

International Growth Centre public lecture

The Age of Sustainable Development

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*Director of The Earth Institute, Quetelet Professor of Sustainable Development,
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Special Advisor to United Nations Secretary-General on Millennium Development Goals*

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Suggested hashtag for Twitter users: **#LSESachs**



THE AGE OF SUSTAINABLE DEVELOPMENT

JEFFREY D. SACHS

International Growth Centre

London School of Economics

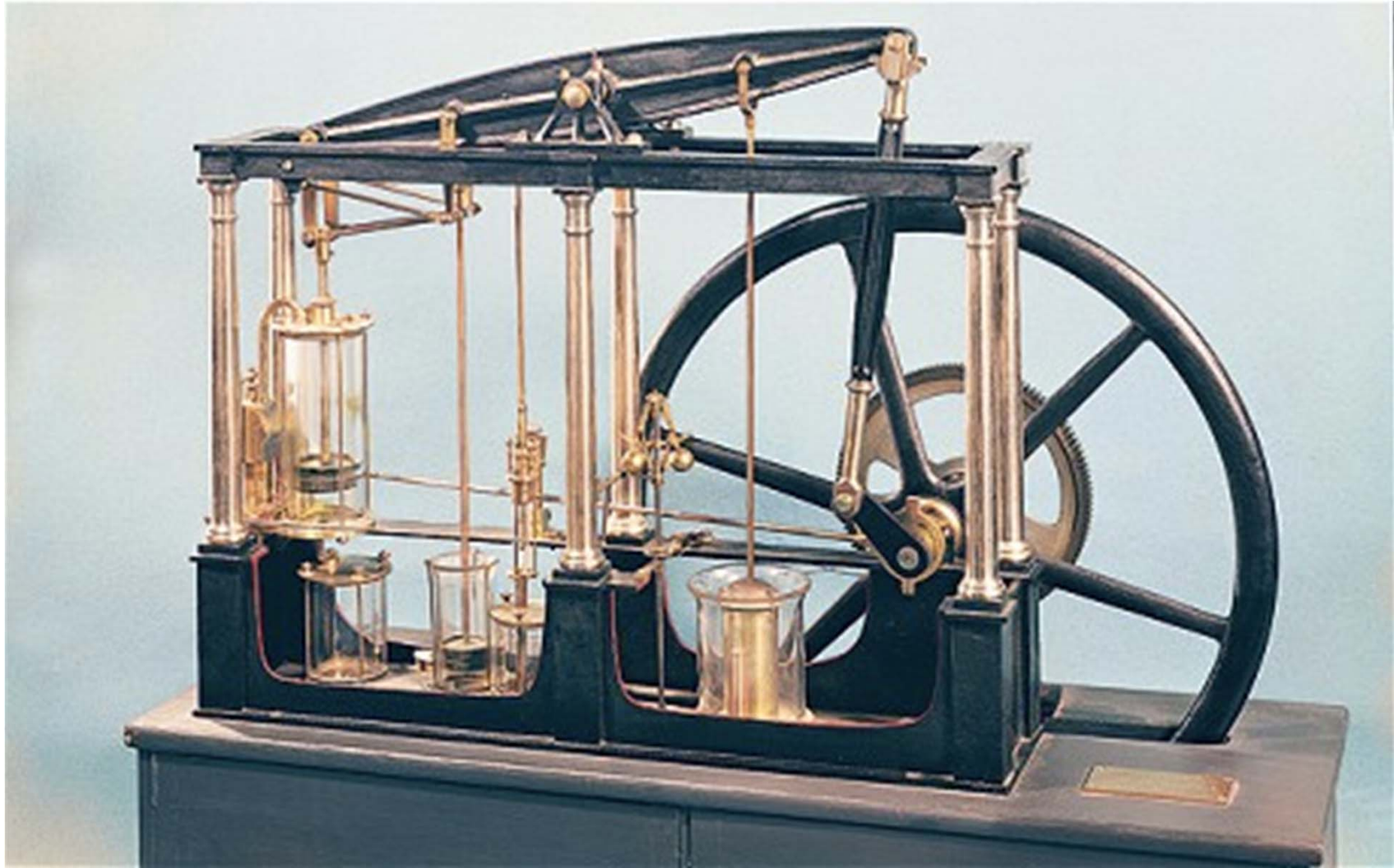
4 February 2015



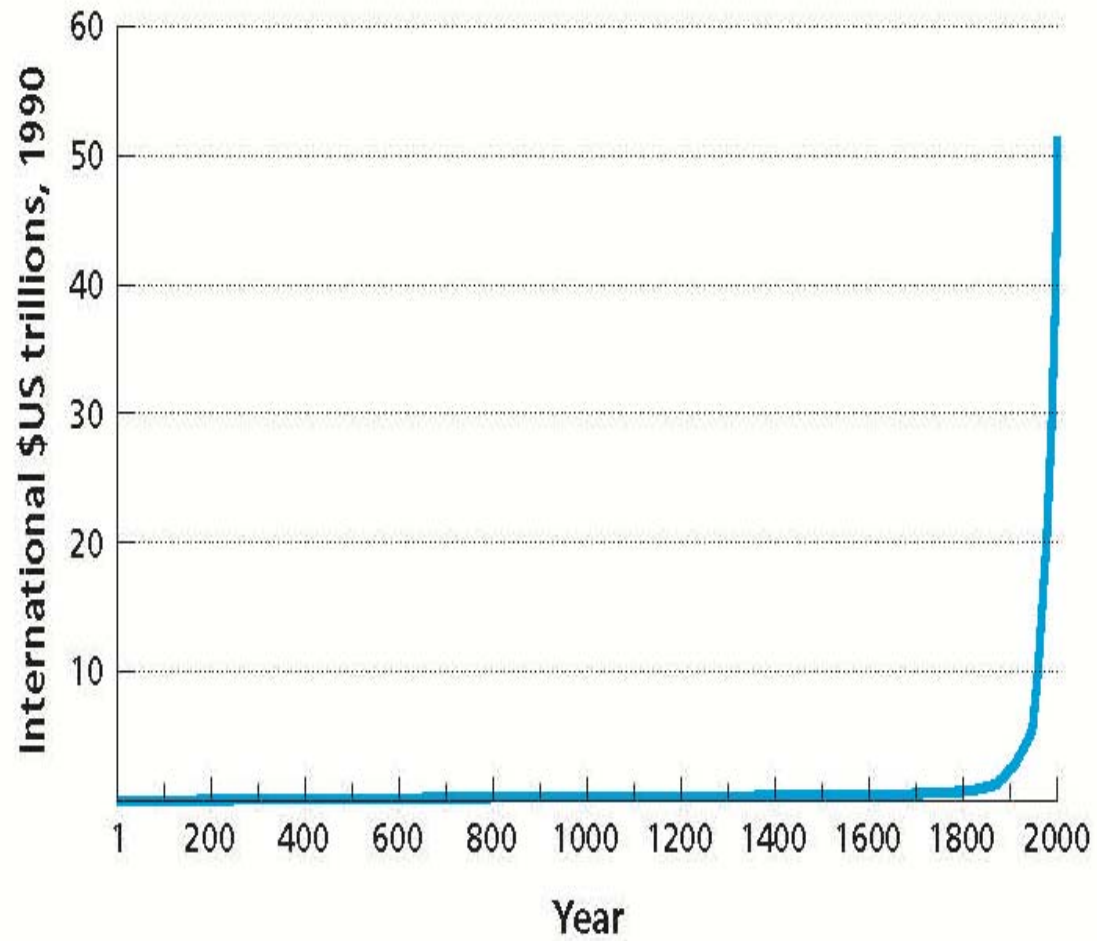
The Anthropocene:

It's All About Scale

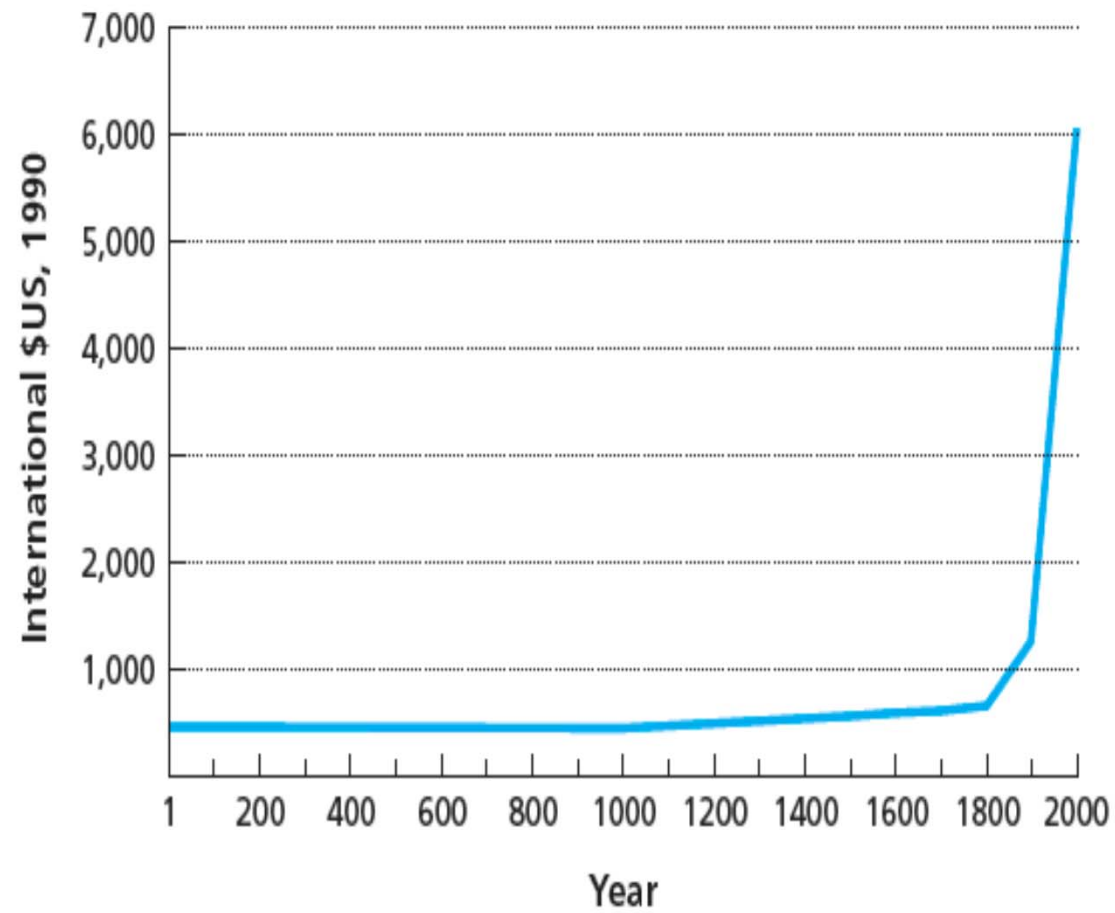
James Watt's Engine: Most Significant Invention of Modern History



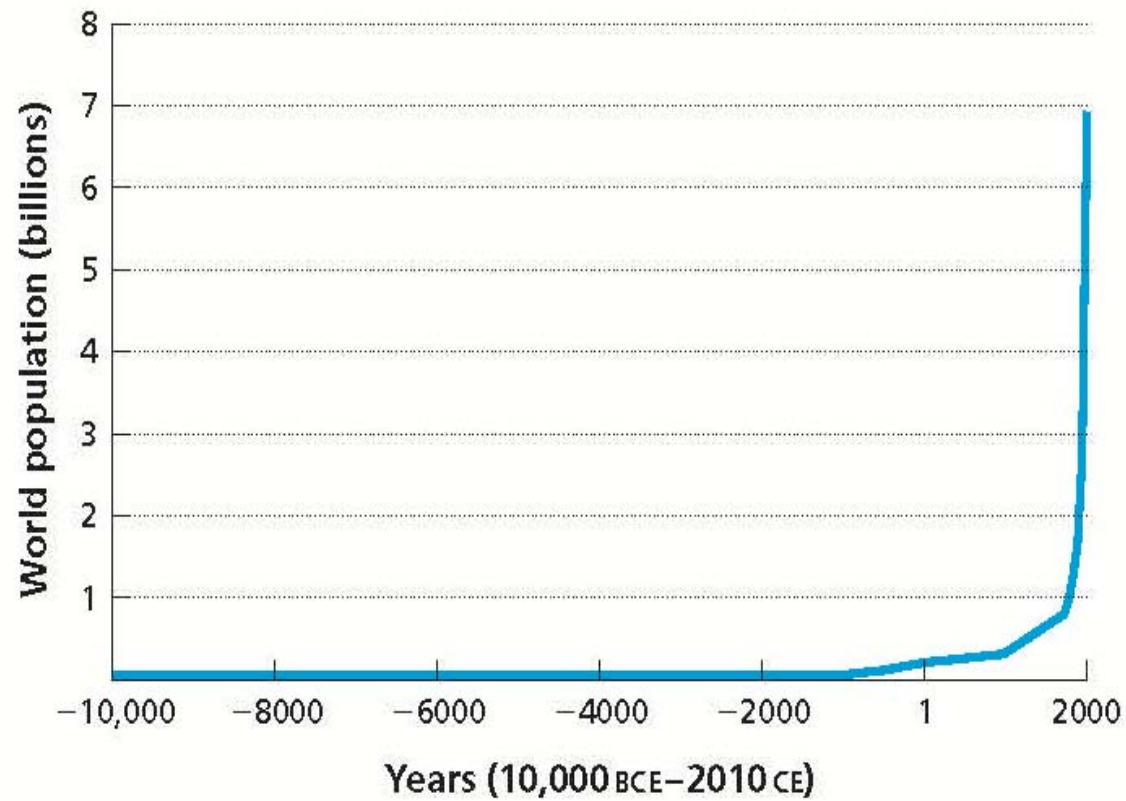
Gross World Output

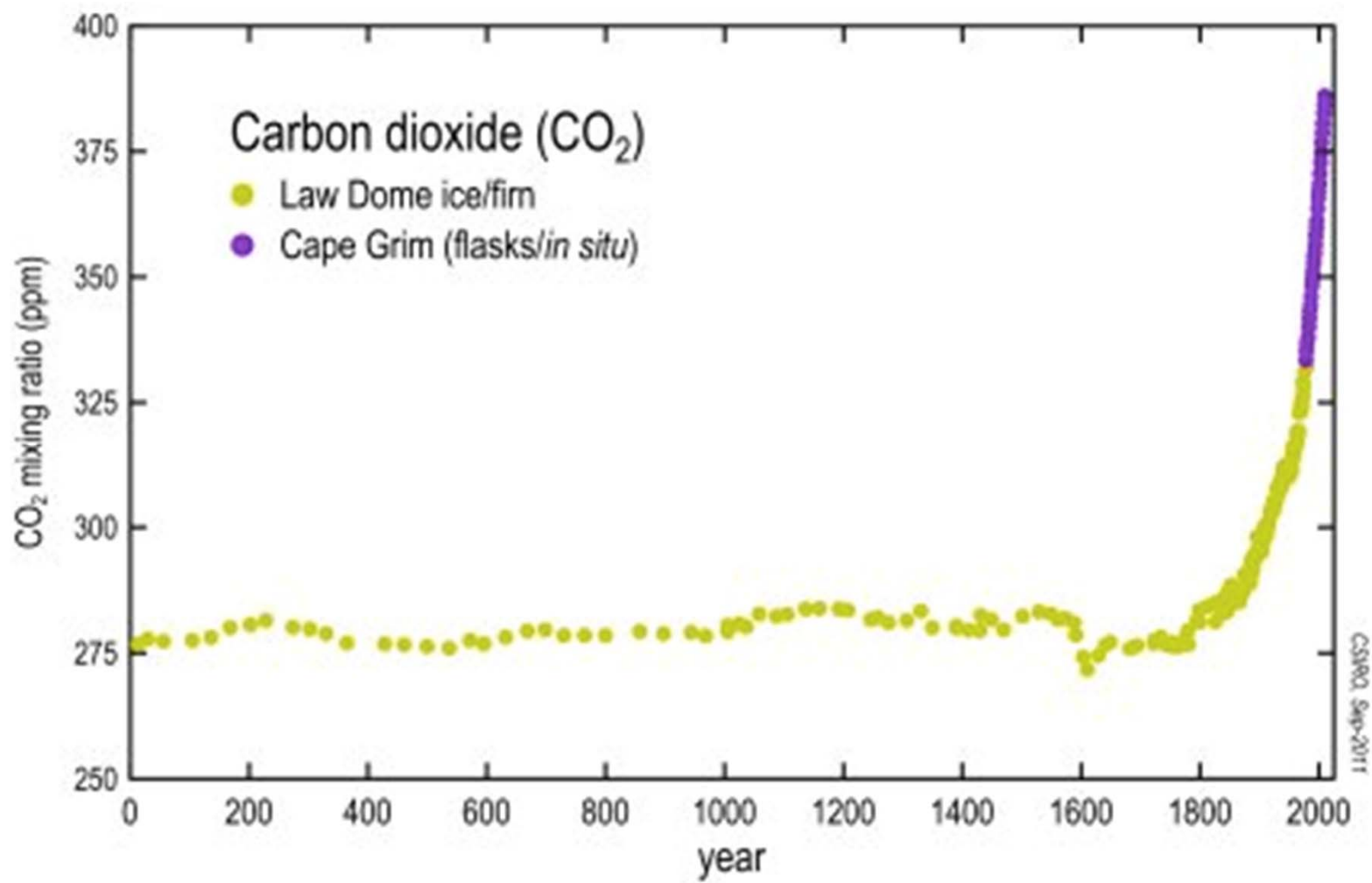


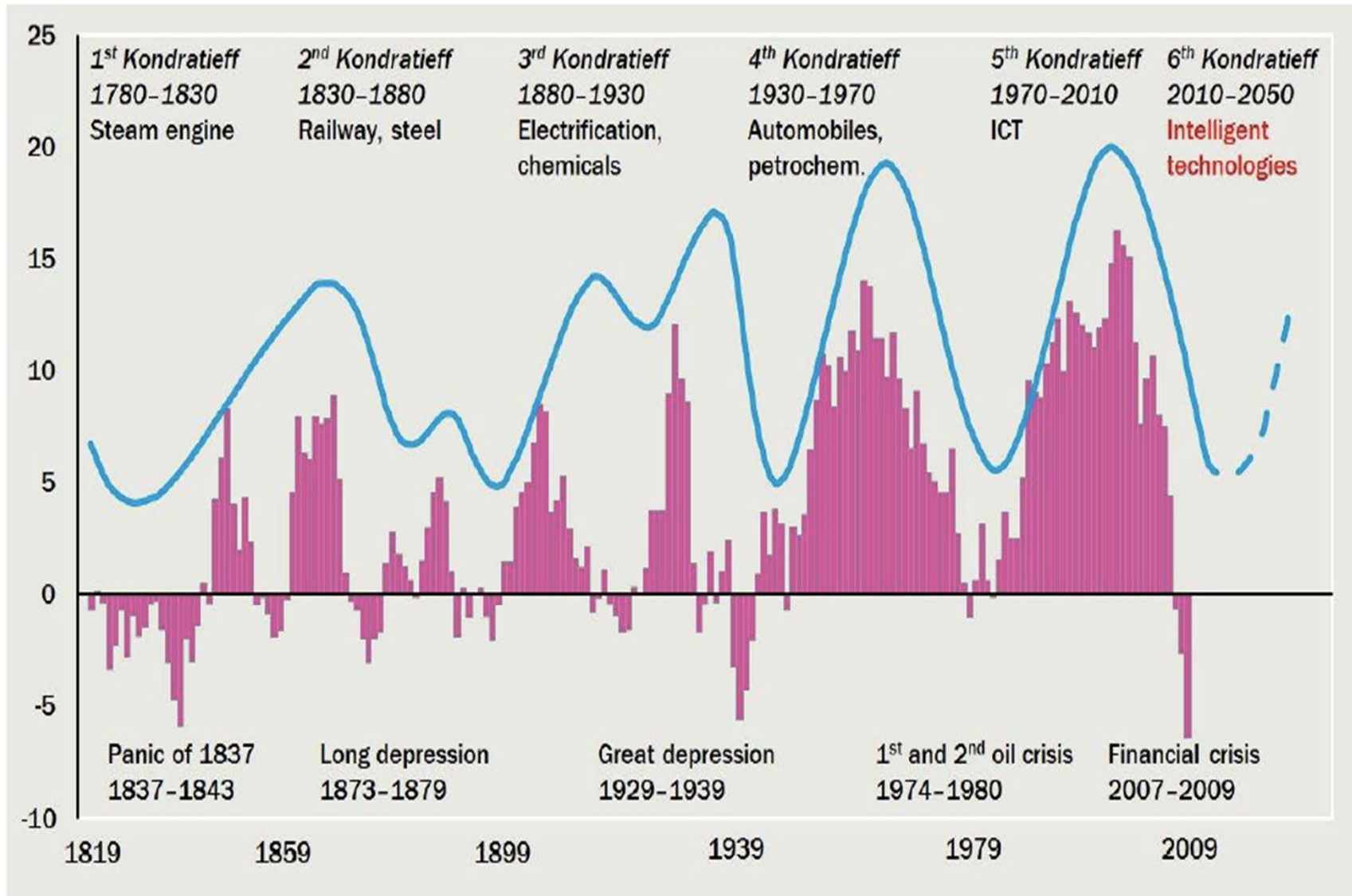
Gross World Product per Capita



Human Population in the Holocene



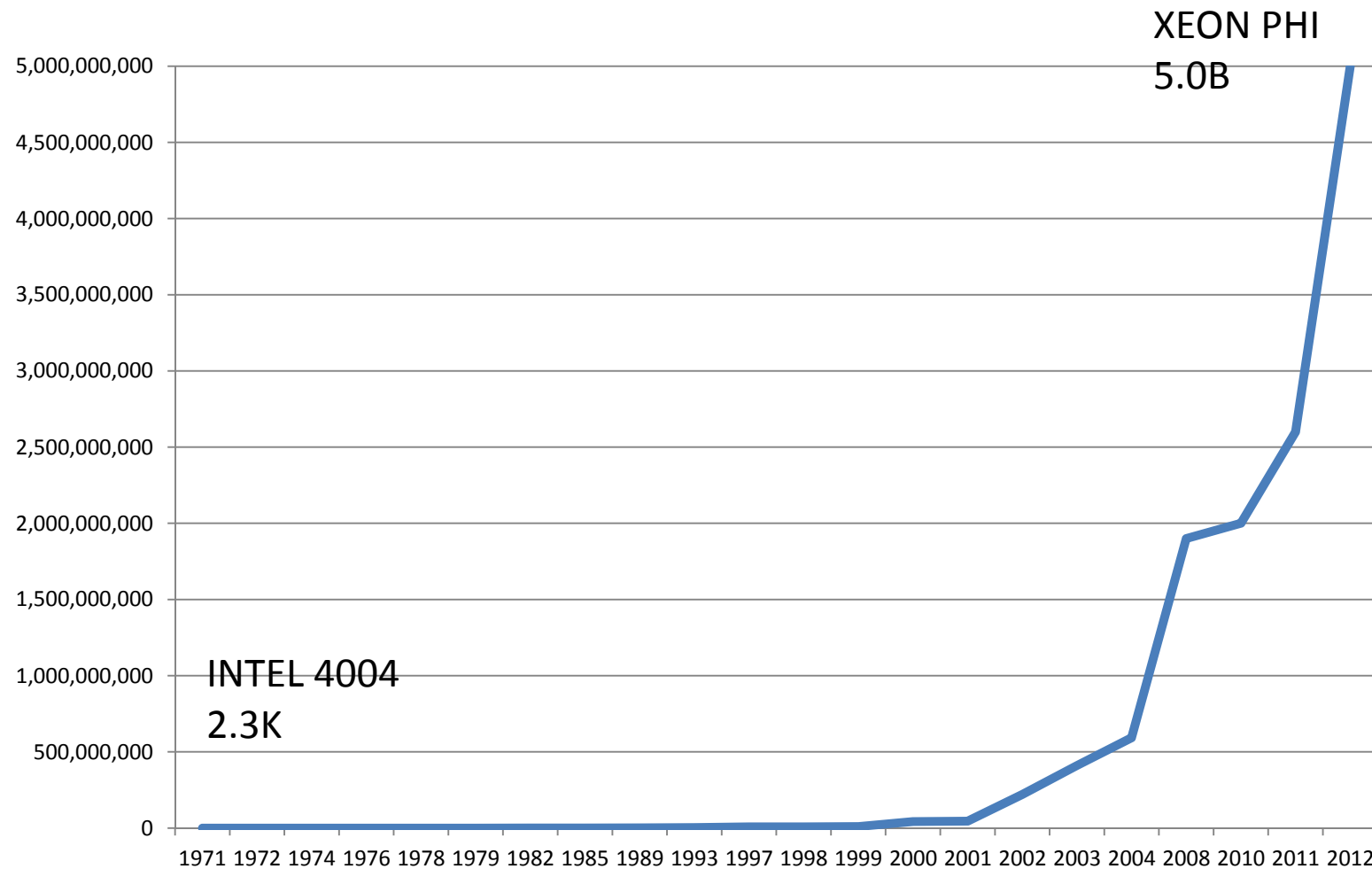




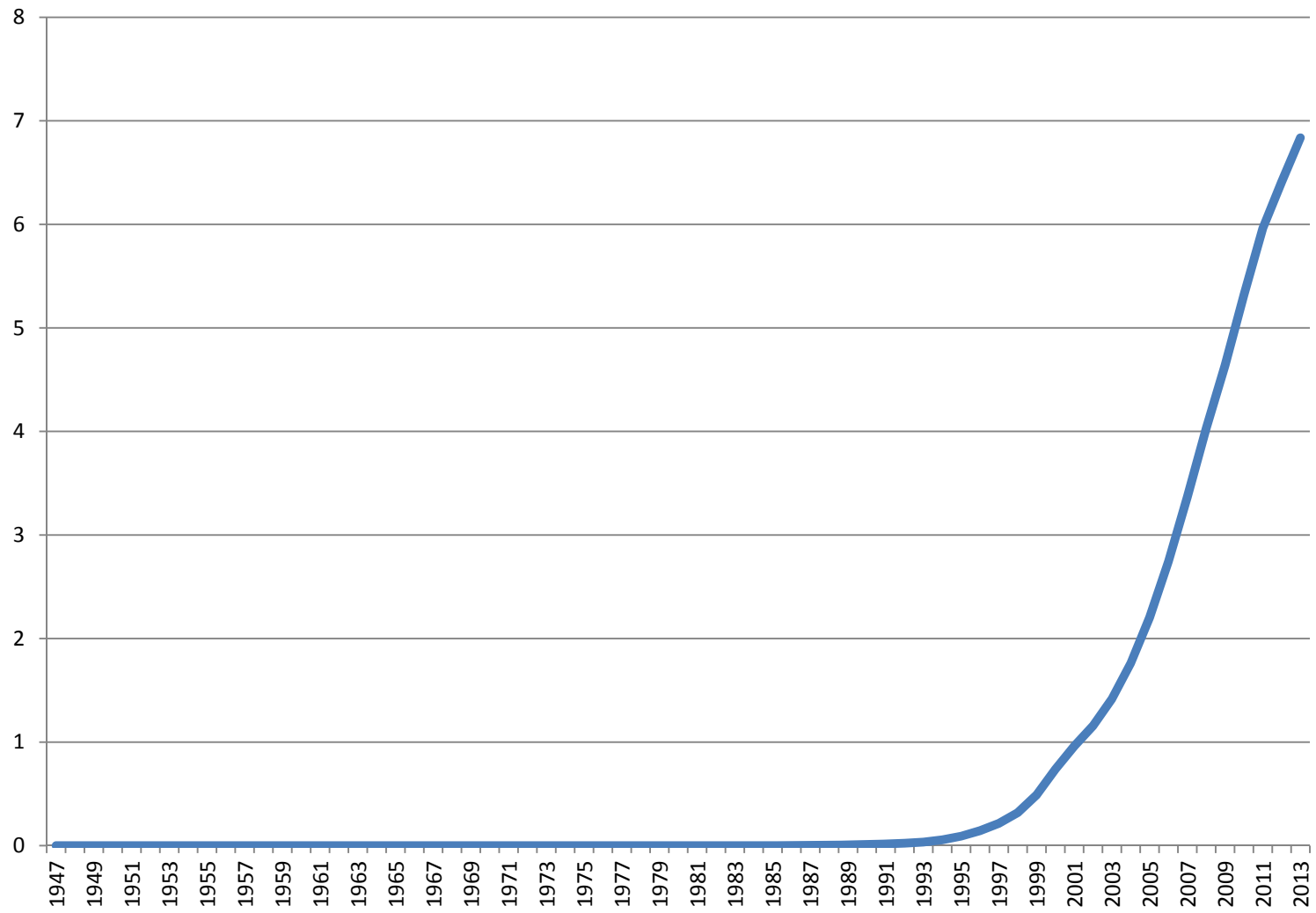
SIXTH WAVE SHOULD BE SUSTAINBLE GROWTH BUILT ON DIGITAL REVOLUTION

THE INFORMATION AGE

(TRANSISTOR COUNT ON INTEL MICROPROCESSORS)



Mobile Subscribers Worldwide, Billions



Shenzhen, 1980



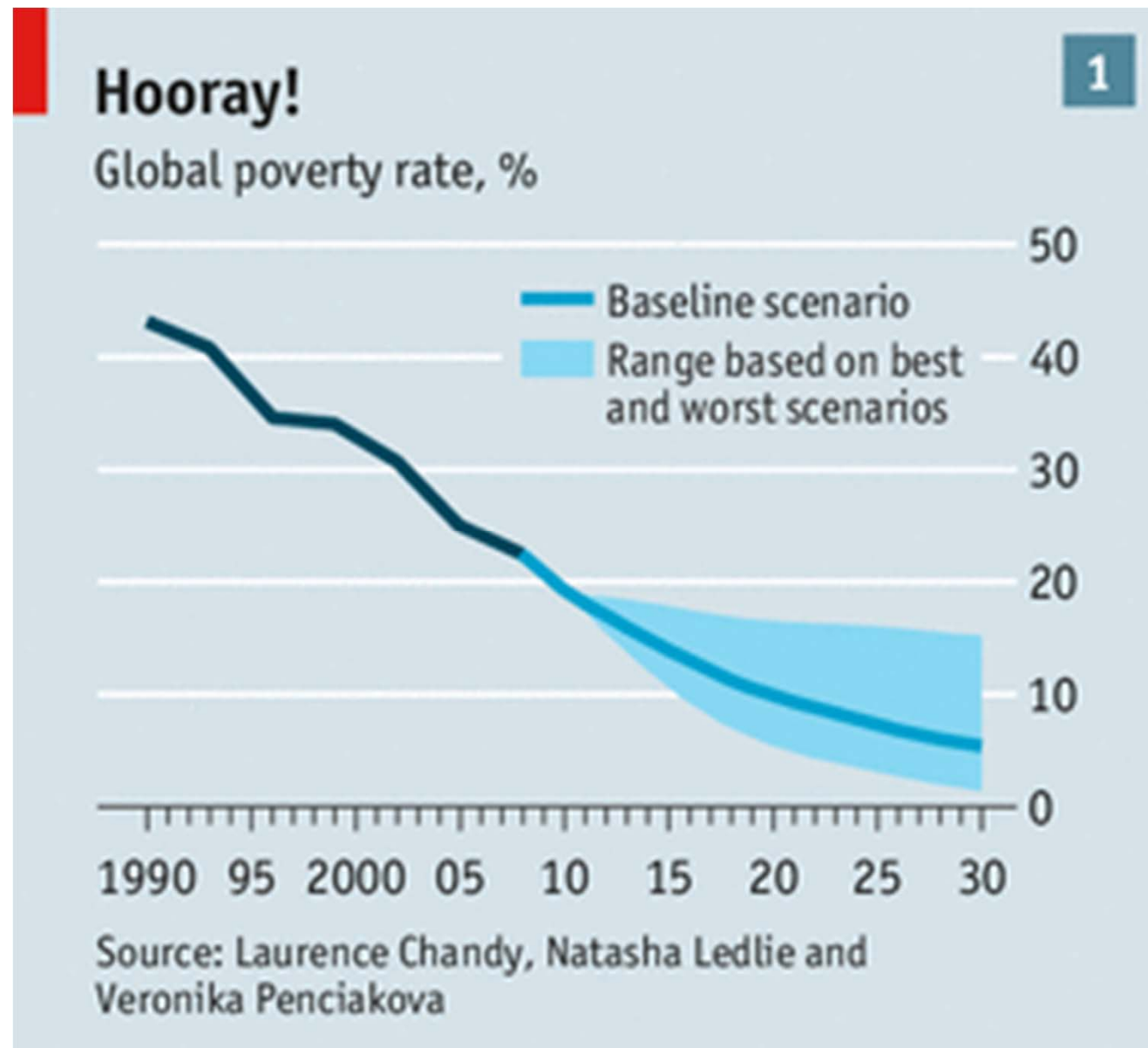
Shenzhen, 2013



A WORLD IN FLUX

1. GLOBAL-SCALE PRODUCTION SYSTEMS
2. RAPID ICT-ENABLED TECHNOLOGICAL CHANGE
3. RAPID POPULATION GROWTH IN AFRICA AND SOUTH ASIA AND AGING IN THE HIGH-INCOME COUNTRIES
4. WORLDWIDE DECLINE OF MIDDLE-SKILLED JOBS
5. EXTREME ENVIRONMENTAL CRISES
6. ECONOMIC AND GEOPOLITICAL MULTI-POLARITY

PROGRESS DURING THE MDG ERA



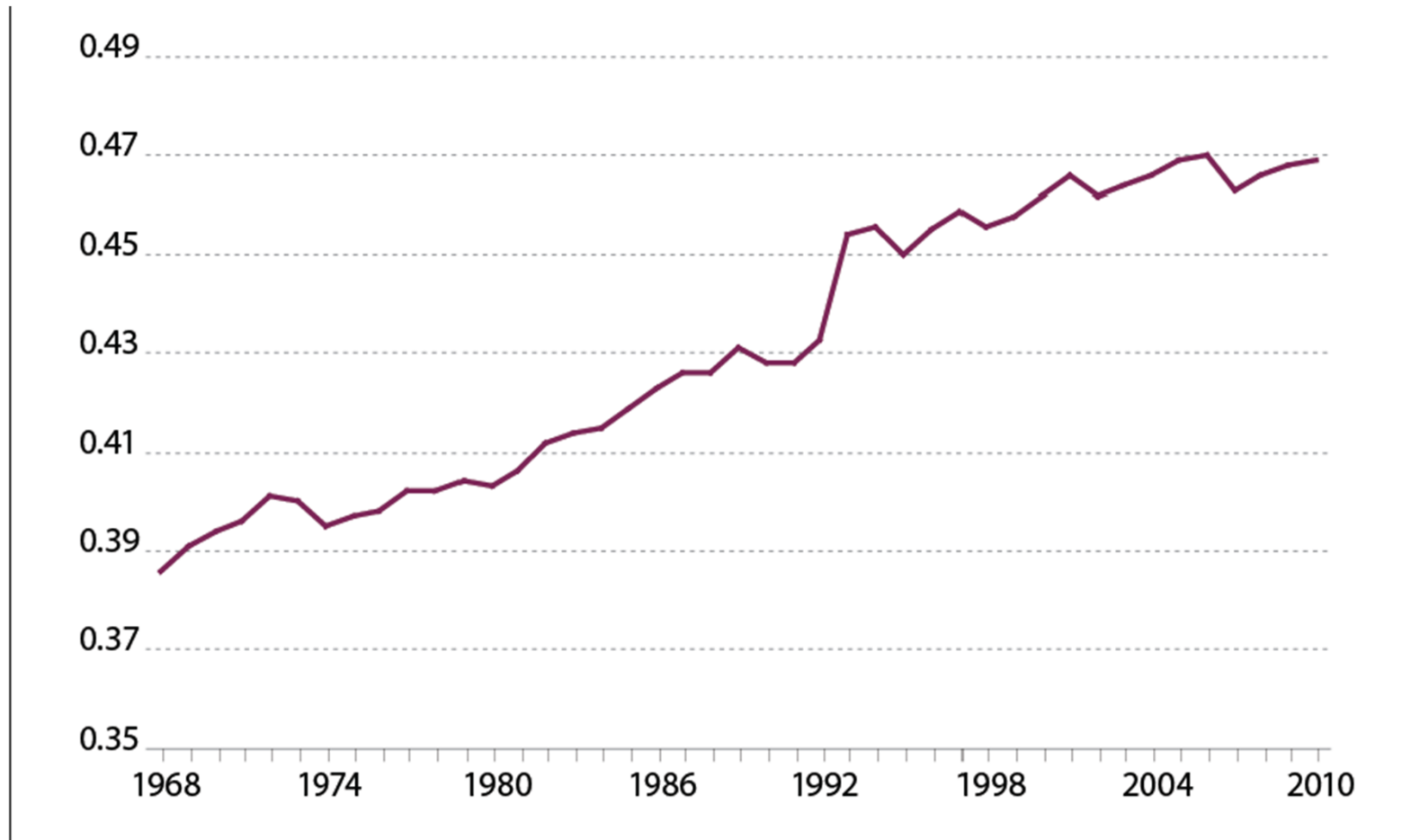
YET ECONOMIC GROWTH AND POVERTY
REDUCTION ARE HAMPERED BY THREE
LARGE HURDLES:

GROWING INCOME INEQUALITY AND
SOCIAL EXCLUSION

CONTINUED RAPID POPULATION GROWTH

GROWING ENVIRONMENTAL CRISES

GINI COEFFICIENT IN US, 1968-2010



SOURCE: US CONGRESSIONAL RESEARCH SERVICE 2012

GINI COEFFICIENT IN CHINA, 1981-2012



Sources: Gini coefficients for the years 1986–2001 are from Ravallion and Chen (2007), 2002 from Gustafsson et al. (2008), 2003–2012 from the National Bureau of Statistics.



Tunis, January 2011



Cairo, January 2011



Athens July 2011



Tel Aviv, August 2011



Chile, August 2011



New York City, November 2011



Madrid, September 2012



Istanbul, June 2013



Rio de Janeiro, June 2013

PERSISTENCE OF HIGH FERTILITY IN AFRICA

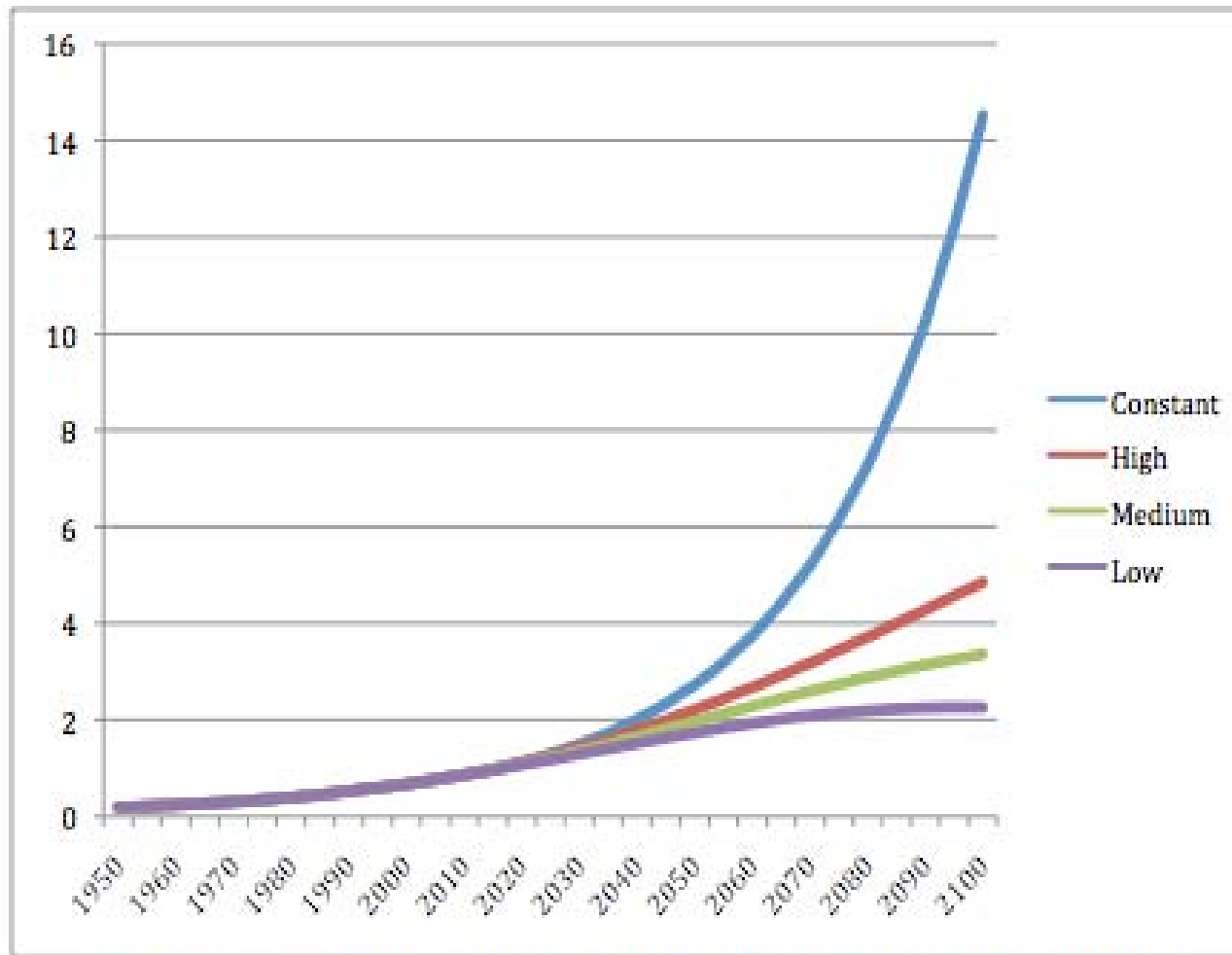
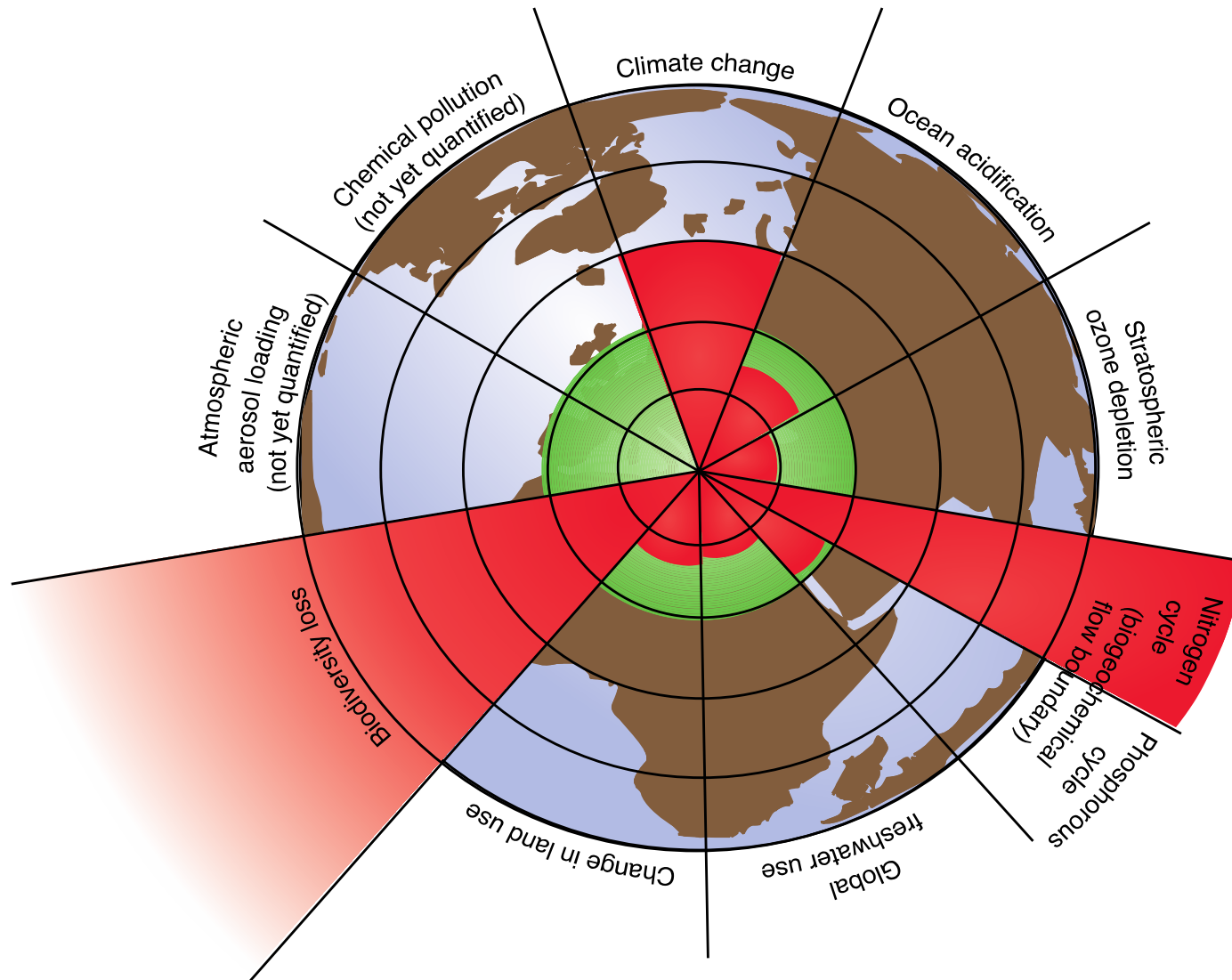


Figure 5.15: UN SCENARIOS FOR POPULATION IN SUB-SAHARAN AFRICA, 1950-2100

“PLANETARY BOUNDARIES”



Source: Rockström et al 2009a)



JAGUARY DAM, SAO PAULO STATE, JANUARY 2014



SUMATRA FOREST FIRES, MARCH 2014



BOSNIA, May 16 2014

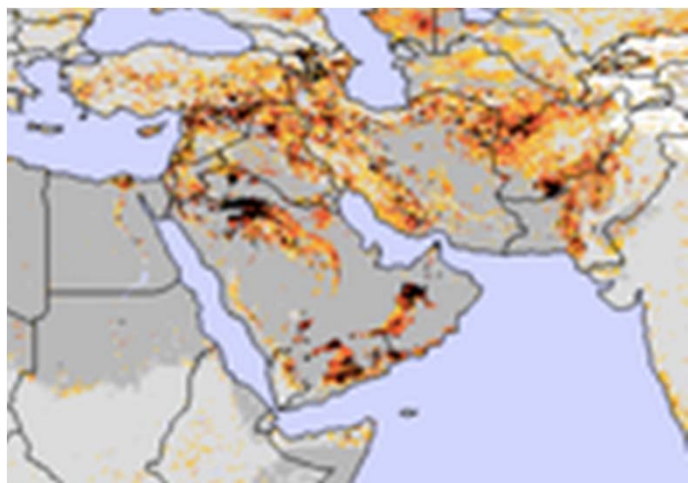
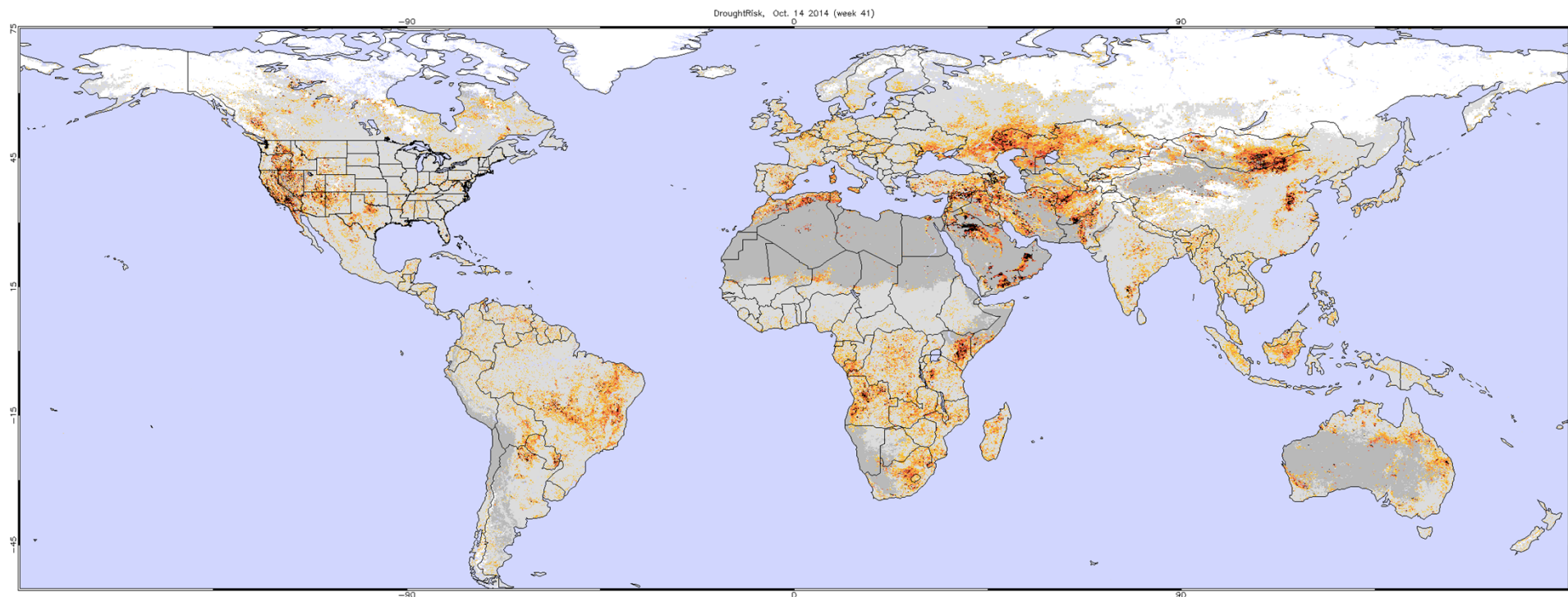


HIROSHIMA FLOODS, AUGUST 2014



STEVENS CREEK RESERVOIR, MAY 2014

CURRENT DROUGHT RISK MAP, OCTOBER 2014



INSET FOR THE MIDDLE EAST AND WEST ASIA

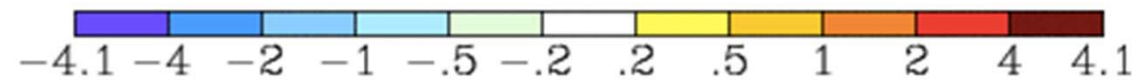
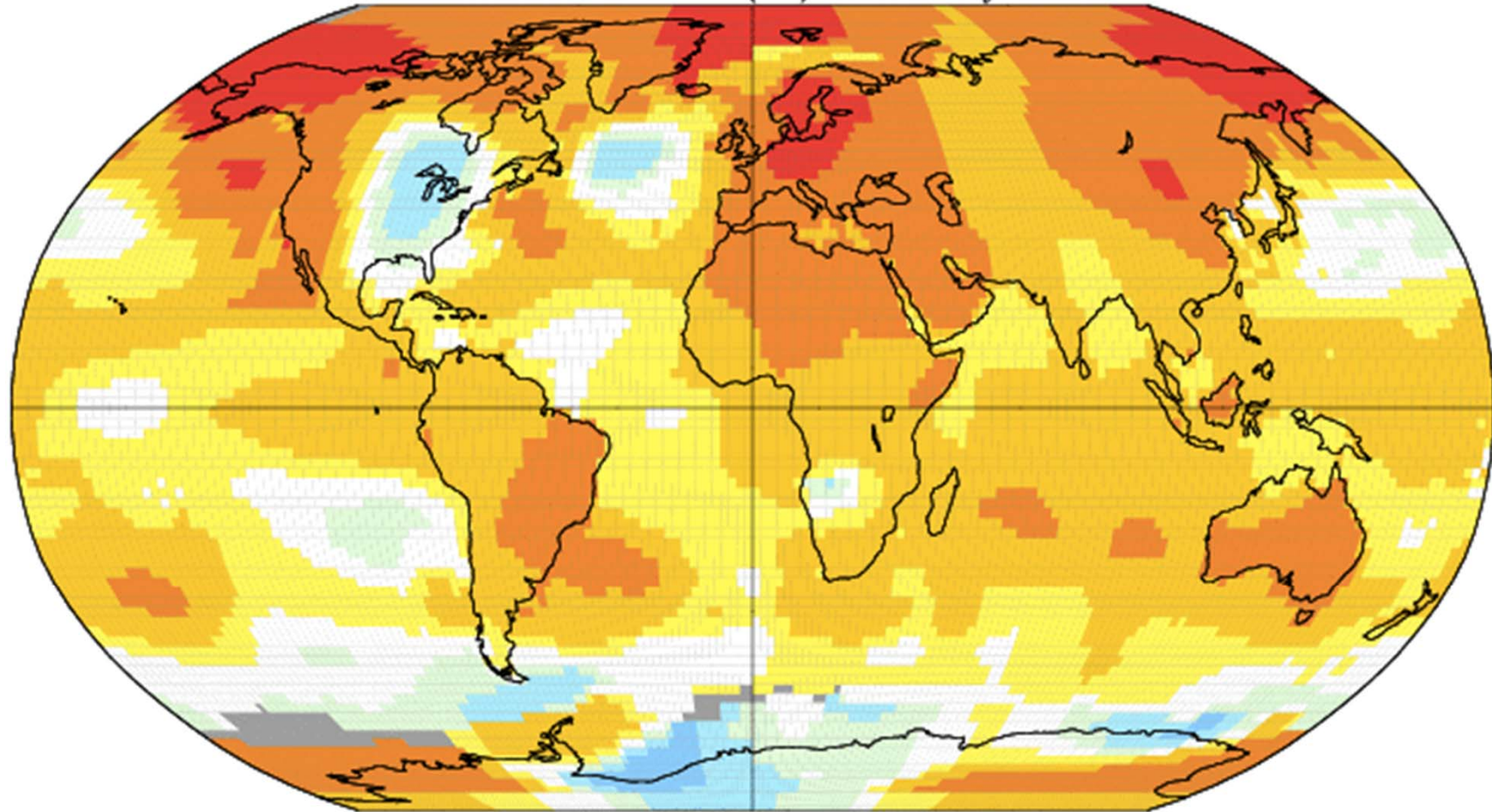
http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_browse.php

2014: Warmest Year on Instrument Record

Annual J-D 2014

L-OTI(°C) Anomaly vs 1951-1980

0.67



***Sustainable Development* as a Framework for Action**

Sustainable Development is the Holistic Integration of Economic, Social, and Environmental Objectives in an Approach to Scientific Analysis, Governance, Problem Solving, and Human Action

The UN Member States are now negotiating **Sustainable Development Goals (SDGs)** to be adopted in September 2015

2015 is the Decisive Year for Setting Sustainable Development Goals

Financing for Sustainable Development (Addis
Ababa, July 2015)

Sustainable Development Goals
(UN HQ, September 2015)

Climate Change Agreement at COP21
(Paris, December 2015)

SDG PRIORITIES

(CONSOLIDATING THE 17 STATED PRIORITIES OF THE UN GENERAL ASSEMBLY)

1. END POVERTY AND HUNGER
2. HEALTH FOR ALL
3. EDUCATION FOR ALL
4. REDUCE ECONOMIC INEQUALITIES; END GENDER INEQUALITIES
5. SUSTAINABLE GROWTH AND DECENT JOBS
6. SUSTAINABLE INFRASTRUCTURE
7. SUSTAINABLE CITIES
8. STOP HUMAN-INDUCED CLIMATE CHANGE
9. CONSERVE MARINE AND TERRESTRIAL ECOSYSTEMS
10. GOOD GOVERNANCE AND GLOBAL PARTNERSHIPS

Challenges to Meet the Sustainable Development:

Rapid Technological Transformation

Equity in Social Service Provision

Community Protection of Natural Resources

Strengthening of Local Governance

Sharing Work, Learning, and Leisure

Restraining Arbitrary Corporate Power

Responsible investing and Financial Markets

Re-Democratizing Our Democracies

Identifying Shared Global Values

CRITICAL “SUSTAINBLE SYSTEMS” PRIORITIES:

SUSTAINABLE ENERGY SYSTEMS

SUSTAINABLE AGRICULTURE AND NUTRITION

SUSTAINABLE URBANIZATION (“SMART CITIES”)

WILL NEED TECHNOLOGICAL BREAKTHROUGHS

NEED NEW GLOBAL PUBLIC-PRIVATE PARTNERSHIPS
(PPPs) FOR SUSTAINABLE TECHNOLOGIES:

LOW-CARBON ENERGY SYSTEMS

RESILIENT AND SUSTAINABLE AGRICULTURE

SMART ICT-ENABLED URBAN SYSTEMS

ICT-ENABLED HEALTH, EDUCATION, GOVERNANCE

EXAMPLES OF DIRECTED SCIENCE AND TECHNOLOGY:

VACCINES, MEDICINES, AND DIAGNOSTICS

RADAR

CRYPTOGRAPHY

NUCLEAR ENERGY

COMPUTING

SEMICONDUCTORS

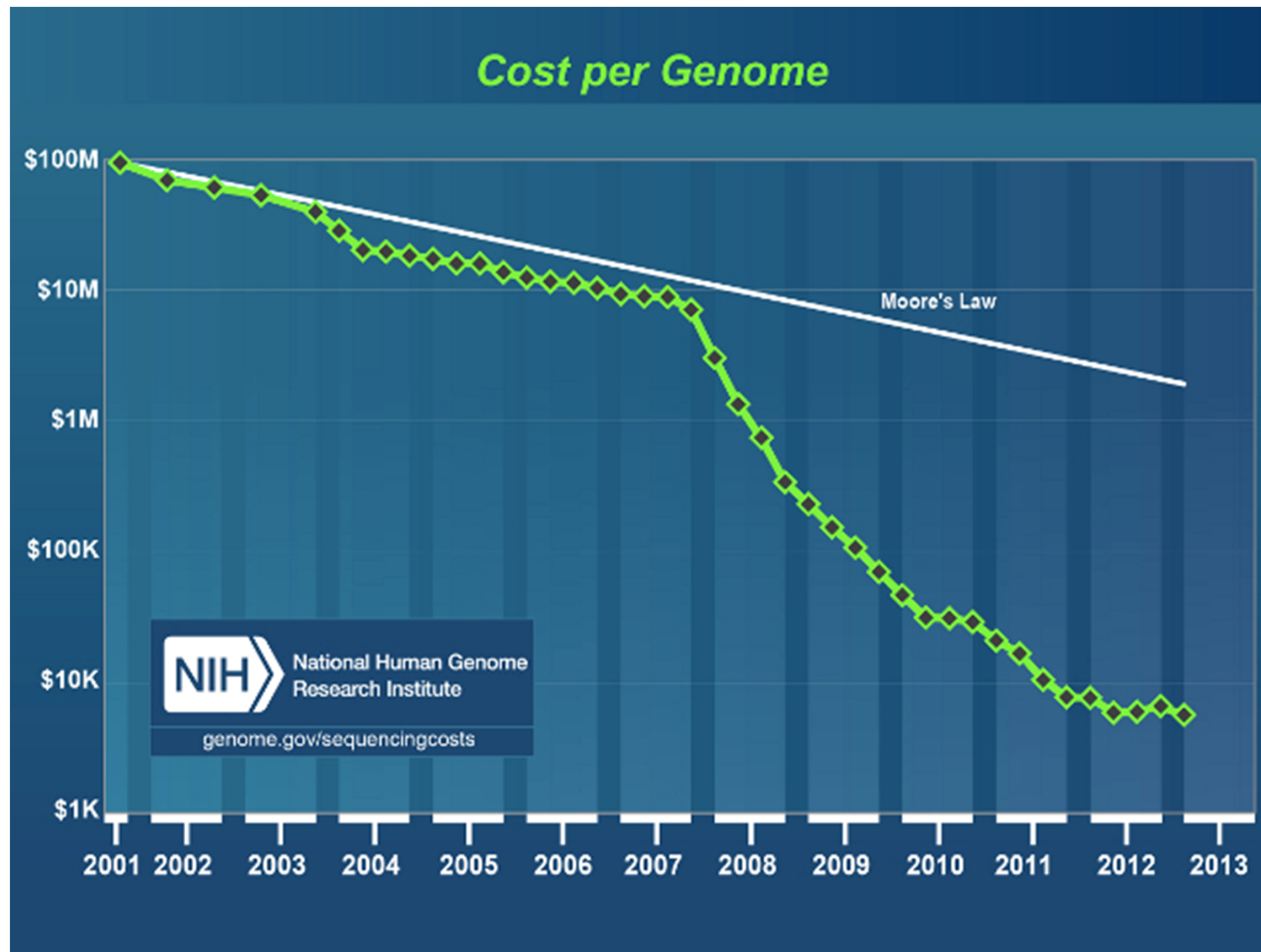
SATELLITES AND SPACE SCIENCE

INTERNET

HUMAN GENOME PROJECT

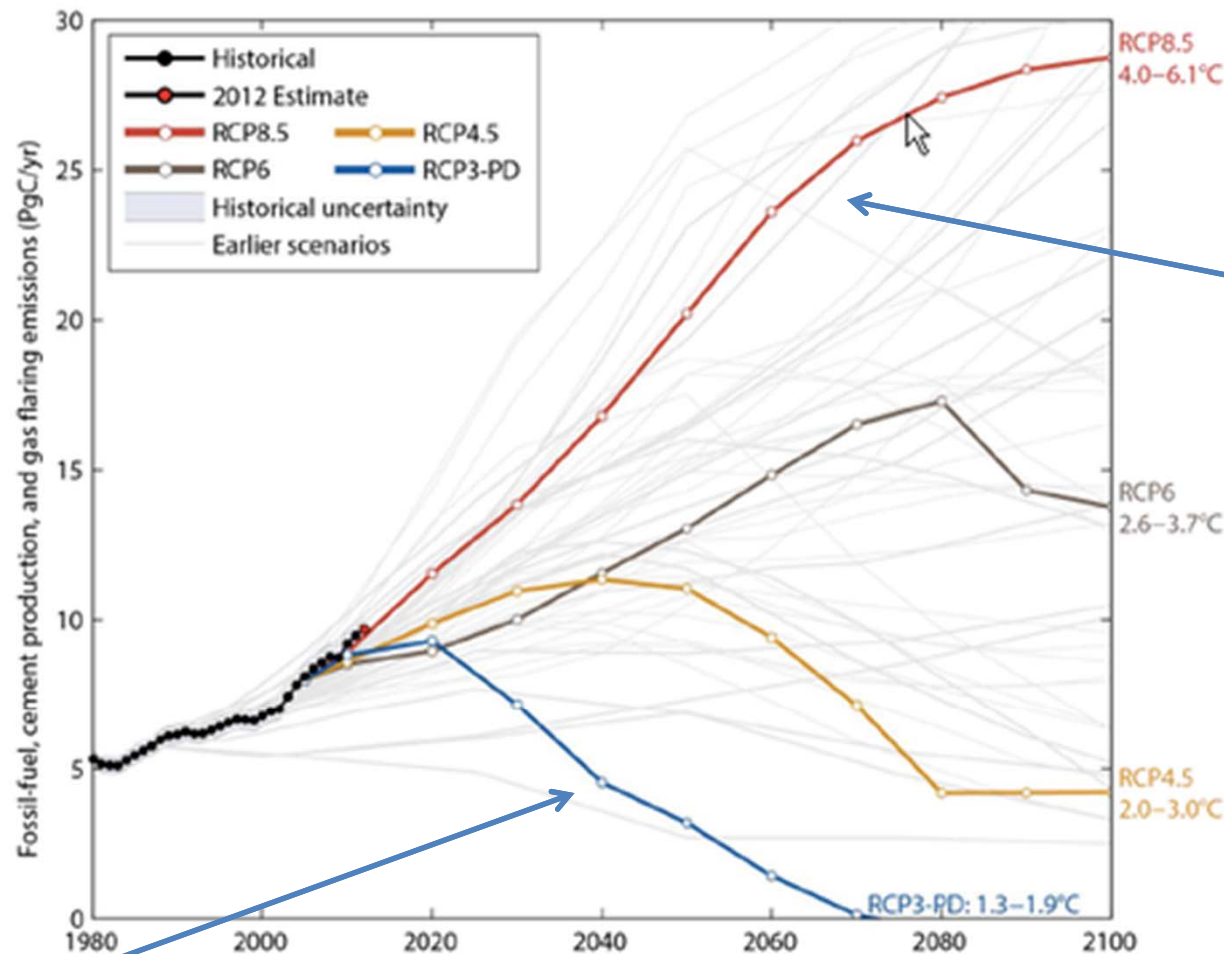
HIGGS BOSON (CERN)

BRAIN INITIATIVE



HALVING OF COST ROUGHLY EVERY NINE MONTHS

Emissions are heading to a 4.0-6.1°C “likely” increase in temperature
Large and sustained mitigation is required to keep below 2°C



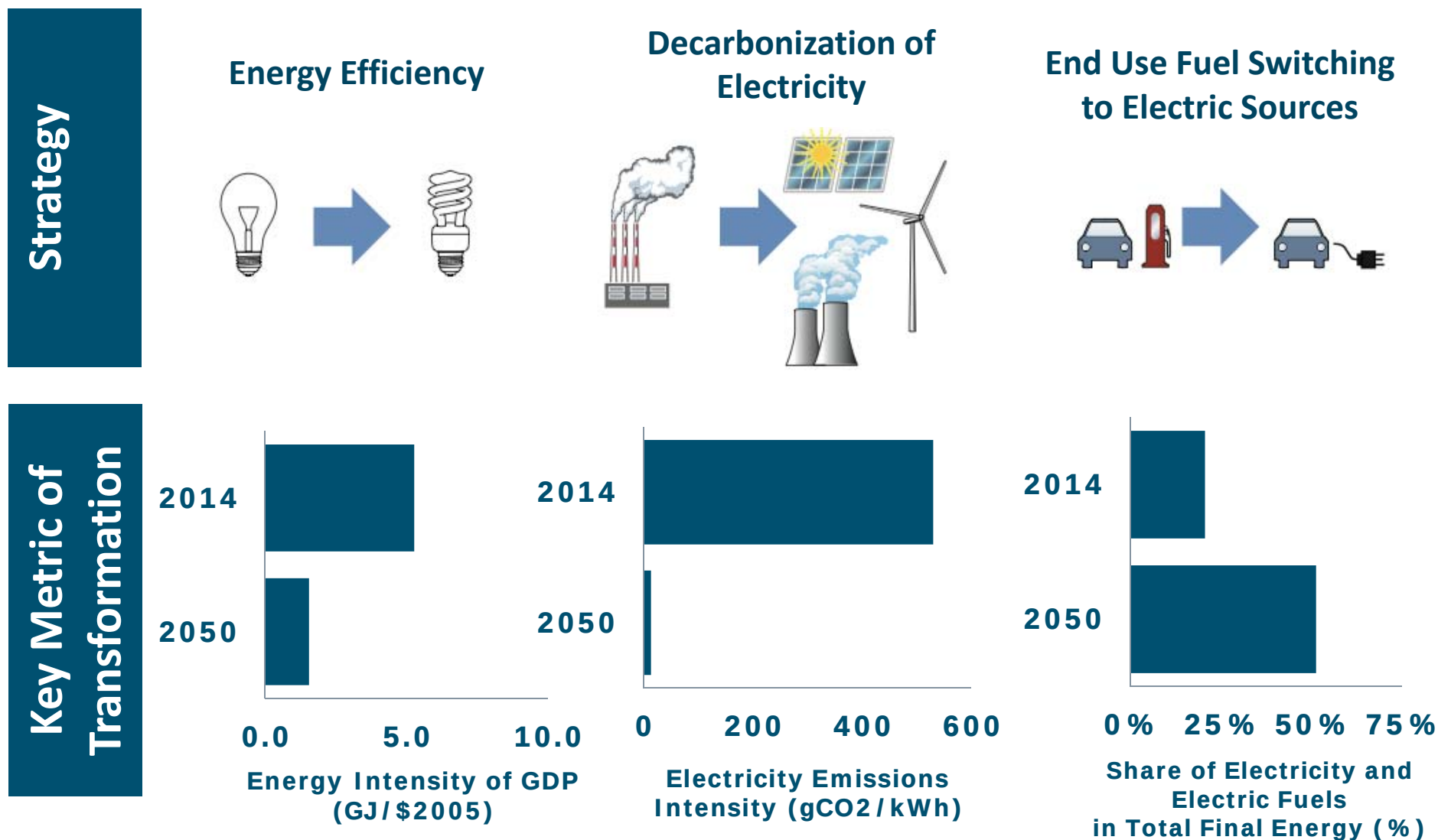
BAU:
4-6 degree C

Linear interpolation is used between individual datapoints

2-degree C

Source: [Peters et al. 2012a](#); [Global Carbon Project 2012](#);

Main Decarbonization Strategies



THE WORLD WILL NEED TO STRAND OIL, GAS, AND COAL RESERVES

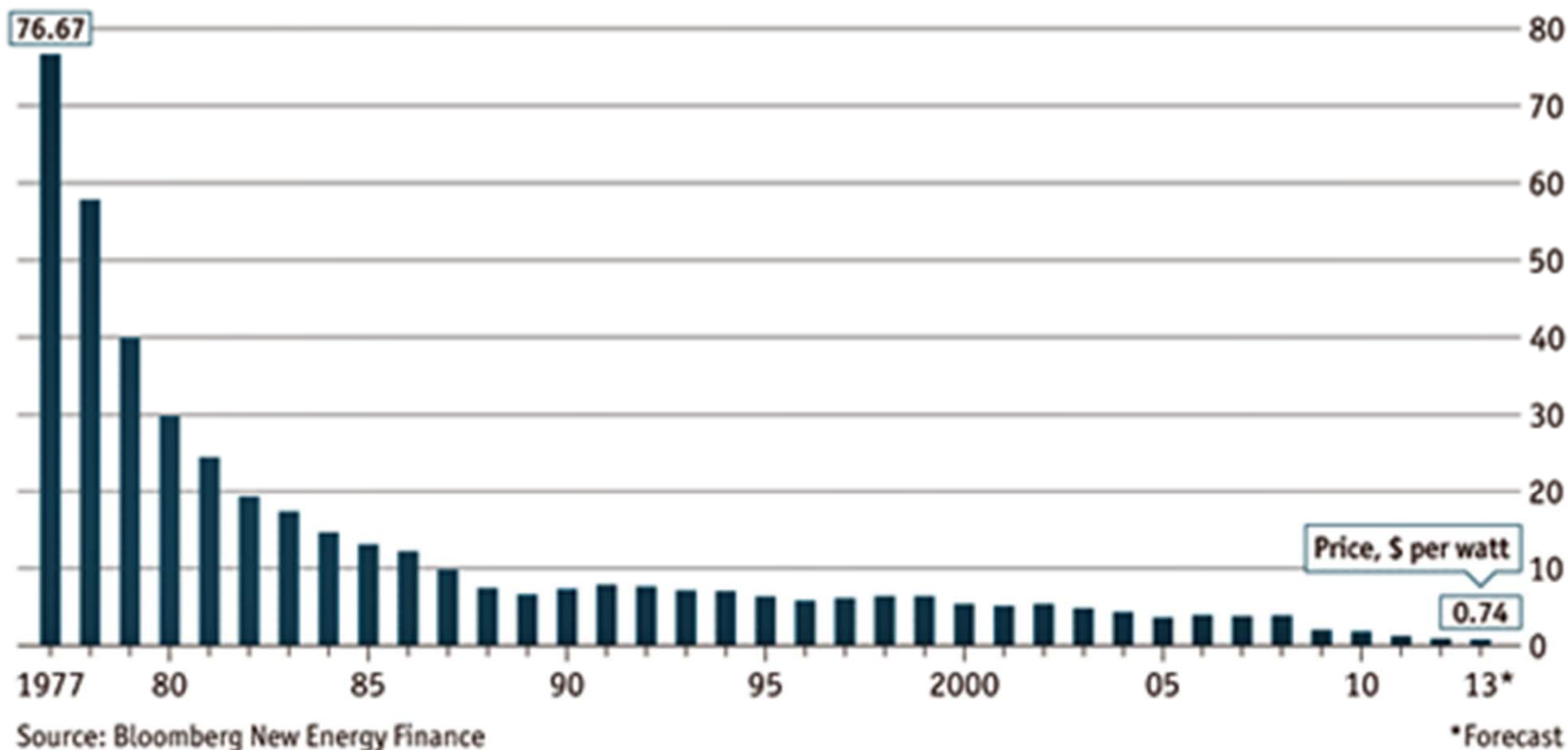
Table 1 | Regional distribution of reserves unburnable before 2050 for the 2 °C

Country or region	2 °C with CCS					
	Oil		Gas		Coal	
	Billions of barrels	%	Trillions of cubic metres	%	Gt	%
Africa	23	21%	4.4	33%	28	85%
Canada	39	74%	0.3	24%	5.0	75%
China and India	9	25%	2.9	63%	180	66%
FSU	27	18%	31	50%	203	94%
CSA	58	39%	4.8	53%	8	51%
Europe	5.0	20%	0.6	11%	65	78%
Middle East	263	38%	46	61%	3.4	99%
OECD Pacific	2.1	37%	2.2	56%	83	93%
ODA	2.0	9%	2.2	24%	10	34%
United States of America	2.8	6%	0.3	4%	235	92%
Global	431	33%	95	49%	819	82%

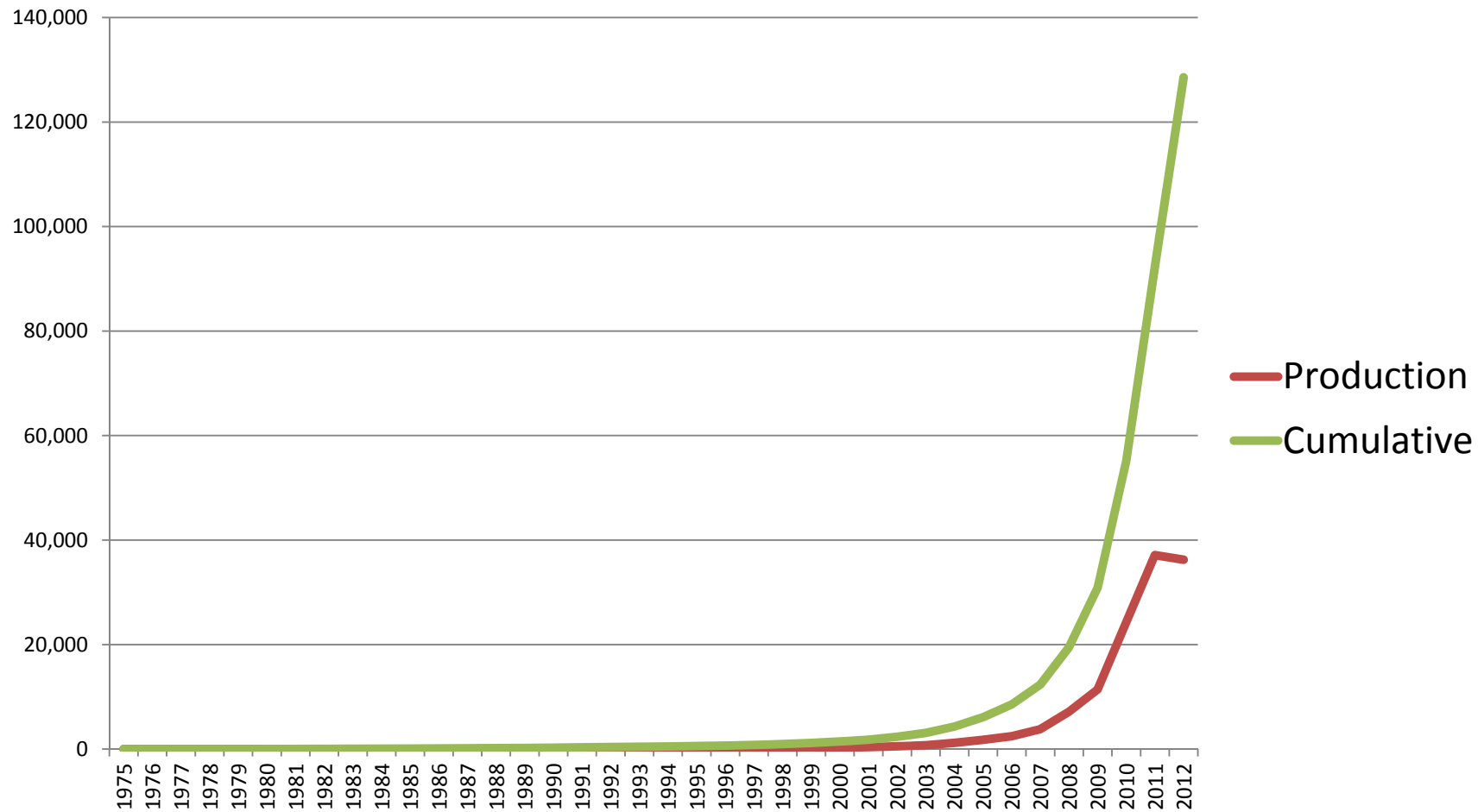
FROM McGLADE AND EKINS, NATURE MAGAZINE, JANUARY 8, 2015

The Swanson effect

Price of crystalline silicon photovoltaic cells, \$ per watt



Solar PV: Annual and Cumulative Production (MW)



KEY ROLES OF SUSTAINABLE DEVELOPMENT DISCIPLINES

(1) Understanding Mechanisms: climate, biodiversity, economic dynamics

(2) Monitoring and mapping Earth system states

(3) Developing integrated physical-human systems for the “green economy”

(4) Assisting directed technological change e.g. “deep decarbonization,” ICT-based health and education, sustainable agriculture, smart cities

(5) Leading public and university education, and building a shared global framework for action

Some Recent Alliances for Sustainable Development

- Earth League
- UN SDSN
- SDSN.Edu and MDP
- DDPP
- PPPs for Low-Carbon Technology

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