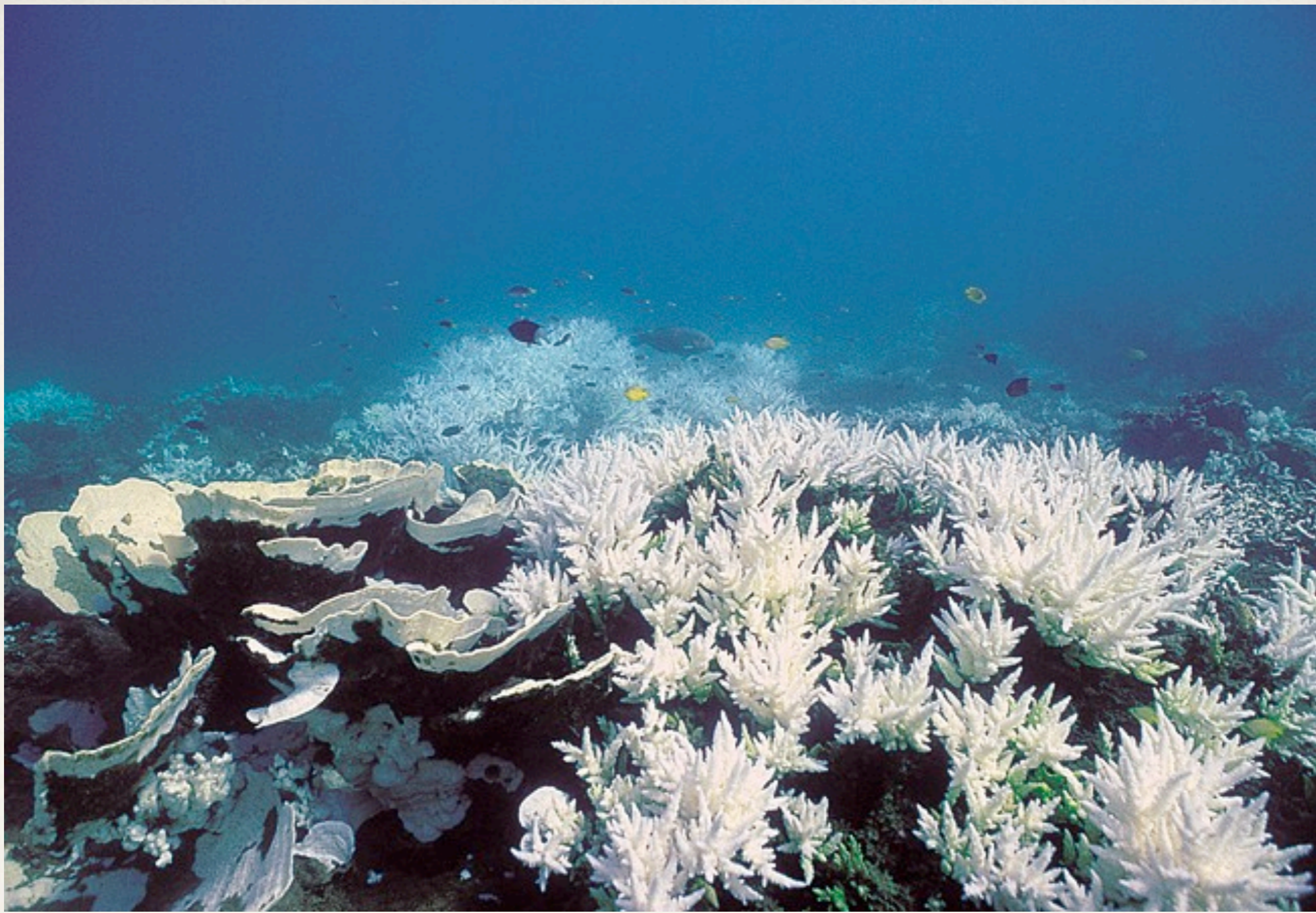


A World In Transition: Innovation in a Changing Globe

Christopher Brewster





Climate Change

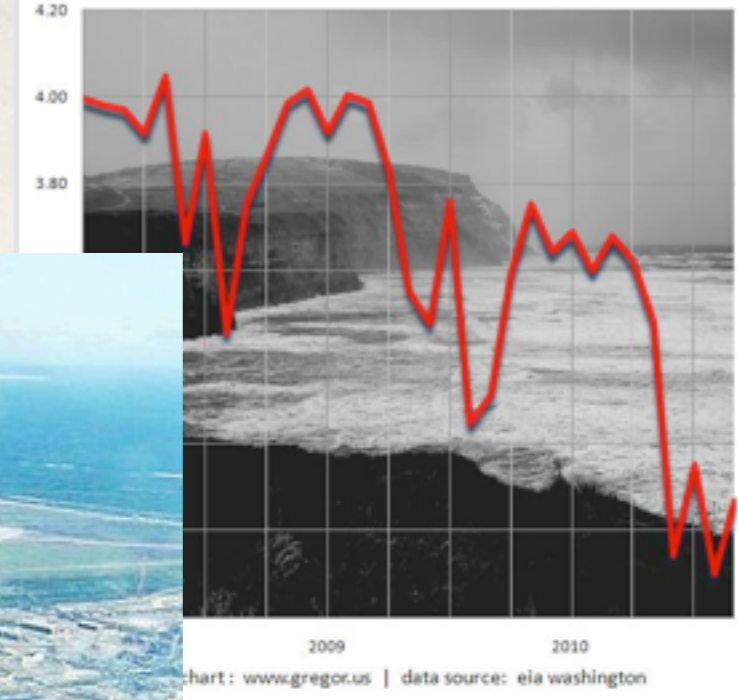
It is happening now

- * It is happening now
- * Weather events are becoming more extreme
- * Temperatures are climbing around the world
- * 2010 was the joint warmest year on record and the wettest ever.
- * It is already affecting many geographical regions of the world
 - * Pakistan
 - * Russia
 - * The last fortnight in Queensland



* It has already affected the natural world - some arbitrary examples:

- * 40% loss of all plankton in oceans since 1950 - foundation to ocean food system and major absorber of CO²
- * Total loss of coral reefs in our lifetime - nursery to many commercial fish
- * Arctic and Antarctic temperatures have risen and glaciers and sea ice is melting
- * Biodiversity: extinction rates between 100-1000 greater than normal background rate - with concomitant increase risk to human health, and plant health



Growing Scarcity of Energy

Its happening now!

- * We are a petroleum oil dependent society.
- * Production has plateaued the last 5 years
- * IEA has admitted in its 2010 report that conventional petroleum production peaked in 2005
- * Highest supply level ever reached was 87Mbd (July 2008) (including biofuels and NLG) - we are now at 86 (Mbd) - reality 73MBD of real crude oil - important distinction
- * After oil peaks, the decline in production can be dramatic cf. North Sea production falls of 20% in the last two years.
- * Oil price is trending sharply upward and is expected to reach a steady price over \$100 in the next 2 years. Possibly even higher.
- * Volatility will increase greatly
- * Greater dependence on "unconventional" crude oil sources - but these bring a very heavy toll on environment in water and energy consumption, environmental pollution.
- * China, India and Brazil are major growing economies so demand will greatly increase in coming years

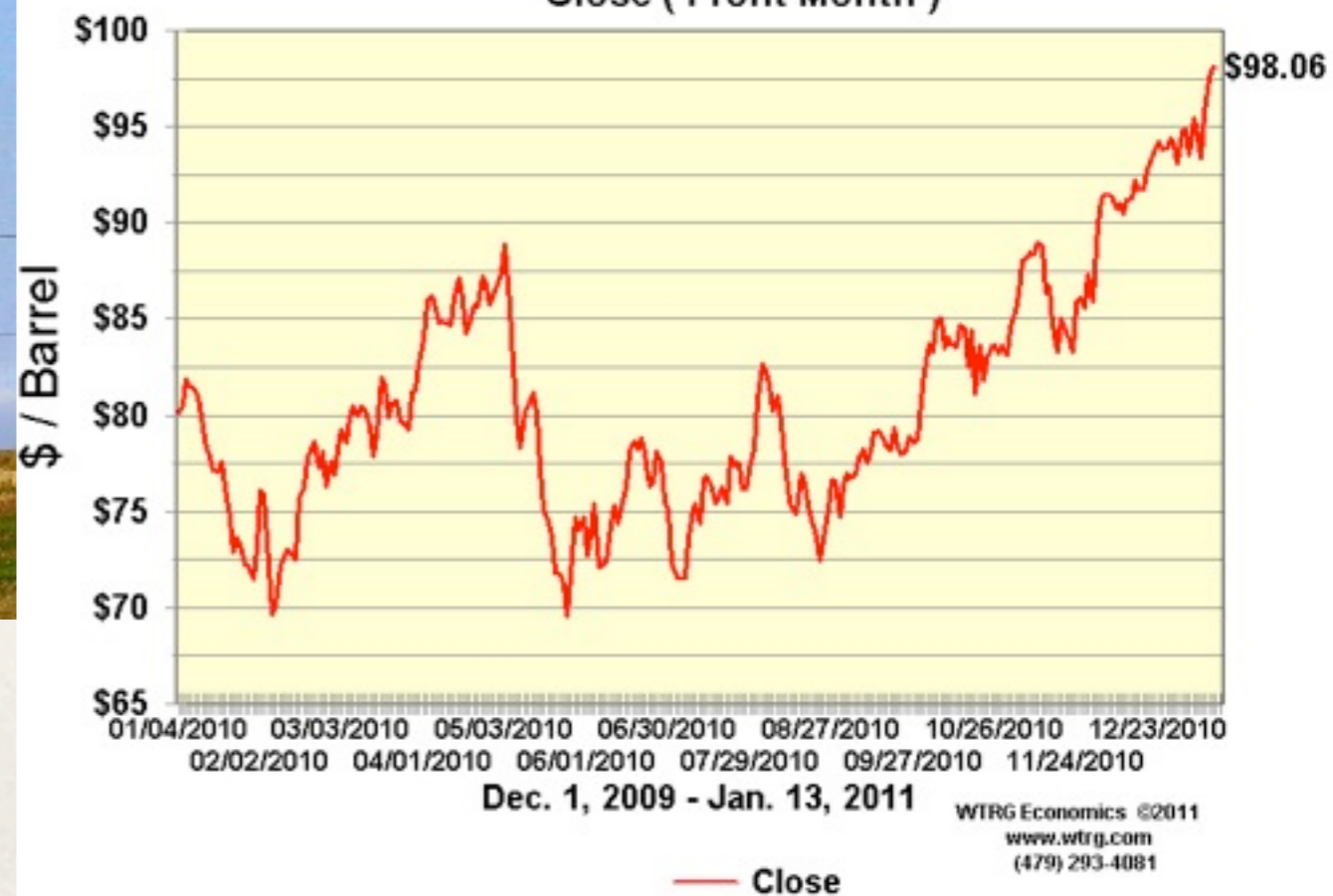
Wind Power Worldwide June 2010

Position	Country	Total capacity June 2010 [MW]	Added capacity June 2010 [MW]	Total capacity end 2009 [MW]
1	USA	36.300	1.200	35.159
2	China	33.800	7.800	26.010
3	Germany	26.400	660	25.777
4	Spain	19.500	400	19.149
5	India	12.100	1.200	10.925
6	Italy	5.300	450	4.850
7	France	5.000	500	4.521
8	United Kingdom	4.600	500	4.092
9	Portugal	3.800	230	3.535
10	Denmark	3.700	190	3.497
Rest of the World		24.500	2.870	21.698
Total		175.000	16.000	159.213

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Brent Crude Oil Futures
Close (Front Month)



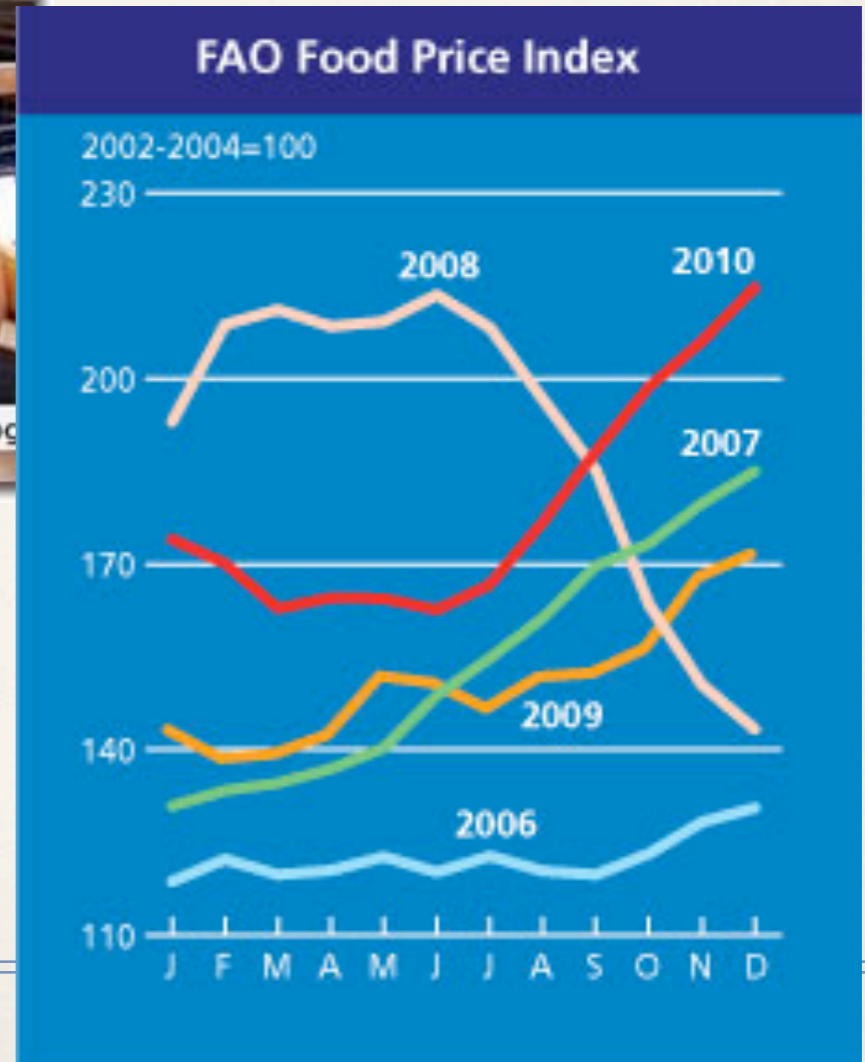
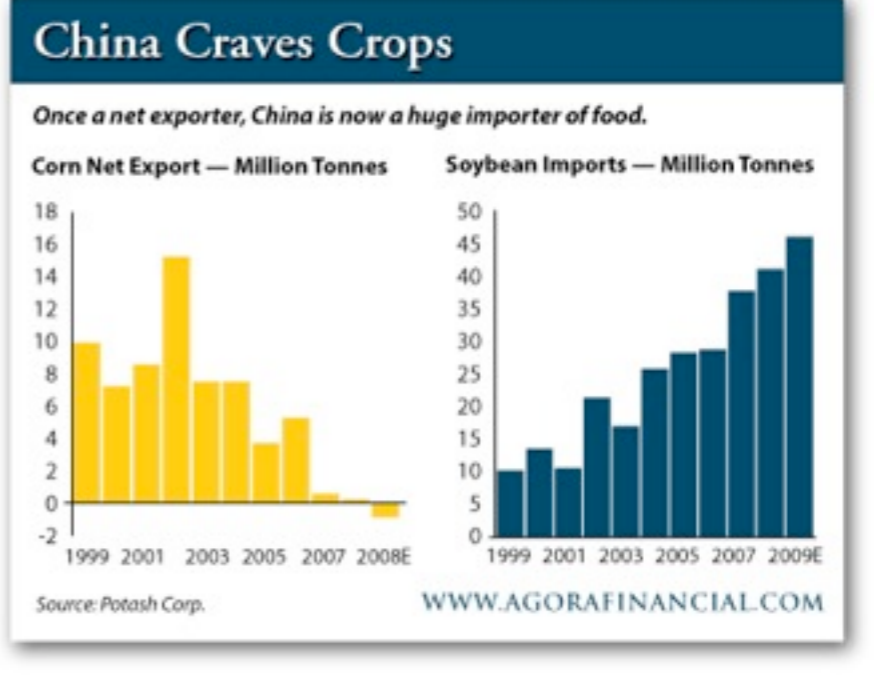
* The problems associated with our oil dependence are *NOT* solved by other fuel sources

* This is particularly true for transport and food

** Transport is still highly dependent on petroleum oil - because of its energy density, the most difficult being aviation

** Food's dependence on petroleum leads to my next topic 'food insecurity'

* Fundamentally as a recent report produced by Chatham House and Lloyds of London say: "WE ARE HEADING TOWARDS A GLOBAL OIL SUPPLY CRUNCH AND PRICE SPIKE"



Food Insecurity

It's happening now.

- * Currently between 1 and 2 billion people in the world are malnourished or starving. 6 million children die every year of starvation
- * And yet we have enough food to feed the world
- HOWEVER:
- * Food price drivers are many:
 - ** severe El Niño events
 - ** Climate change
 - ** A renewed surge in oil prices - and more generally the peak oil issue because industrial agriculture is so heavily energy dependant - cultivation, transport, processing but also pesticide and fertiliser production - a Johns Hopkins study shows 35 calories of energy go to produce 1 calorie of beef
 - *** The EROI for food is important - for Japanese rice, it has fallen from 1.27 calories per calorie expended, to 0.38 in 1974
 - ** A decline in productivity
 - ** Population and income growth, especially in Asia
 - ** Shifting diets: higher calorie intake -- more and more food is transformed into meat for growing middle classes in China and India
 - ** Diverting food commodities for biofuel production - 40% of US corn crops now go to ethanol production
- * Because of global food markets, more and more people are dependant on food produced on the other side of the world, e.g. the US and Russia are major grain producers, and countries like Egypt are major grain importers
- * Climate change will lead to greatly reduced food production in many parts of the world, as we saw with Russia's grain crop failing this past summer

Energy Use in the UK Food Sector

13% Manufacturing

6% Farming & fishing

4% Pre farm (fertiliser, pesticides & machinery production)

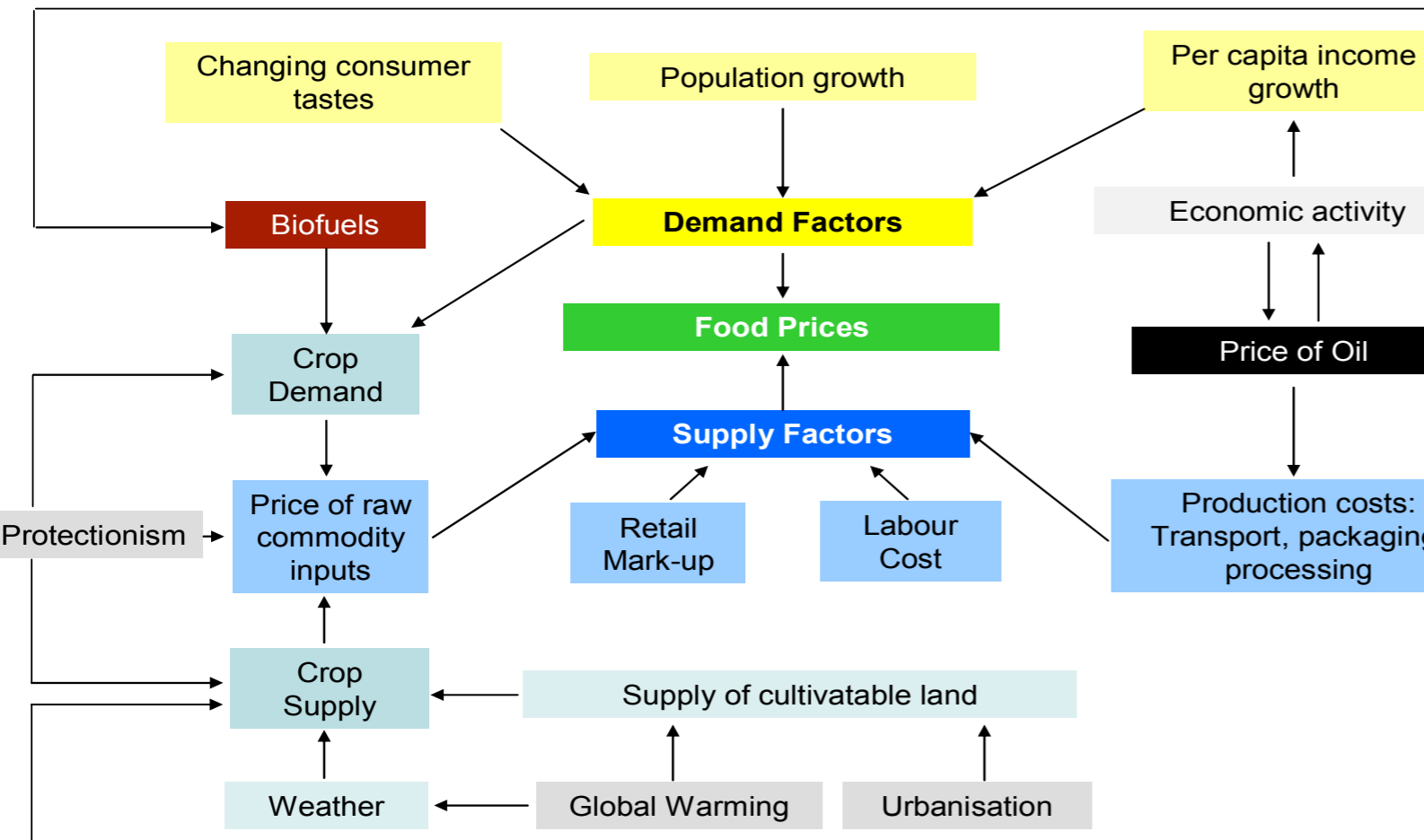
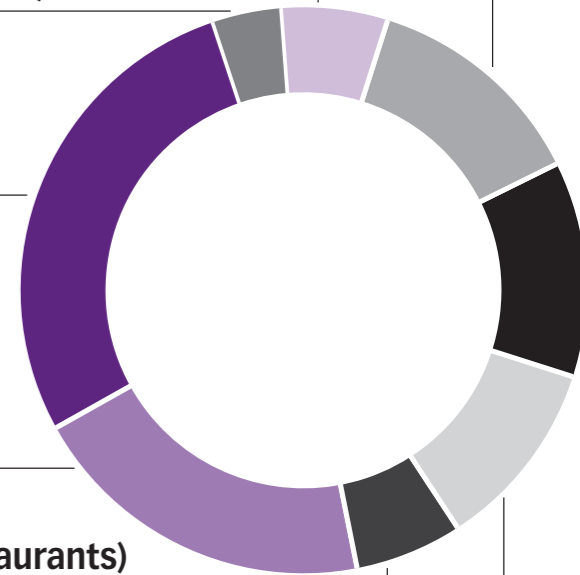
28% Net trade

20% Households (shopping, storage & preparation)

6% Catering (hotels & restaurants)

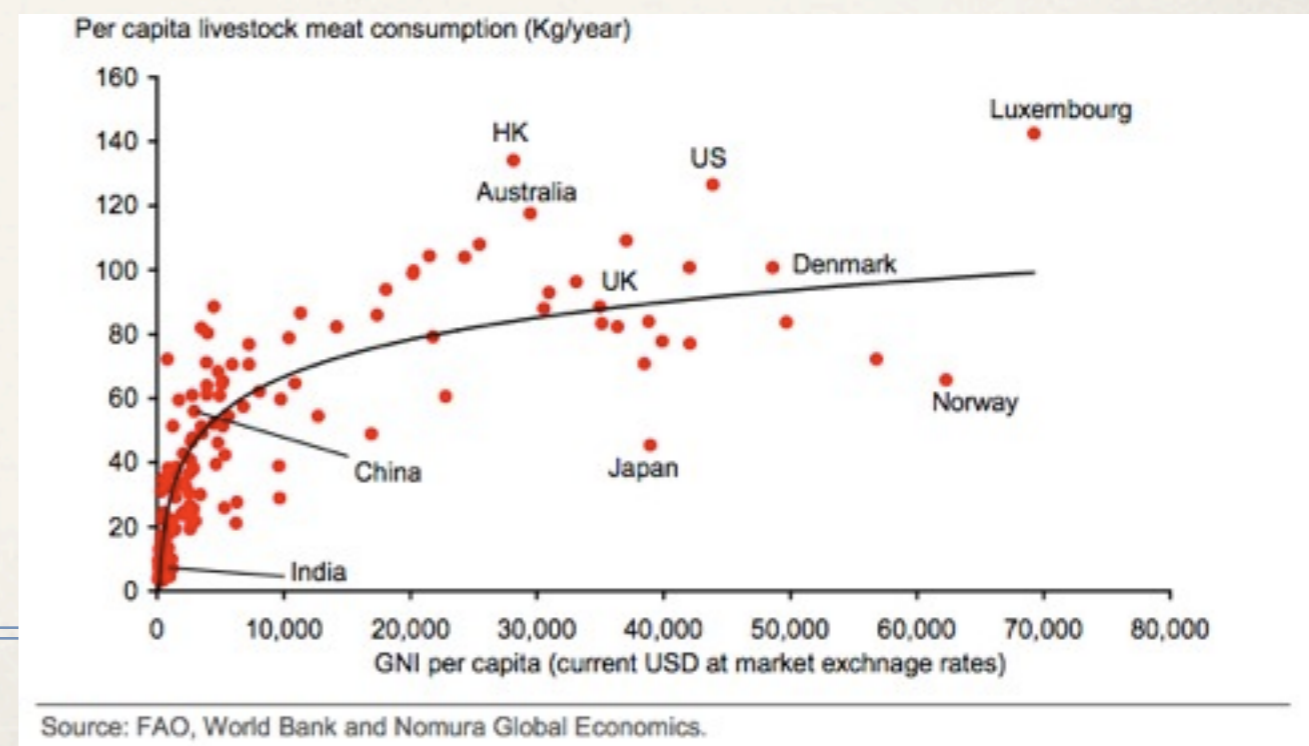
11% Retail

12% Commercial transportation (UK & overseas)



Food Insecurity

It will affect us in Western Europe too



* The food web is extremely insecure across the world

* Above all it is energy dependent across all stages of production, processing, transportation and end consumer purchase and consumption.

* There are major social and political implications:

** The riots in Tunisia which appear to have now toppled the government are in large part due to increased food prices, as are similar riots in Algeria

** Egypt has suffered 20% food inflation in 6 months

** and we should not imagine that in Western Europe we are immune to these impacts.

* These problems are exacerbated by speculation in food: over \$200Bn according to some estimates but this is also linked to the rising price of oil

* Food inflation in UK is double general inflation

* This hits poorest sections of population disproportionately

* Agriculture and food production is also major component of GHG emissions

* Widespread suggestion (e.g. Sir Nicholas Sterns) that a substantial change eating habits especially meat consumption could make a major contribution to GHG emission reduction:

* So:

** It will be more expensive

** It will be more difficult to import

** We need to change our diets

** We need to change our production methods

Currently we are very vulnerable to many kinds of different shocks

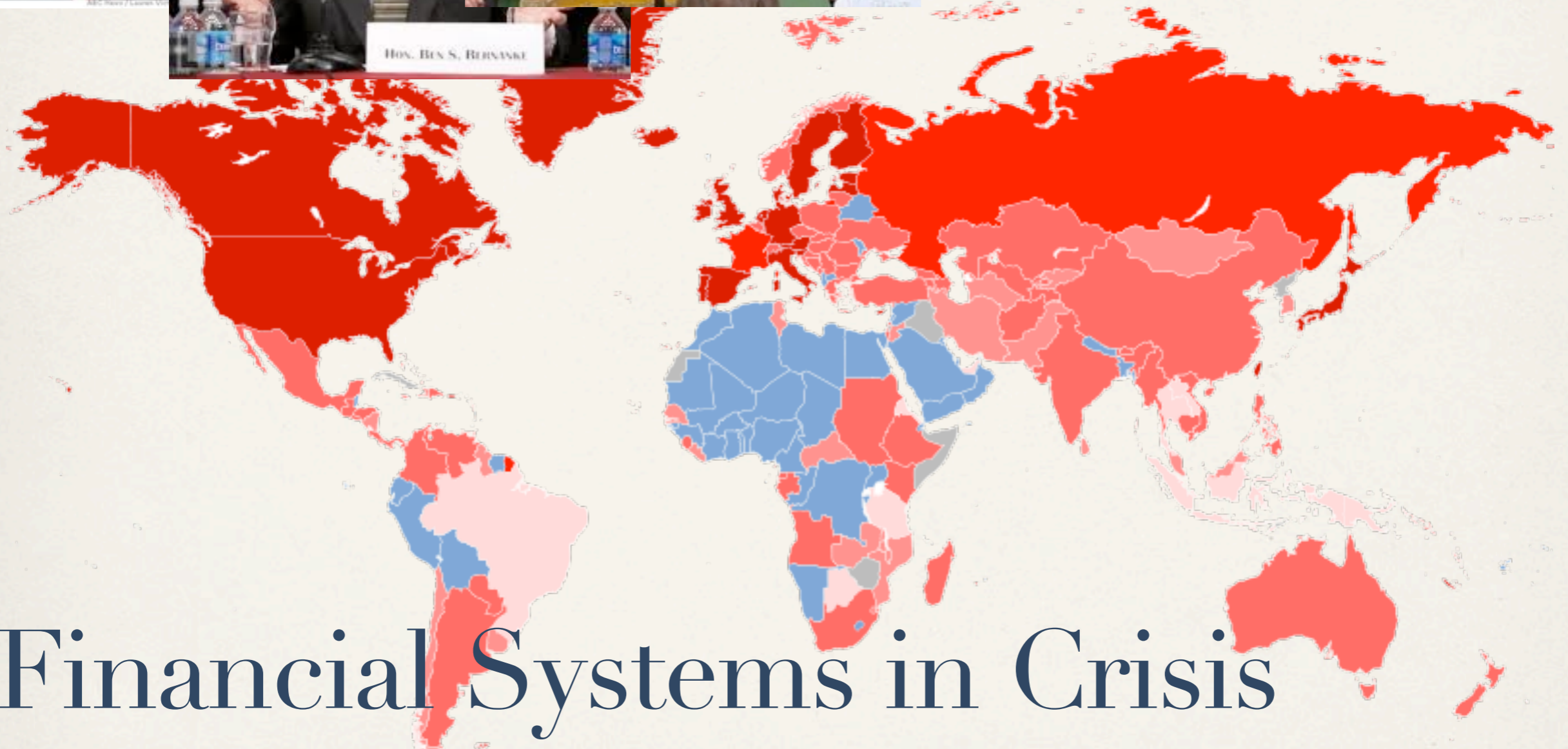


BEAR
STEARNS
LEHMAN BROTHERS

northern
rock

RBS
The Royal Bank of Scotland Group

Lloyds TSB



Financial Systems in Crisis

It has happened and is continuing

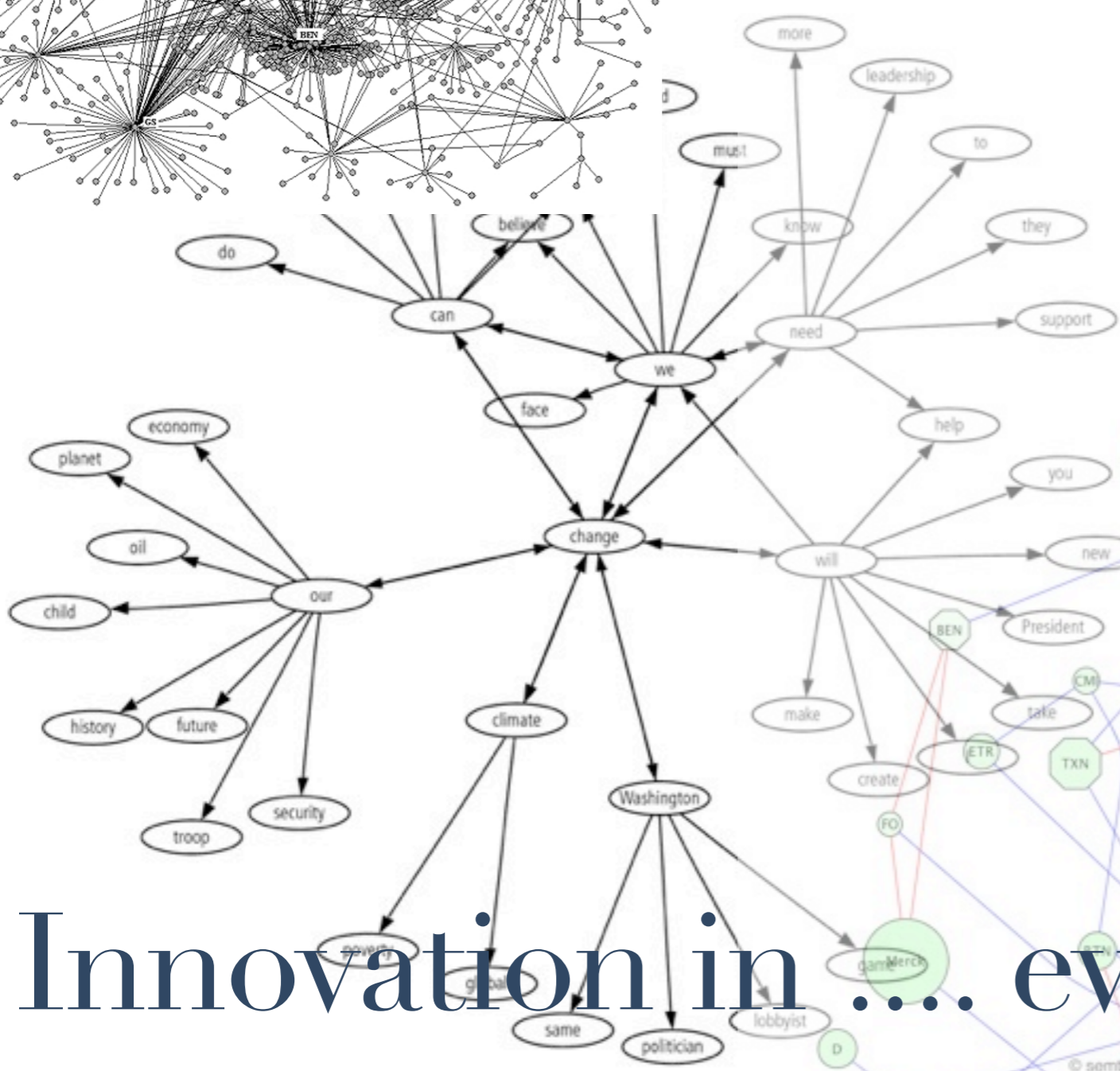
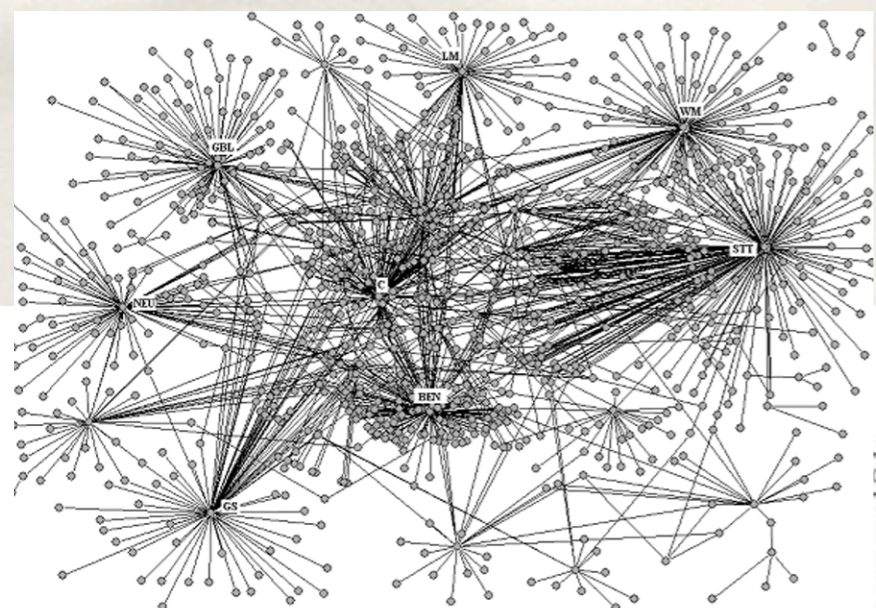
- * Many commentators seemed surprised by the financial crisis of 2008
- * and yet in reality it was inevitable, and a direct consequence of deep structural tendencies in the financial system
- ** specifically the dollar-debt financial system where the US treasury bonds are bought by foreign governments obligatorily because a collapse of the dollar would hurt them more than the US - 'our currency, but your problem' - John Connally
- * we live in a growth obsessed economy without regards for either the natural limits to growth, and the inherently cyclical nature of free markets
- * I will not go into all the causes (short and long term) for the financial crisis of 2008 whose effects we are still dealing with. I will observe that:
- ** We have not addressed any of the fundamental issues as yet
- ** We have basically allowed the finance sector to carry on business as usual with no consequences for the immense damage it has wrought on people across the world
- ** We are obsessed with 'restoring market confidence' rather than identifying that which will benefit the whole of our societies and economies.
- ** debt fuelled economies around the world have led (especially since 1970) to a great increase in income inequality both within nations and between nations - more countries have a higher Gini co-efficient now than in the 1980s
- ** there is a fundamental ideological conflict between the perception that the role of banks is to fund capital formation and industry vs. the reality that in Western economies banks have focussed on speculation and asset-price inflation, and the continued inflated bonuses provided to investment bankers reflect this reality.
- * A key further factor remains the link with rising energy prices
- * "The continued poverty of the majority of the planet's inhabitants and excessive consumption by the minority are the two major causes of environmental degradation" - UNDP 2000
- * Short term-ism - average time held for a US stock is 22 seconds - non productive stockmarket activity



Innovation beyond Technology

Build a better mousetrap

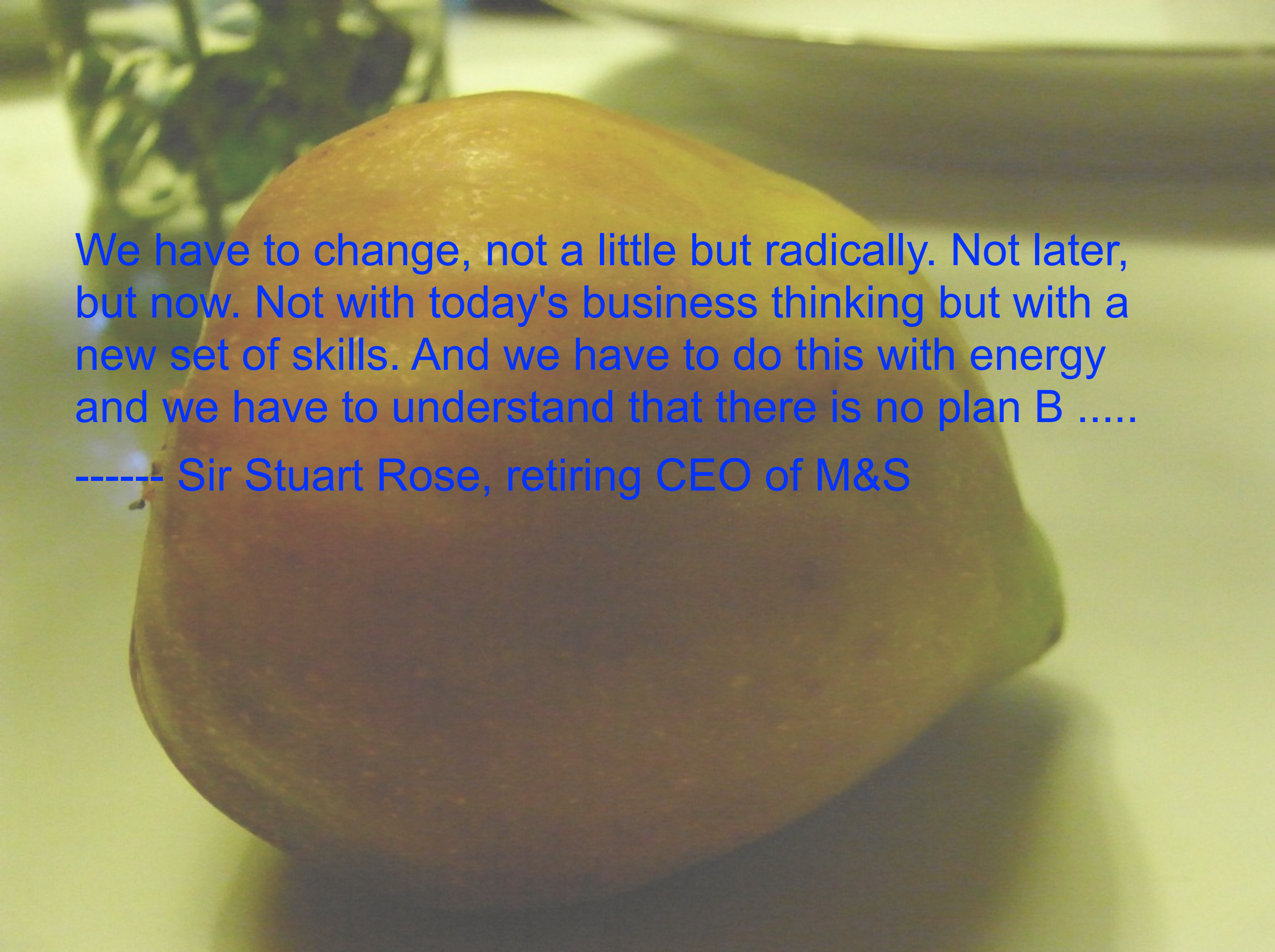
- * We are fascinated by technological breakthroughs
- * And we have been very good at technological progress
- * And this is normal, part of human nature
- * BUT we are facing resource limits which technology is not addressing
- * Most new gadgets may appear to reduce some "negative" aspect e.g. energy consumption, while in fact adding to the overall problem



Innovation in everything

Mousetraps don't cut it!

- * There is a need for innovation beyond widgets and high tech
- * There is a need for innovation and creativity in:
 - * Our social systems
 - * Our economic systems
 - * Our political systems
 - * Above all our society's relationship with nature and the natural world.
- * Where do the solutions lie?
- * We are not asking radical enough questions, we are afraid to rethink the foundations
- * Where is the agility? Where is the innovation in business models, in social roles for business, in the whole conception of society. We are still stuck in a 19th century model of the world, dealing with 21st century problems.
- * This is not for lack of good ideas being available. Our problem is more a groupthink which makes it socially unacceptable to question foundational aspects. Or to express that more gently makes it very very slow to achieve any change.



We have to change, not a little but radically. Not later, but now. Not with today's business thinking but with a new set of skills. And we have to do this with energy and we have to understand that there is no plan B

----- Sir Stuart Rose, retiring CEO of M&S

Thank You

Finis

Centre for Executive Development





Resources

(A partial list)

- * The Oil Crunch - A wake-up call for the UK economy: Second report of the UK Industry Taskforce on Peak Oil & Energy Security (ITPOES). (2010) Available from <http://www.peakoiltaskforce.net/>
- * Sustainable Energy Security: Strategic Risks and Opportunities for Business. Chatham House-Lloyd's 360° Risk Insight White Paper. Antony Froggatt and Glada Lahn, June 2010. Available from <http://www.chathamhouse.org.uk/publications/papers/view/-/id/891/>
- * The Fourth Carbon Budget - Reducing emissions through the 2020s. Committee on Climate Change. 2010. <http://tinyurl.com/33zqewb>
- * Rose, Stuart - <http://www.guardian.co.uk/sustainable-business/stuart-rose-radical-marks-spencer>
- * A User's Guide to the Crisis of Civilization, and How to Save It. Nafeez Mosaddeq Ahmed, Pluto Press, 2010
- * Nomura - Global Economics and Strategy: The Coming Surge in Food Prices, September 2010, available from <http://www.nomura.com/europe/resources/pdf/080910.pdf><http://www.nomura.com/europe/resources/pdf/080910.pdf>
- * United Nations Development Programme - Human Development Report 2010, available from: <http://hdr.undp.org/en/>
- * DEFRA - Ensuring the UK's Food Security in a Changing World, 2008, available from <http://www.ifr.ac.uk/waste/Reports/DEFRA-Ensuring-UK-Food-Security-in-a-changing-world-170708.pdf>
- * Wittenberg, Alex, 2010, Global Emerging Risks Survey, Financial Times in association with Oliver Wyman
- * <http://www.theoil drum.com/>
- * <http://www.realclimate.org/>