

Towards a Sustainable Lake Macquarie in the face of Peak Oil and Climate Change

Rotary, Toronto
8/9/09



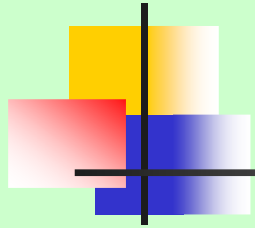
John Shiel BE, MEngSc, MAppSc

Vice-Chair, Permaculture Hunter Region
Transition Town Newcastle

University of Newcastle - Researching Urban Sustainability

www.envirosustain.com.au - Energy Auditing

jshiel@westnet.com.au



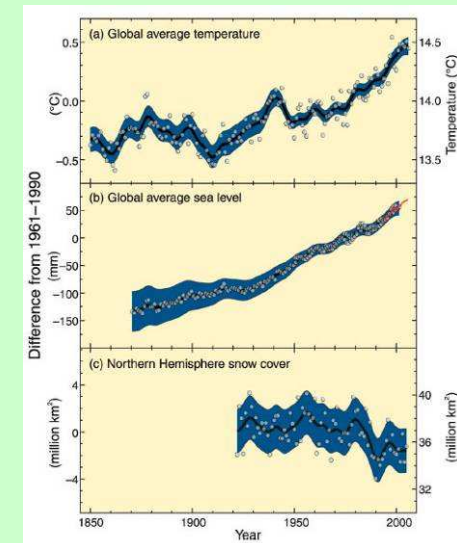
Agenda

- Climate Change
- Peak Everything
 - Peak Oil
- Towards a Sustainable Lake Macquarie
- What businesses can do

Climate Change - Evidence & Key Findings from the IPCC

(IPCC AR4 SYR, 2007)

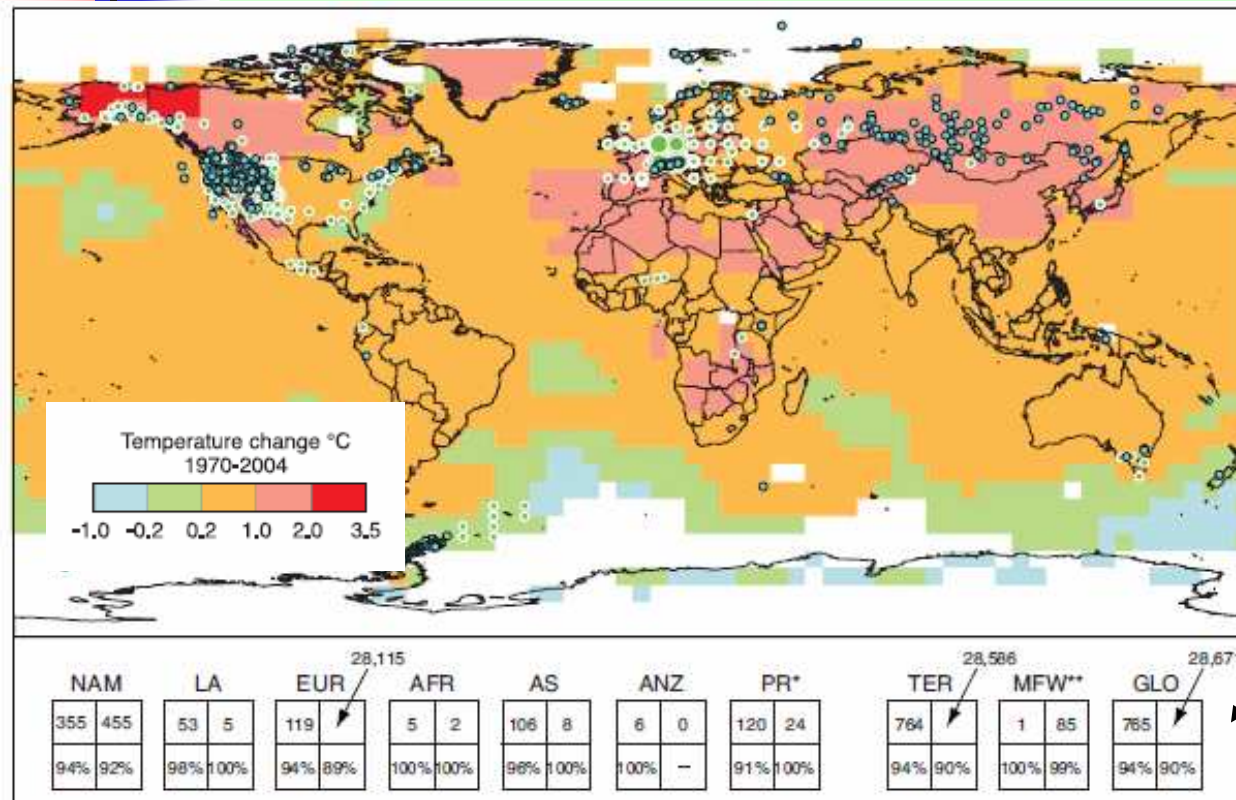
- Evidence - Since industrial revolution
 - 0.8 degree C increase in global av. surface **temperature**
 - Around 150 -200 mm **sea level rise** (ocean thermal expansion)
 - More than 2 million square kilometers of Nth Hemisphere **snow**
- Certain findings
 - The planet is **warming**
 - Most of the temperature increase is due to **man-made greenhouse gases** (Physics, Carbon 14 dating, & models)
 - **Urgent, rapid decrease** in emissions **needed by 2015** to stop dangerous temperature increase
- Other Key Findings
 - **Many natural systems are being affected** by regional climate changes
 - With current policies and practices **greenhouse gas emissions will continue to grow** over next few decades (6°C by 2100)
- Still some uncertainties – climate is very complex
- Who is IPCC ?
 - Over 1,000 expert climate scientists
 - Each scientist is independent, peer reviewed
 - Fewer than 15 skeptic scientists who disagree
 - Few of these are climate experts
 - Many oil funded (Exxon-Mobil)
 - Mostly non-peer-reviewed eg. Ian Plimer (Geologist)



IPCC

- WG I: The Physical Science > 600 Relevant Scientists. Plus > 450 Reviewers.
- WGII: Impacts, Adaptation & Vulnerability >300 Experts. Plus > 750 reviewers
- WG III: Mitigation of Climate Change > 250 Experts. Plus > 400 Reviewers

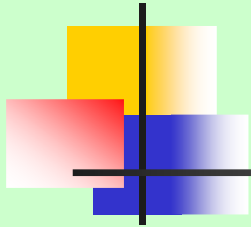
Observed changes of natural systems by Region in physical and biological systems and surface temperature - 1970-2004 IPCC AR4 SYR, 2007



Physical	Biological
Number of significant observed changes	Number of significant observed changes
Percentage of significant changes consistent with warming	Percentage of significant changes consistent with warming

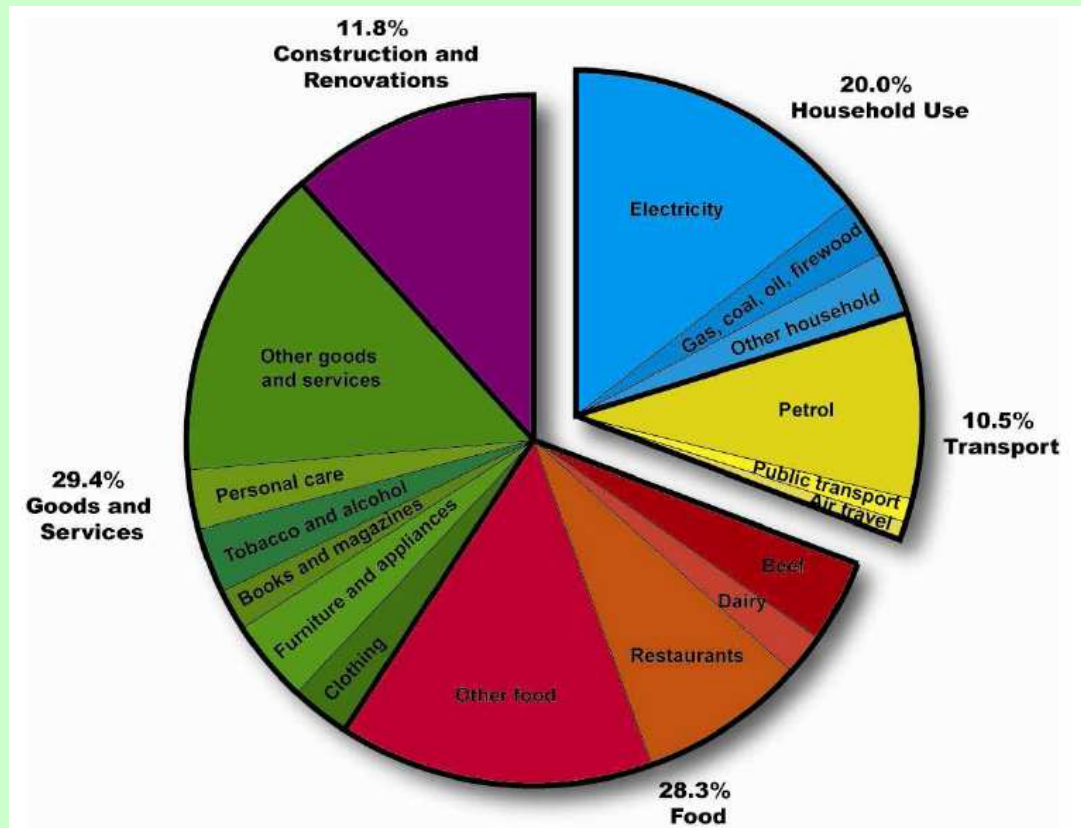
■ Alarming new evidence

- Earth within 1 degree of warmest for a million years (BoM - Wiles, P., 2008)
- Antarctica's Larson B ice shelf broke away in 2002 (Darby, 2009)
 - 3,250 sq km ice shelf disintegrated
- An **ice wall damming** the endangered **Wilkins ice shelf** against the **Antarctic Peninsula has melted**, which can allow thousands of square kilometres of ice behind it to float away. (Darby, 2009)



Greenhouse Gas of Households – Consumerism Lifestyle

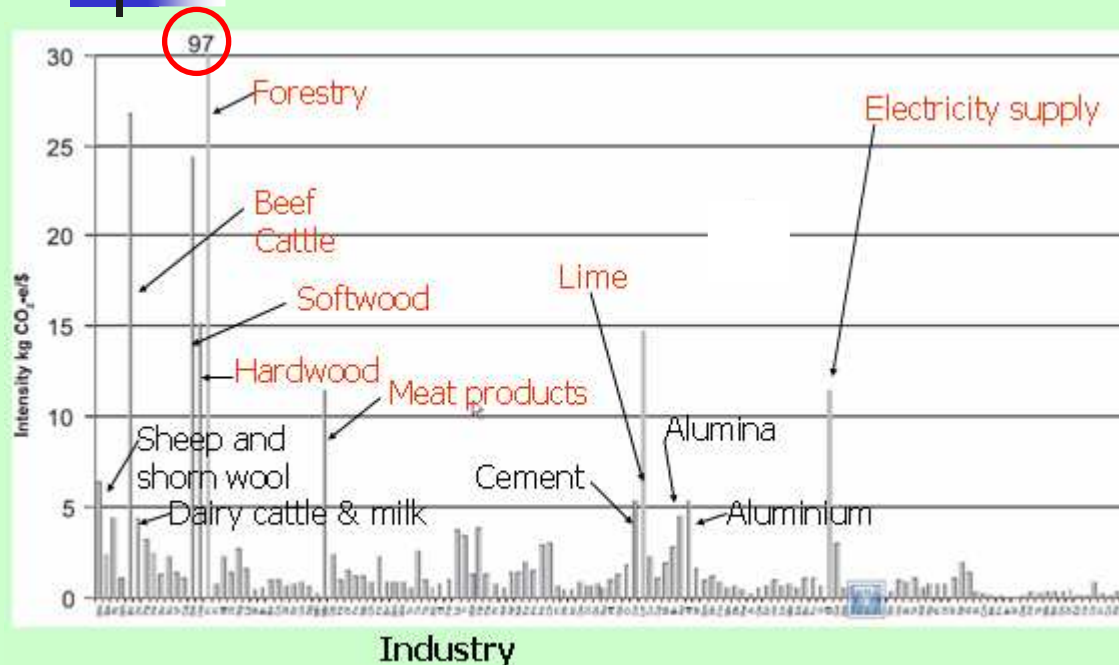
Note High Occupant Behaviour Emissions (ACF, 2007)



- Using operational and embodied emissions, and input/output Lifecycle Analysis.
- GHG consumption in Australia
 - 60% is **food & new goods** and **services**
 - **Transport** is 50% of energy used in house
- **Need to lower our consumption, food and transport behaviour**
 - **Can still have a high standard of living**

Industry Greenhouse Gas Emissions

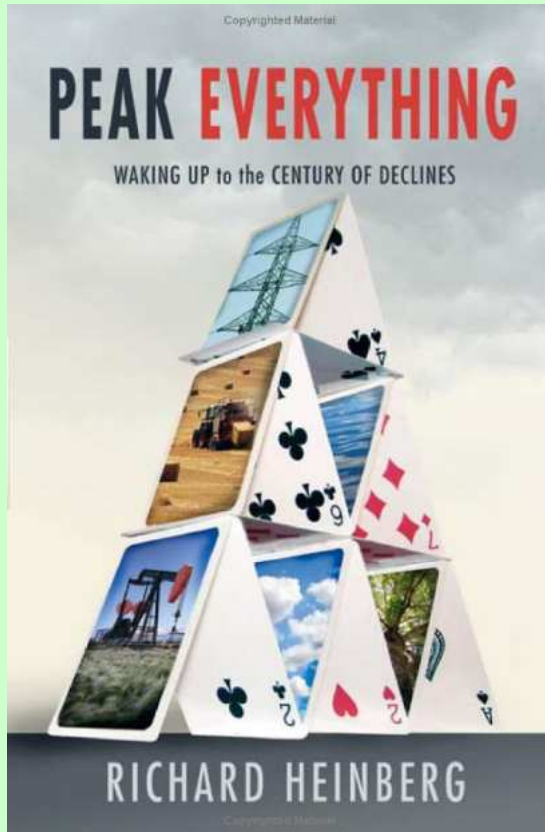
(The Balancing Act – A Triple Bottom Line Analysis of the Australian Economy (Univ of Syd, CSIRO, 2005))



- Considers
 - Operational and embodied energy emissions
 - Suppliers
- Note big industry emitters
 - Forestry, Beef cattle, Softwood, Lime, Hardwood, Meat products, Electricity supply, Sheep, Cement, Aluminium

- Forestry
 - Land clearing and land preparation (with heavy machinery),
 - Chipping wood,
 - Transport
 - Logs,
 - Bins of wood chips chipped in the forest
 - Downstream processing facility such as a saw mill, a particle board mill, or a pulp and paper factory
- Forestry does not include the planting and management of **softwood** and **hardwood** plantations
- Australia produces about 13 million m³ of **softwood** annually with about 40% used for pulp, and 60% for sawlogs and particle boards. Significant imports of softwood come from New Zealand and Canada.
- Australia produces about 11 million m³ of **hardwood** roundwood and about 8 million m³ of woodchips for export.

Peak Everything



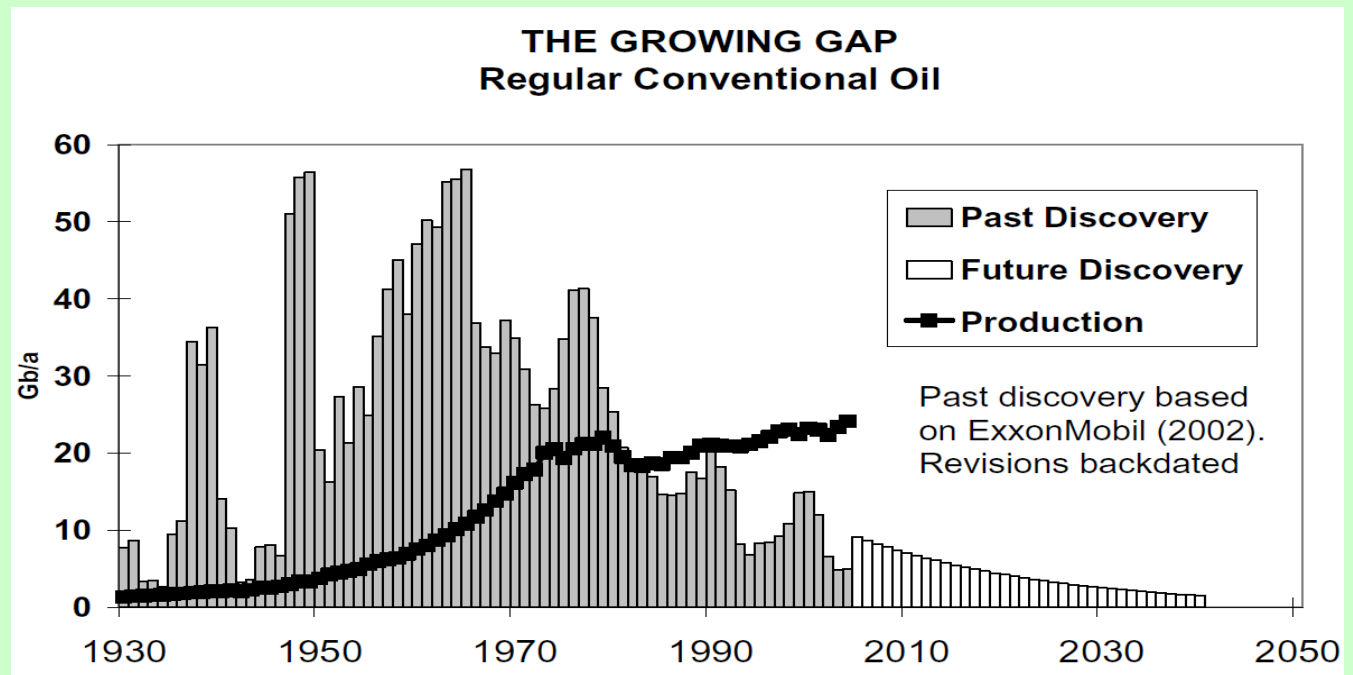
- “In the course of the present century we will see **an end to growth** and a commencement of **decline in** all of these parameters
 - Population
 - Grain production (total and per capita)
 - Uranium production
 - Climate stability
 - Fresh water availability per capita
 - Wild fish harvests
 - Arable land in agricultural production
 - Yearly extraction of some metals and minerals (including copper, platinum, silver, gold, and zinc)”

Richard Heinberg (Heinberg, 2007)

Peak Oil – Extracted half of oil reserves

(Campbell, C.J., 2005)

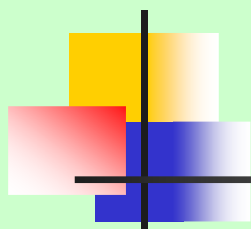
- **Peak Oil** is where we have extracted 50% of the Oil Reserves.
- We have reached the end of the “era of cheap oil”
- Garnaut calls it the “Platinum Age”



Professor Kjell Aleklett, head of ASPO (Assoc. for Study of Peak Oil and Gas) has found that **maximum oil production will fall 25% by 2030.**

He says all governments must act now to reduce the world's energy consumption - June 5, 2009.

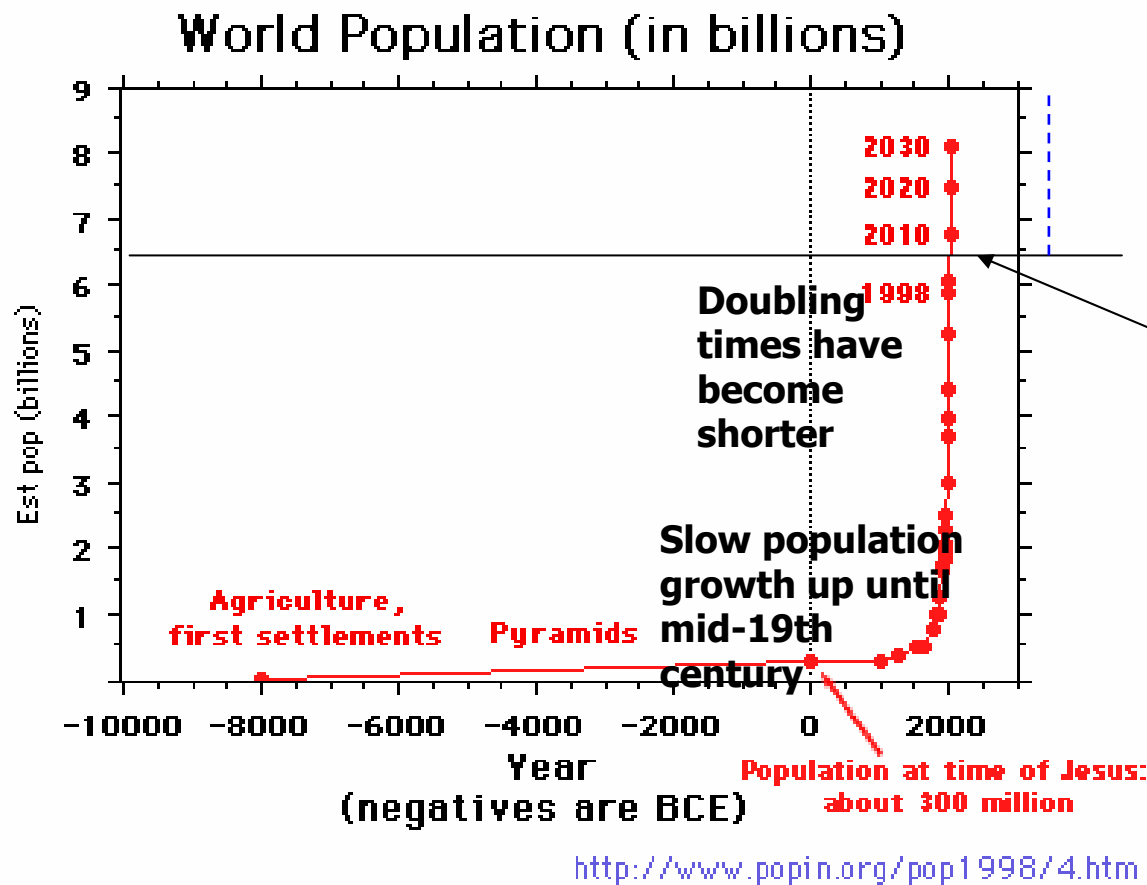
<http://www.abc.net.au/news/stories/2009/06/05/2590594.htm>



Years left of Resources

Mineral	Years left at 50% US consumption rate (New Scientist, 2007)	Years left at 2% increase from 2008 consumption (Brown, 2008)	Years left at current rate of consumption (OECD/IEA, 2008)	Use
Indium	4			LCDs (TVs, Monitors)
Lead	8	17		Lead pipes, batteries
Silver	9			Jewellery, catalytic converters
Antimony	13			Drugs
Tin	17	19		Cans, solder
Uranium	19			Weapons, power stations
Tantalum	20			Mobile phones, camera lenses
Zinc	34			Galvanising
Gold	36			Jewellery, dental
Copper	38	25		Wire, coins, plumbing
Chromium	40			Chrome plating, paint
Oil			~ > 40	Energy, plastics, medicine, food
Platinum	42			Jewellery, catalysts, car fuel cells
Nickel	57			Batteries, turbine blades
Iron Ore		54		Steel – ships, cars, machinery.
Bauxite		68		Produces Alumina, for Aluminium
Phosphorus	142			Fertiliser, animal feed
Aluminium	510			Transport, electricals, durables

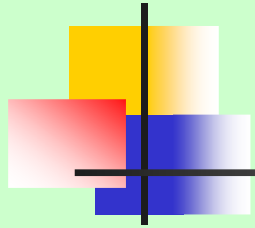
Reasons for Resource Scarcity & Pollution



- Population Explosion
 - The number ONE environmental problem (Counts, 2009)

Already a tapering of population increase, and less than 9 billion people by 2050 – China, food

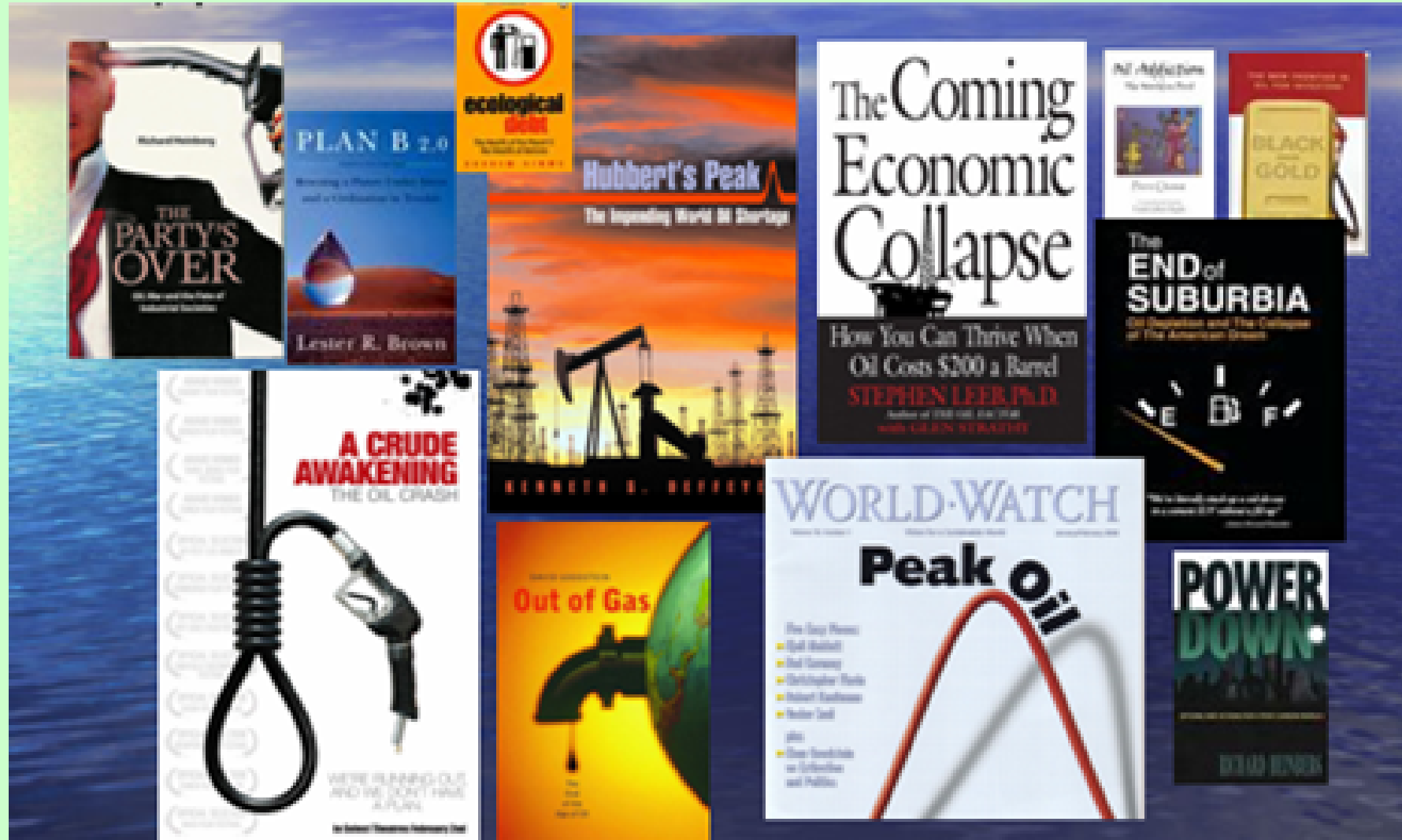
- Life expectancy has increased
- Birth rates have greatly exceeded mortality rates
- People are more mobile and can live anywhere



Tragedy of the Commons

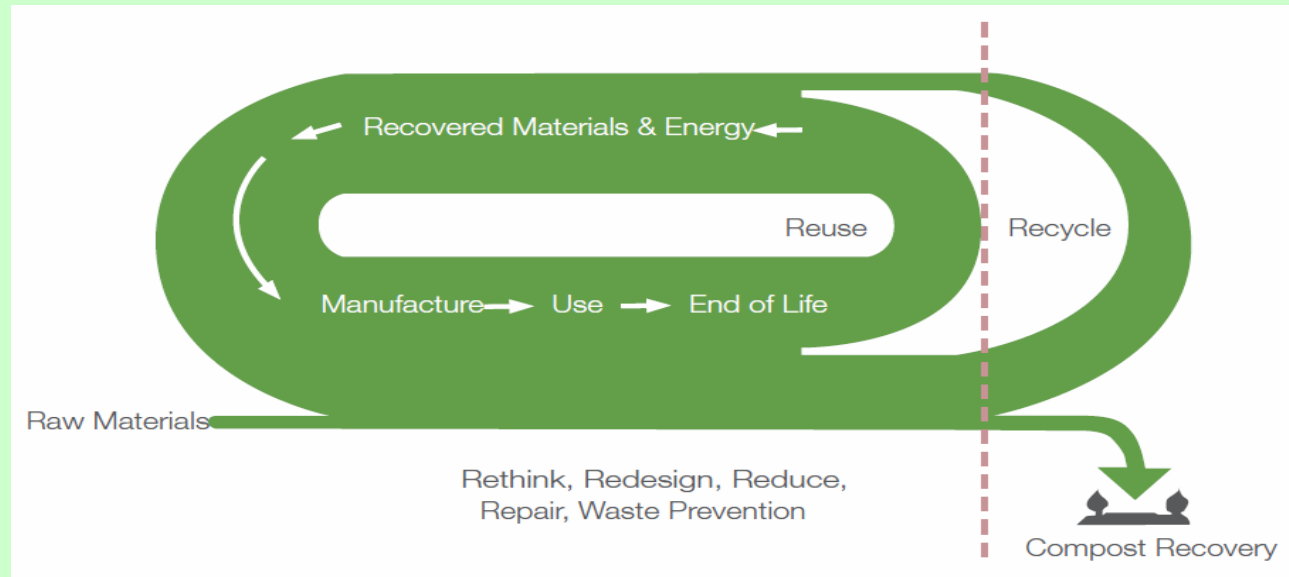
- In old days, allowed to roam a goat on the commons area
- More goats
 - Better off for families
 - Worse off for the environment
- Applied to the Environment
 - Air has limits to greenhouse gases
 - Now reaching the Peak of resource extraction

End of Oil is an Opportunity

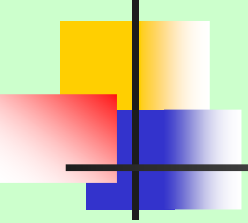


Positive Futures – Arup (Recovery, Recycling),

- **Arup**, shows we need to move towards almost 100% recycling and recovery by 2050 (Head, 2008)

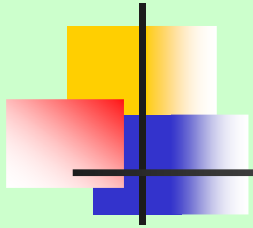


- We could make our **unit of currency Joules** instead of artificially-valued **dollars** (Turnbull, 2008)



Can we have full employment in a steady-state (zero-growth) economy?

- Assume
 - Zero population growth
 - No more than 2.2 children per couple
 - Low consumerism
 - More home-made products, repairs, recycled goods
 - Goods built to last forever
 - Much higher quality
 - Less plastics – costly oil
 - More local food growing
 - Full employment – almost zero unemployment
 - Everyone was paid by
 - A corporation,
 - Coops (many more of these)
 - Government
 - Their own business



Positive response to challenges

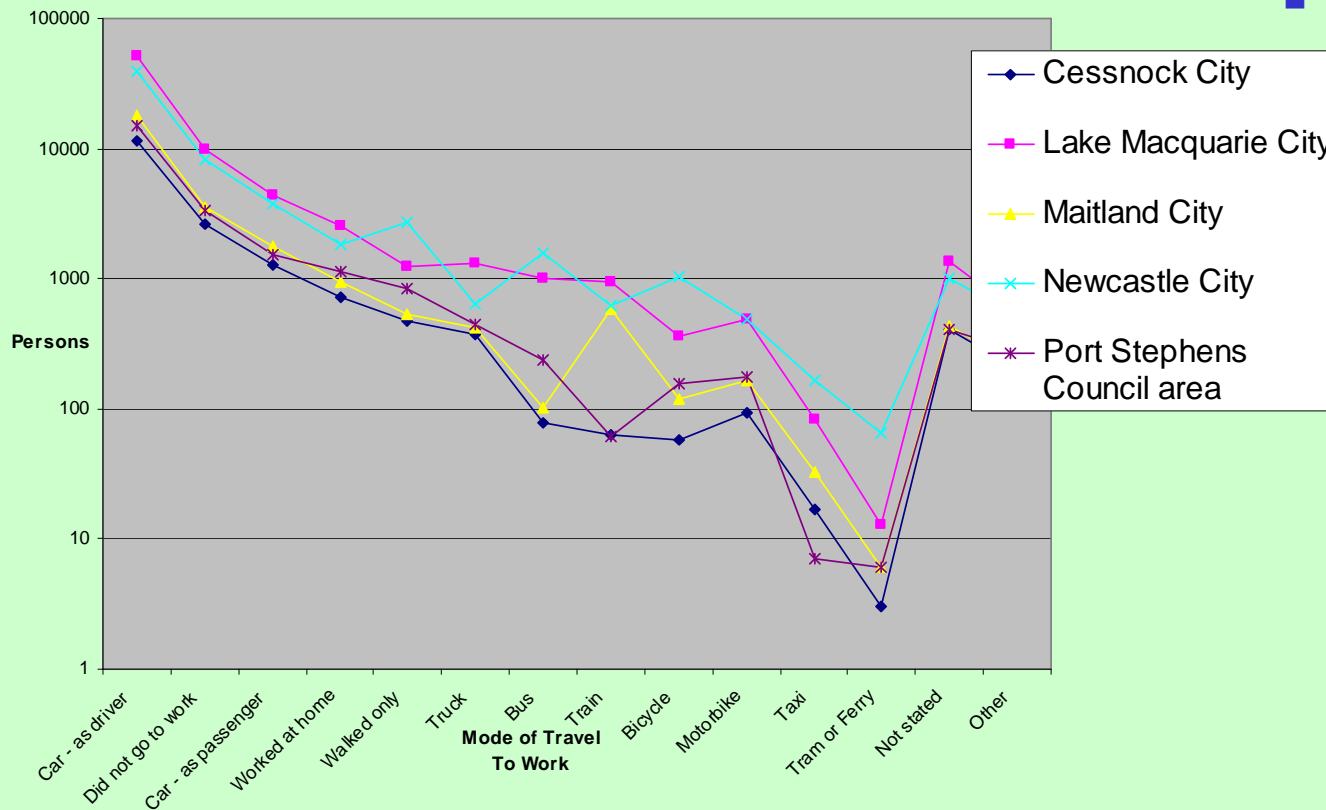
- Everyone
 - Could work only 3-4 days per week
 - Could have more time for family, friends, community, and
 - Could boost local resilience
 - Develop local job opportunities
 - Coops for food, local products
 - Assist with community food gardens
 - Build local transport facilities
 - Bike systems
 - Develop support systems for vulnerable areas and people in community

Towards a Sustainable Lake Macquarie – Issues & Ways forward

- Sea Level Rise
 - > 1m ??

Develop local, high, sustainable towns
Eg. Glendale, Charlestown etc.

How We Get to Work (NB: Log Scale), 2006



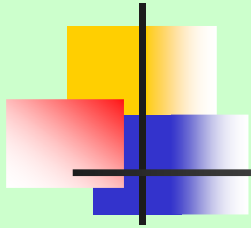
- Large area

- Many cars in LMCC
- Maybe electric bikes/trikes, charged by renewable energy



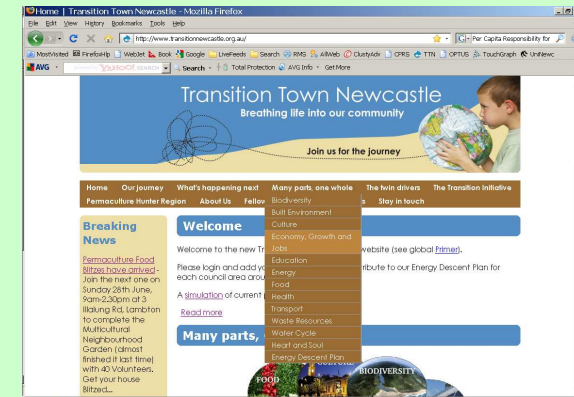
Transition Towns – positive community response to Peak Oil and Climate Change, based on Permaculture.

Permaculture Hunter - Food



<http://www.transitionnewcastle.org.au/>

- Transition Towns
 - Coal Point
 - Newcastle – hub



transformed the site from this...



to this...

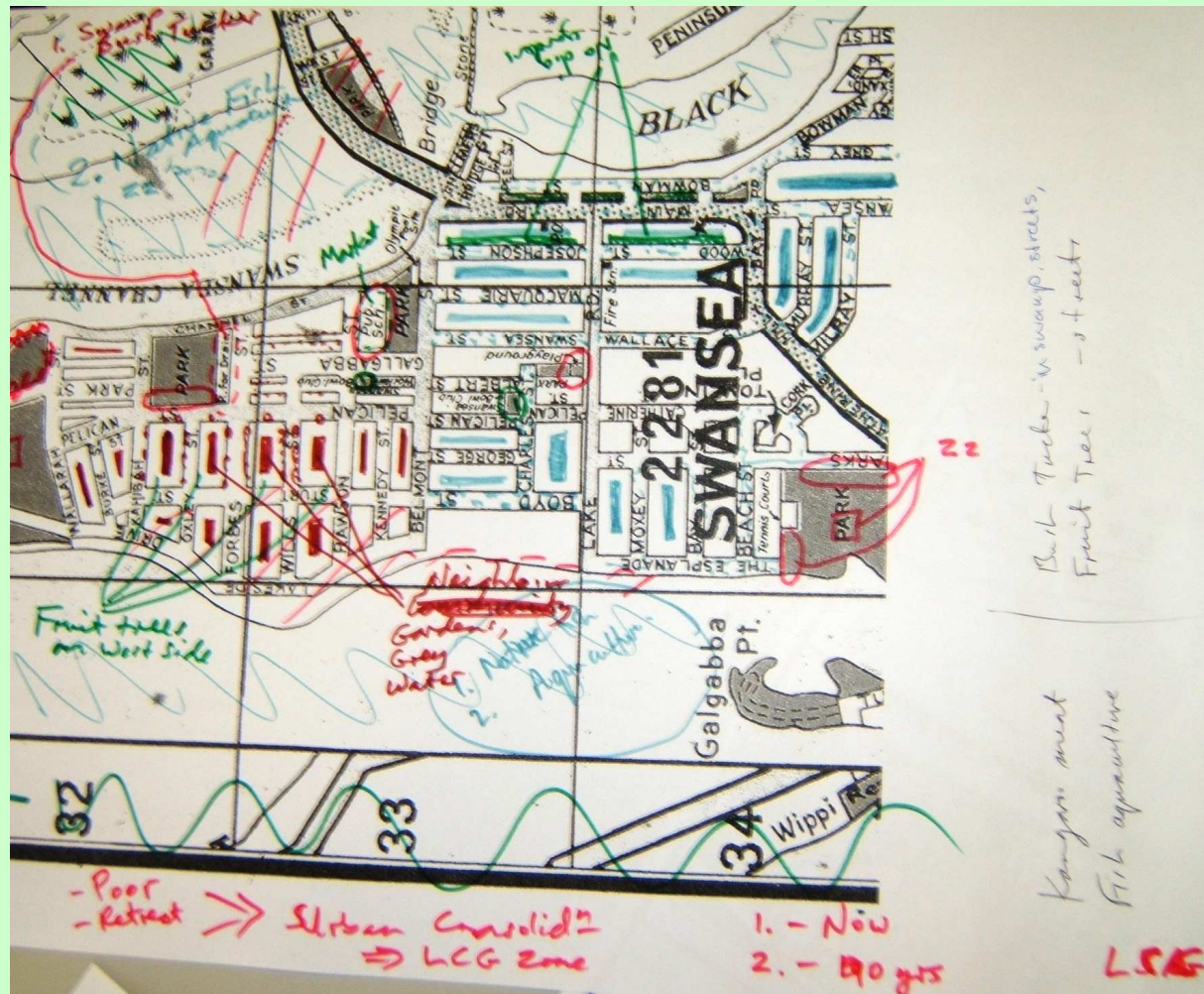


- Local Food
- Permaculture Hunter
 - Designing & then Building in 1 - 2 day Blitzes
 - Community **food gardens**
 - School **food gardens**
 - Lambton, Beresfield preschool, The Junction, Adamstown, Cardiff North

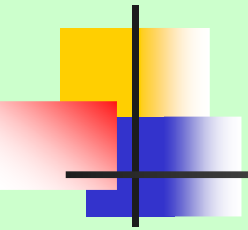


Swansea Opportunities

One group report - Building Sustainable Organisations, Communities & Eco-Villages (McCurdy, 2008)



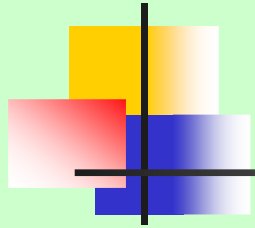
- Bridge raised
- Urban mixed zone consolidation along public transport
- Water stormwater harvesting
- Electric bikes
- Fruit trees, no-dig vegetable gardens
- Bush tucker
- Farmers markets
- Kangaroo and Fish farms



Industrial Ecology

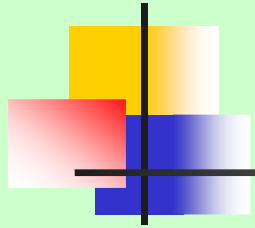
Businesses can reduce footprint

- Waste of one industry – input of another
 - Reduces raw materials, pollution, and saves on waste treatment
 - Eg. paper, timber, steel offcuts,
 - Reduces supply energy, transport
 - Lowers costs
 - Lake Macq Recycling Directory – where to go
 - Oils, acids, paints, concrete, brick, cork, scrap metal, recyclables (paper, bottles), computers, ink/toner, polystyrene, plastic bags, tyres, carpets
- Programmes to Lower Energy Use & Costs
 - Audit & Assistance
 - Council – Win-Win Sustainable Business Initiative – Info pack
 - **Few to handout** – if you would like to start
 - Dr Kate Barton kbarton@lakemac.nsw.gov.au
 - State gov – DECC
 - Green Business Program – financial support to reduce energy, water use
 - Eg. Ecosave Ltd obtained \$185,000 to upgrade HVACs
 - Energy Efficiency for **Small Businesses** (<\$20,000 in electricity)
 - Sustainability Advantage Program - **Large Business**
 - Eg. Ultrafloor energy savings of **\$50,000 per year** with small process changes
 - Federal gov
 - Green Building Fund – grants of \$50k - \$500k of 50% of retrofits



Movie

- Arup's CBD makeover



Summary

- Climate Change
- Peak Everything
 - Peak Oil
- Towards a Sustainable Lake Macquarie
- What businesses can do



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