Ideas that are Changing the World

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9th November 2011

Club of Rome
New Delhi, India

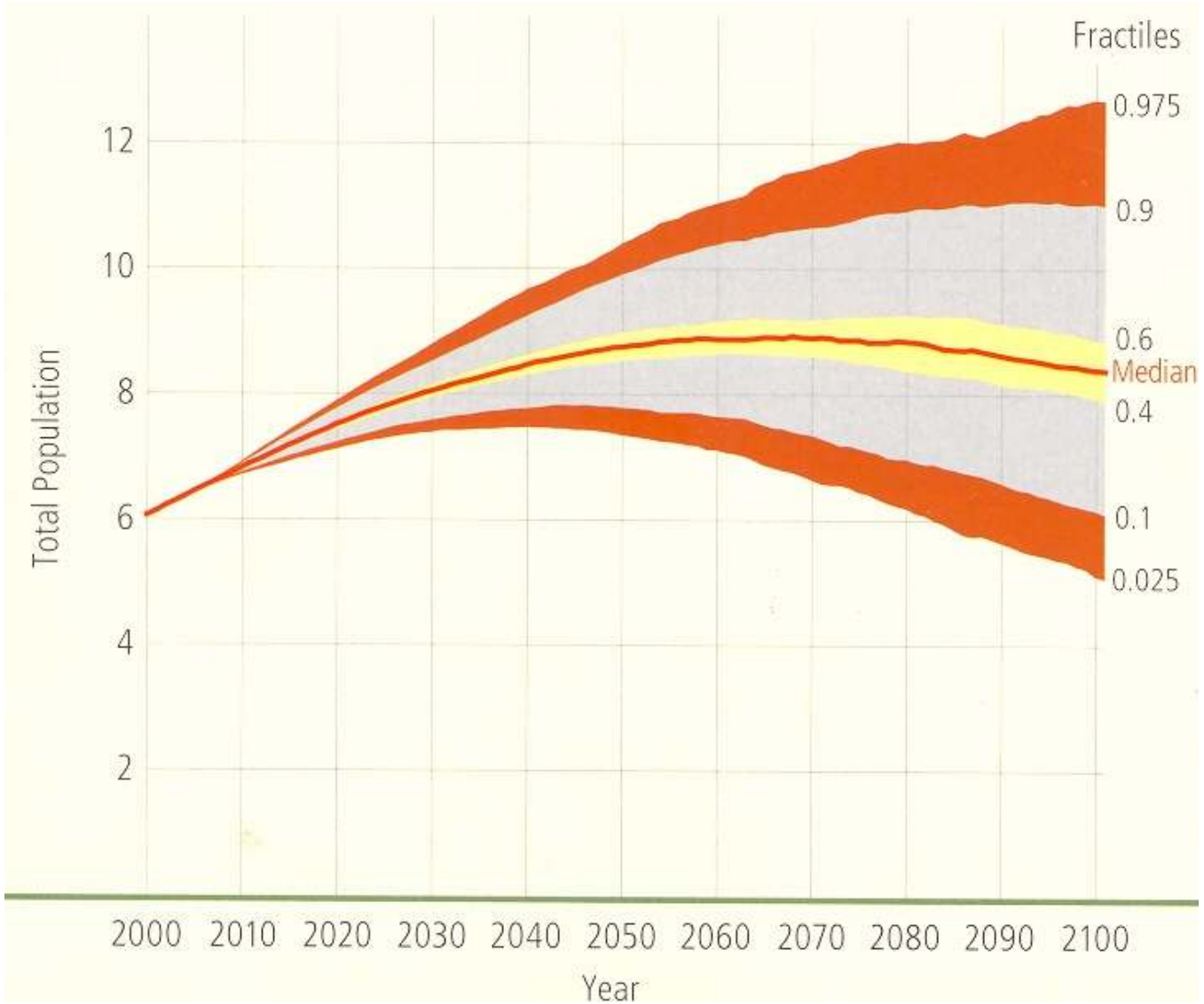
The Loess Plateau, China

Source: CSIRO

Loess Plateau

Source: EARTH'S HOPE The Lessons of the Loess Plateau - John D. Liu, EEMP www.eemp.org

Total Population of the World in Billions



Source: IIASA

21st Century Challenges

Minerals

Food production

Climate change

Conflict and terrorism

Population – the driver

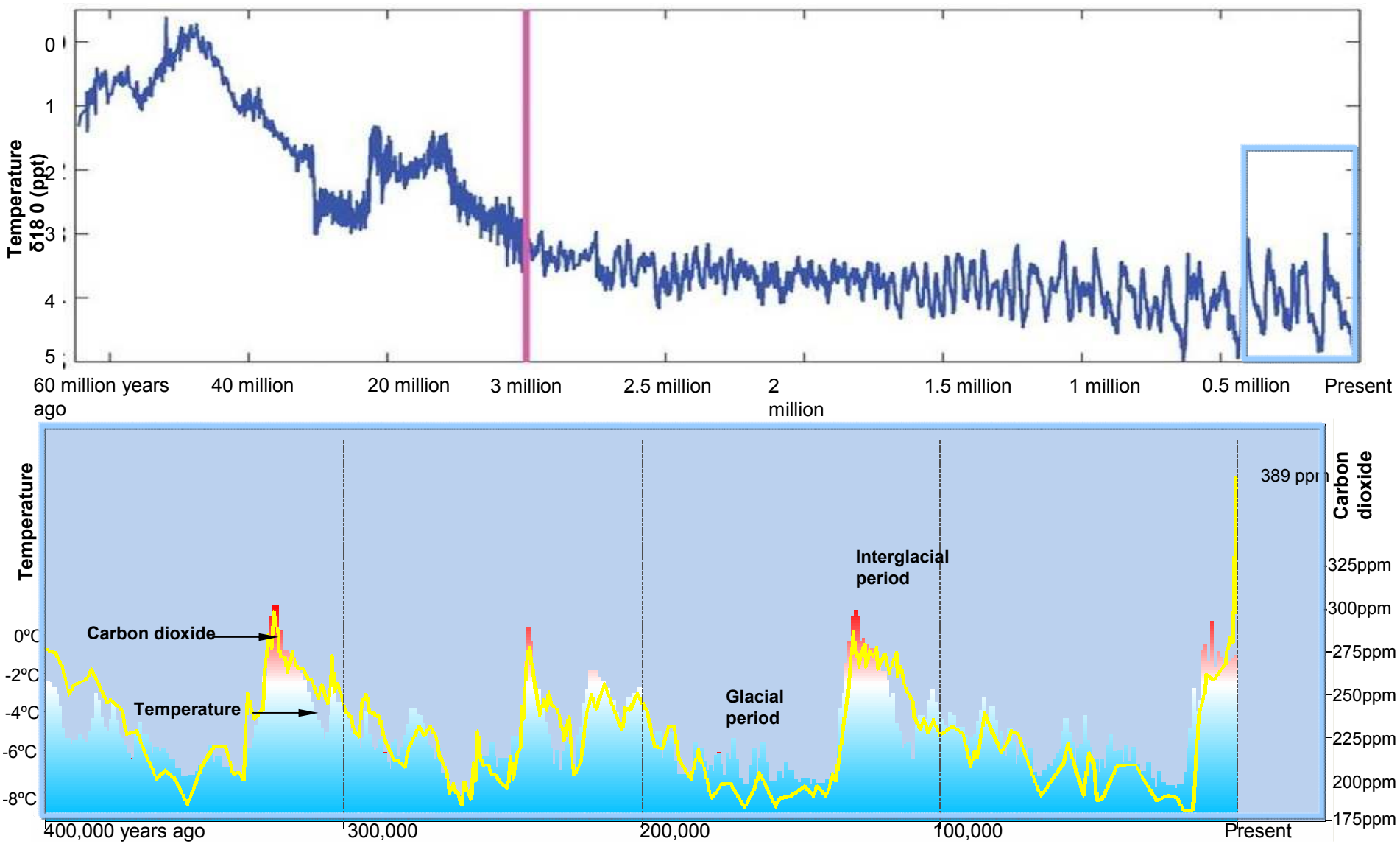
Ecosystems

Water resource

Health and development

Energy security and supply

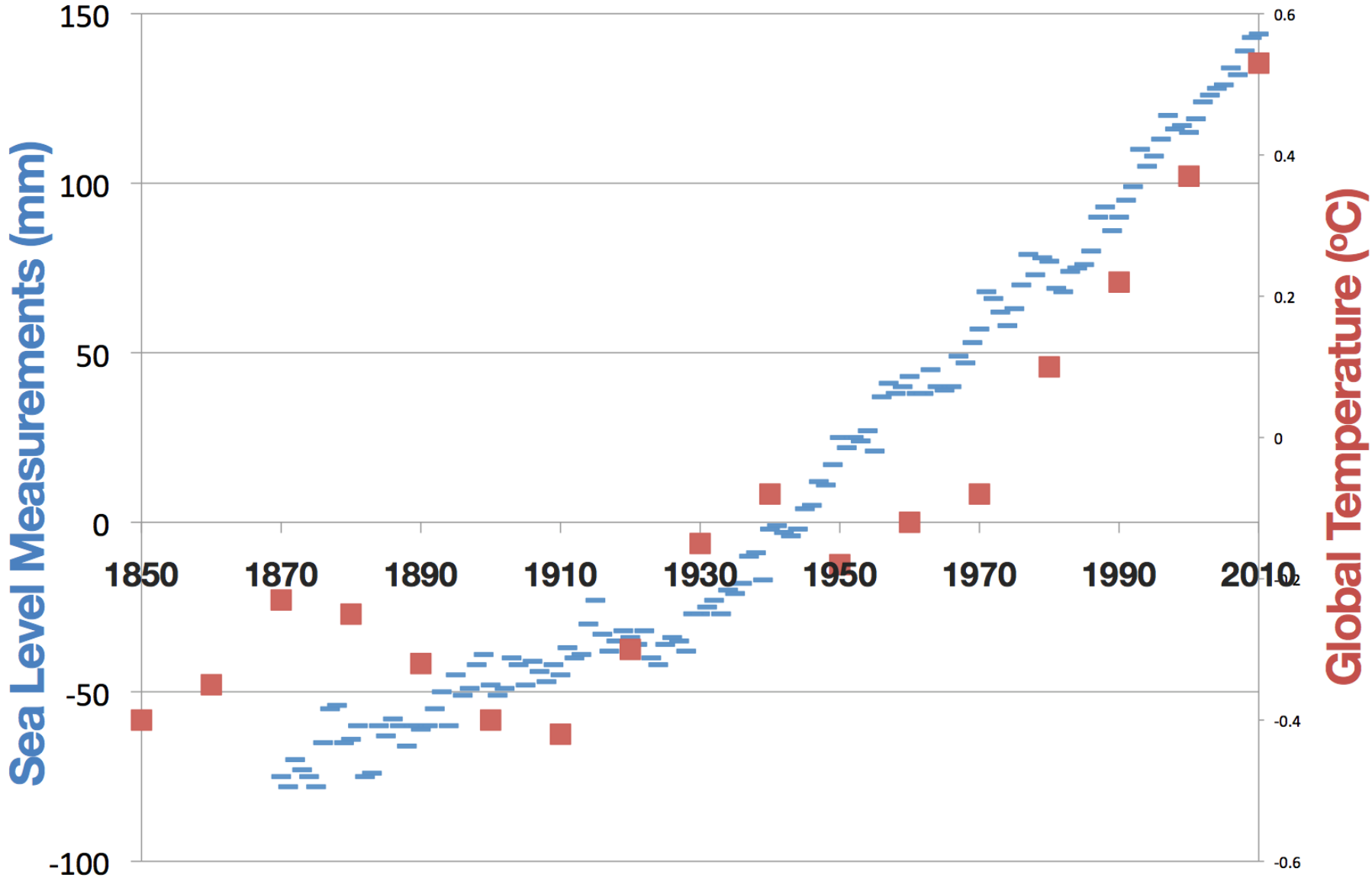
Observed Global Temperatures



Source: Fedorov et al. Science 2006, 312, 1485

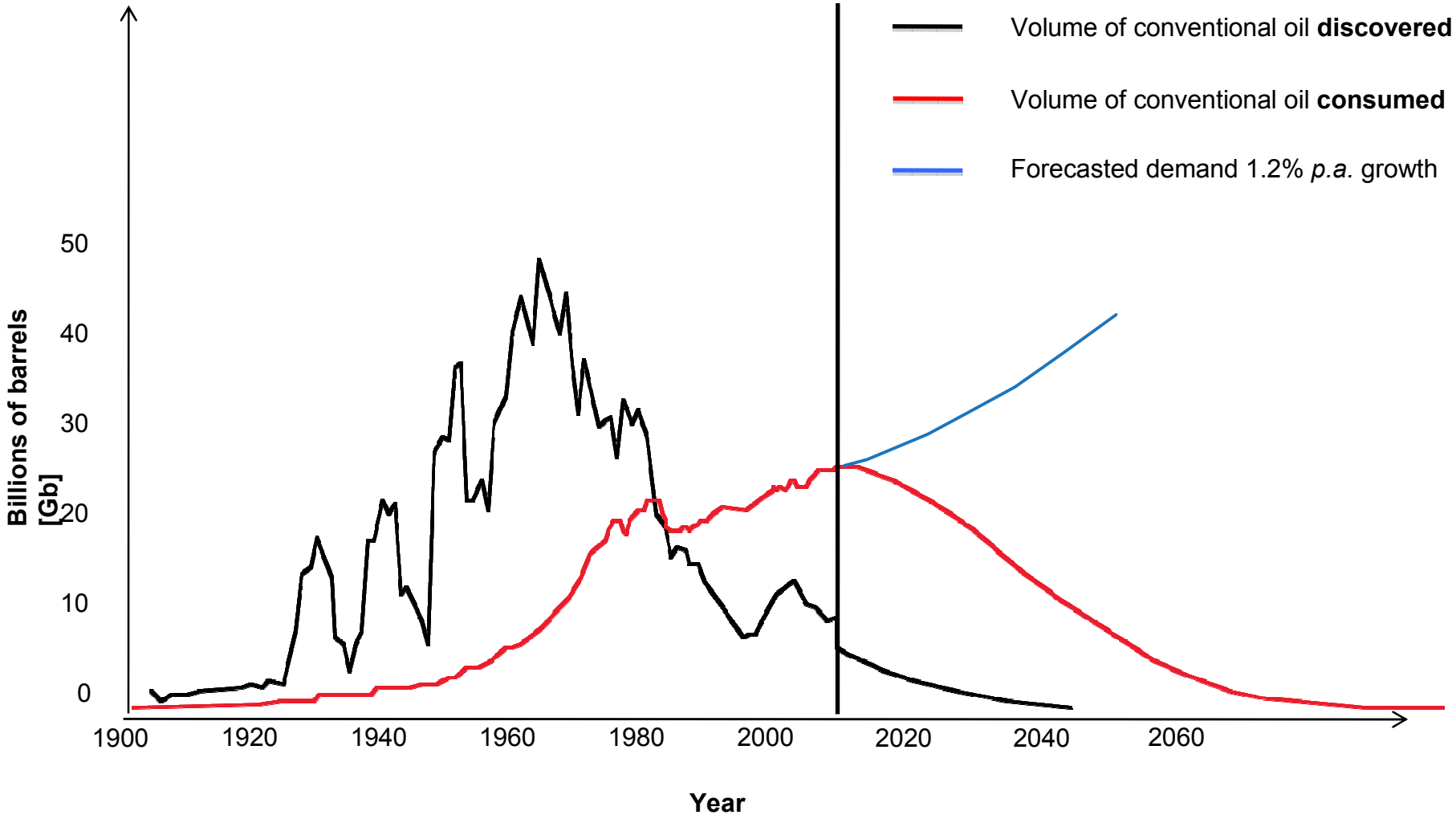
Source: ML Design. From "The Complete Ice Age: How Climate Change Shaped the World" edited by Brian Fagan, Thames & Hudson Ltd., London, 2009

Sea Level and Temperature Measurements



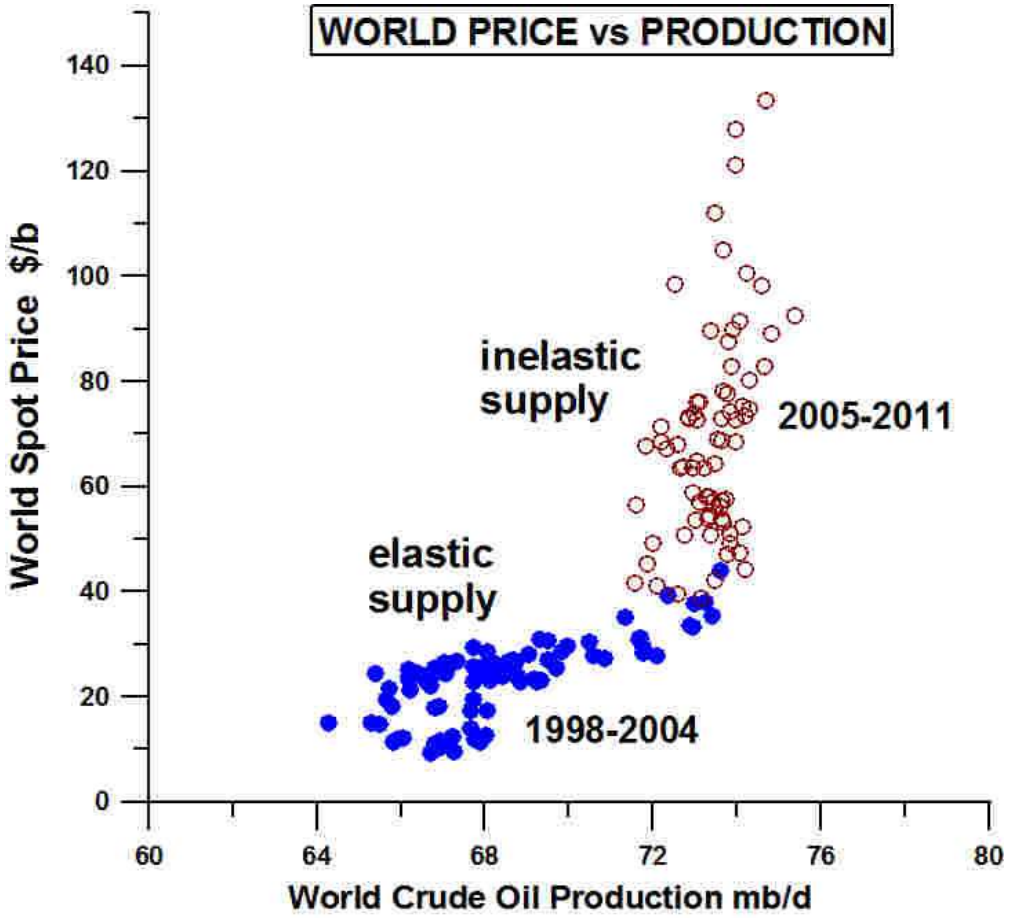
Source: Met Office & Proudman Oceanographic Laboratory Liverpool

Conventional Oil Supply and Demand



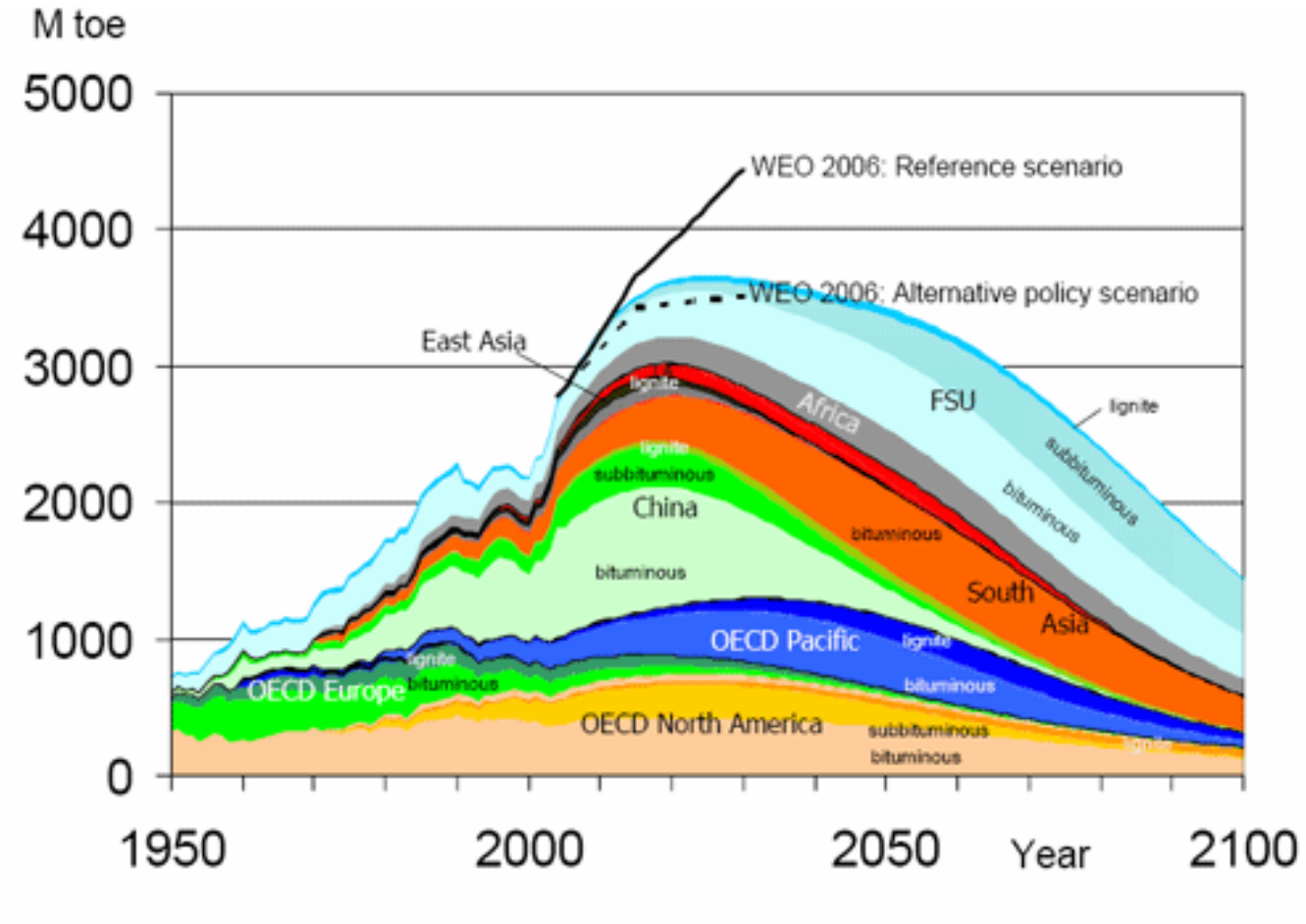
Source: N.A. Owen, O.R. Inderwildi and D.A King, 'The status of conventional world oil reserves - Hype or cause for concern?' (2010) Energy Policy, doi:10.1016/j.enpol.2010.02.026

Crude Oil Price versus Crude Oil Production from 1998 to present



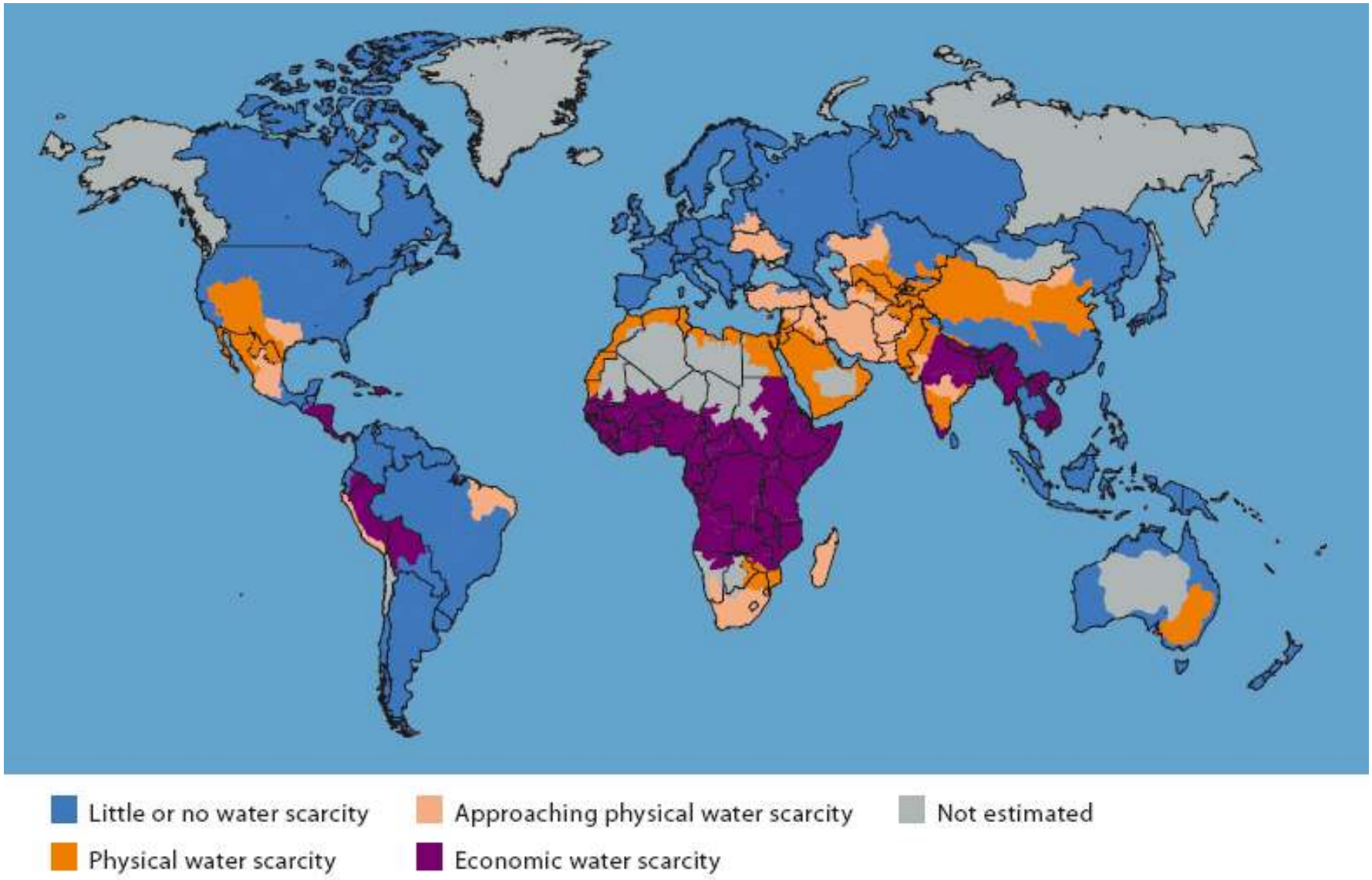
Source: James Murray, (2011) Fossil Fuel Hydrocarbon Energy, Economic Growth and Climate Change, Policy Forum

Coal: Resources and Future Production



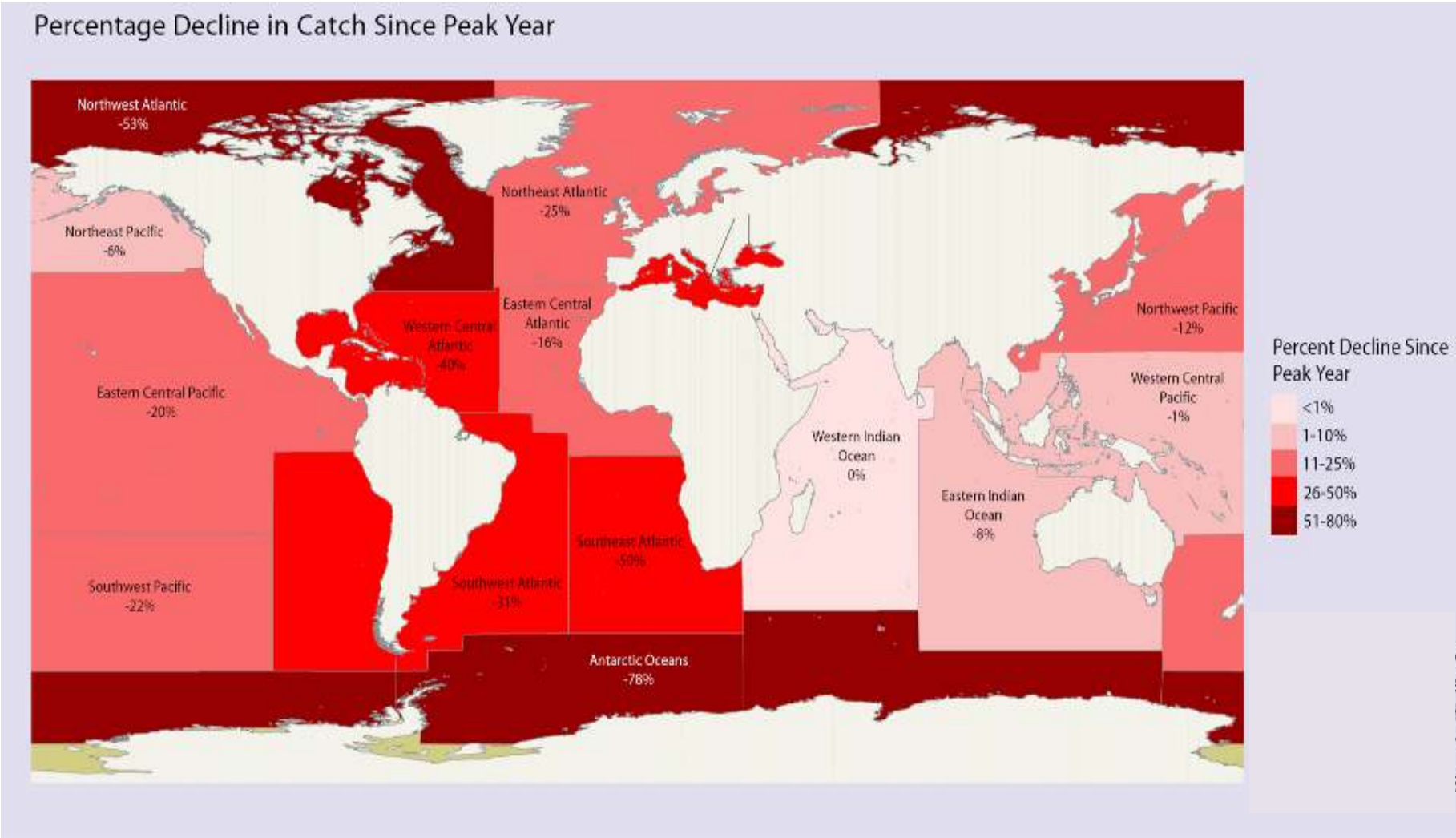
Source: Energy Watch Group

Global Water Demand



Source: http://maps.grida.no/go/graphic/areas-of-physical-and-economic-water-scarcity

Percentage Decline in Catch Since Peak Year



Source: FISHSTAT 2008. http://earthtrends.wri.org/maps_spatial/maps_detail_static.php?map_select=210&theme=1

Sustainable Development

- Each generation should leave at least as large a productive base for its successor as it inherited from its predecessor

  - Productive Base:

Manufactured capital

Human capital

Social Capital

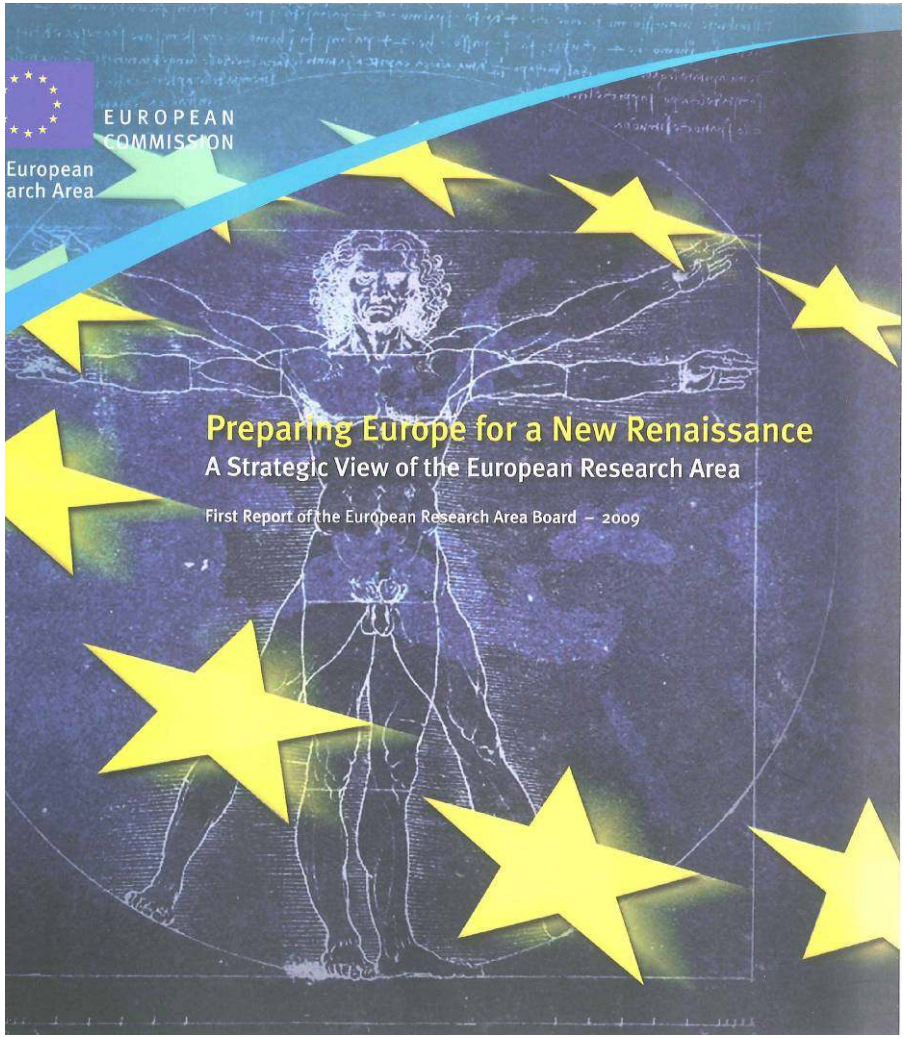
Natural/Environmental capital
+ Institutions, cultural coordinates

Social worth of these assets = **wealth of a nation**

From Partha Dasgupta

The Paradigm Shift

- Collective response
- Global governance
- Sustainable consumption



A Twenty First Century Renaissance

Cultural Challenges to the Paradigm Shift

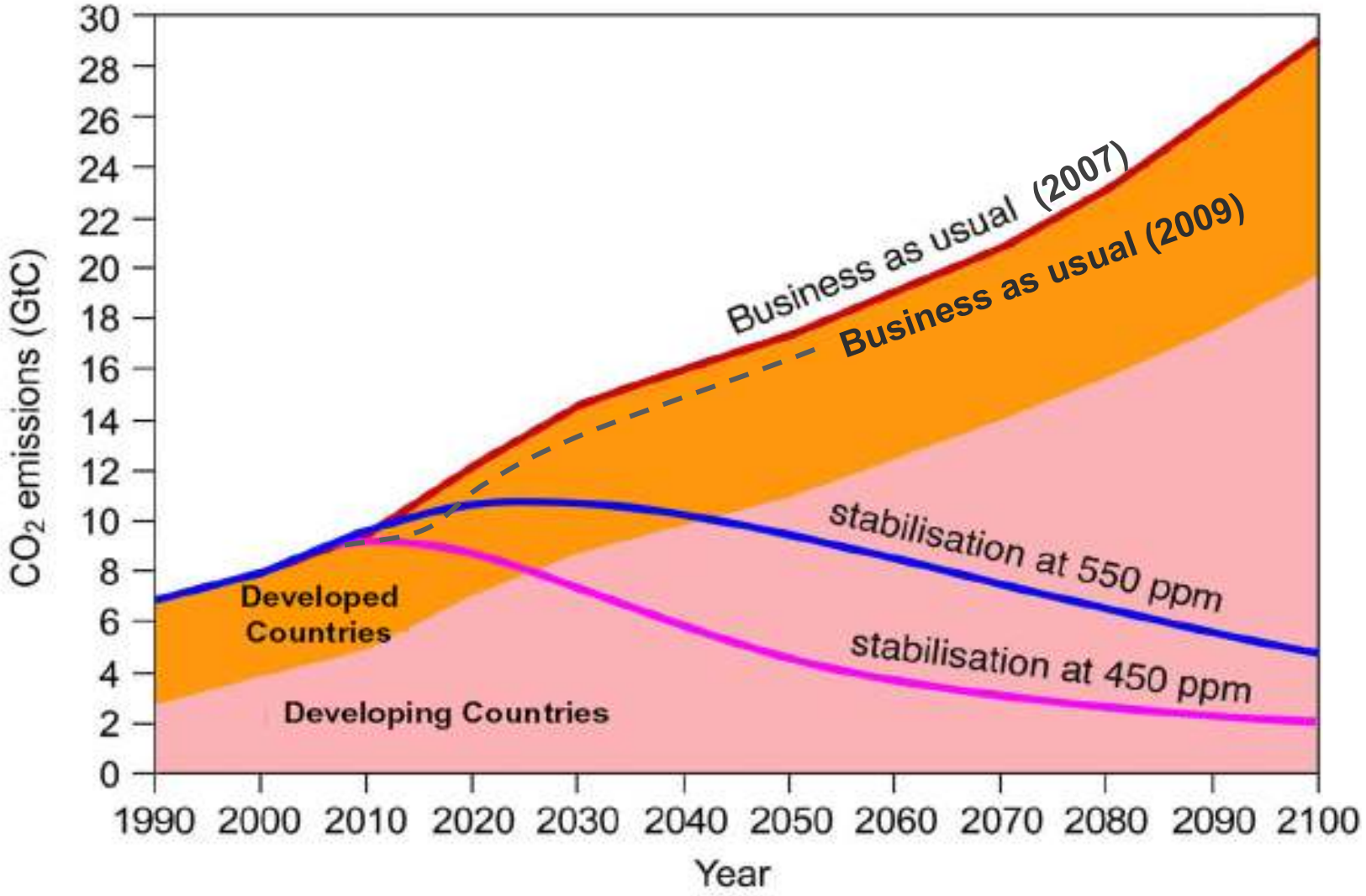
1. National perceptions versus global priorities

2. Economism; unfettered consumerism as the instrument for economic growth

3. Nostalgic romanticism

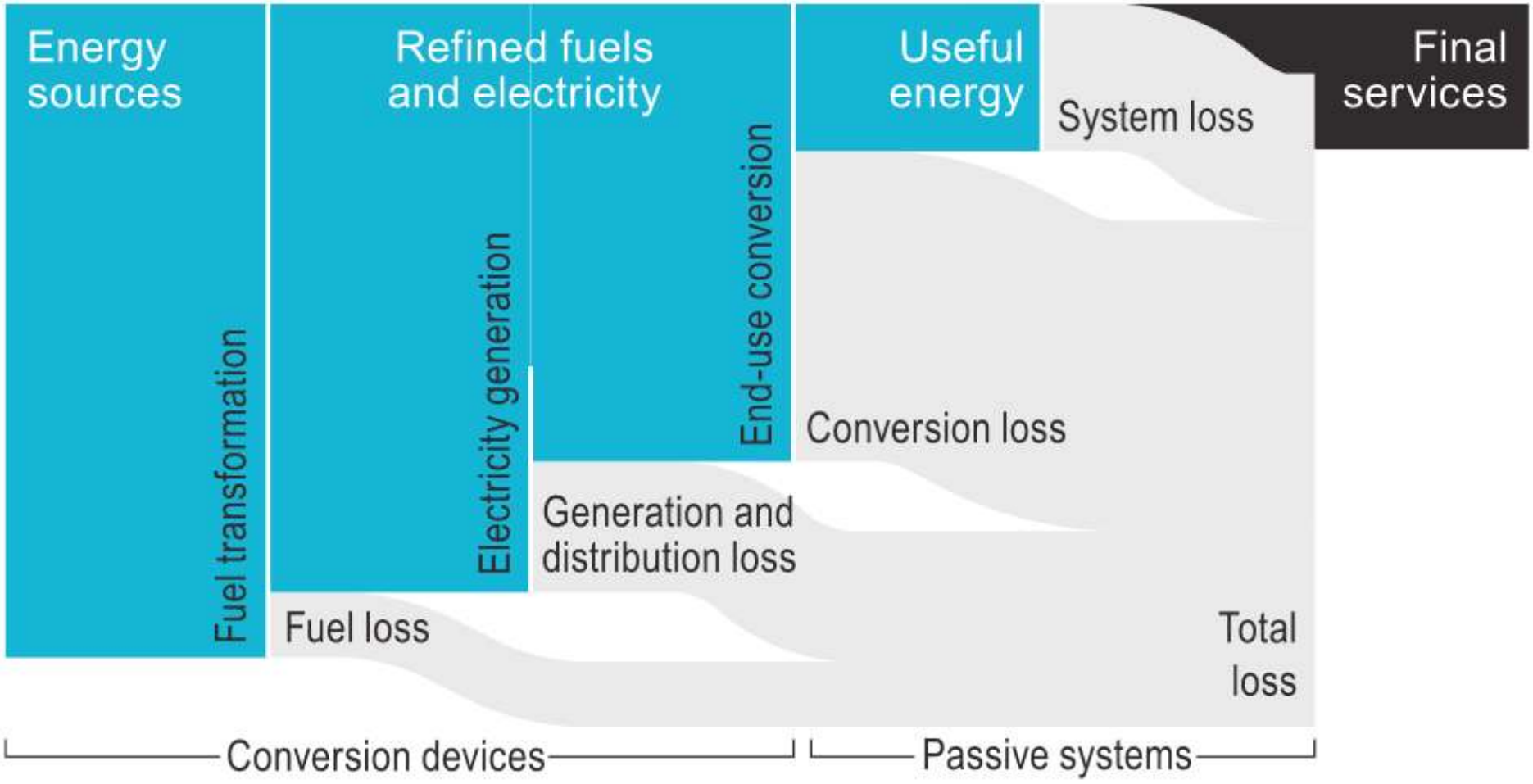
4. Re-gearing science and technology to meet the global challenge

The Rise in Emissions to 2100



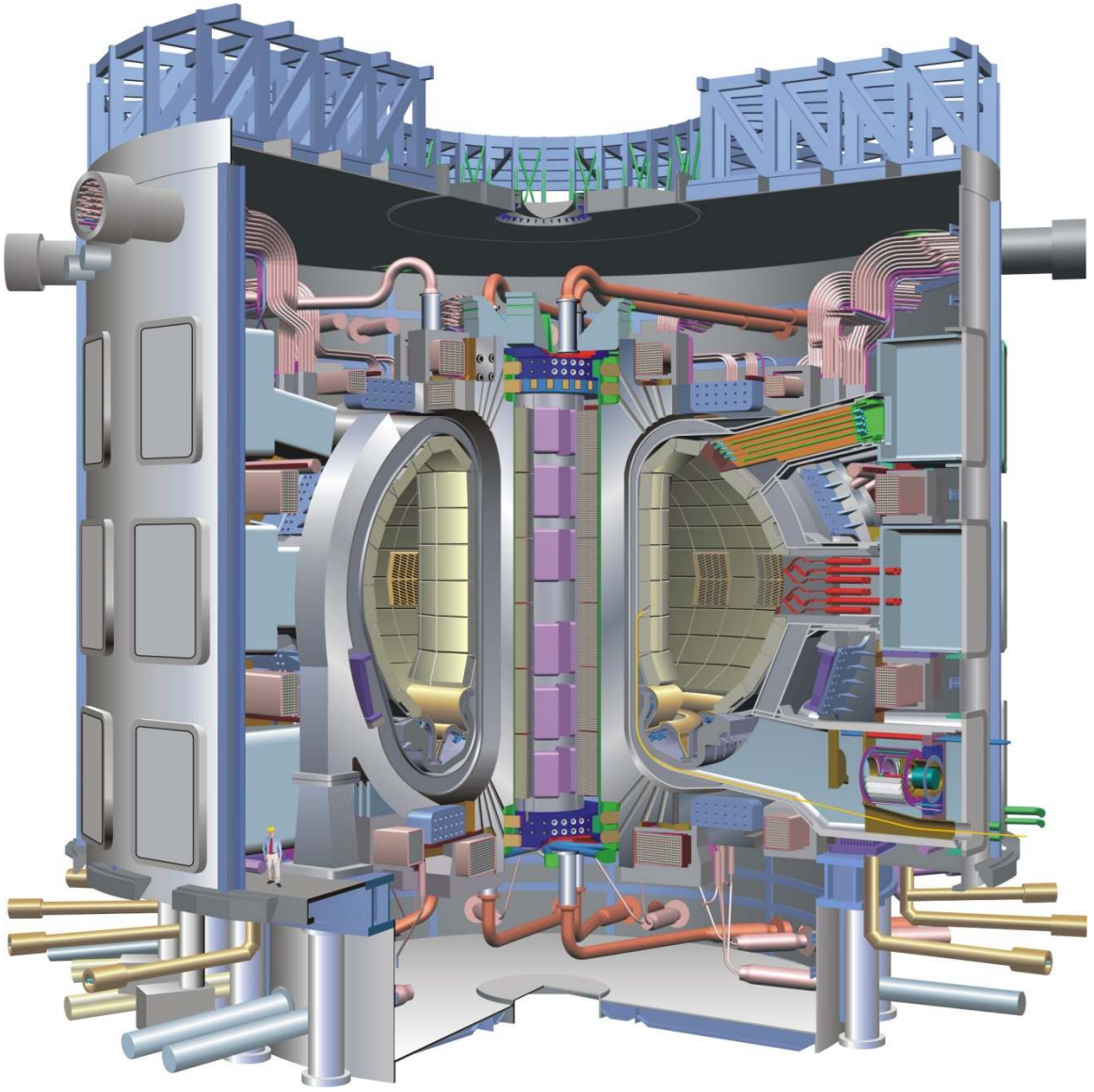
Source: Adapted from Defra

The Flow Path of Energy



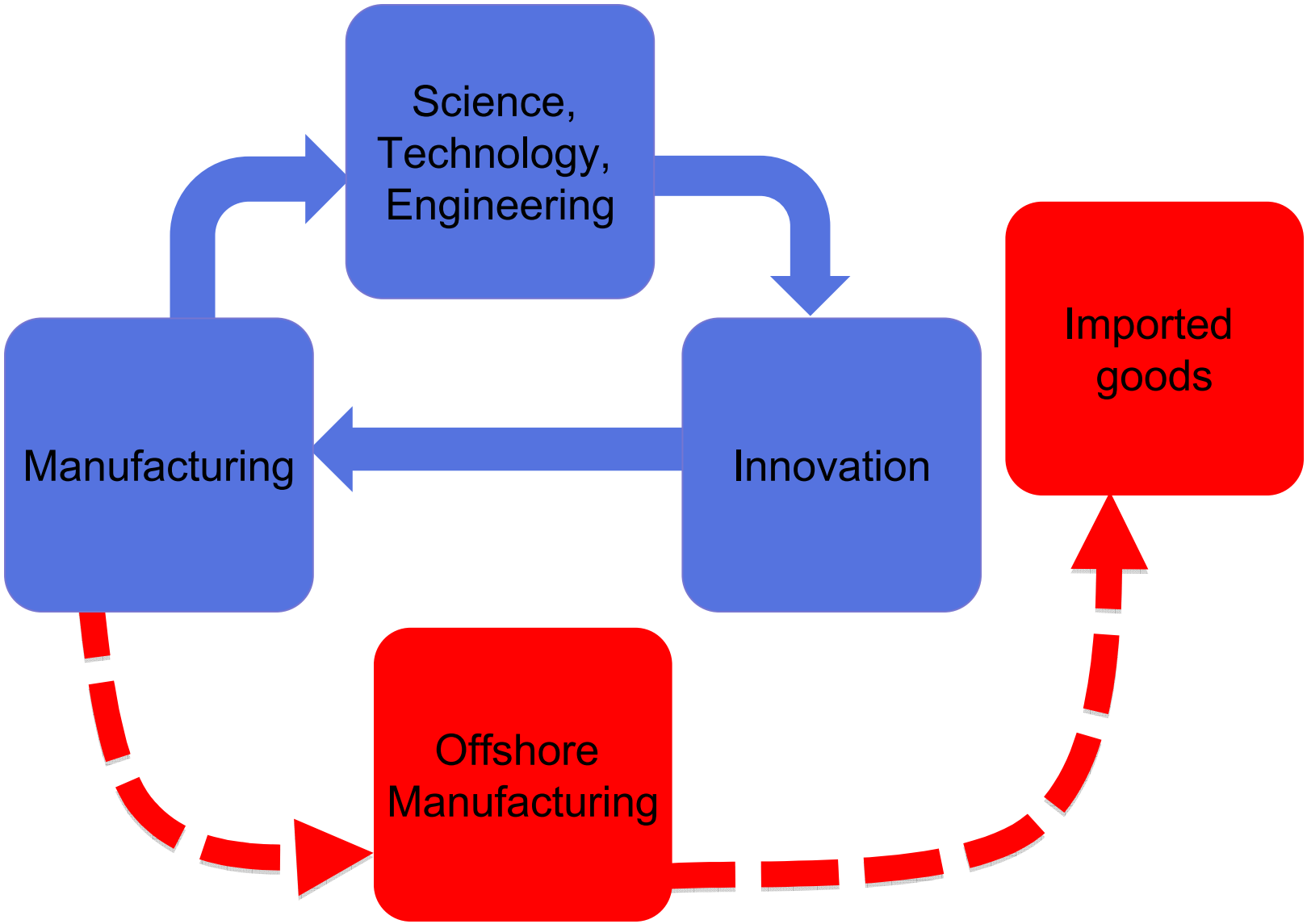
Source: J.M. Cullen and : J.M. Allwood, University of Cambridge Energy Policy, Volume 8, Issue 1 doi:10.1016/j.enpol.2009.08.054

The International Fusion Project: ITER

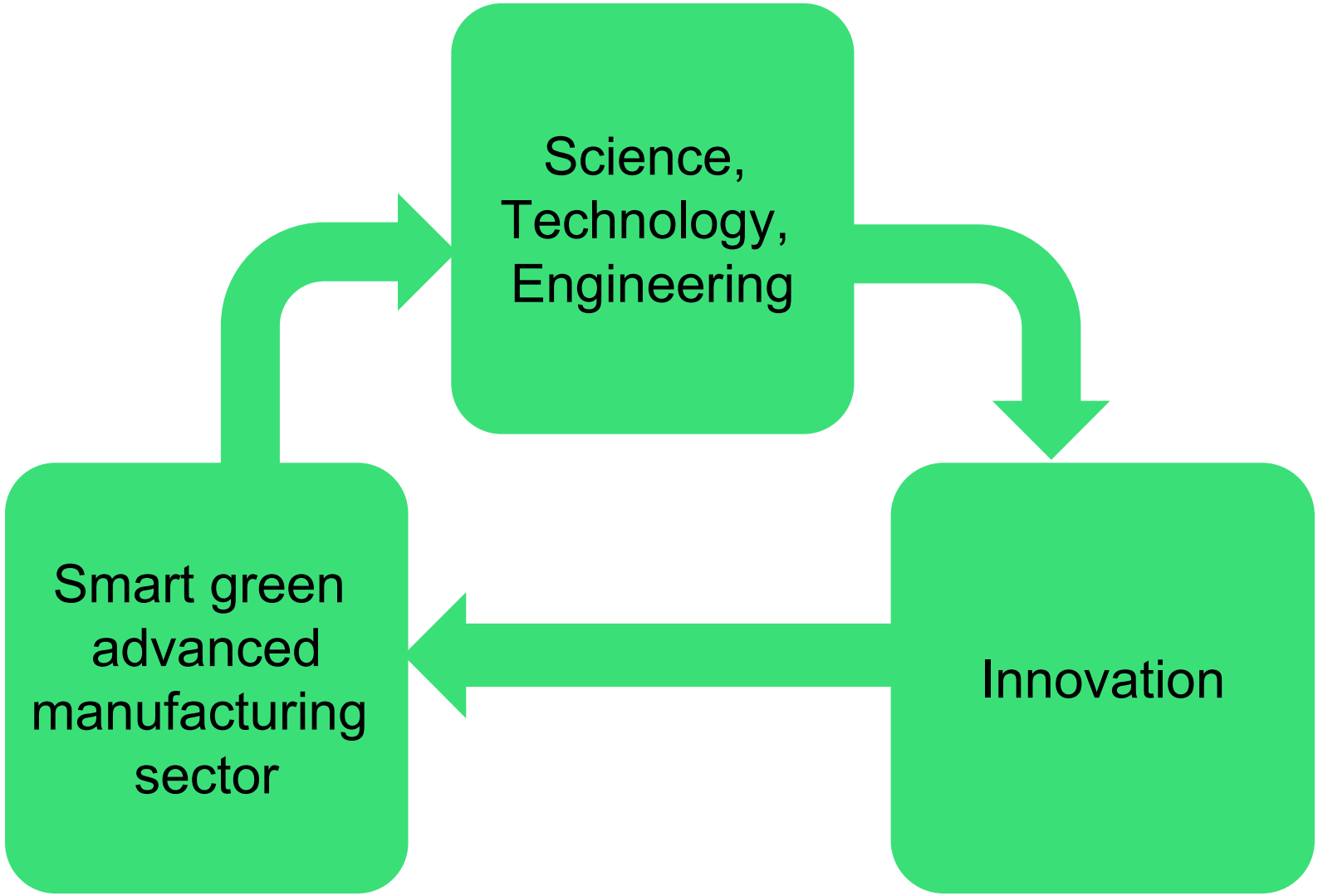


Source: Culham Centre for Fusion Energy

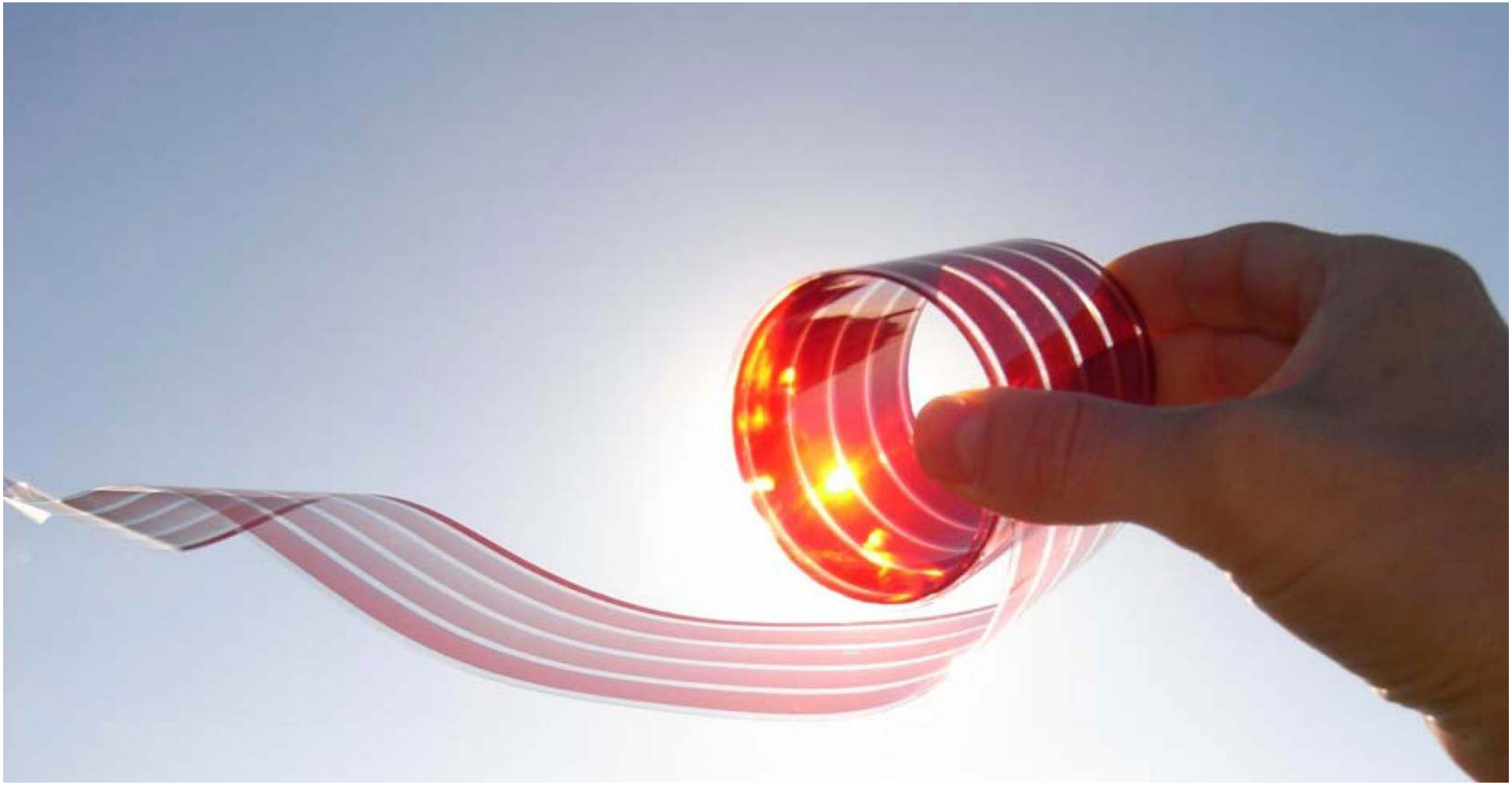
Historical Development of Advanced Economies



Emergence of Smart Green Advanced Manufacturing Sector



Plastic photovoltaics

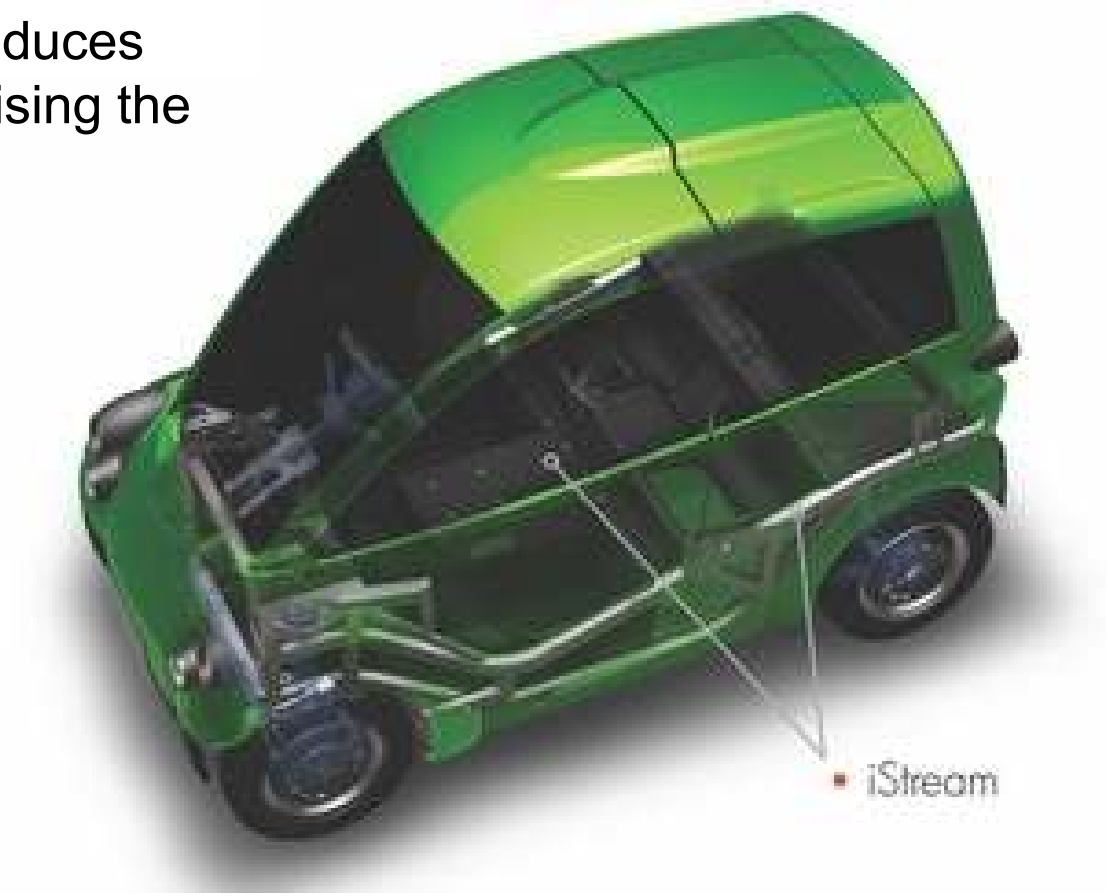


Source: Cambridge University under a programme supported by the EPSRC and the Carbon Trust

Road

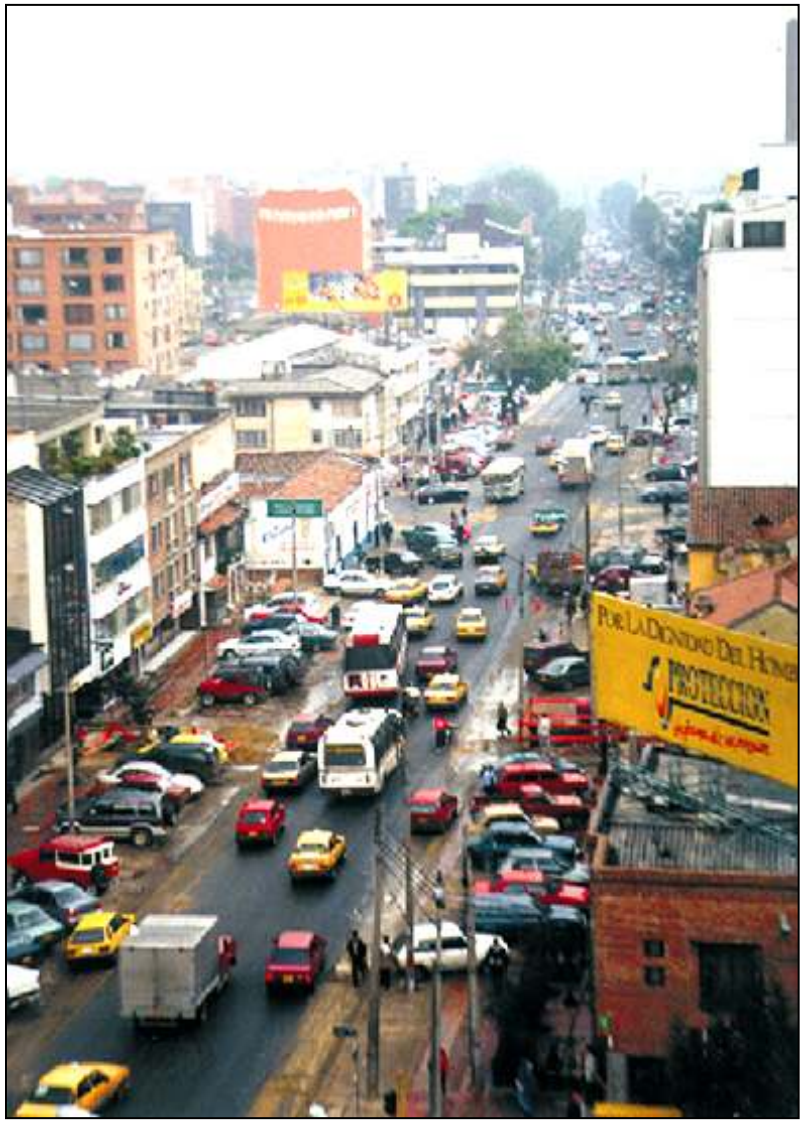
iStream

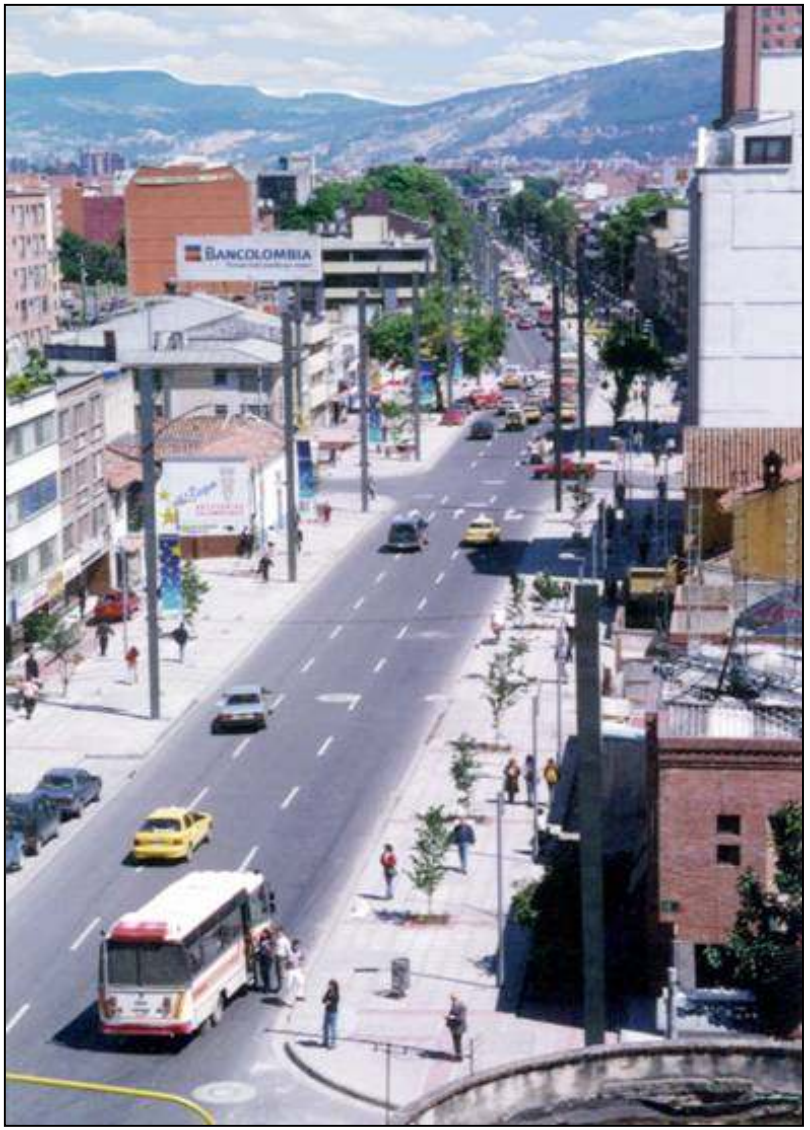
- A separate body chassis assembly process
- Simplified assembly reduces assembly times minimising the cost and energy used



Source: Gordon Murray Designs

People vs. Cars: Bogota



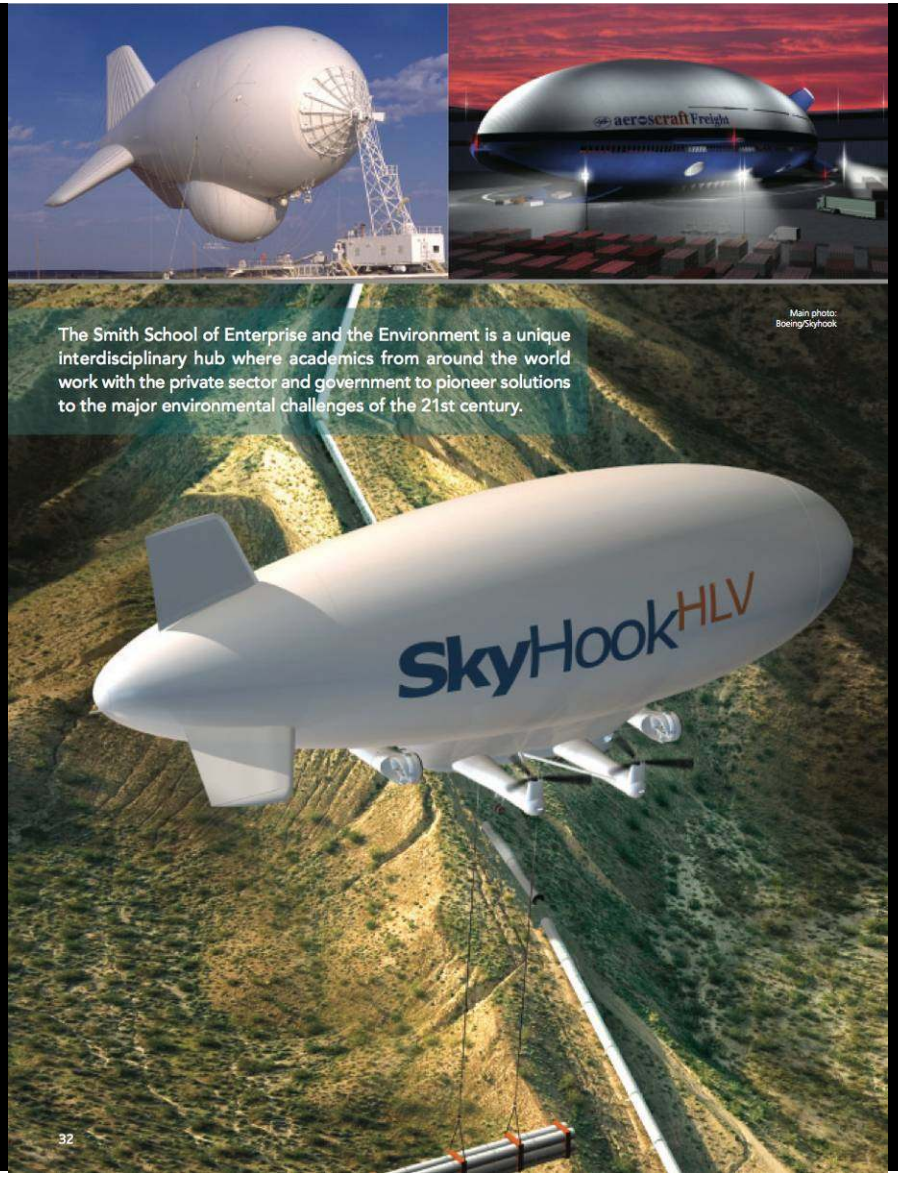


Source: Courtesy of Enrique Penalosa

Algae biomass production: Open ponds and bioreactors

Source: T.M. Mata et al. 2010, Microalgae for biodiesel production and other applications: A review, Renewable and Sustainable Energy Reviews

Hybrid Airship

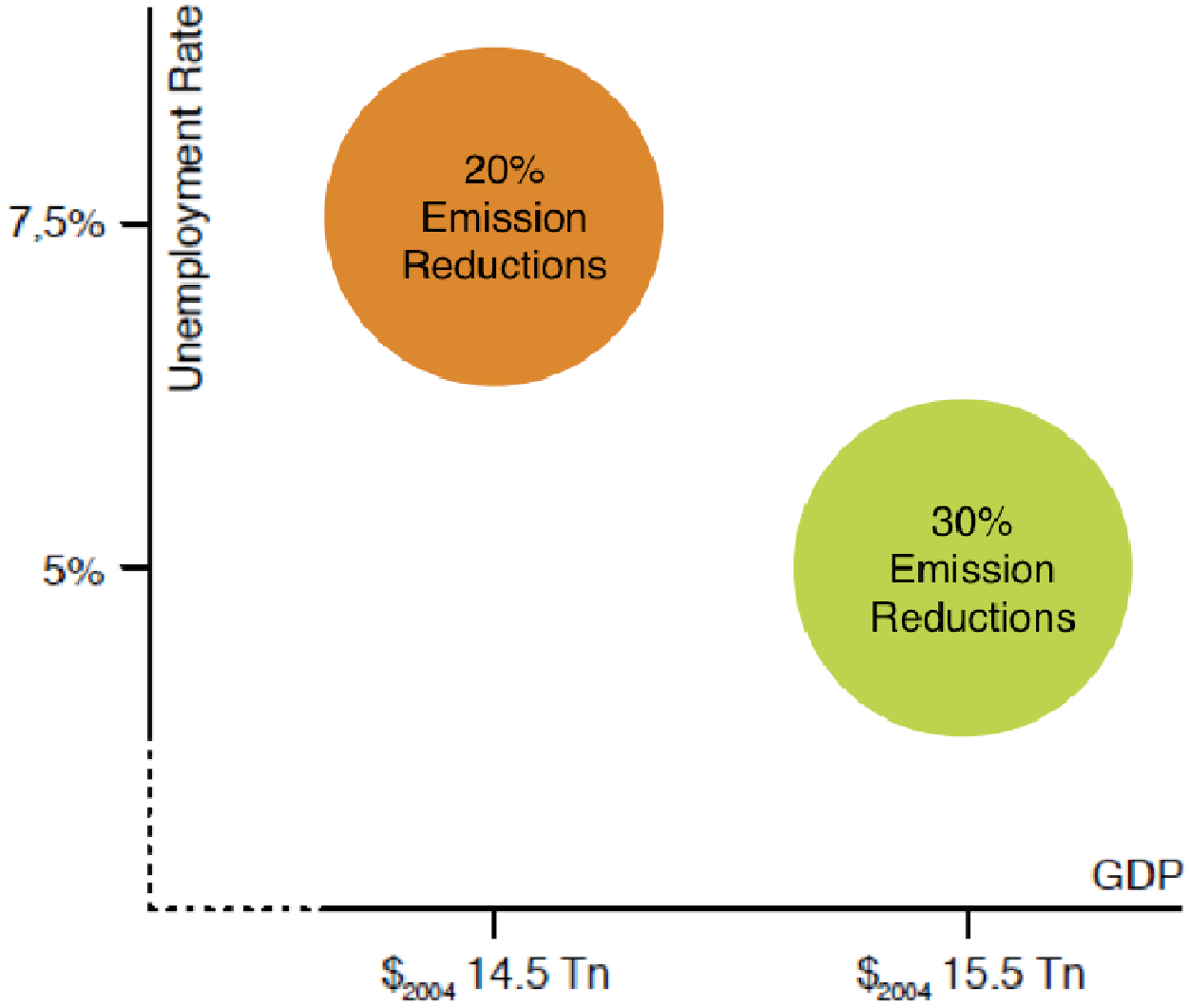


Source: Aviation and the Environment March 2010

A New Growth Path for Europe

Source: 'A New Growth Path for Europe: Generating Prosperity and Jobs in the Low Carbon Economy' (2011)

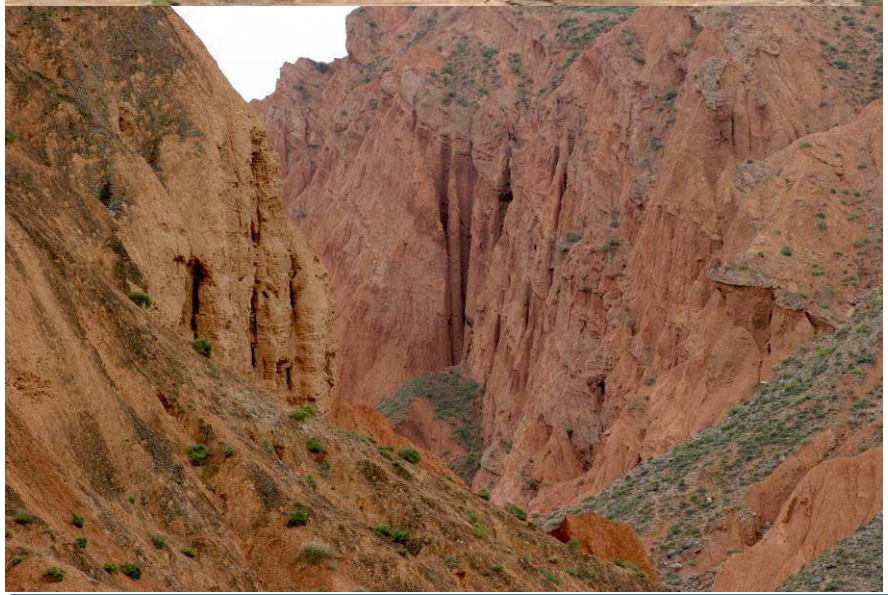
Two Scenarios for Europe in 2020



Source: Adapted from 'A New Growth Path for Europe: Generating Prosperity and Jobs in the Low Carbon Economy' (2011) based on GEM-E3 simulations

Ecosystem Rehabilitation: China's Loess Plateau

1997 2005



Source: EARTH'S HOPE The Lessons of the Loess Plateau - John D. Liu, EEMP www.eemp.org

The Smith School of Enterprise and the Environment at the University of Oxford

Making an impact on the environmental changes facing the planet