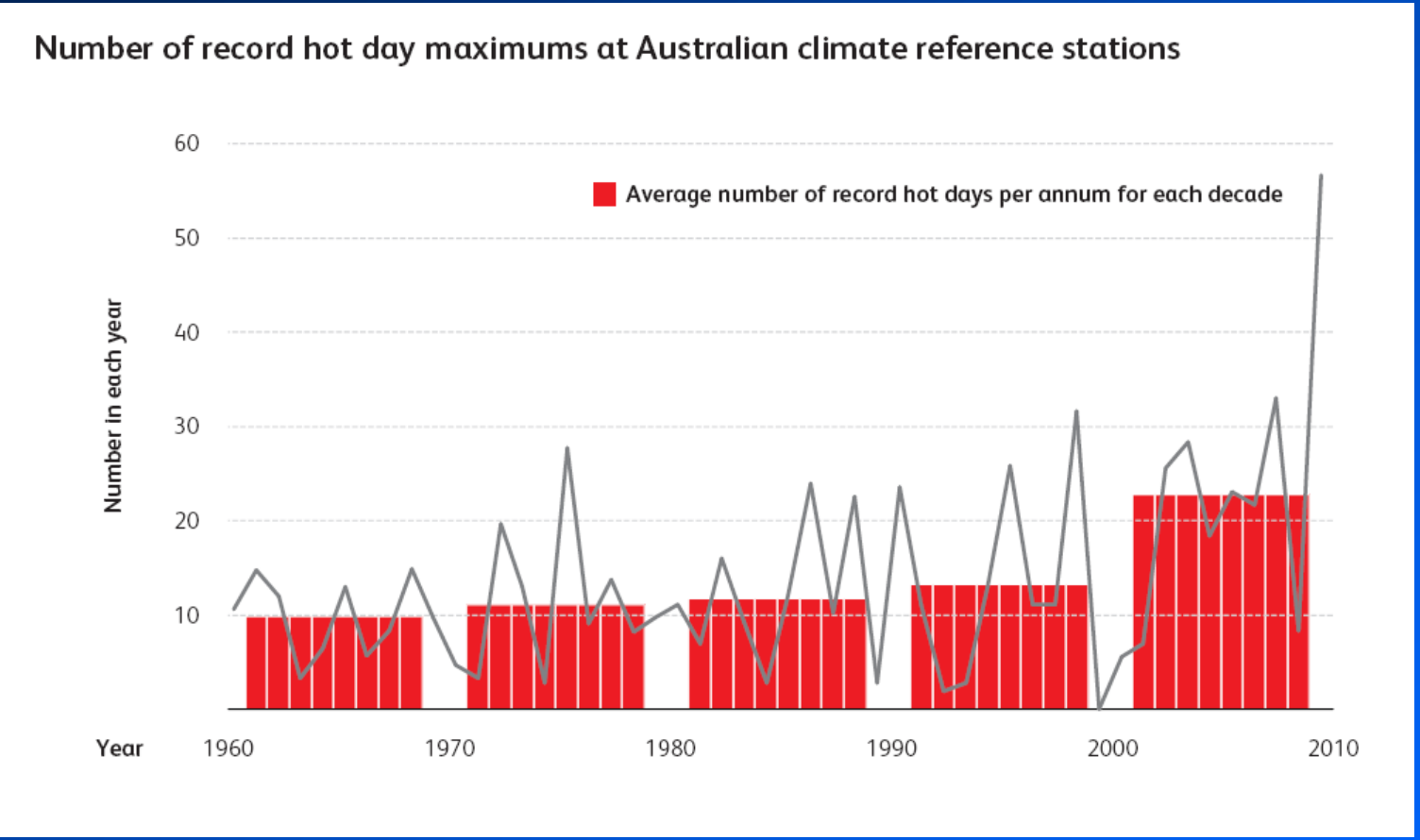
Source: http://wattsupwiththat.com/2009/12/08/the-smoking-gun-at-darwin-zero/

The Bureau of Meteorology added 1.7° to Darwin's Temperature Record – lying bastards



The data has been manipulated to suit global warming theory.

The Bureau of Meteorology and the CSIRO collude in lying.

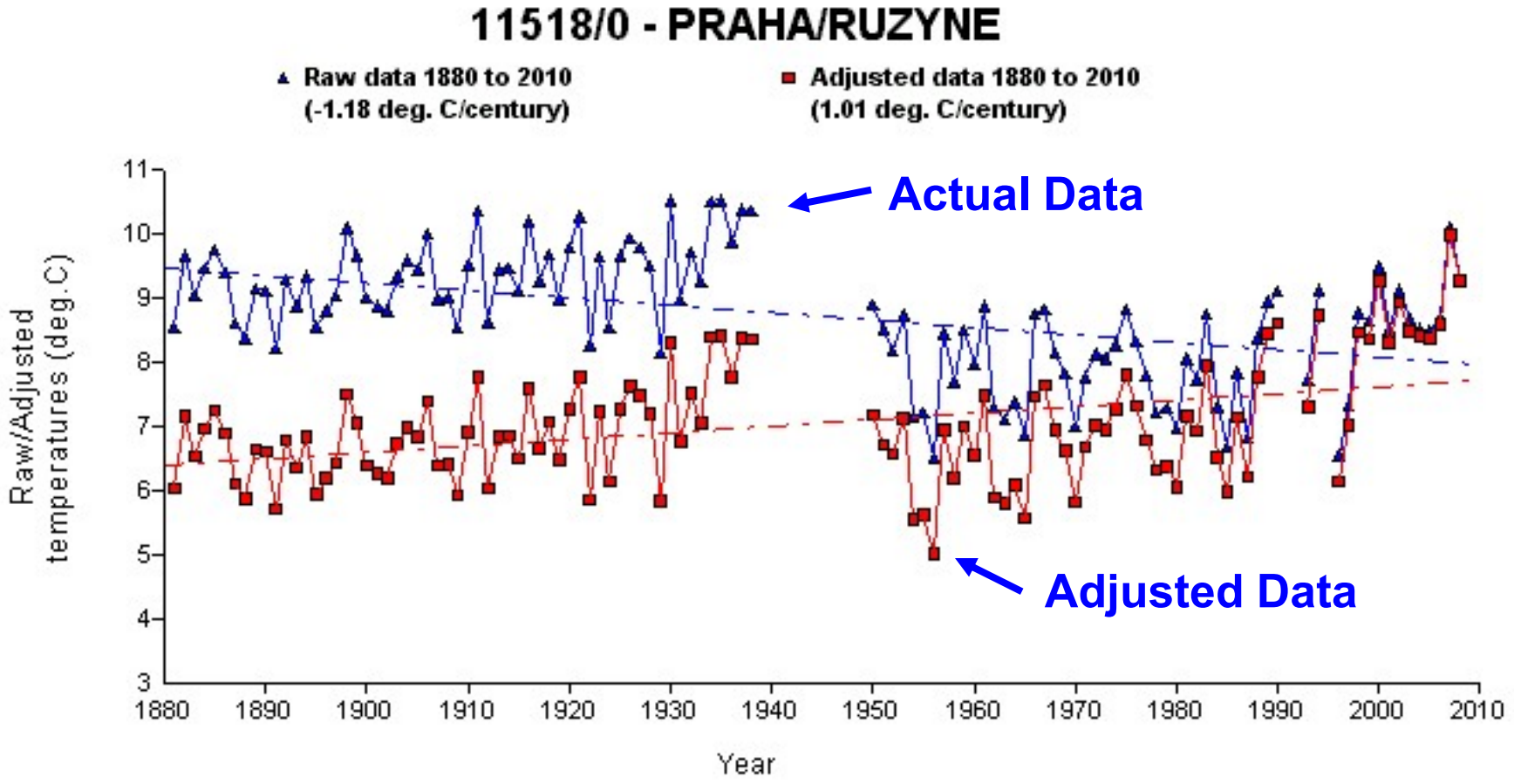


With over 100 years of data, why do the graphs start in 1960?

-It is the only way they could get a warming trend.

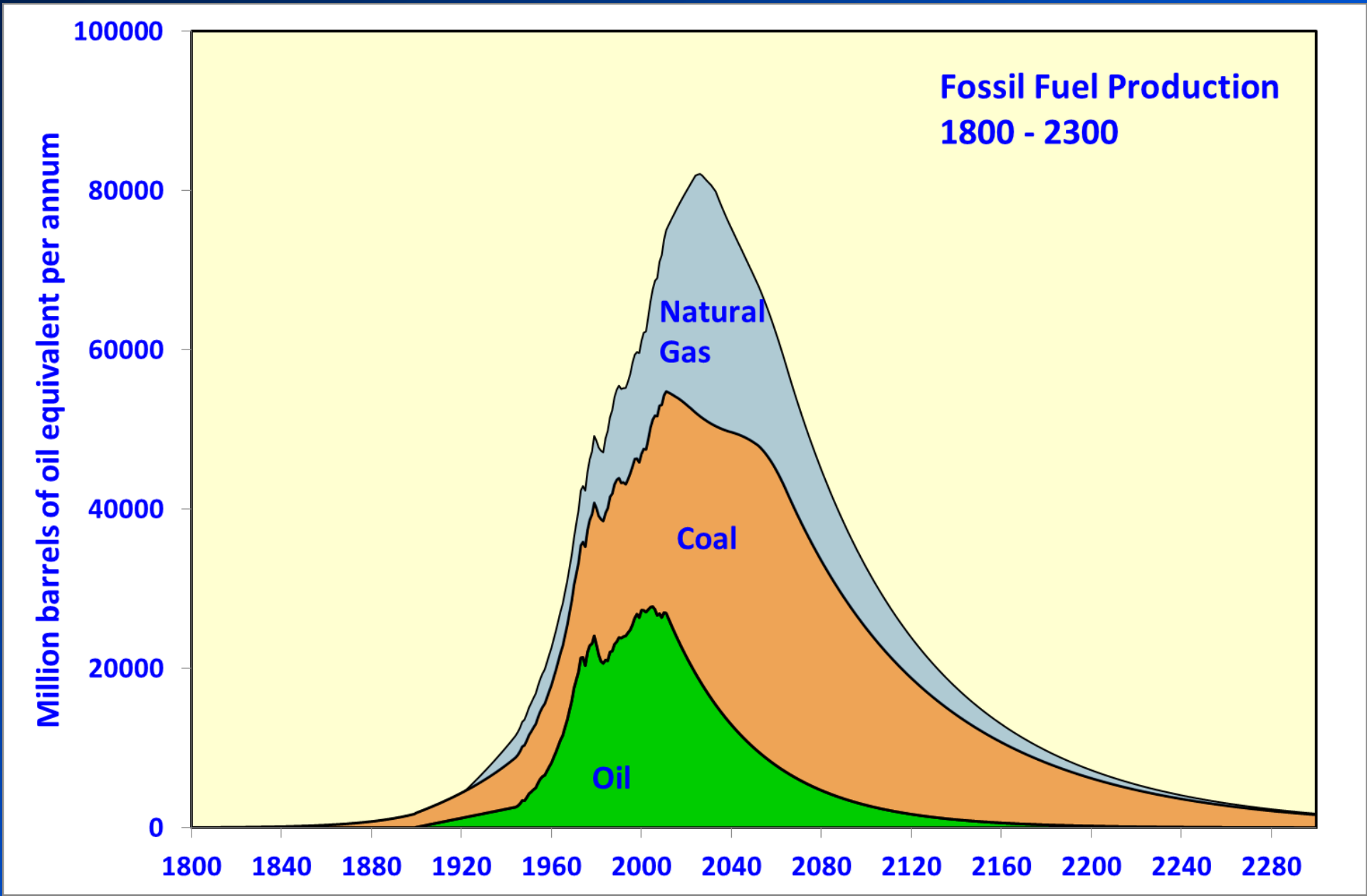
-To quote Oliver Cromwell, the CSIRO and the BOM "are a pack of mercenary wretches, and would like Esau sell your country for a mess of pottage".

Faking Prague's Temperature Record

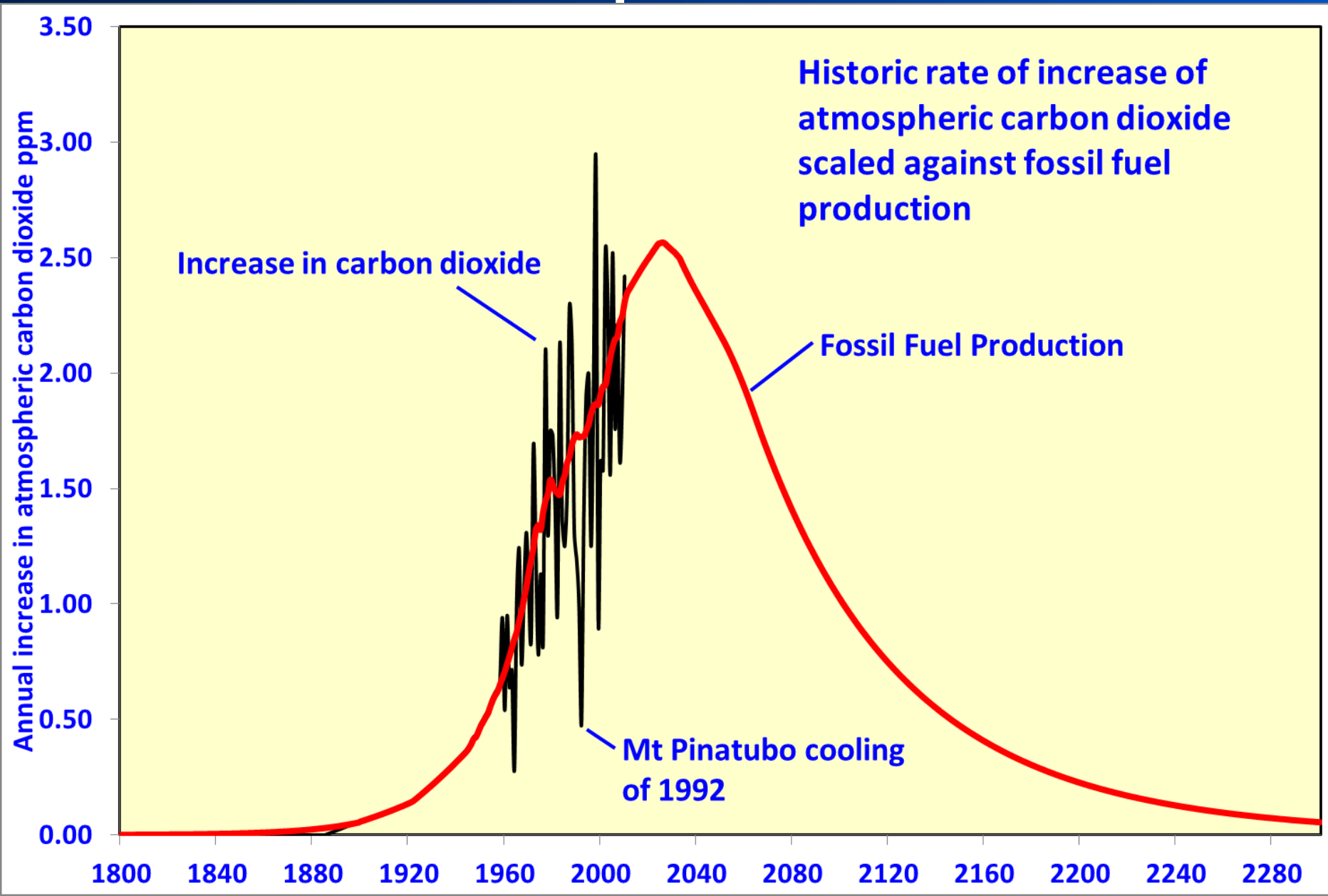


Data Source: Global Historical Climate Network (part of NOAA)

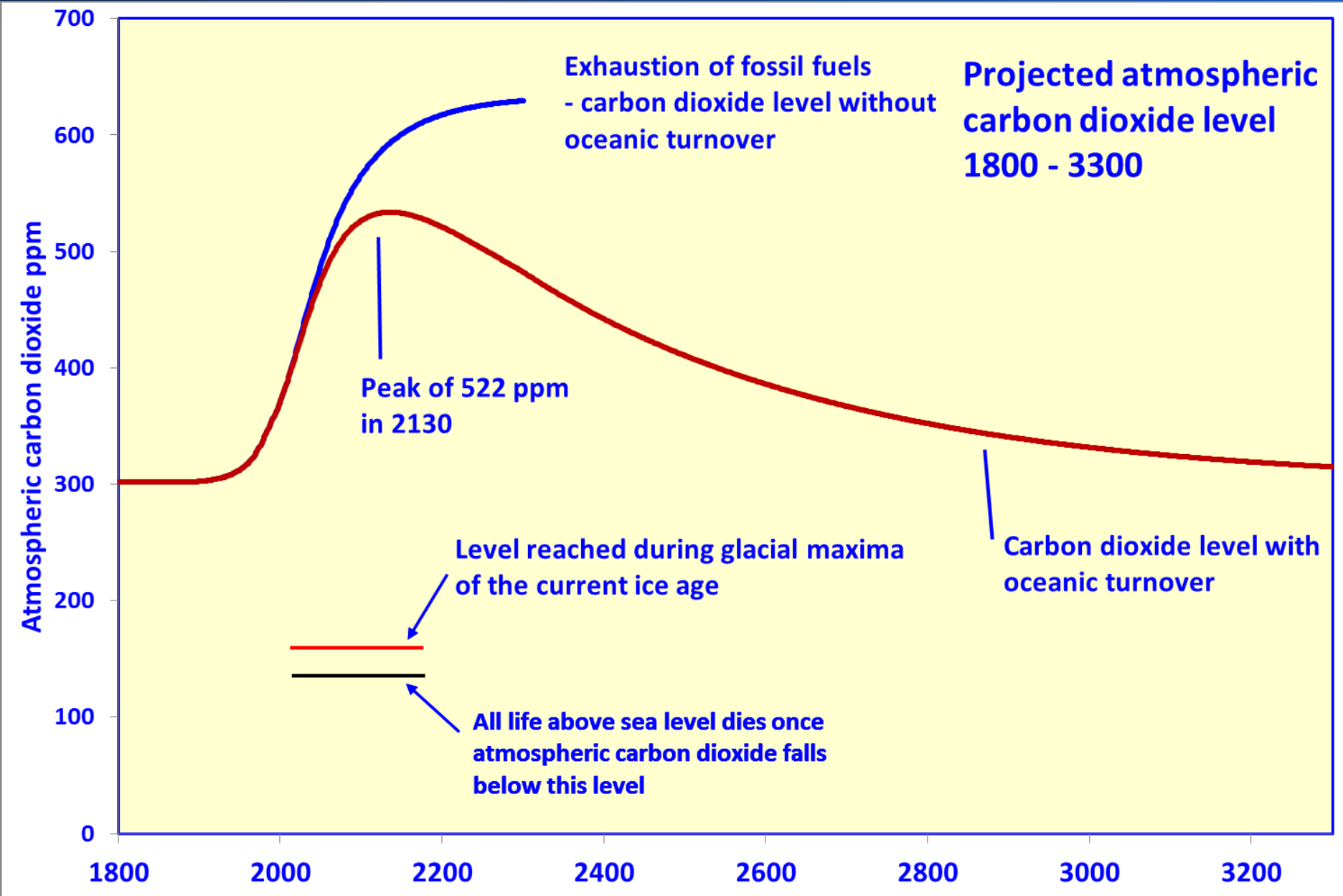
Where atmospheric carbon will come from



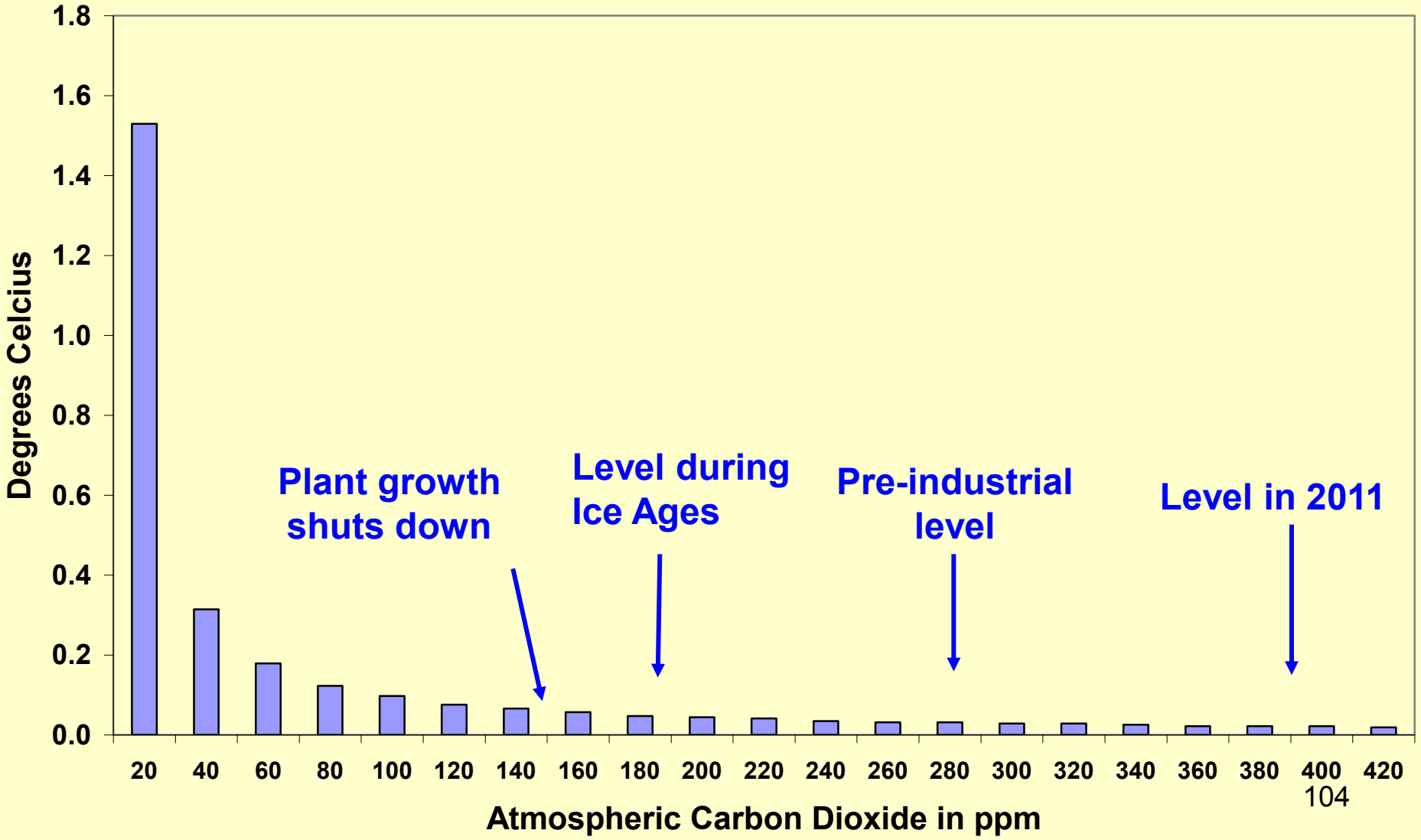
What that means for rate of increase of atmospheric CO2



We are getting a brief burst of aerial fertiliser.



Carbon dioxide is tuckered out as a greenhouse gas.



Professor Plimer is wrong.

Professor Plimer in a letter to The Australian on 29th October, 2011:

"*Carbon dioxide emissions certainly affect climate*."

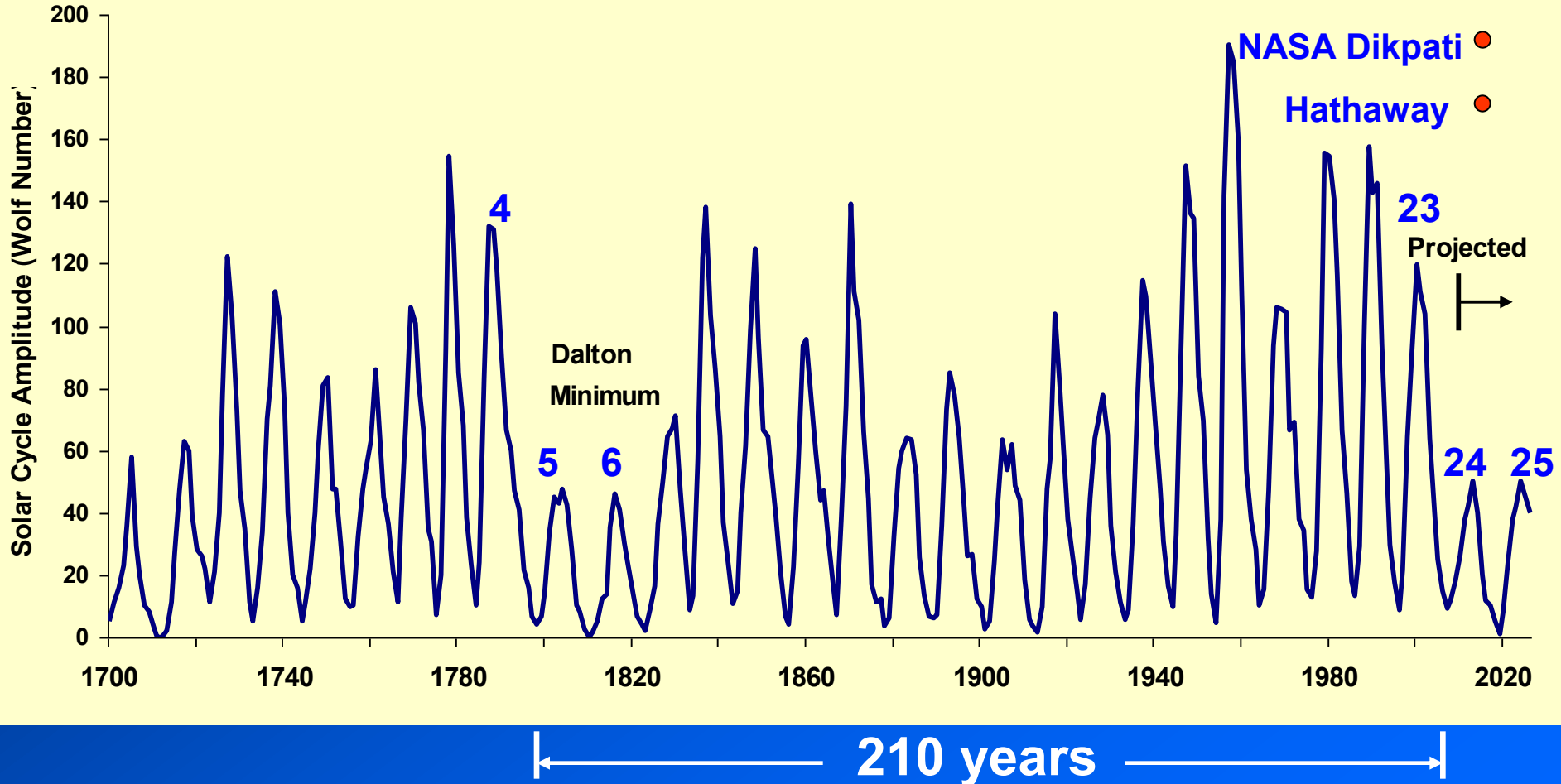
True. The effect has been quantified and it is minuscule.

"*There are legitimate fears that unchecked emissions will damage future generations*."

Wrong. The heating from CO2 is lost in the noise of the climate system.

Natural variation on a decadal scale is four times the total heating effect of CO2 over centuries.

The World won't stop having climate cycles just because they are inconvenient.



Sunspot Cycle Length Relative to Temperature

Armagh, Northern Ireland 1796 – 1992 Butler and Johnson

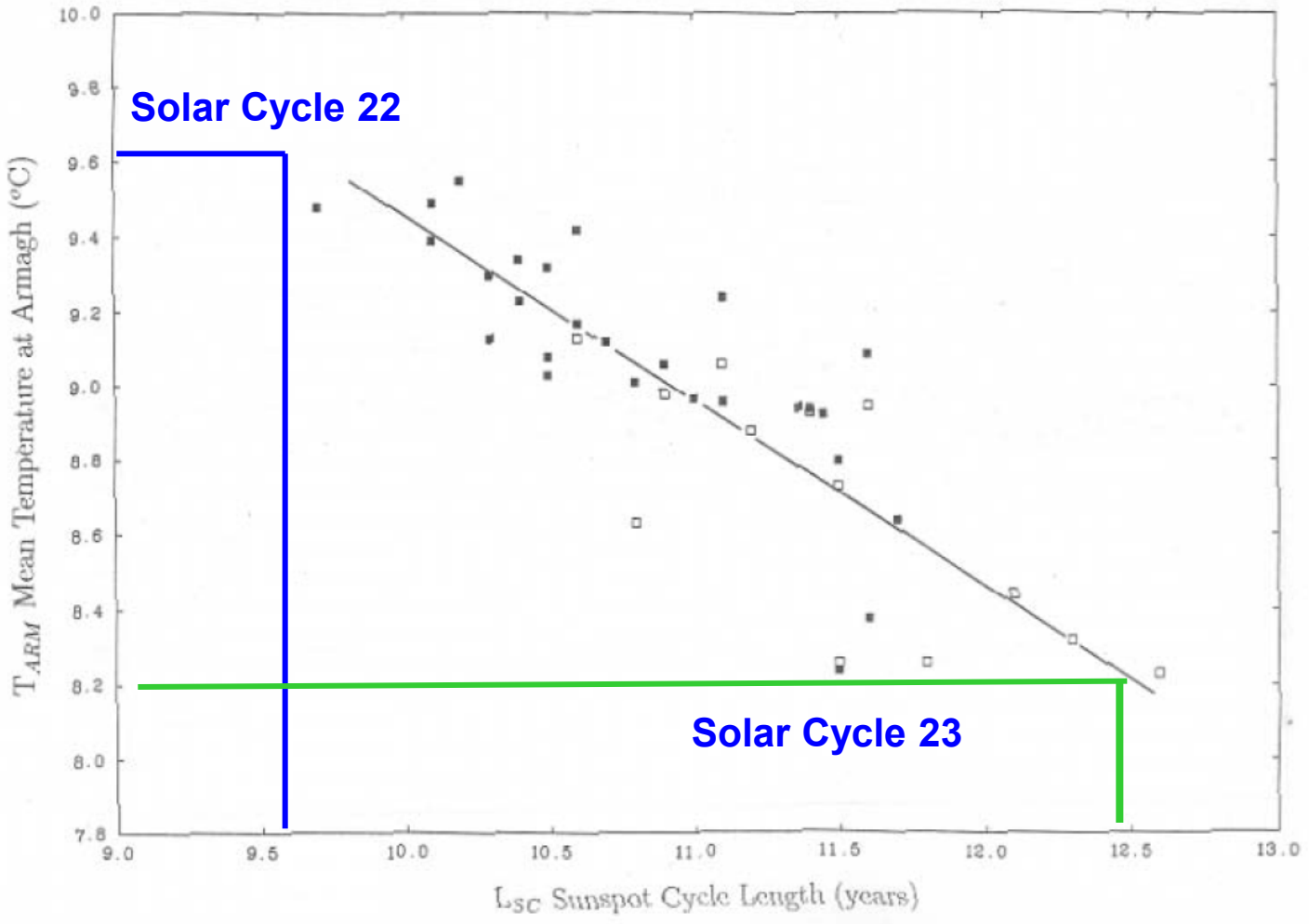
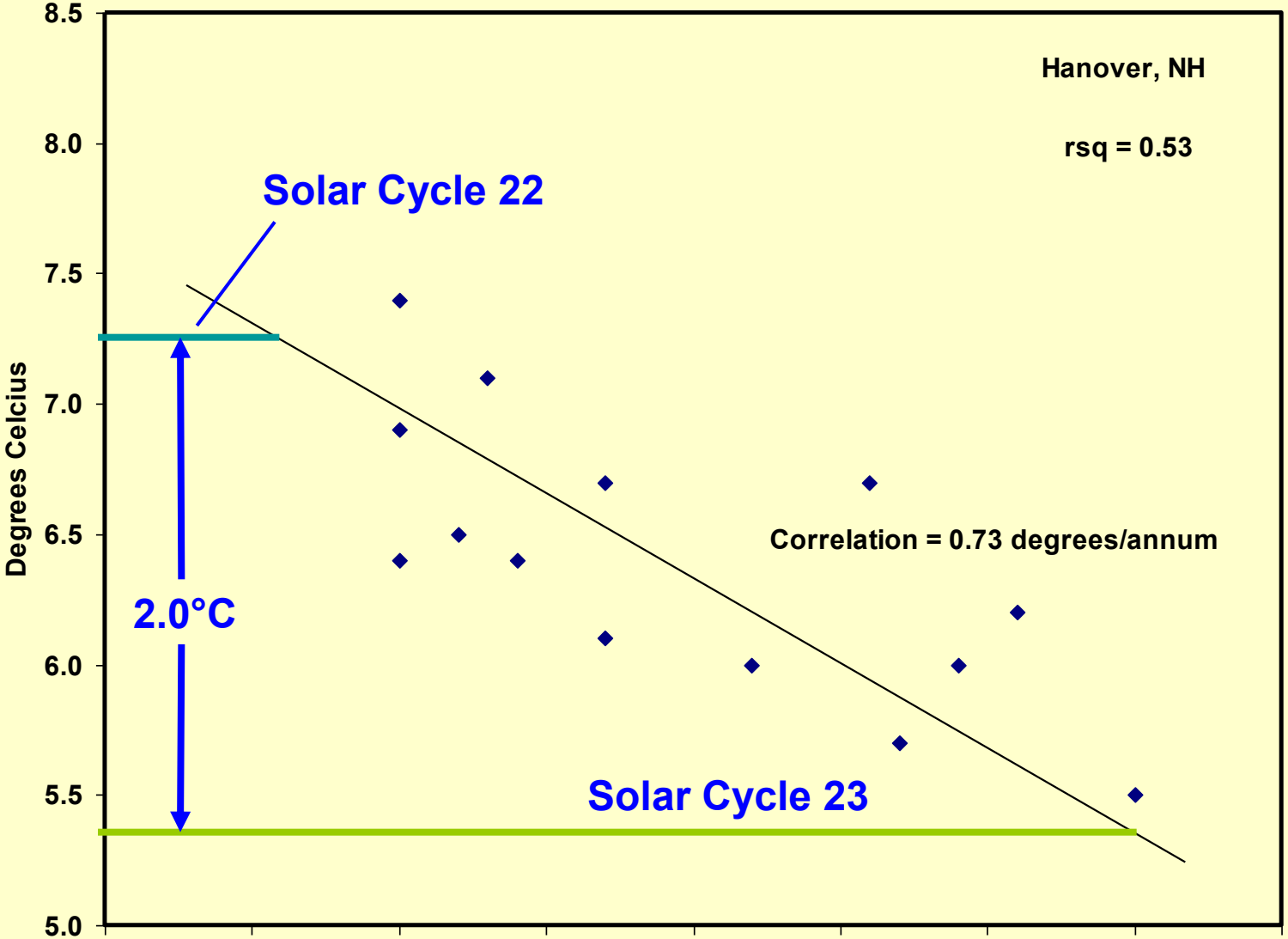
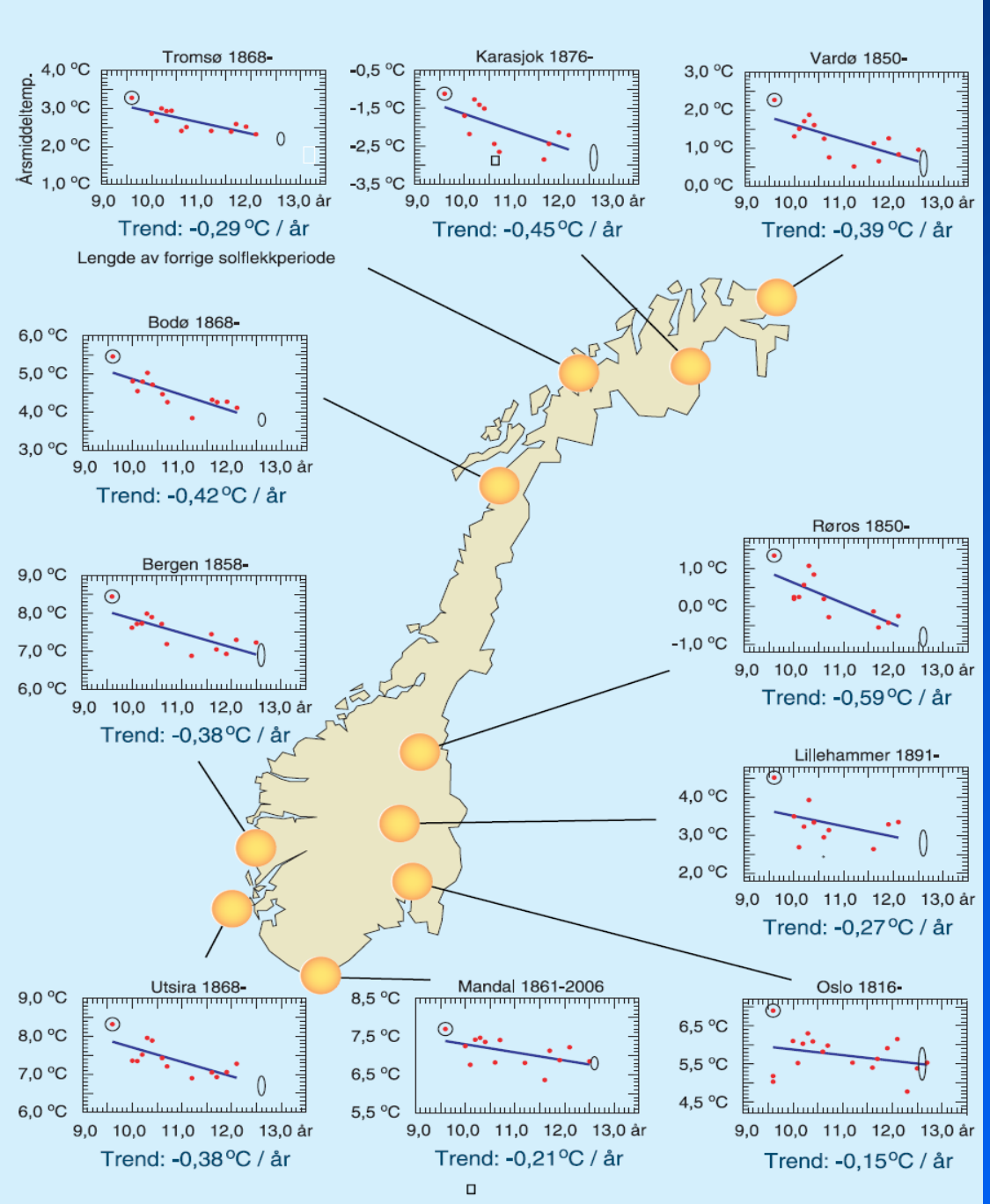


Figure 5. The mean temperature at Armagh for 11 year intervals, centred on years of sunspot maximum and minimum, plotted against the sunspot cycle length. Symbols: open squares - Series I, filled squares - Series II. The mean regression line is shown.

Hanover, New Hampshire

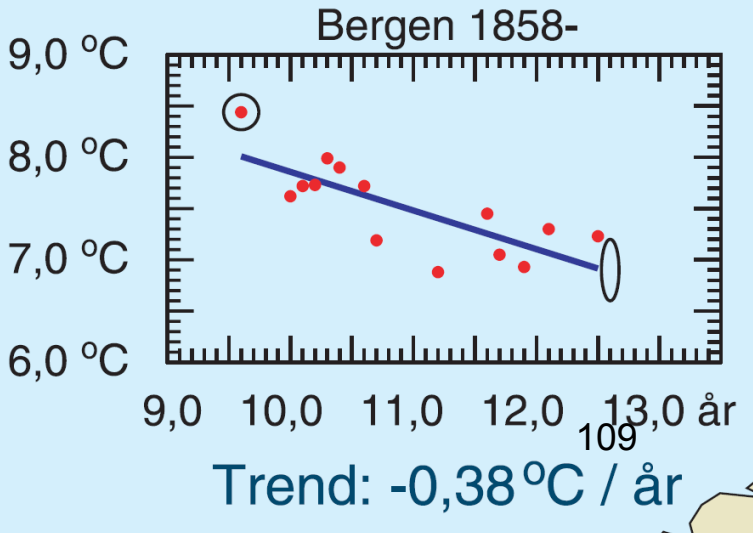




Friis-Christensen and Lassen theory, using Butler and Johnson methodolgy, applied to Norway

- a 1.5° C cooling underway

Work by Professor Jan-Erik Solheim of Oslo University



Three wise Norwegians:

Temperature prognosis based on long sunspot cycle 23

Jan-Erik Solheim*

Institute of Theoretical Astrophysics, University of Oslo, Norway

Ole Humlum

Department of Geosciences, University of Oslo, Norway

Department of Geology, University Centre in Svalbard (UNIS), Svalbard

Kjell Stordahl

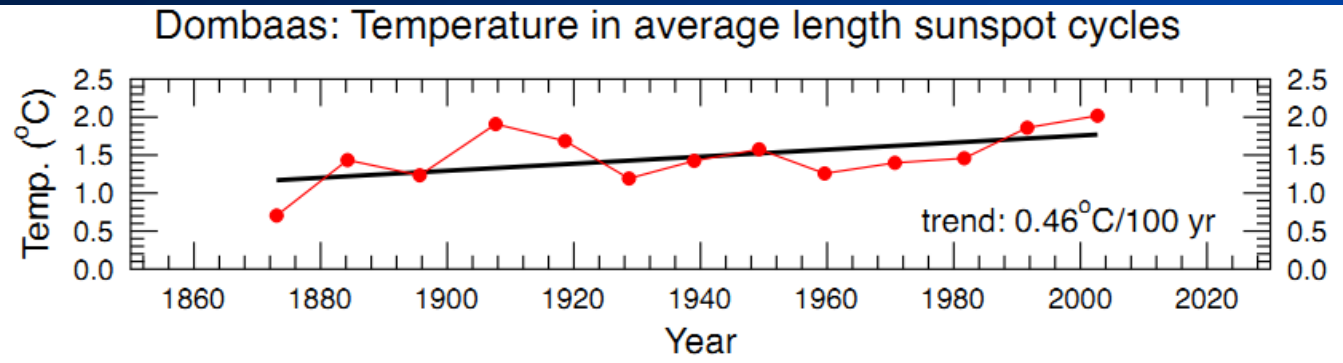
Telenor Norway, Finance, Fornebu, Oslo, Norway

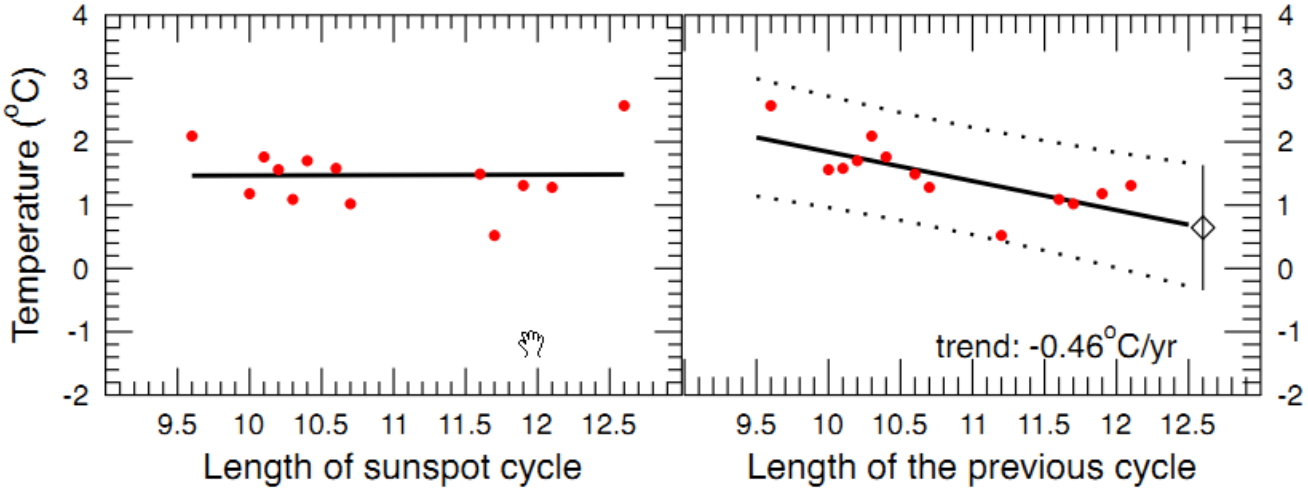
Credit me with a scientific discovery:

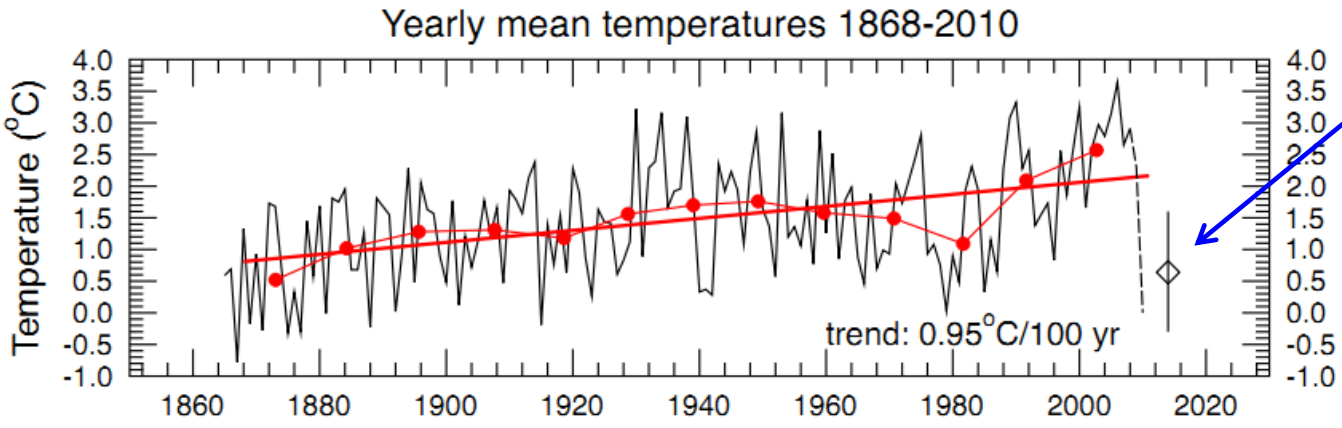
Archibald (2008) was the first to realize that the length of the previous sunspot cycle (PSCL) has a predictive power for temperature in the next sunspot cycle, if the raw (unsmoothed) value for the SCL is used. Based on the observed length of SC23 being 12.6 years, considerably longer than SC22 of 9.6 years, he predicted cooling during the coming SC24. He demonstrated this based on a long series from de Bilt in the Netherlands 1705-2000 which

That enables climate to be predicted with great accuracy.

Dombaas, Norway

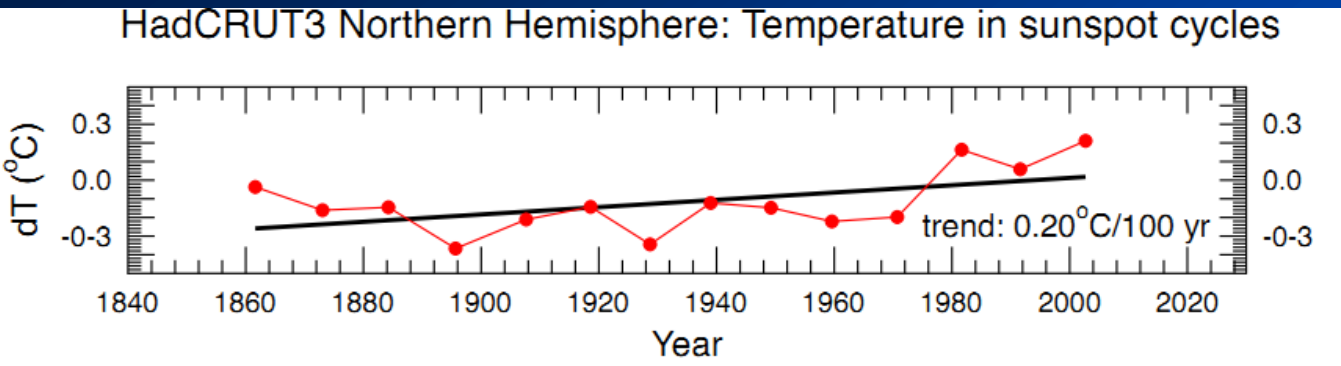


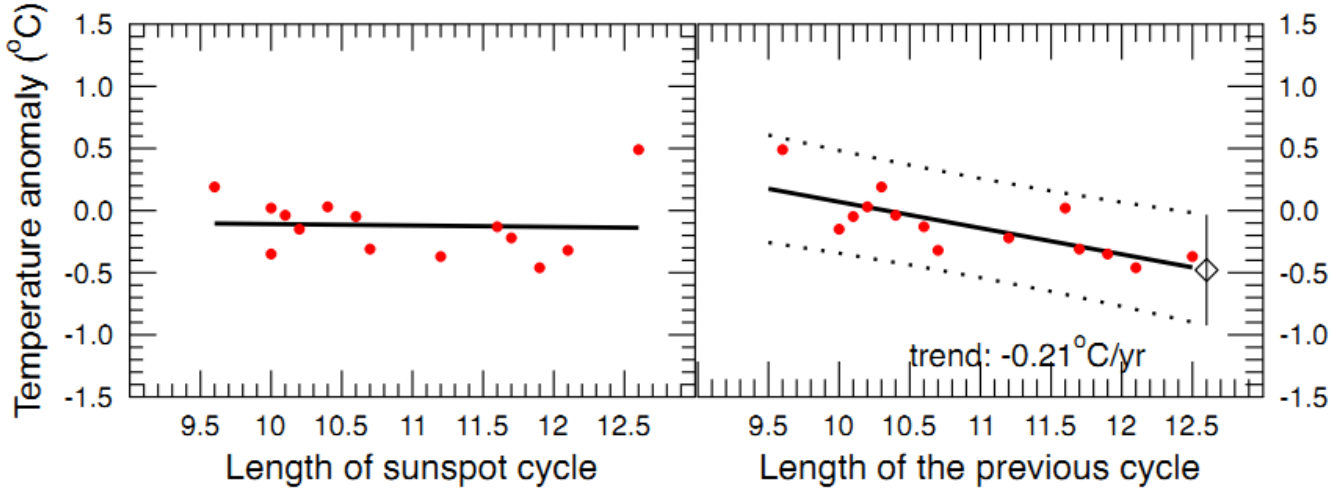


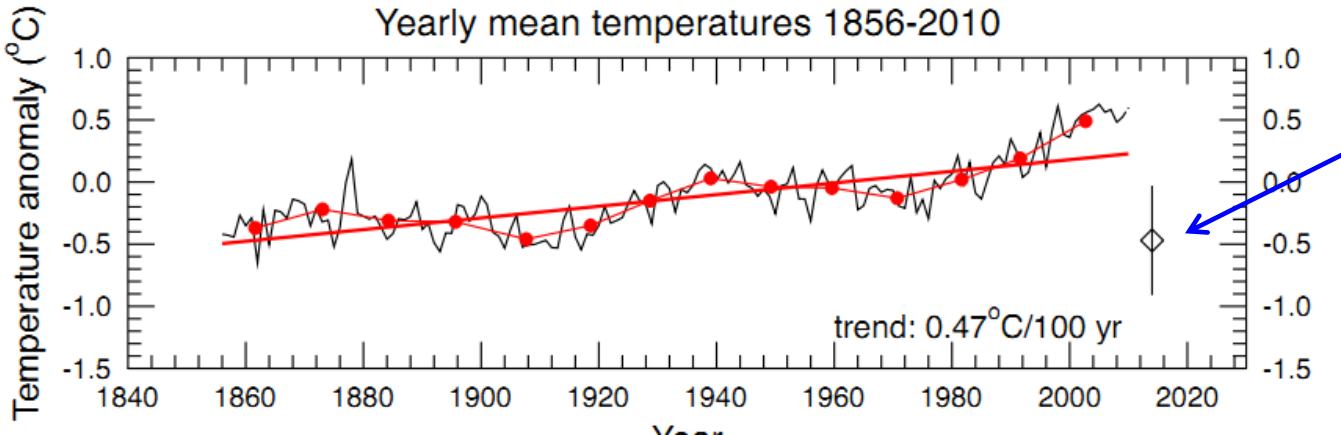


Predicted Decline

Northern Hemisphere



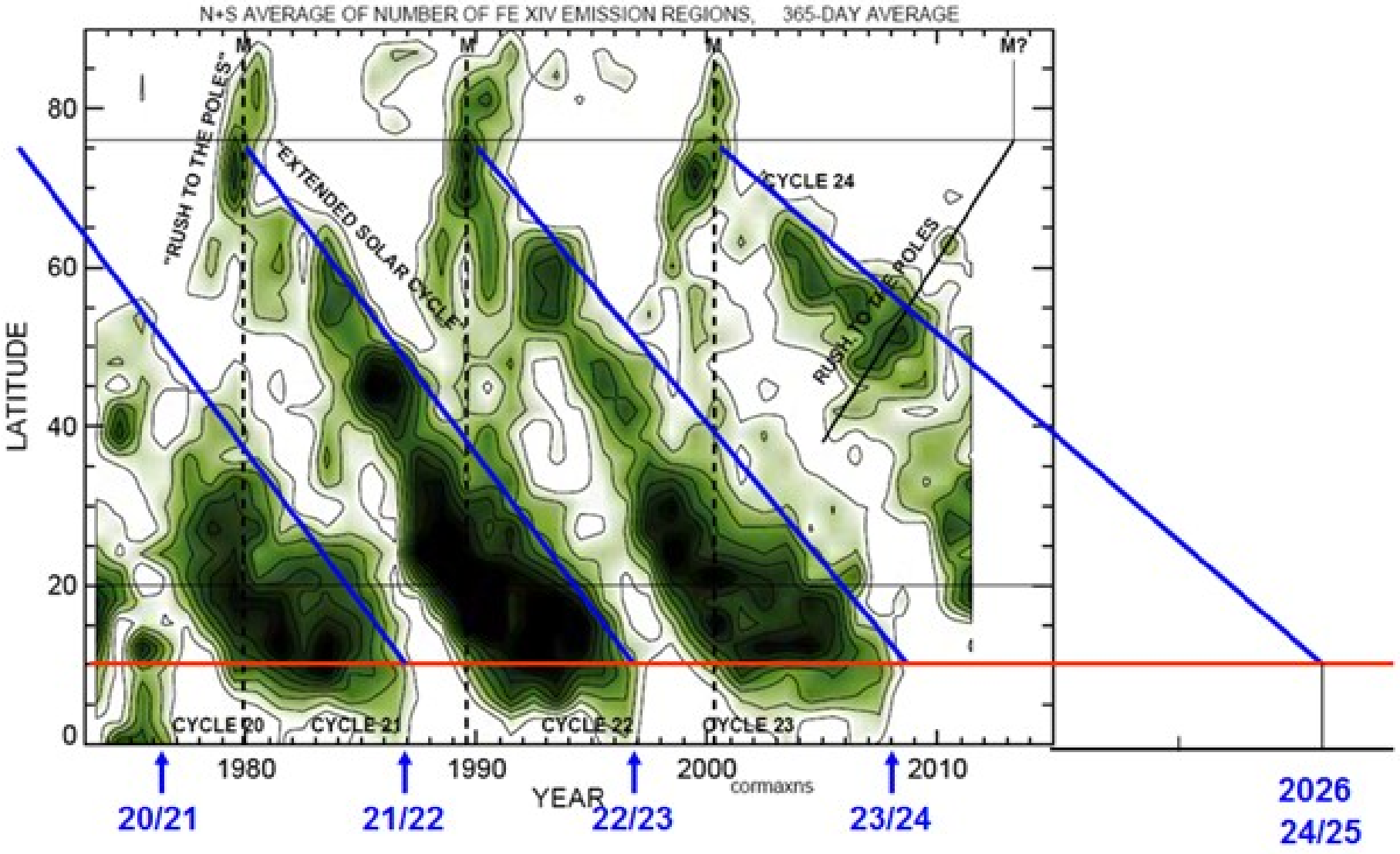




All the warming of the last 150 years will be reversed.

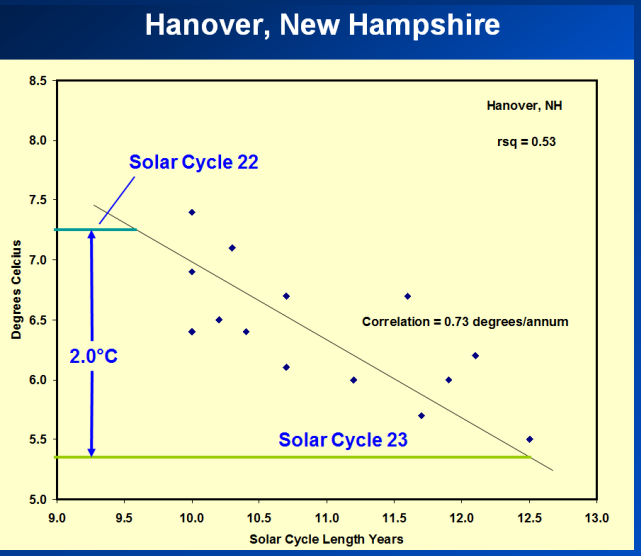
Predicted decline

Combine that with a prediction of solar activity:

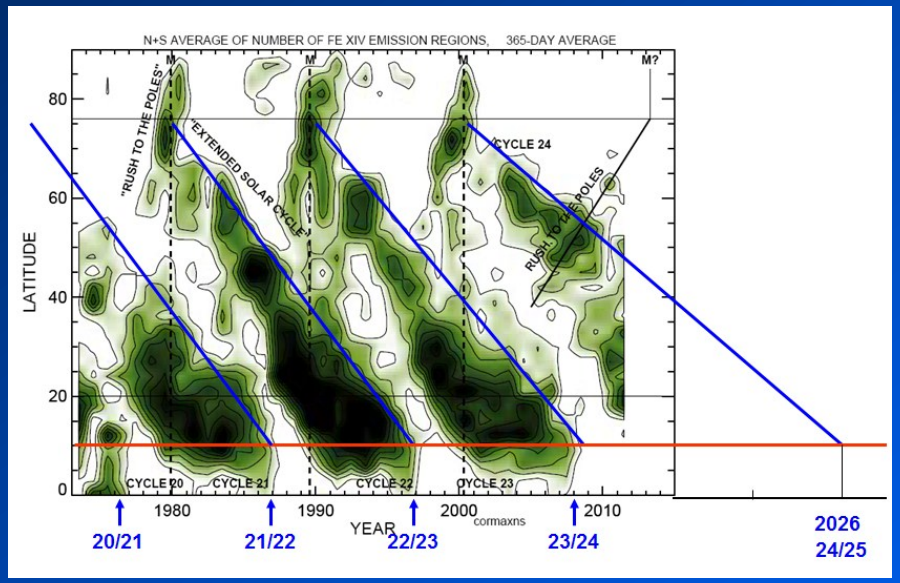


We can now predict climate to 2040.

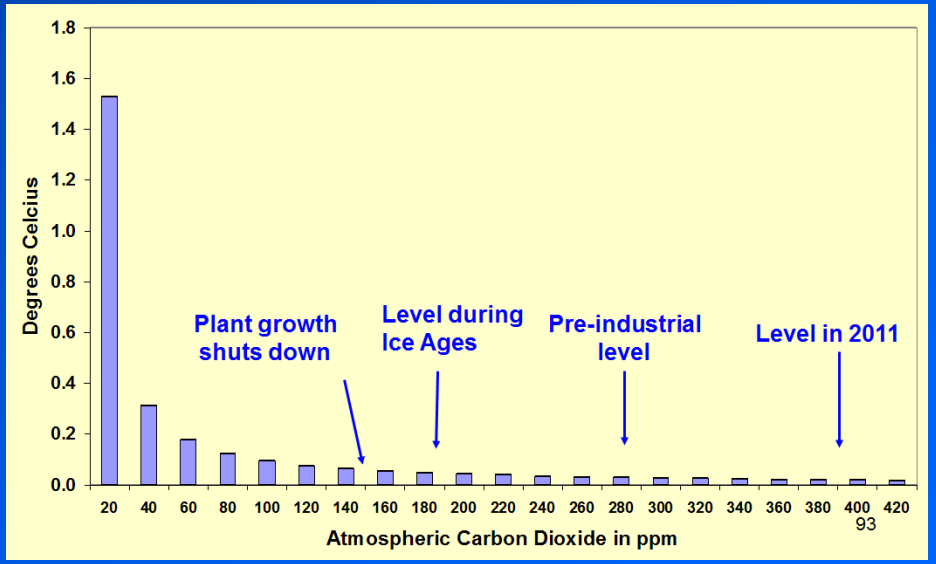
Using these three tools:



Solar cycle length - temperature

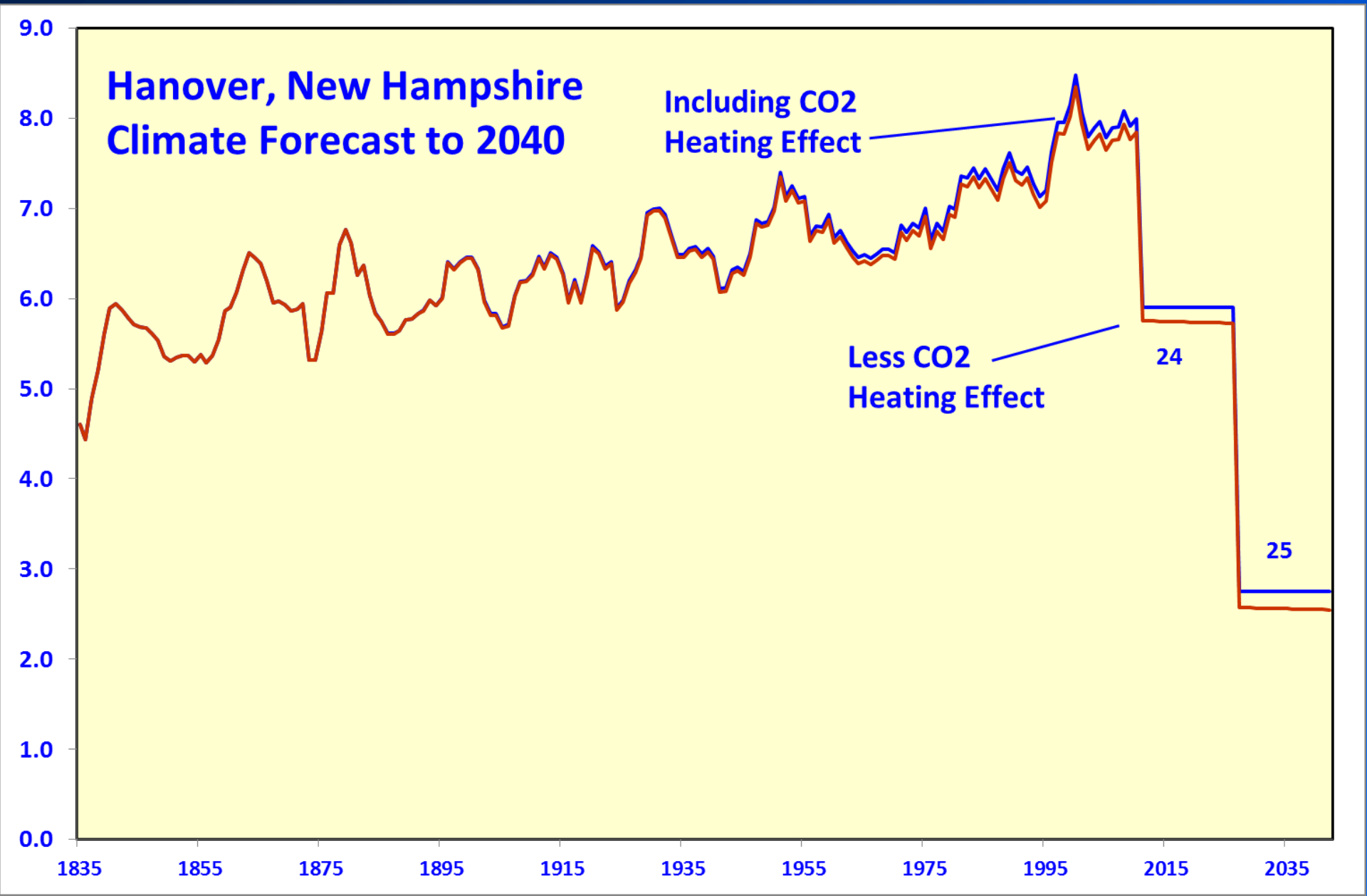


Solar activity forecast



Logarithmic heating effect of CO2

We are able to predict climate to 2040.



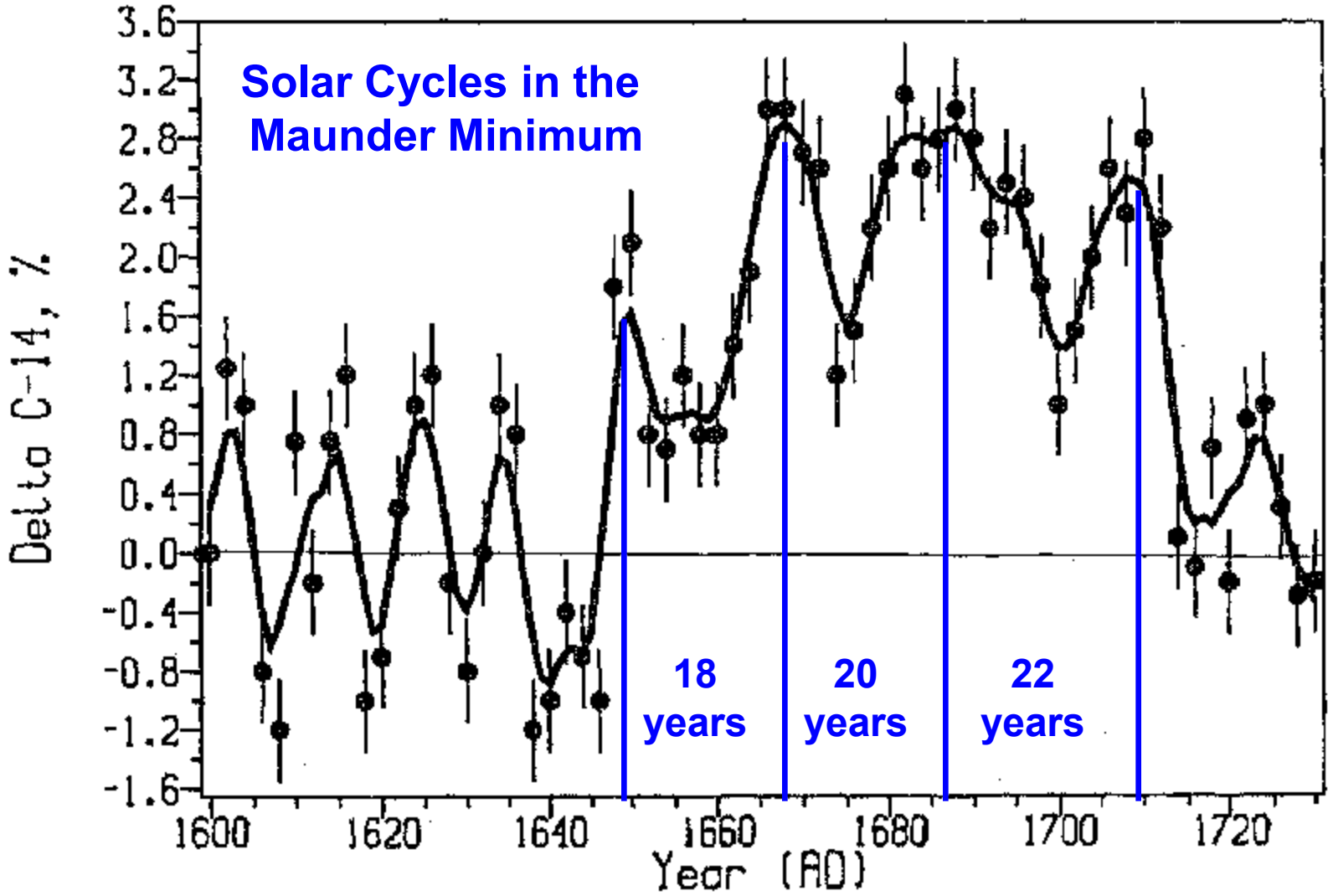
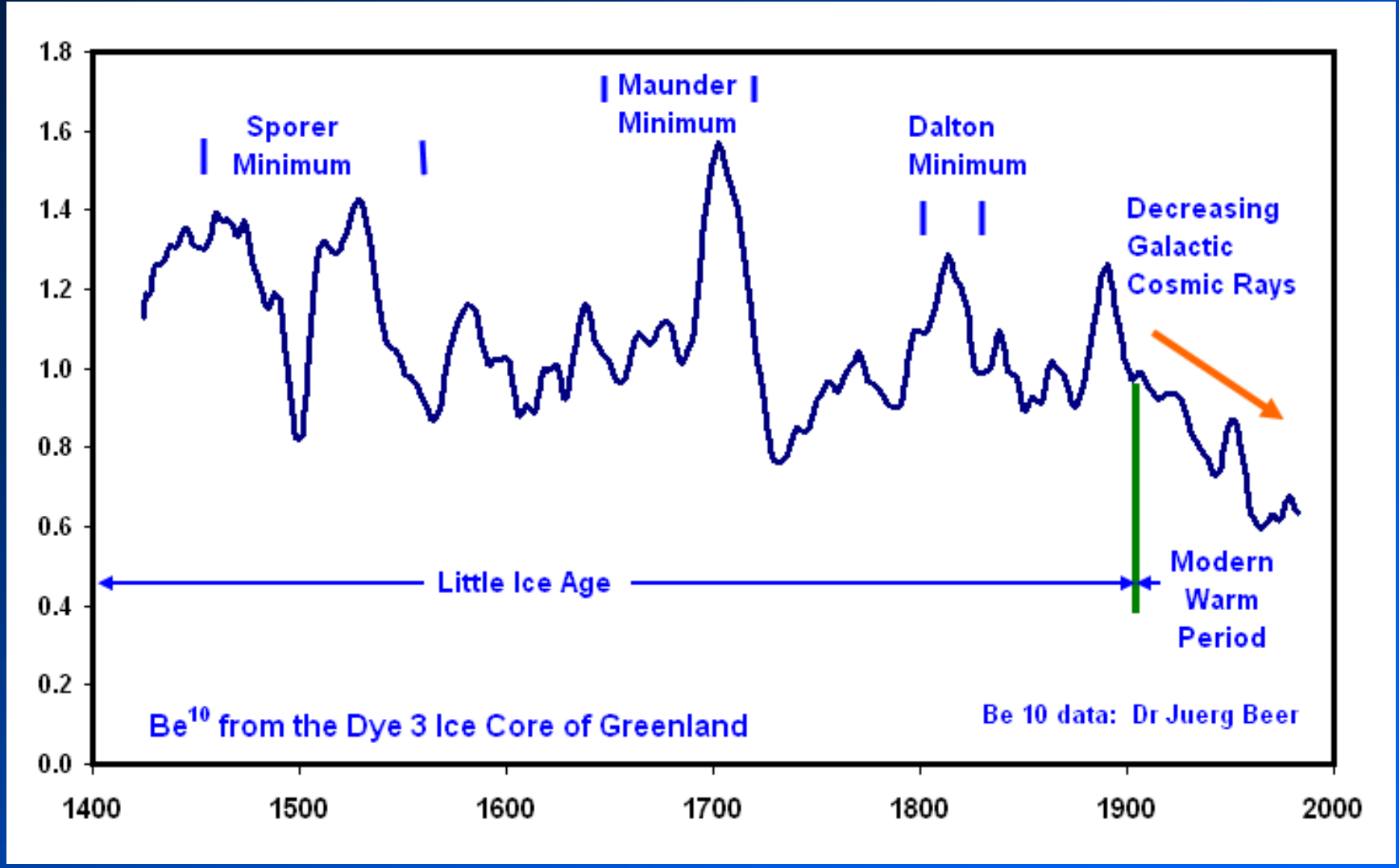


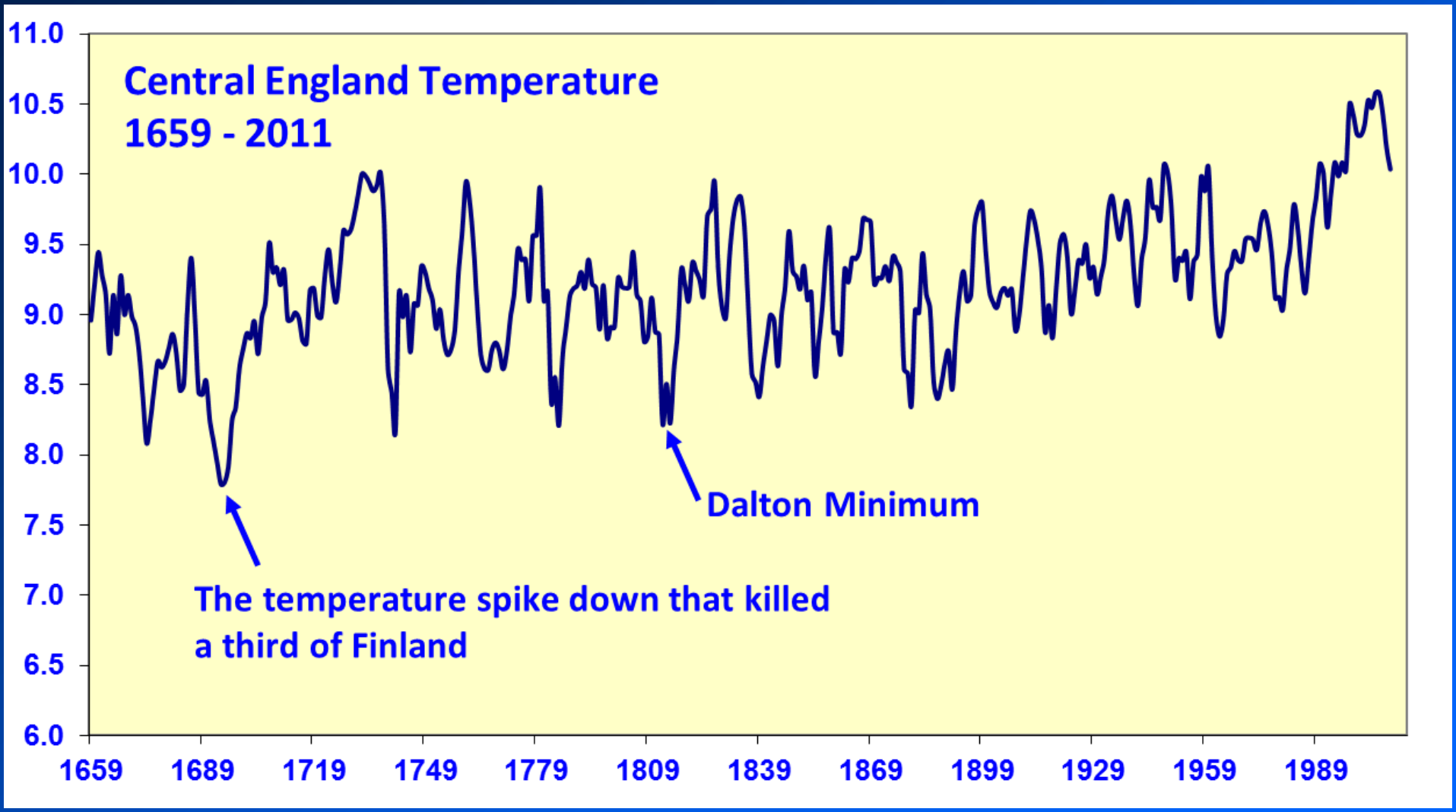
Figure 2. ^{14}C content variations in the bi-annual rings of the pine-trees from South Urals for AD 1600–1730. (By courtesy of Kocharov *et al.* 1995).



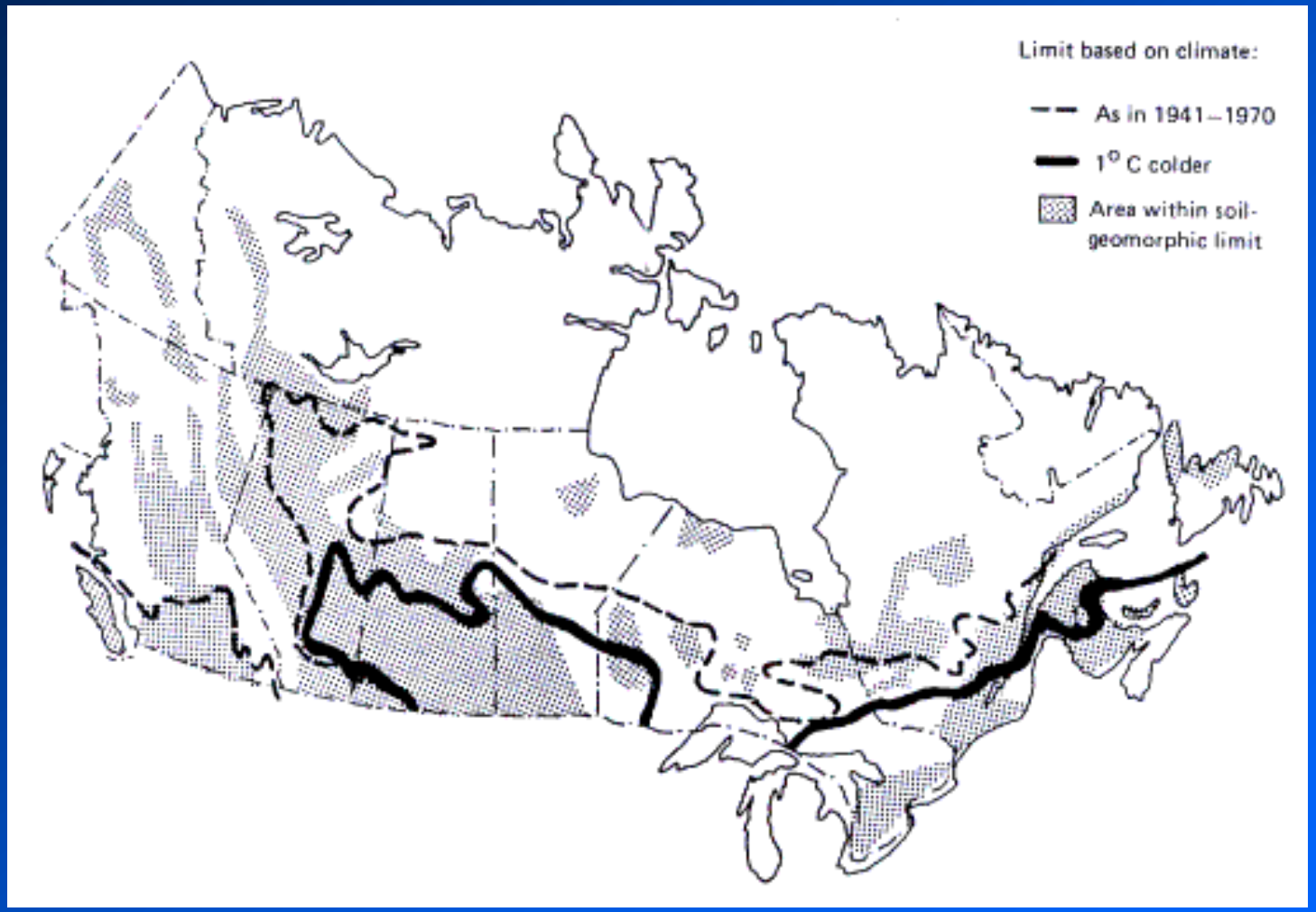
Famines in France 1693-94, Norway 1695-96 and Sweden 1696-97 claimed roughly 10% of the population of each country.

In Estonia and Finland in 1696-97, losses have been estimated at a fifth and a third of the national populations, respectively.

We see it in the thermometer record.

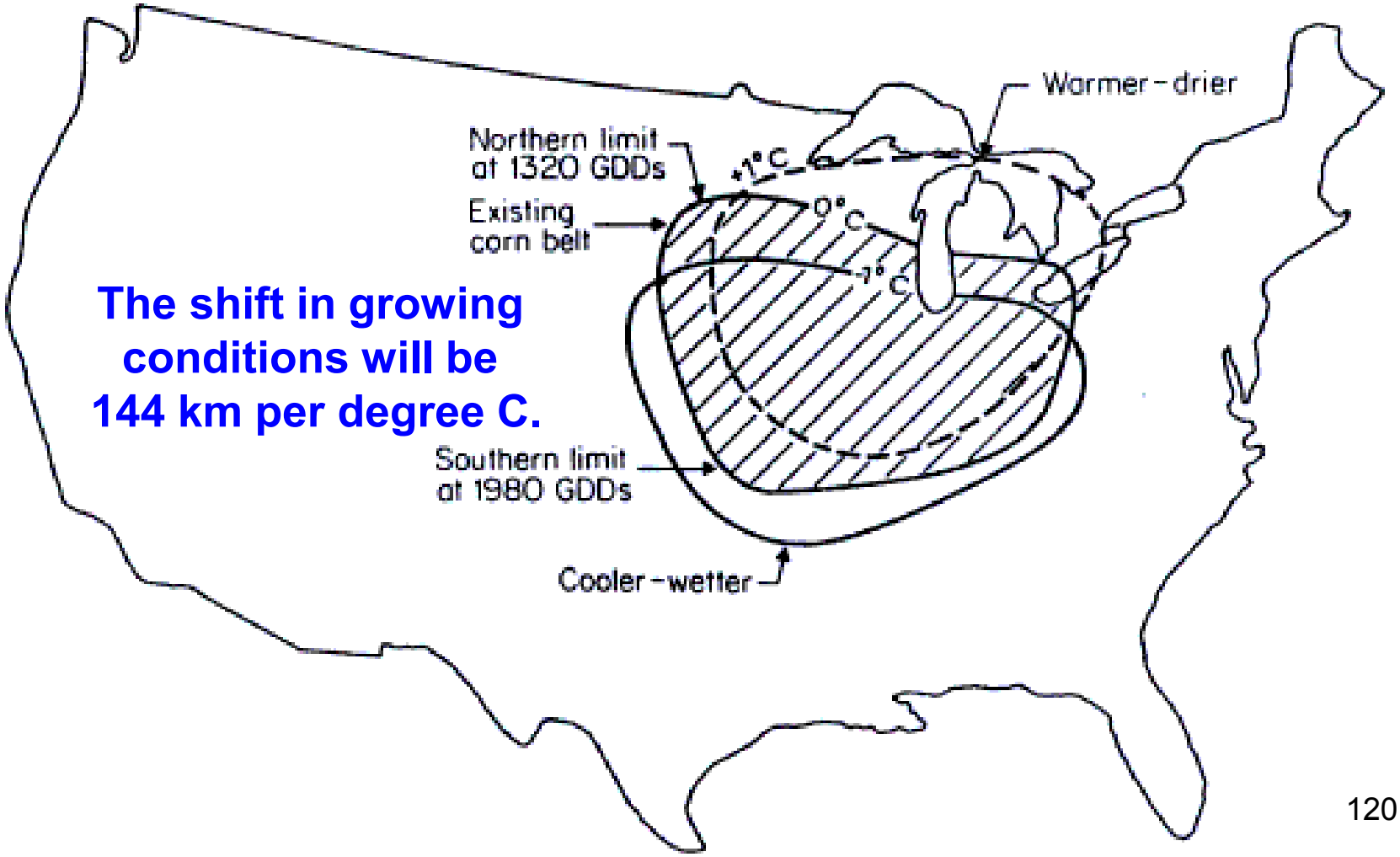


A prediction of Canadian agricultural response dating from the last cooling event 40 years ago



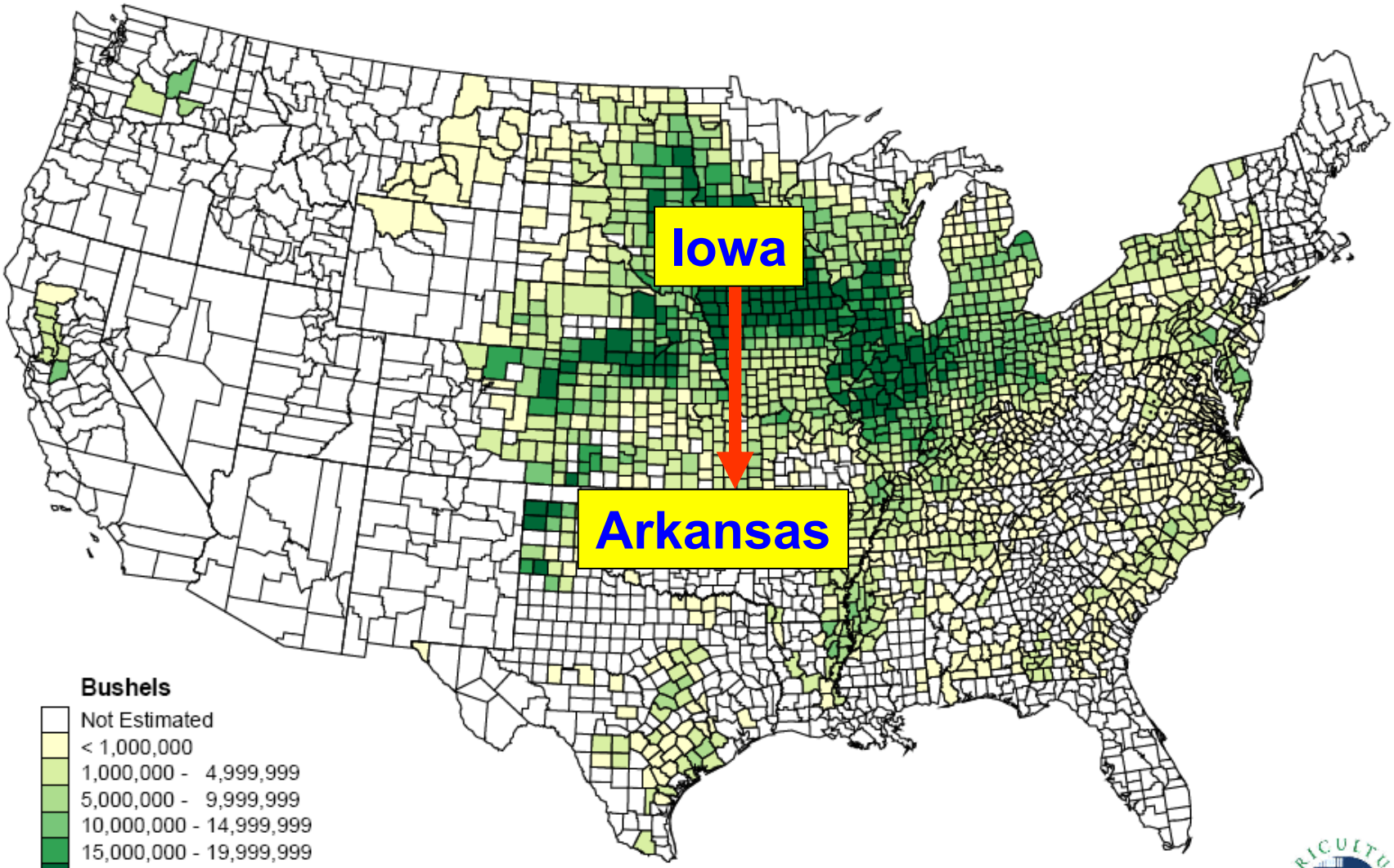
A 1° C decrease would reduce the frost-free period by 15 days.
A 2° C decrease would not allow the wheat crop to ripen before the first frost.
A 5 ° C decrease – it's all over.

The Corn Belt shifts south but total growing area remains the same.



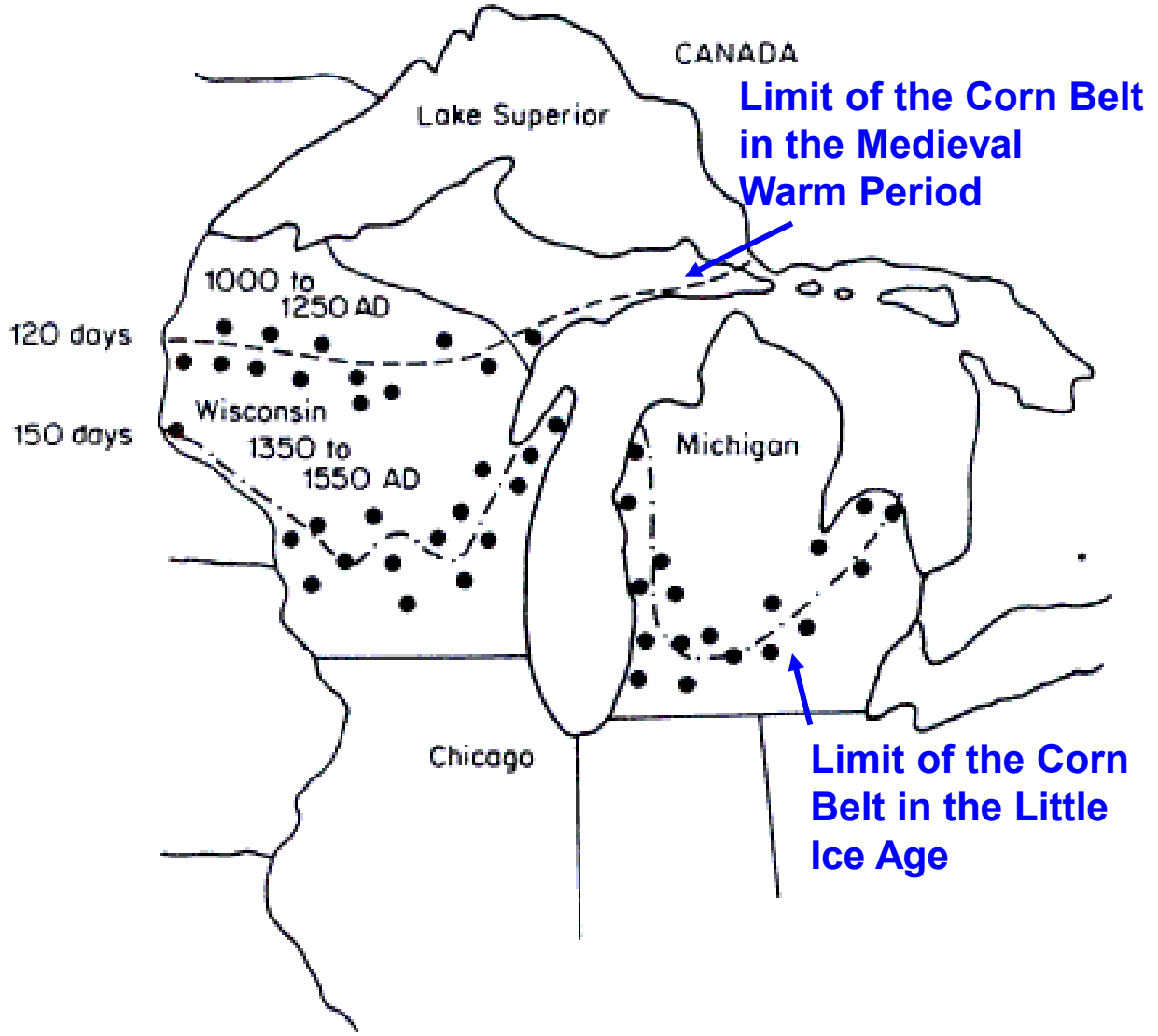
Corn Belt shifts to the Sun Belt

Corn for Grain 2010 Production by County for Selected States



U.S. Department of Agriculture, National Agricultural Statistics Service

It has happened before in the US.



Distribution of prehistoric ridge-furrow maize gardens in relation to present-day frost-free seasons.

The northern limit of prehistoric maize fields appears to have retreated up to 320 km southward concurrently with cooling in the thirteenth and fourteenth centuries.

Lake Victoria Level and Solar Activity

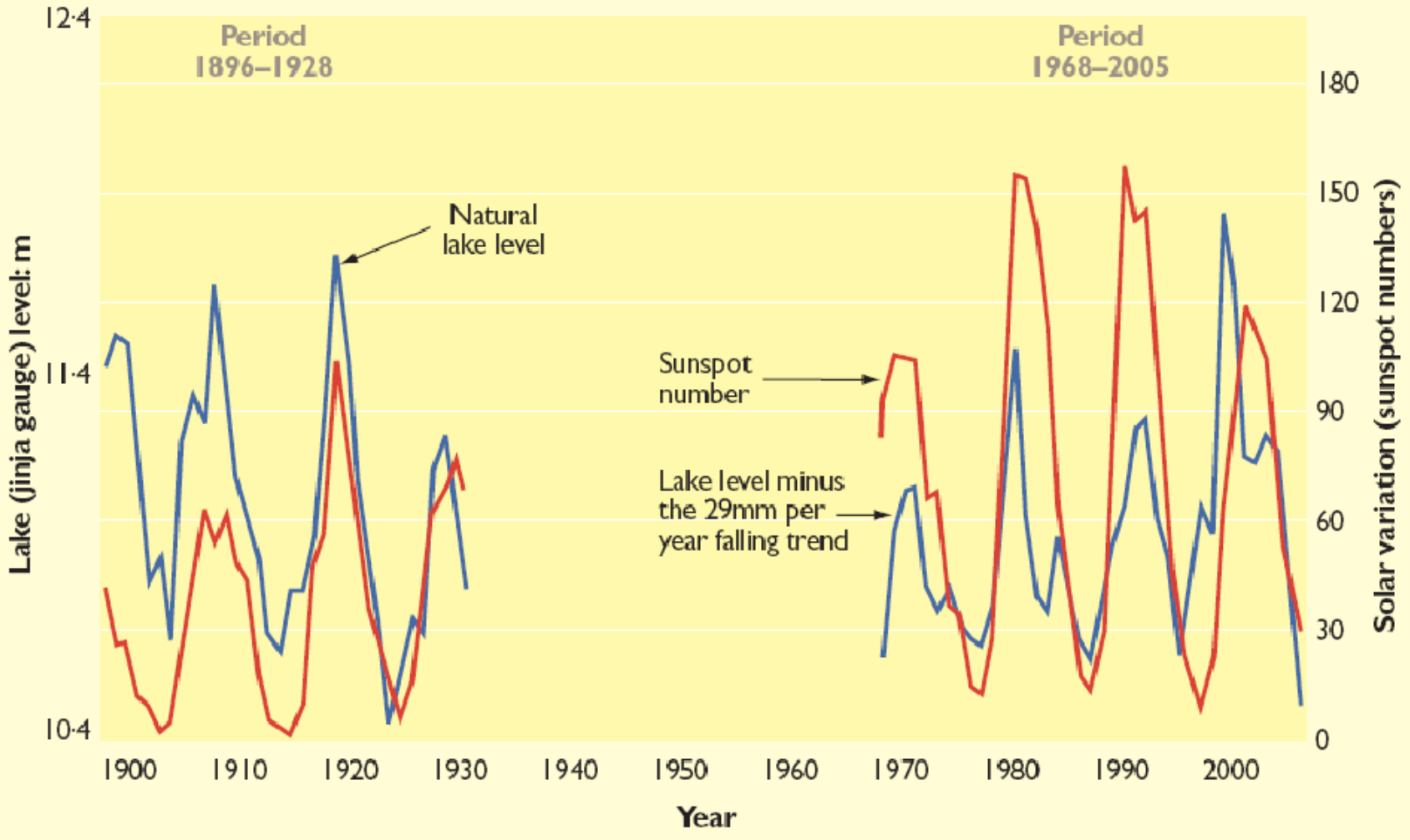
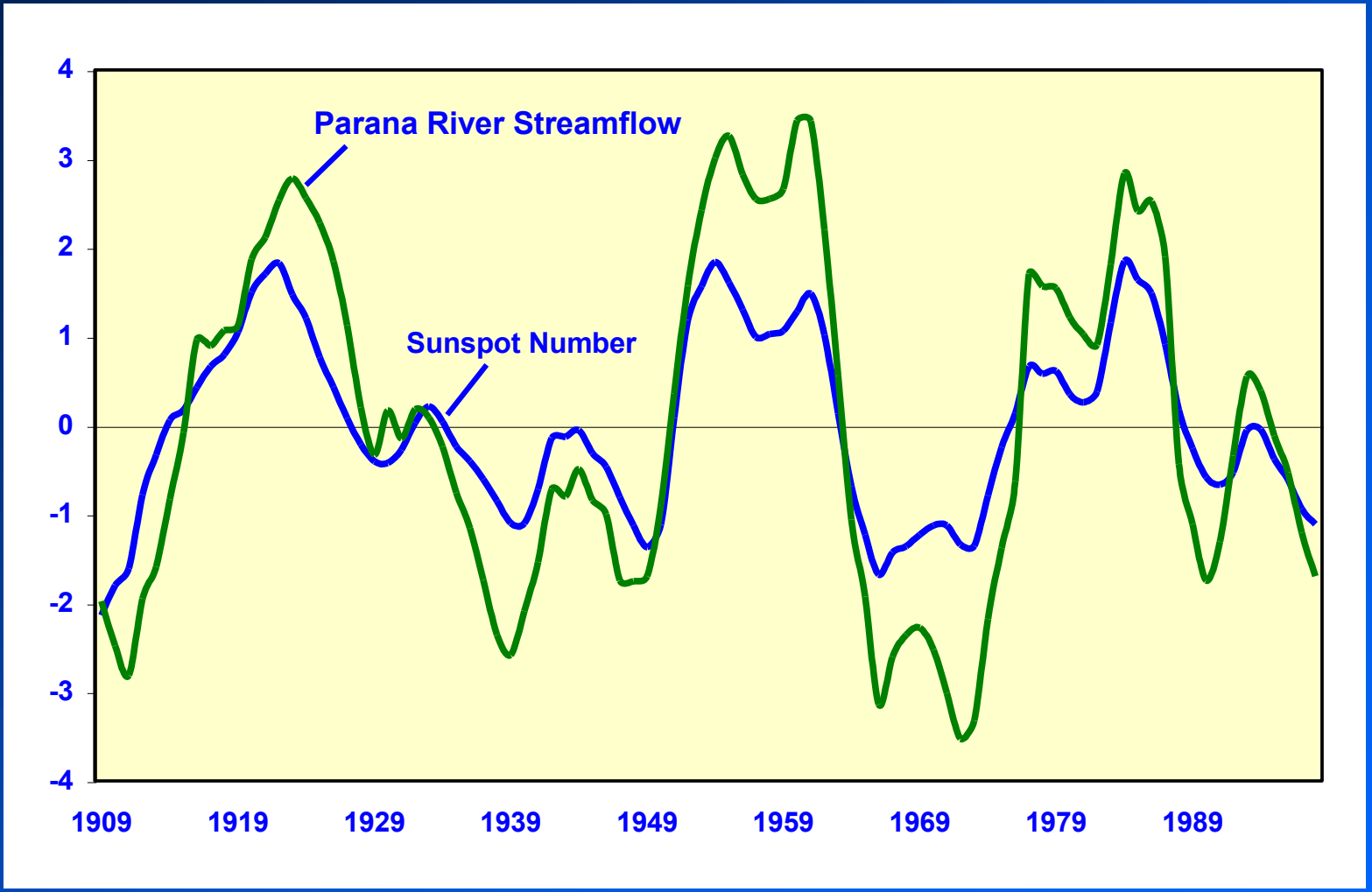


Figure 3. Levels of Lake Victoria from 1896 to 1928 and from 1968 to 2005 correspond closely to sunspot activity

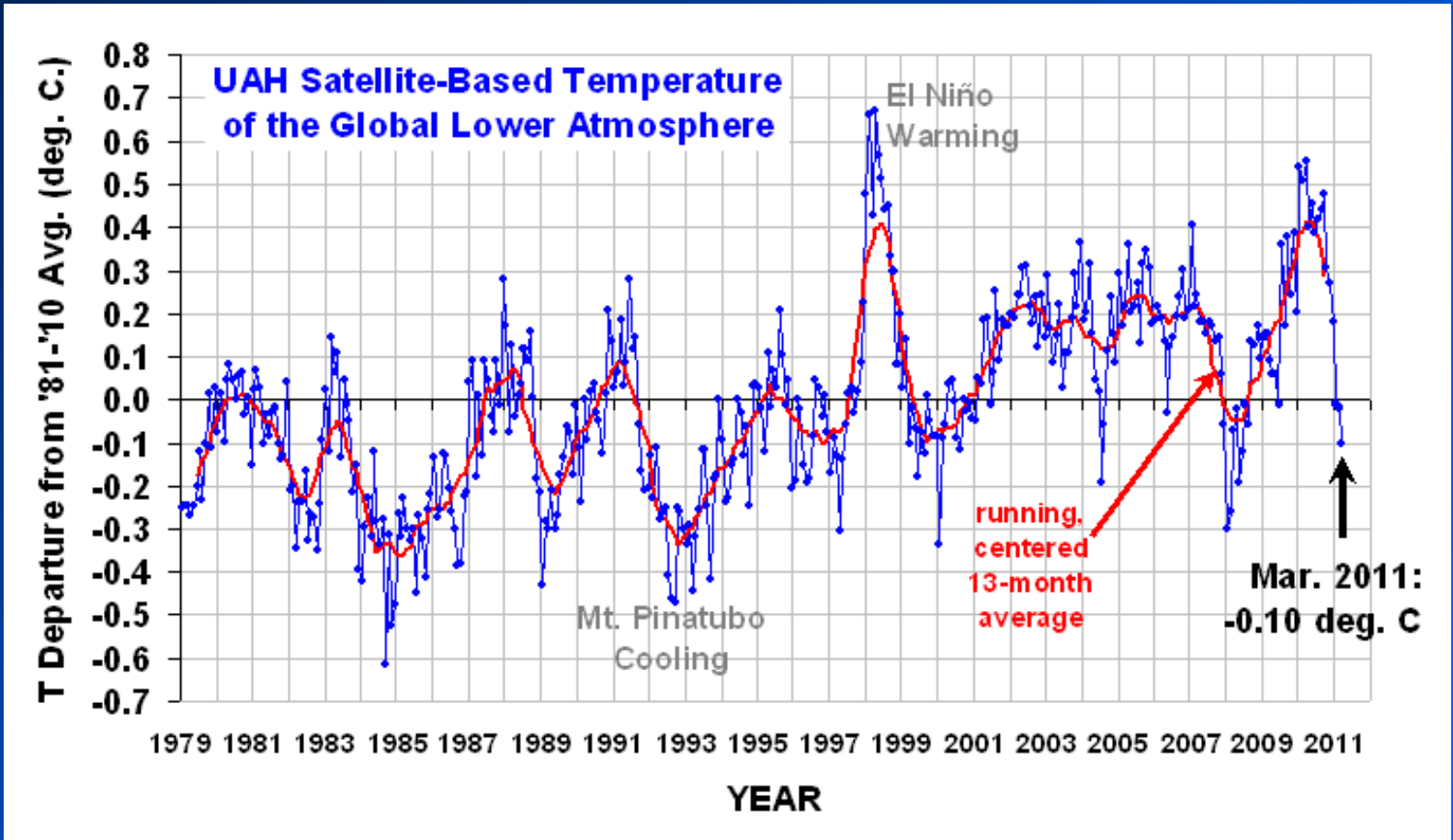
24 years of drought in train for East Africa

Colder is drier.



The Itaipu Dam on the Parana River provides 90% of Paraguay's electric power and 20% of Brazil's.

If a Mt Pinatubo-type eruption is overprinted on a de Vries cycle event:



Then we get an 1816 – type crop failure event.

1816 Event – 50% Chance

- Mt Tambora in Indonesia erupted on 10th April, 1815.
- Average global temperatures decreased by 0.4 – 0.7° C.
- On 4th June 1816, frosts were reported in Connecticut.
- On 6th June 1816, snow fell in Albany and Maine.
- Oats rose from 12 cents a bushel to 92 cents a bushel.
- For the last 500 years, major volcanic eruptions averaged 45 years apart.
- One of these could easily reduce world grain production by 400 million tonnes.