

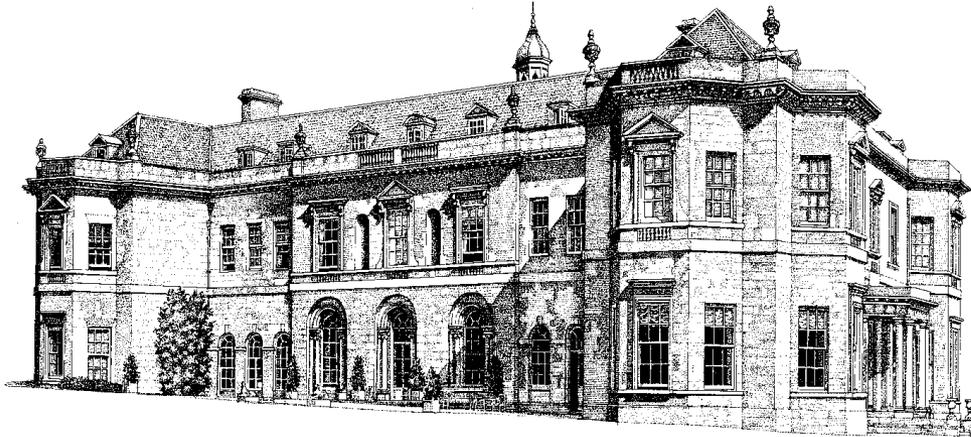
Introducing *The Vital Spark* to Japan

*Innovating Clean & Affordable Energy
for All*

Professor Gwythian Prins
Convenor of the Hartwell group

October 2013

The Hartwell Group 2007 -13



Hartwell House in Buckinghamshire, England, where the Royal Meteorological Society was founded in 1850, and where the Hartwell group was originally convened by Professor Prins, and has continued to meet since 2009.

- **Devoted** to the continued **improvement** of living conditions for **all humanity** while **lightening** the weight of the **human footprint** on Planet Earth
- **Convened** first to react to a common recognition of **the fatally flawed** nature of the **Kyoto Protocol: top-down** targets & timetables could **never work-** and haven't. The Kyoto Protocol regime collapsed at Copenhagen in 2009
- **Aimed** at **high-level interventions**, *first* to help redirect global diplomacy on climate issues (*The Hartwell Paper*, 2010; *Climate Pragmatism*, 2011), *now* to set **sound principles for energy innovation** (*The Vital Spark*, 2013)

The VITAL SPARK



Innovating Clean and Affordable Energy for All

The Third Hartwell Paper

July 2013

Downloadable at THE LONDON SCHOOL OF ECONOMICS and & the INSTITUTE FOR ENERGY ECONOMICS OF JAPAN websites in English or Japanese.
Printed copies available from IEEJ

The Hartwell Group: twenty *Vital Spark* authors – researchers and policy-makers from The Americas N&S, Asia & Europe

- **Professor Gwythian Prins**, Research Professor, LSE and Director, the Mackinder Programme for the Study of Long Wave Events, London School of Economics & Political Science, England
- **Mark Caine**, Research Fellow, LSE and Hartwell Co-ordinator, the Mackinder Programme for the Study of Long Wave Events, London School of Economics & Political Science, England

- **Professor Keigo Akimoto**, Group Leader, Systems Analysis Group, Research Institute of Innovative Technology for the Earth, Japan
- **Professor Paulo Calmon**, Centre for Advanced Studies in Government and Public Administration, University of Brasilia, Brazil
- **Dr John Constable**, Director, Renewable Energy Foundation, England
- **Dr Enrico Deiaco**, Director, Innovation and Global Meeting Places, Swedish Agency for Growth Policy Analysis, Sweden & Affiliated Researcher, School of Industrial Engineering and Management, Royal Institute of Technology, Sweden
- **Martin Flack**, Analyst, Innovation and Global Meeting Places, Swedish Agency for Growth Policy Analysis, Sweden
- **Dr Isabel Galiana**, Research Fellow, Department of Economics & GEC3, McGill University, Canada
- **Professor Reiner Grundmann**, Professor of Science and Technology Studies, School of Sociology and Social Policy, University of Nottingham, England
- **Professor Frank Laird**, Professor of International Relations, Josef Korbel School of International Studies, University of Denver, USA
- **Dr Elizabeth Malone**, Senior Research Scientist, Pacific Northwest National Laboratory, USA
- **Yuhji Matsuo**, Senior Economist, The Institute of Energy Economics, Japan
- **Dr Lawrence Pitt**, Associate Director, Pacific Institute for Climate Solutions, University of Victoria, Canada
- **Dr Mikael Roman**, Counsellor, Scientific and Technical Affairs, Swedish Agency for Growth Policy Analysis, Office of Science and Innovation, Embassy of Sweden, Brazil
- **Andrew Sleigh**, Pinoak Innovation Consulting, England
- **Dr Amy Sopinka**, Pacific Institute for Climate Solutions, University of Victoria, Canada
- **Professor Nico Stehr**, Karl Mannheim Chair for Cultural Studies, Zeppelin University, Germany
- **Dr Margaret Taylor**, Project Scientist, Lawrence Berkeley National Laboratory, USA
- **Hiroyuki Tezuka**, General Manager, Climate Change Policy Group, JFE Steel Corporation (on behalf of Japan Iron and Steel Federation), Japan
- **Masakazu Toyoda**, Chairman and CEO, The Institute for Energy Economics, Japan

Energy innovation: of special local interest in Japan – the great innovator



In this picture, the young Meiji Taitei travels from Kyoto to Tokyo at the Restoration 1868

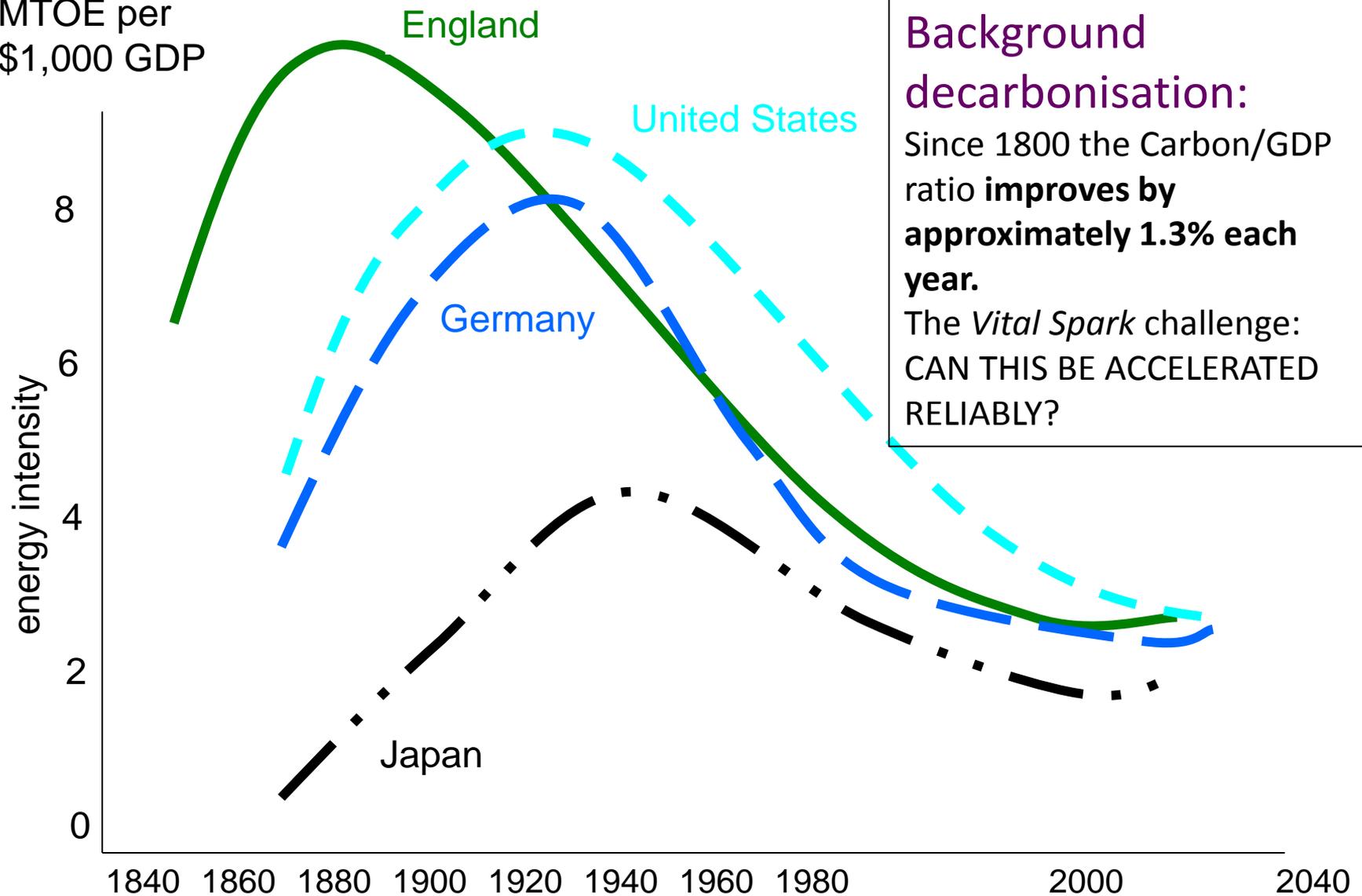
He reigned 1868 -1912 and saw Japan transformed by immense innovation from the feudal Tokugawa shogunate to **industrial world power**



The unique fusion



MTOE per
\$1,000 GDP



**Background
decarbonisation:**

Since 1800 the Carbon/GDP ratio **improves by approximately 1.3% each year.**

The *Vital Spark* challenge:
CAN THIS BE ACCELERATED
RELIABLY?

The history of the industrial revolution

Nuclear – stalled but still vital



“The only zero-carbon source that can be technically scaled up in short order is nuclear – much faster than renewables on a similar time-frame; and while not the case in China and to a degree in India, **the trend in the West after the Fukushima incident is the opposite...**”

The Vital Spark p.38

With closure of the Oi reactor in September 2013, Japan is without nuclear power again for the second time since last May; and the evidence of incompetence in the cause and the post-accident containment of the Fukushima reactor disaster mean that Japan will likely face a period of high dependence on imported fossil fuels, at great expense, pending the re-opening of some of the reactor fleet.

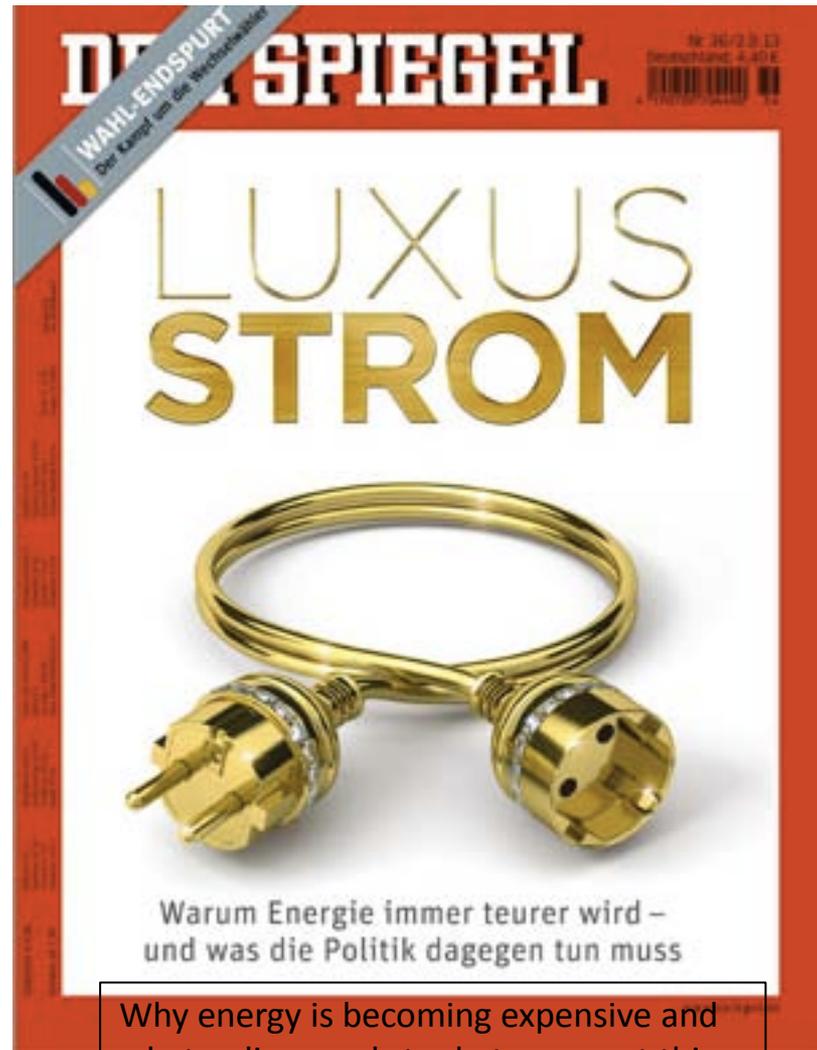
Kashiwazaki-Kariwa (world’s largest capacity nuclear station) may be the first to be certified for re-start, soon.

But Fukushima effect was world-wide...

“Luxury Electricity” – the disaster of the *Energiewende*

“Germany's **aggressive and reckless** expansion of wind and solar power has come with a **hefty pricetag** for consumers, and the costs often fall disproportionately on the poor. Government advisors are calling for a **completely new start**”. *Der Spiegel* 26 August 2013

- “Renewable” energy **increase** 10.2% 2012
- National emissions **increase** 2%
- Brown coal burn **increase** to provide grid stability.
- Domestic price **estimated to increase 40%** by 2020

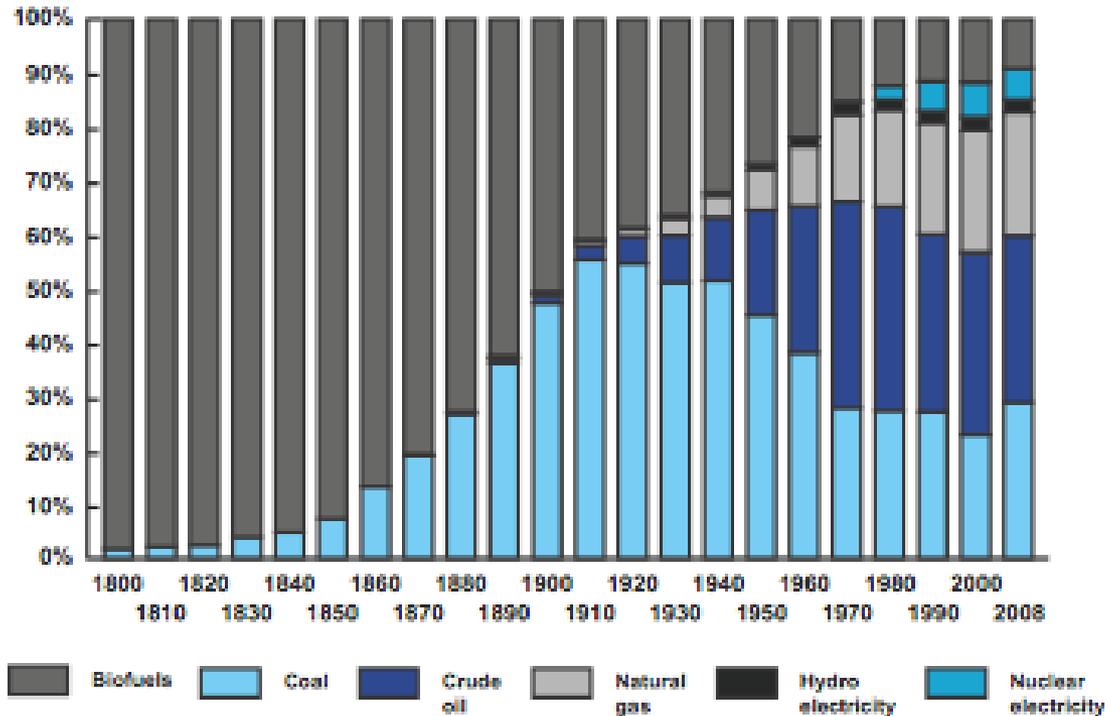


<http://www.spiegel.de/international/germany/high-costs-and-errors-of-german-transition-to-renewable-energy-a-920288-3.html>

Two global contexts: (1) energy transitions

“the global energy system marches to a slow, multi-generational drum” (Vital Spark, p.56)

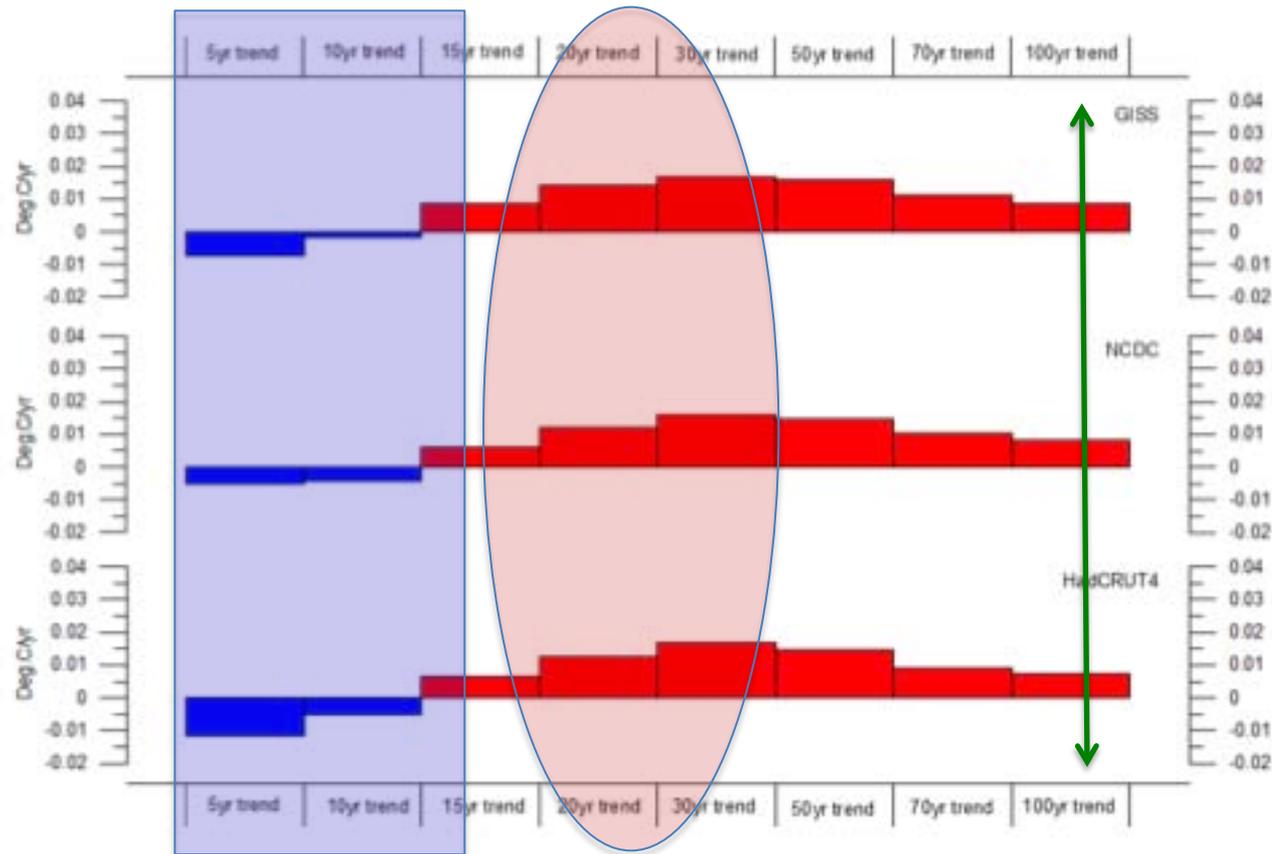
Share of Fuels in Energy Mix, 1800–2008



Source: Energy Transitions: History, Requirements, Prospects, Vaclav Smil, 2010.

- From **Hunter-gatherer** to **Agriculture** (wood/wind) to **Industrial** (coal/oil/gas/nuclear)
- From **high carbon/low energy-density** to **low carbon/high energy-density** (1800 -2100?)
- Current world energy mix: **98.4% coal/oil/gas/nuclear/hydro**. **1.6% “new renewables”**
- Back to the Future?? The currently unsurmountable “new renewable” challenge: **to obtain reliable, high-density energy from low-density, very diffuse fuels**

Two global contexts: (2) 'climate wars' & the failed Kyoto Protocol era: pick your trend.....



Sceptics
point to this

Catastrophists
point to this

*The Vital
Spark*
points to
this

BUT IS GLOBAL TEMPERATURE CLOSELY COUPLED TO HUMAN ACTIVITY VIA CO₂?

THE
LONDON, EDINBURGH, AND DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

[FIFTH SERIES.]

APRIL 1896.

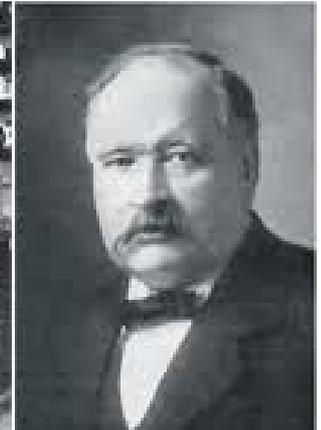
XXXI. *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.* By Prof. SVANTE ARRHENIUS*.

I. *Introduction: Observations of Langley on*

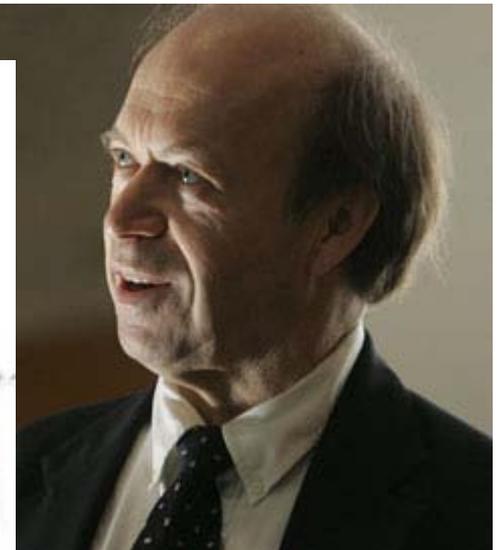
STATEMENT OF DR. JAMES HANSEN, DIRECTOR, NASA GODDARD INSTITUTE FOR SPACE STUDIES

Dr. HANSEN. Mr. Chairman and committee members, thank you for the opportunity to present the results of my research on the greenhouse effect which has been carried out with my colleagues at the NASA Goddard Institute for Space Studies.

I would like to draw three main conclusions. Number one, the earth is warmer in 1988 than at any time in the history of instrumental measurements. Number two, the global warming is now large enough that we can ascribe with a high degree of confidence a cause and effect relationship to the greenhouse effect. And number three, our computer climate simulations indicate that the greenhouse effect is already large enough to begin to effect the probability of extreme events such as summer heat waves.



THEORETICALLY IT CAN BE: THIS IS THE FAMOUS 'GREENHOUSE EFFECT'



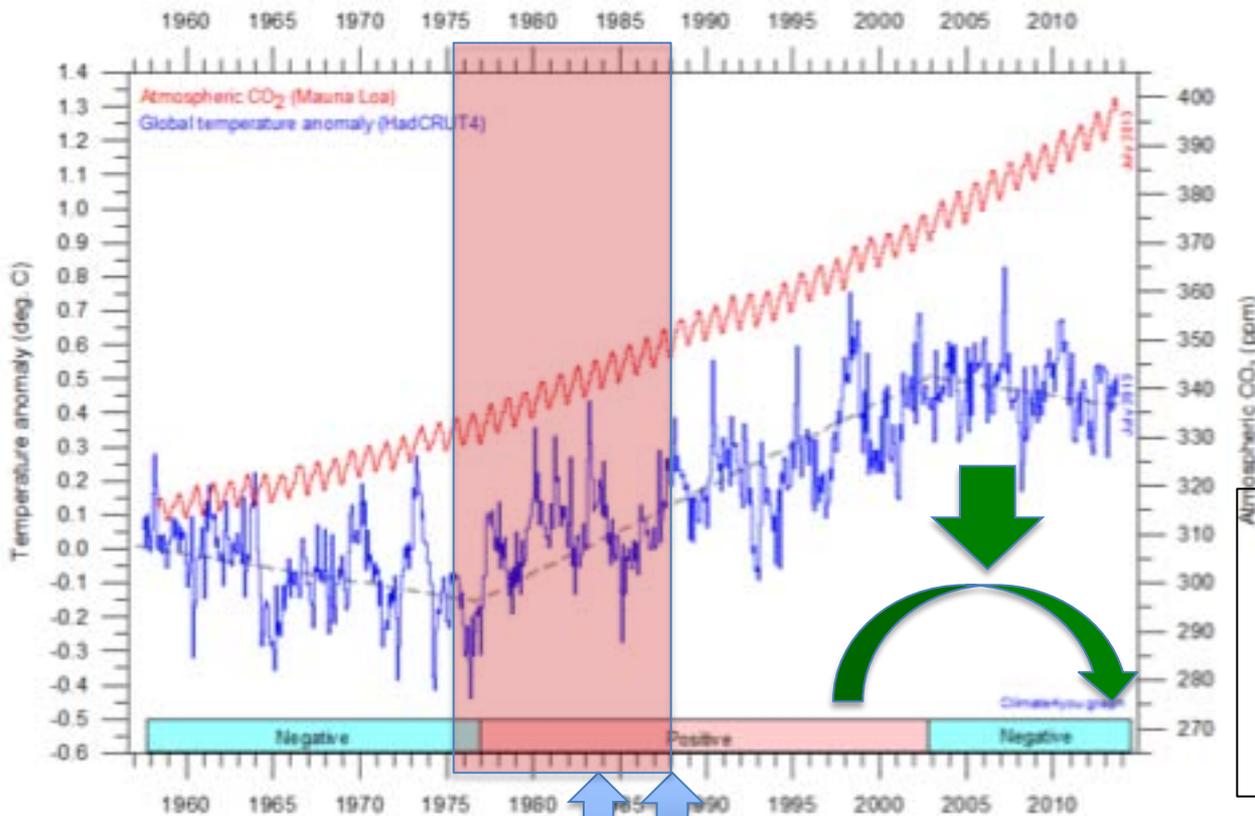
Increasingly certain that we are not as certain as the Hansen 'close coupling' hypothesis of the 1980s once suggested

Decadal predictions from the new HADGem3 computer model were published on Christmas Eve 2012. In this programme the assumptions about strong CO2/temperature correlations have been tempered by more robust modelling of **cybernetic feedbacks**. (eg black carbon in the Arctic & Himalaya glaciers) It **confirmed a fifteen year standstill** and **predicted no global warming for the next five to seven years**.

The AR5 WG1 IPCC report draft leaked in December 2012 has **majoried on uncertainties** for the first time – sharp change from dogmatic catastrophism of Pachauri's AR4 SFP. AR5 published 27 September 2013, shows that **past reports have overestimated** future warming by 70% -160%

Sensitivity: The Carbon Dioxide 'control knob' & 'climate catastrophism' 1984 -2013

Global surface air temperature and atmospheric CO₂, updated to August 2013



The rise and fall of 'climate catastrophism' 1998-2012. Peak was 2006

James Hansen's 'close coupling' hypothesis published, 1984

IPCC created, 1988 after 1st 10 years of late 20th century warming 1976-97

One problem among many

IPCC 5th Assessment Report SFP now suggests, by 2100,

- 1.5 – 4.00 degrees celsius
- 25-45 cm sea-level rise

Warming is in any case not all bad (cold kills more people)

- So a real problem, but not an apocalyptic one

- http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf



The Hartwell group meeting to design and structure *The Vital Spark*, held in Vancouver, Canada, in February 2013, agreed that the amount of **political capital sunk into the failed Kyoto Protocol diplomacy** (from which Japan had withdrawn at the Durban COP 17 in December 2011) made it **essential to follow Sun Tzu's advice and to construct a Golden Bridge** from the failed past to a realistic and ambitious future...

How to square the circle: fundamental Hartwellian principles for policy-making in a context of open systems and great uncertainty



“Only general prosperity can produce widespread consent for emissions reductions, and only affordable energy can deliver prosperity for all”

The Vital Spark, p.24

- 1. OBLIQUE:** Take an **oblique line of approach** that **commands public legitimacy**: make people richer, more comfortable, safer and *take the environmental gains as benefits on the side*. (Strategy even more in tune with the IPCC AR5 overview)
- 2. UNIVERSAL:** **Only a high-energy global economy is morally defensible or politically viable**: It is not acceptable to pursue policies that will leave the bottom billion of humanity without the energy services they require for wellbeing and dignity.
- 3. AMBITIOUS:** *ambire* – the Latin root – emphasises the need for careful cultivation of political support. So **Relentless pragmatism** is the most ambitious approach, *not extravagant promises of impossible things*.

***The Vital Spark:* highlights THREE key lessons for national and international success**



1. A bottom-up approach

to reduce carbon intensity across industries, sectors and countries: a **pragmatic sectoral approach** with more respect for sovereign power – extension of the proven Japanese ‘top runner’ method

2. Combined with the only proven models of international co-operation: the **former Asia Pacific Partnership** and the **Major Emitters/Economies Forum**: APP + MEF

Today, the Abe government has an opportunity to **revive the success of the Asia-Pacific Partnership** in alliance with the new Australian Liberal government: **basis for a new diplomacy?**



3. The serious move to **Nationally Agreed Mitigation Actions** (NAMA) at the Durban COP17 was a **direct result of the Japanese position** first announced the previous year at Cancun COP16

Japanese Government statement at Cancun COP16

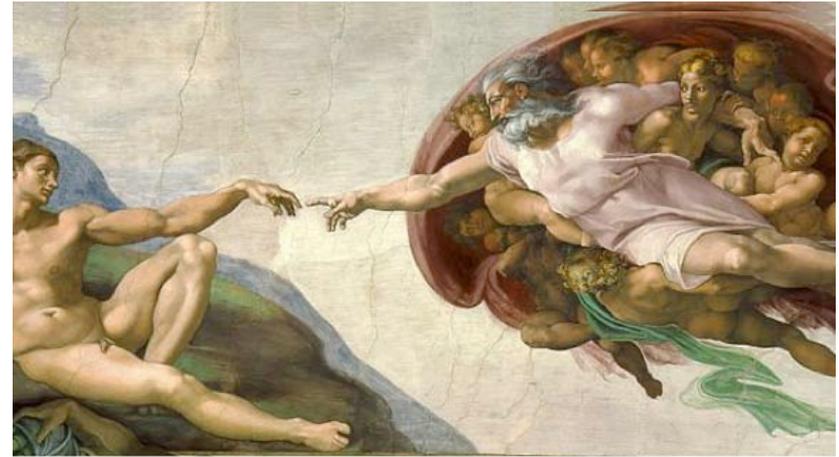
- “...we will *never* inscribe our target in the Annex B to the Kyoto Protocol under any circumstances and conditions...
-Kyoto 2nd commitment period will *never* constitute a fair and effective single framework...”

NAIA joins NAMA

- *The Vital Spark* recommends the addition of **Nationally Appropriate INNOVATION Actions**
 - Focus public funding upstream: to help overcome ‘valley of death’ early demonstrator problems
 - “In a global policy model based on NAMAs, NAIA’s will serve as the vehicle through which individual countries implement their nationally agreed commitments. These **will form the substance of a successful future international discourse..**” *The Vital Spark*, p.81

***The Vital Spark:* highlights the key ‘socio-technical’ challenges**

The book identifies eleven ‘building block’ Insights for successful energy innovation:



Current low carbon technologies are **technically and economically uncompetitive**: forcing them by subsidy creates ‘bubble’ markets

There is **no single universal solution**: all successful solutions are specific to context: **but spontaneous adoption is universally required for massive and rapid adoption** eg mobile telephony: India 24,000% increase since 2000: Nigeria has 30,000 mobile phones in 2000 – 113,000,000 today

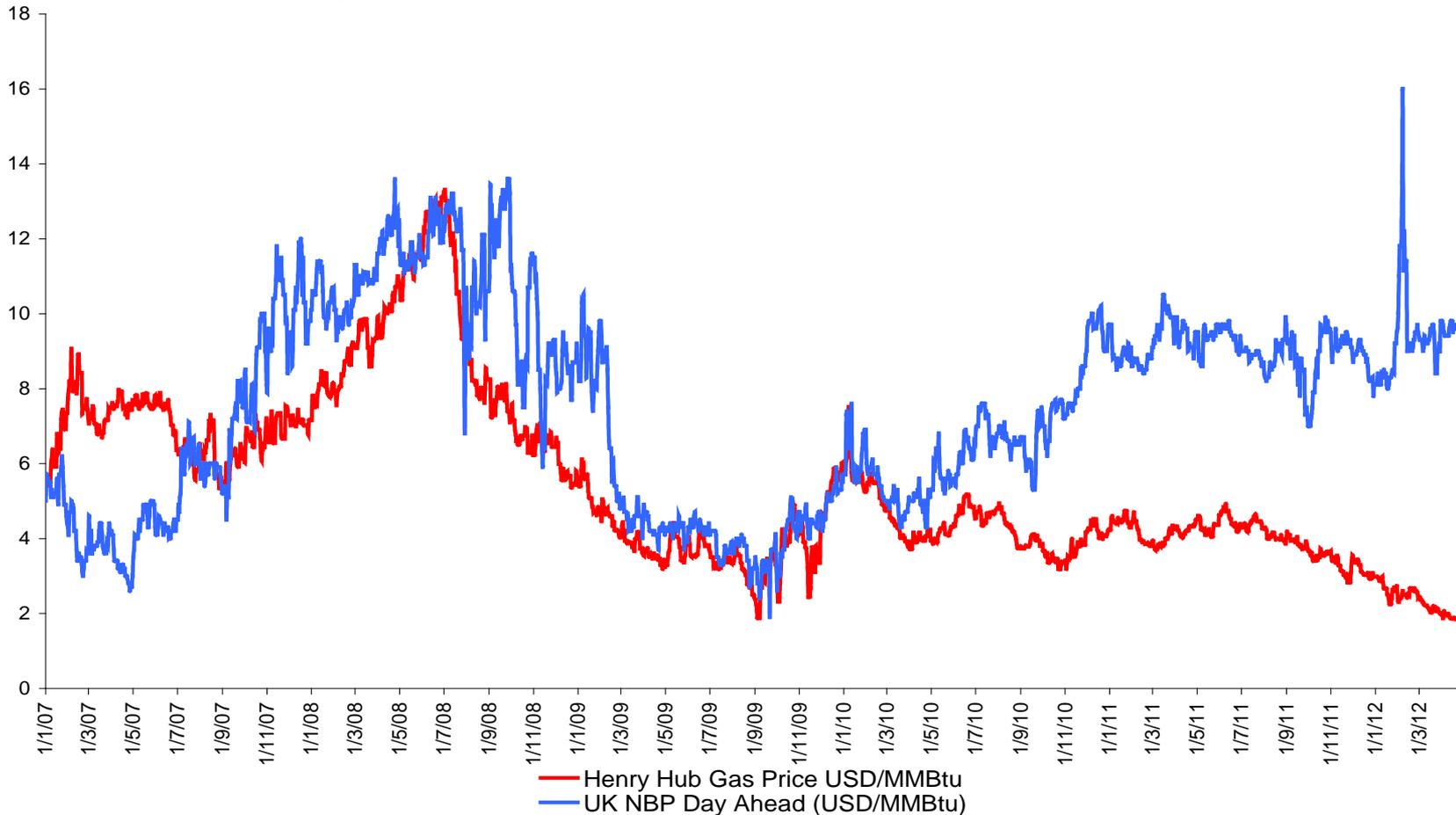
A successful energy transition requires **both invention and innovation**

Invention = fundamental thought: new discovery: disruptive change

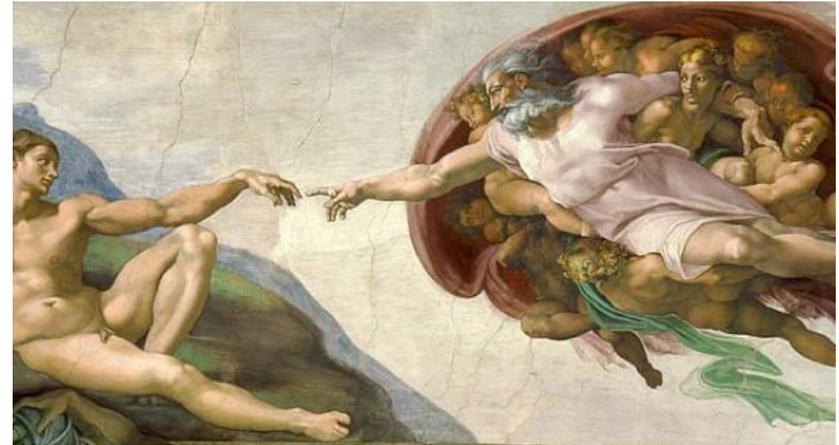
Innovation = improvement of something existing: gradual change

Policy-driven **premature deployment** of immature technologies kills incentive either to invent or to innovate

The 'gas bridge': a geo-political game changer in the USA and a major opportunity in Europe: an unexpected gift of time, of real reductions and of experience



The Vital Spark in Japan



Japan's energy transition will NOT be produced by any single technology stream:

- NOT by a Gas Bridge ALONE (although LPG/LNG currently indispensable)
- NOT by a nuclear re-start ALONE (although essential in the medium term)

– CERTAINLY NOT by early deployment of “new renewables”

**IT WILL REQUIRE AN 'ALL FRONTS' APPROACH WHICH CAN
INVENT, INNOVATE AND DEPLOY INTEGRATED TOTAL ENERGY
CYCLES RELIABLY**



How exciting!

The Vital Spark challenge is a ‘Meiji Restoration’ scale of challenge for Japan to astonish and to show the way forward for the world once more.