

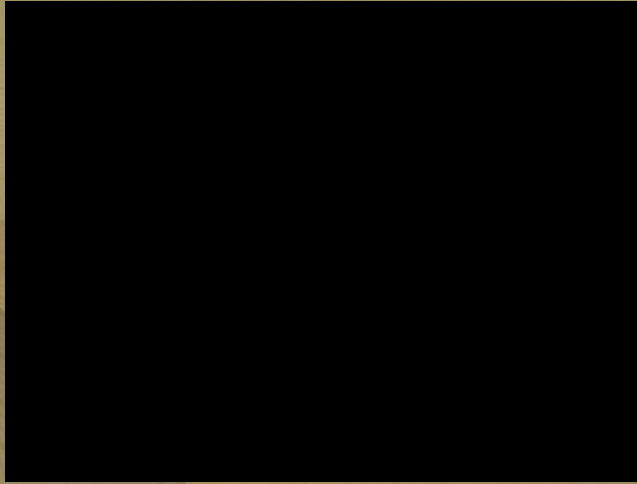
New Zealand's Rising Cost Of Oil Energy Dependence

Peak Oil & Gas

ASPO –NZ
Association for the Study of Peak Oil and Gas – NZ

The Movie

Peak Oil & Gas





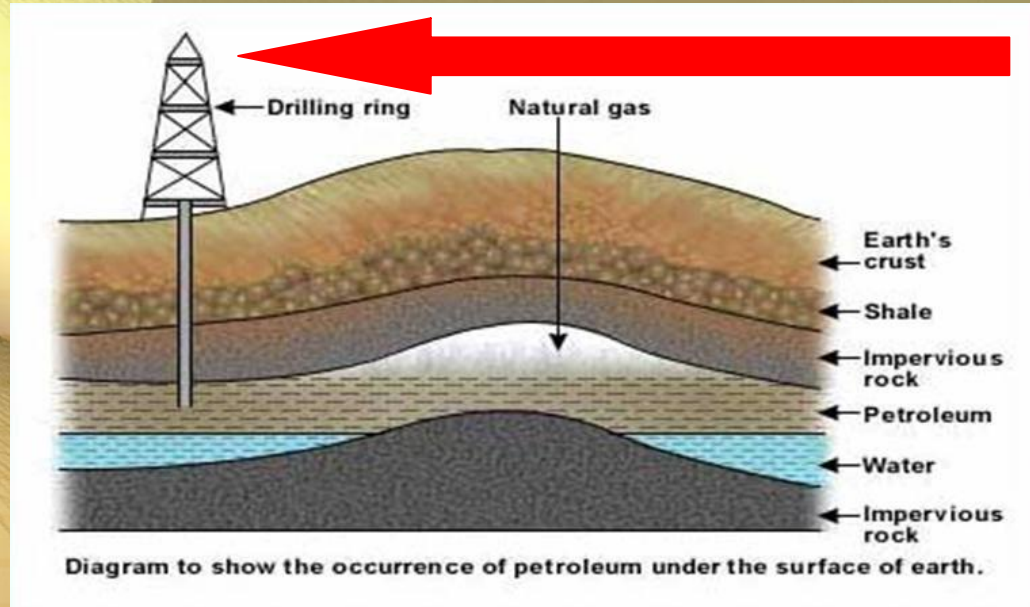
- ~~We are running out of oil~~
- ~~We have enough oil for centuries~~
- ~~Technology will save us~~
- ~~The market will provide~~
- ~~The government will save us~~
- ~~Peak Oil is a green issue~~
- ~~The oil companies are ripping us off~~

- Peak Oil The Cause
- Peak Oil in Context of Resource Depletion (Gas, Electricity, Infrastructure, Industry)
- Peak Oil in Context of the Economy

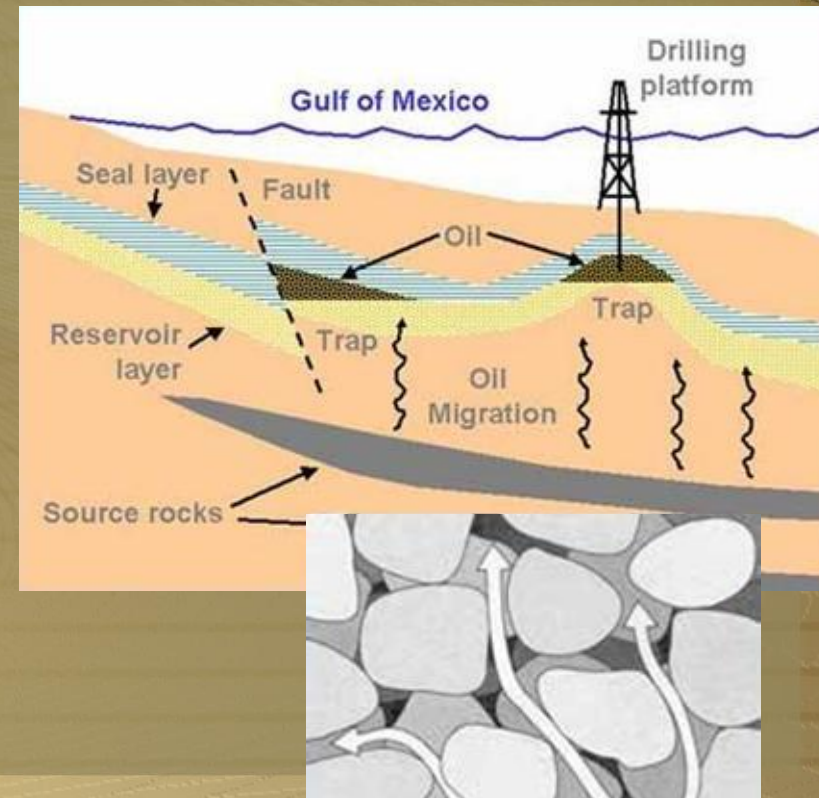
- Oil Field Geology and Production
- Distribution
- Refining
- Energy Return on Investment

Oil Field Geology

Peak Oil & Gas



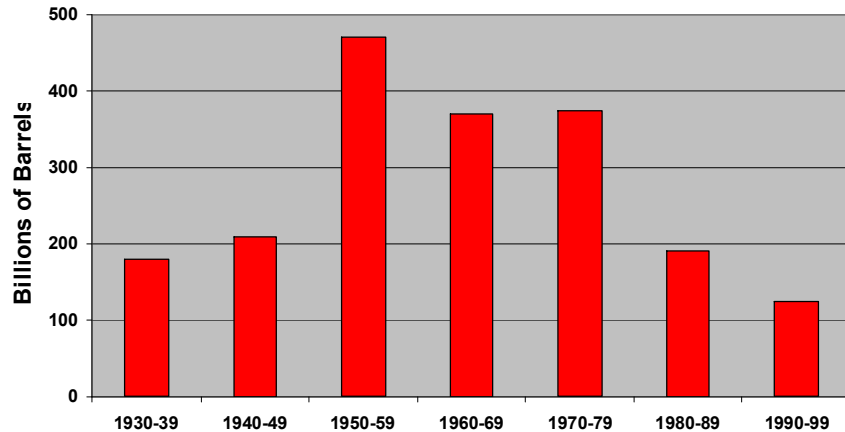
Well Rig Head



Geology & Production

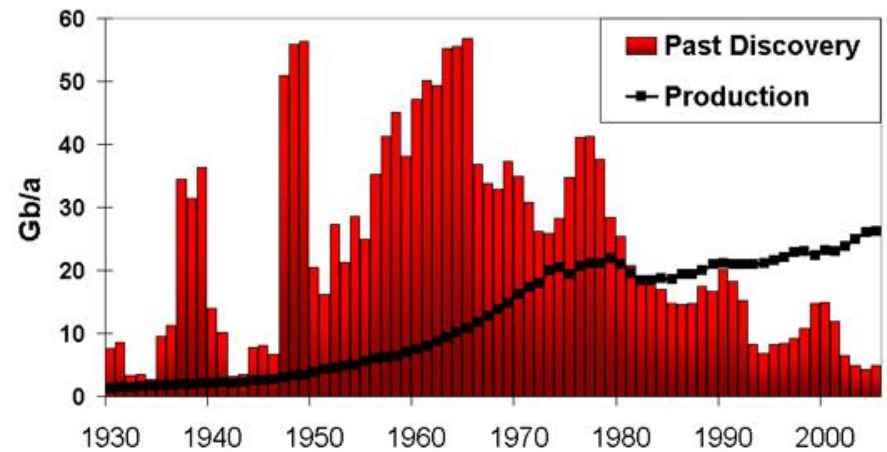
Peak Oil & Gas

Global Oil Discoveries by Decade



Source: C.J. Campbell, 1997

Past discovery (3 year average) and production until 2005



Source: Koppellar 2006

500 million barrel+ fields

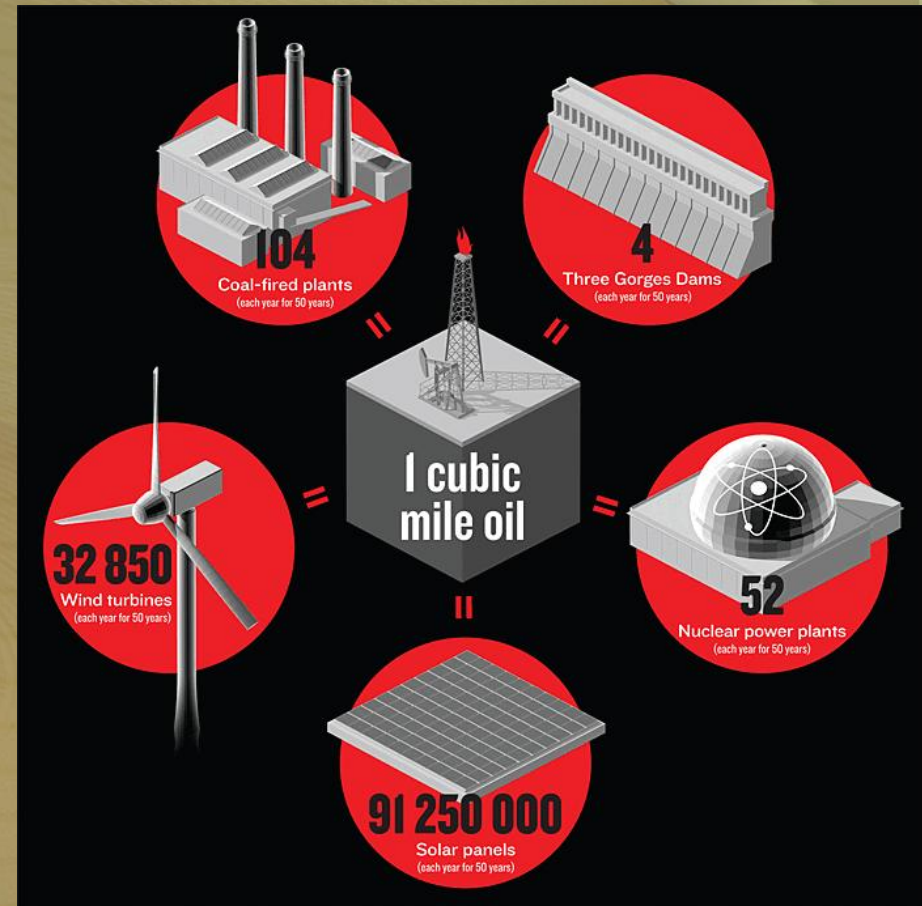
- 2000 – 13 discoveries
- 2001 – 6 discoveries
- 2002 – 2 discoveries
- 2003 – none

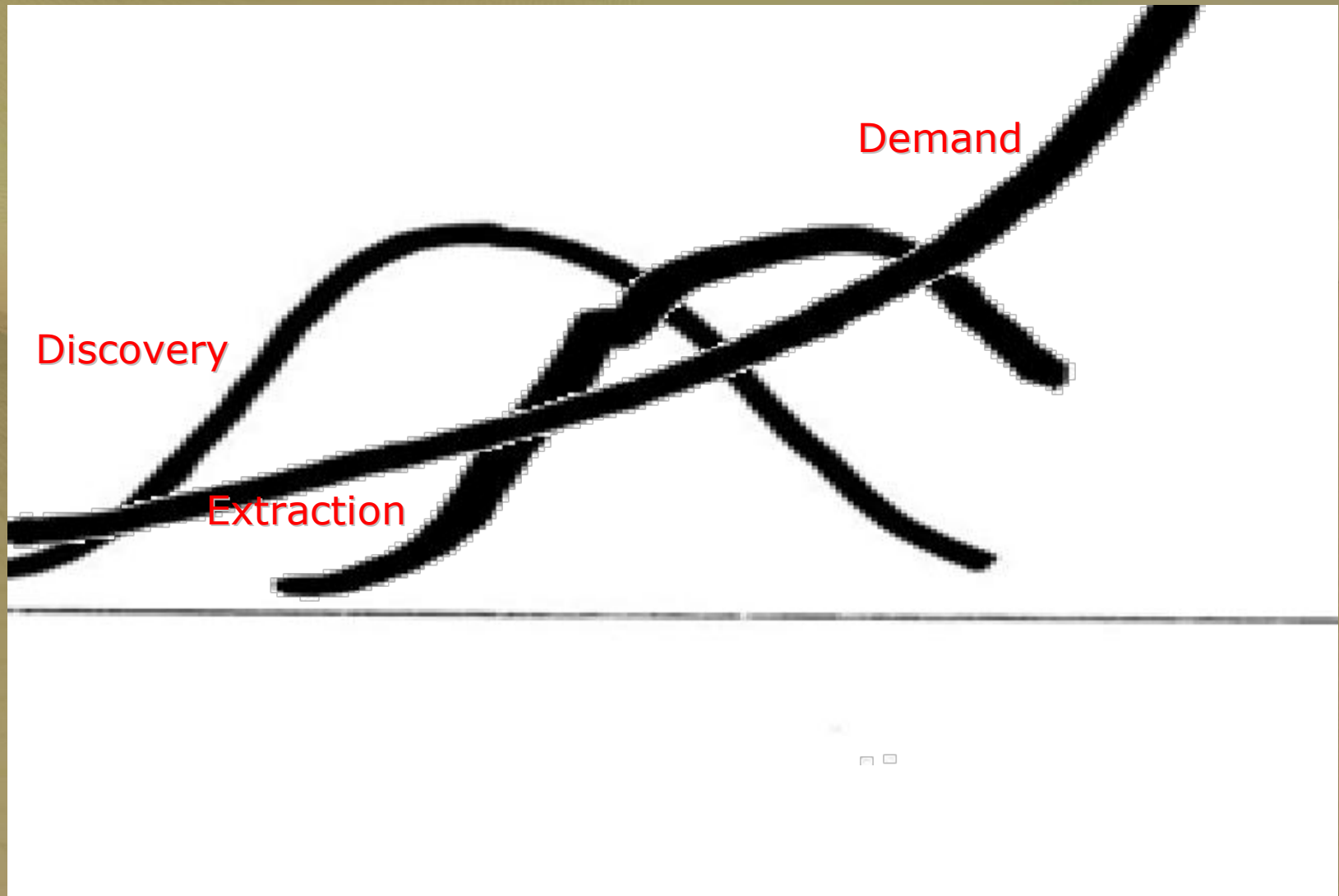
Daily extraction rate

- 84 million barrels per day (mbpd) 1000 barrels per second

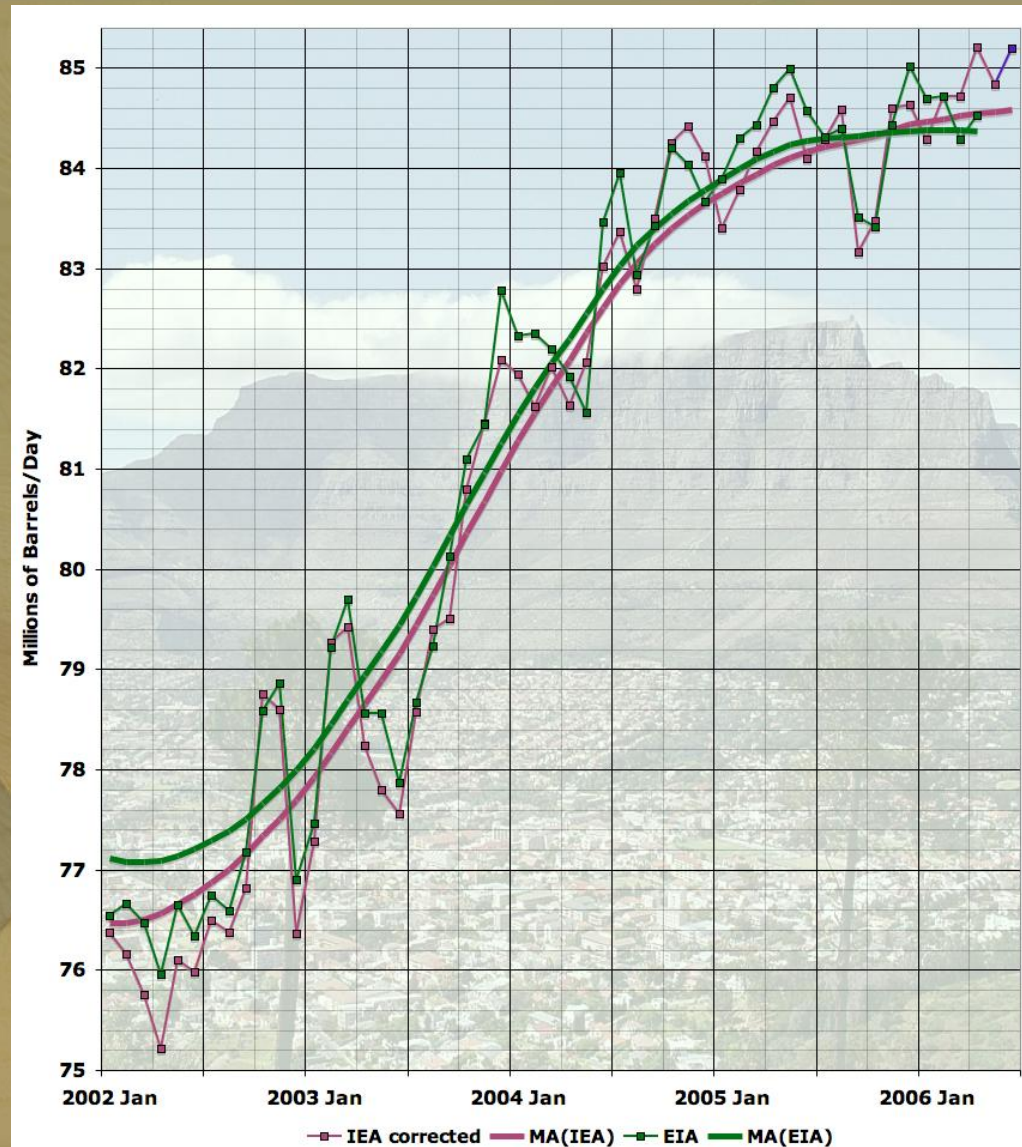
Discovery rate

- less than a quarter Daily Extraction rate



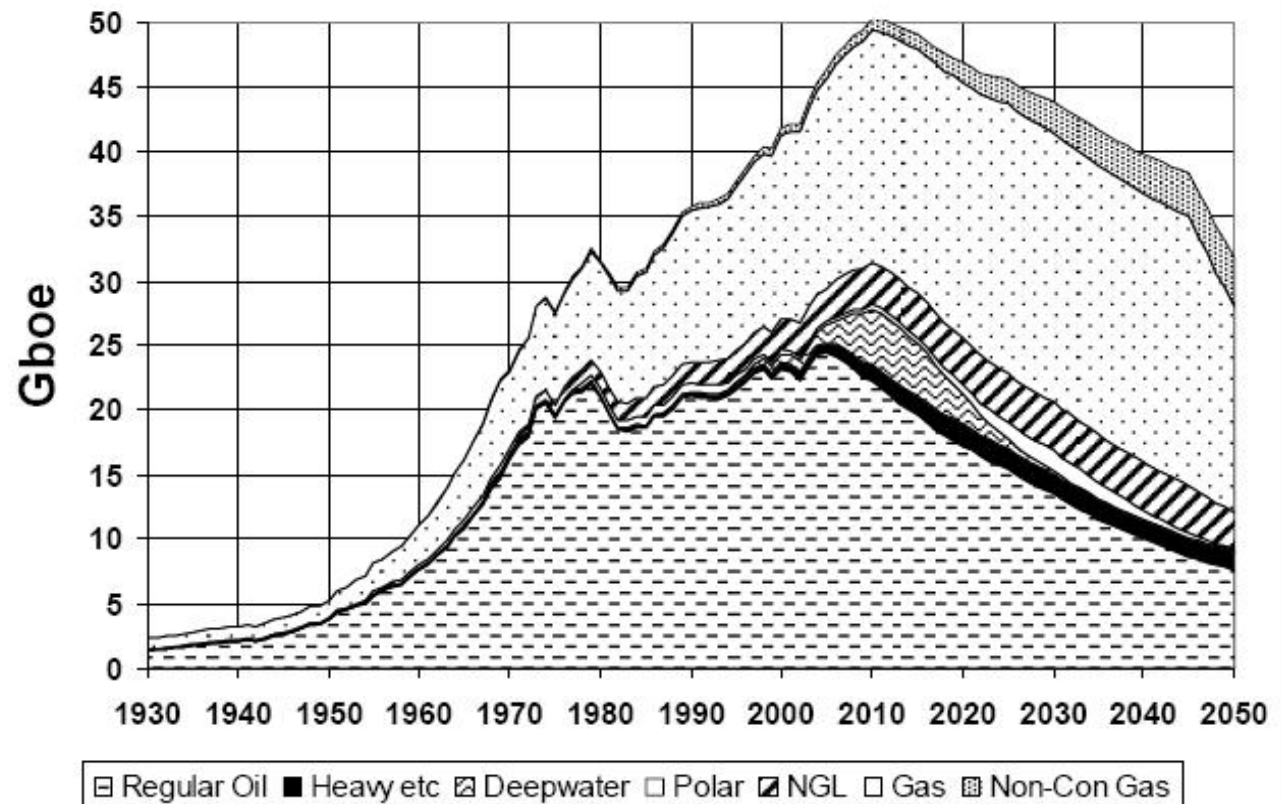


- Peak Oil
The view from
top



Source: Stuart Stanford, The Oil Drum

OIL & GAS PRODUCTION PROFILES 2005 Base Case

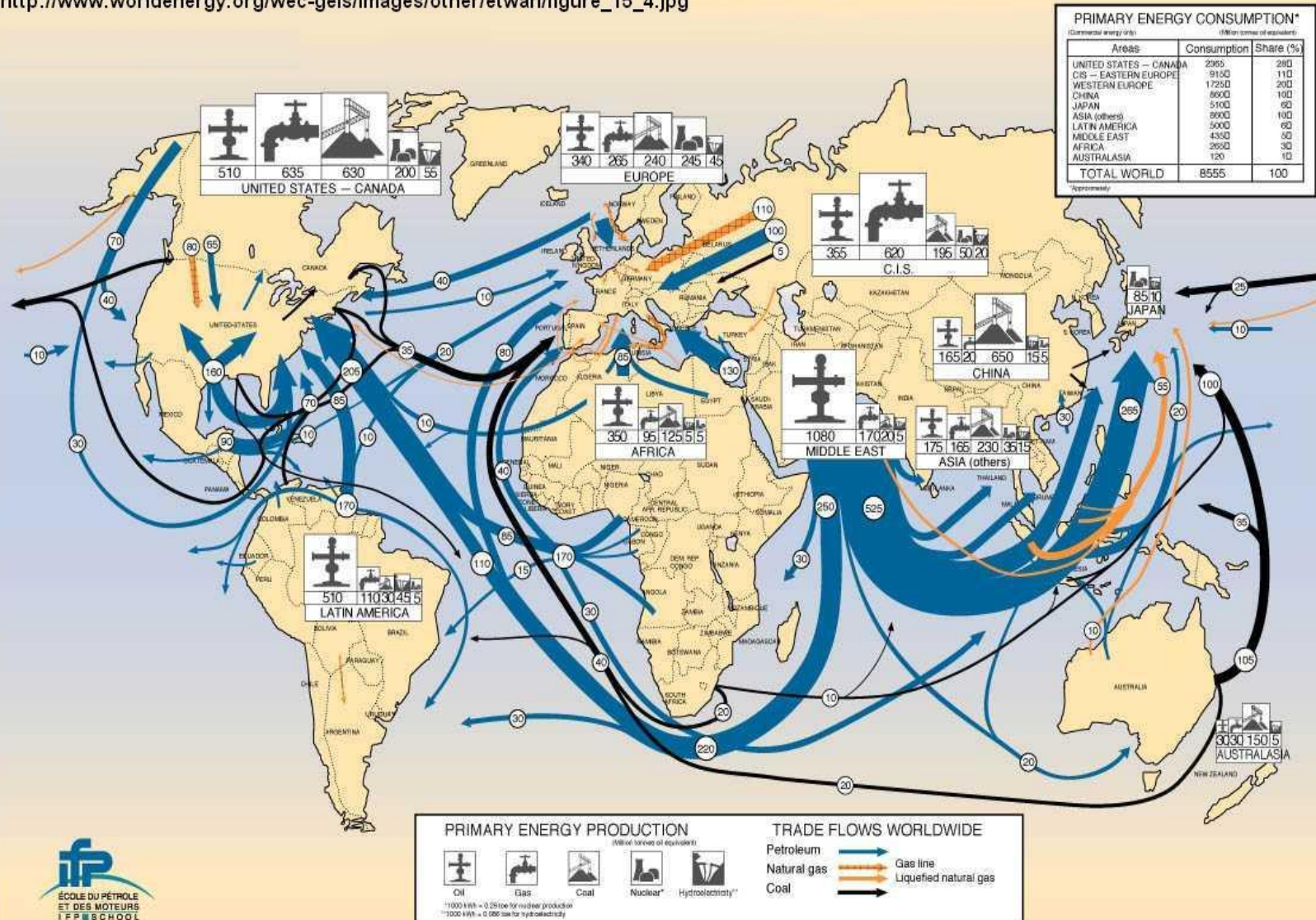


Source: ASPO, 2006

ENERGY WORLDWIDE IN 1998

(World Energy Council)

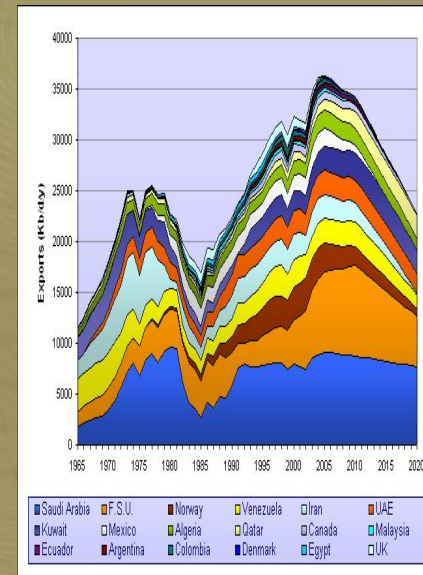
http://www.worldenergy.org/wec-geis/images/other/etwan/figure_15_4.jpg



Peak Exports

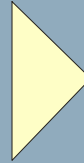
85 mbd v 35 mbd

- Only about 40% of Oil is being traded.
- Many of these exporting countries have rapidly rising populations and internal demand.
- Peak export was last year



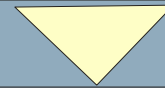
Exploration

Low Yield
Difficult Areas
Small Finds
Low Investment Rates
Reserve Politics



Extraction

Close to Peak Flow Rate
Infrastructure Ageing
Low Investment Rates
Aging Workforce
Bottlenecks



Consumption

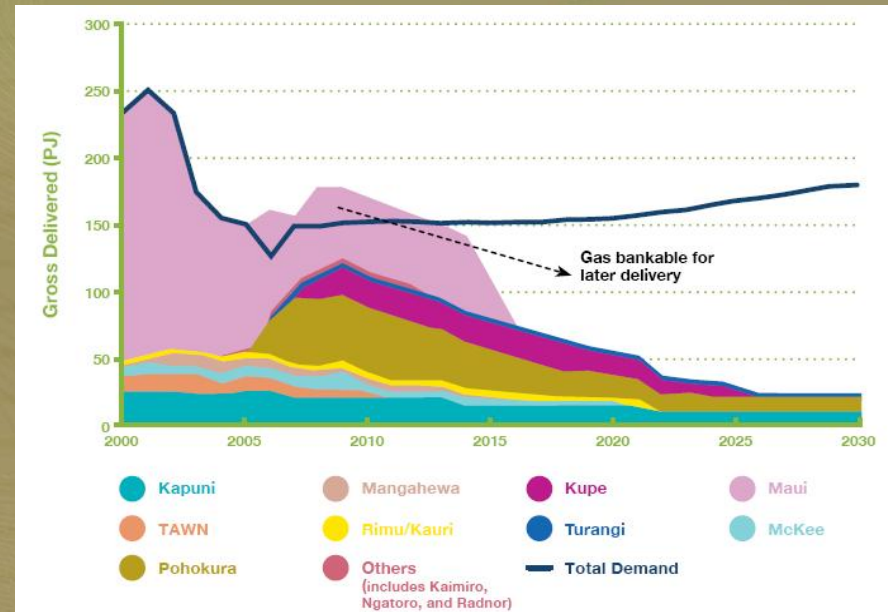
Rising in West
Production shift to Asia
Function of GDP growth
Function of Population



Distribution

Tanker Fleet booked out
Pipelines slow to build
Low Investment Rates

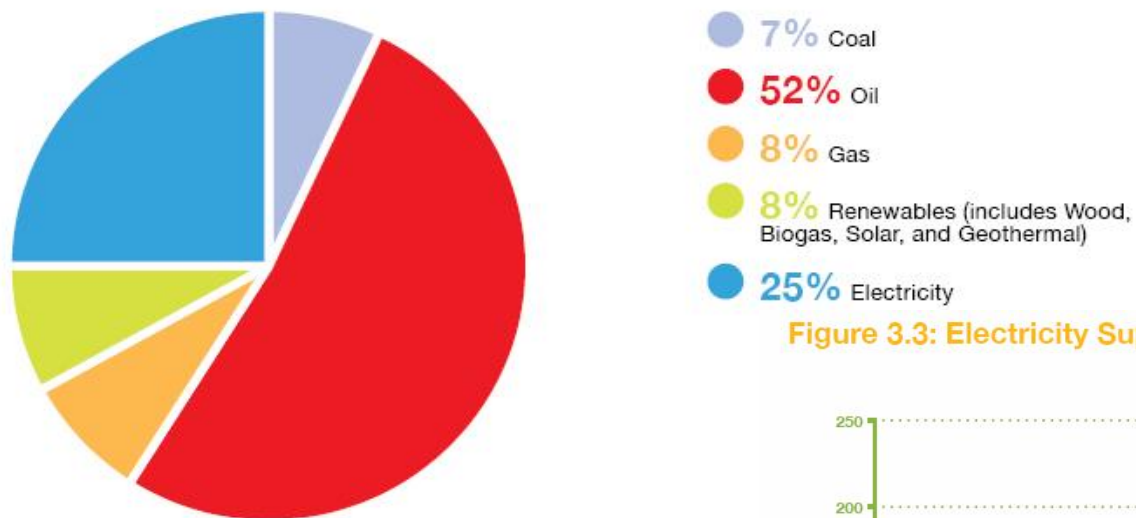
- Gas
 - Transport Difficulty
 - Peak only 5-10 years later
 - Depletion rates severe



Sources: NZ Energy Outlook MED 2006

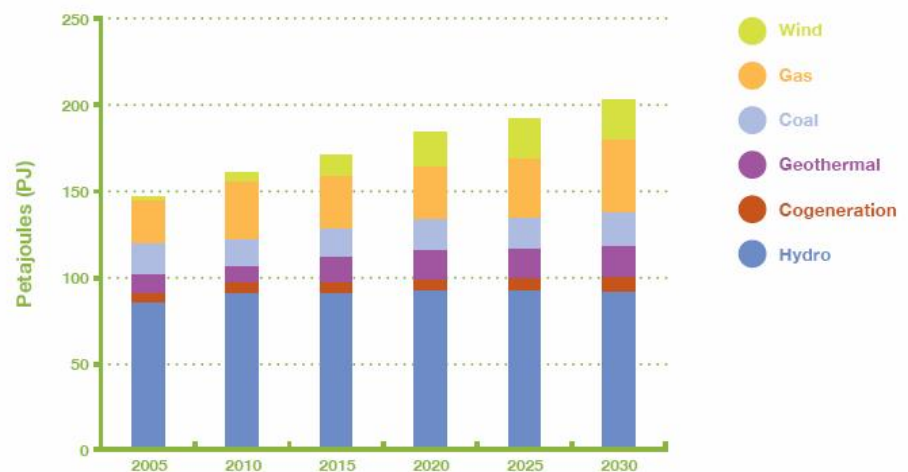
• Electricity

Figure 2.1: Consumer Energy by Fuel¹¹



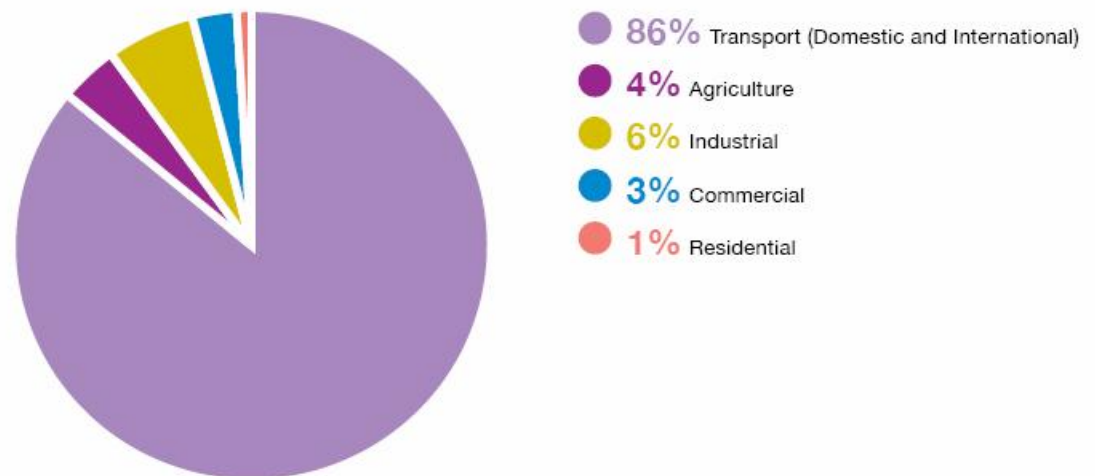
Sources: NZ Energy Outlook MED 2006

Figure 3.3: Electricity Supply by Fuel Type



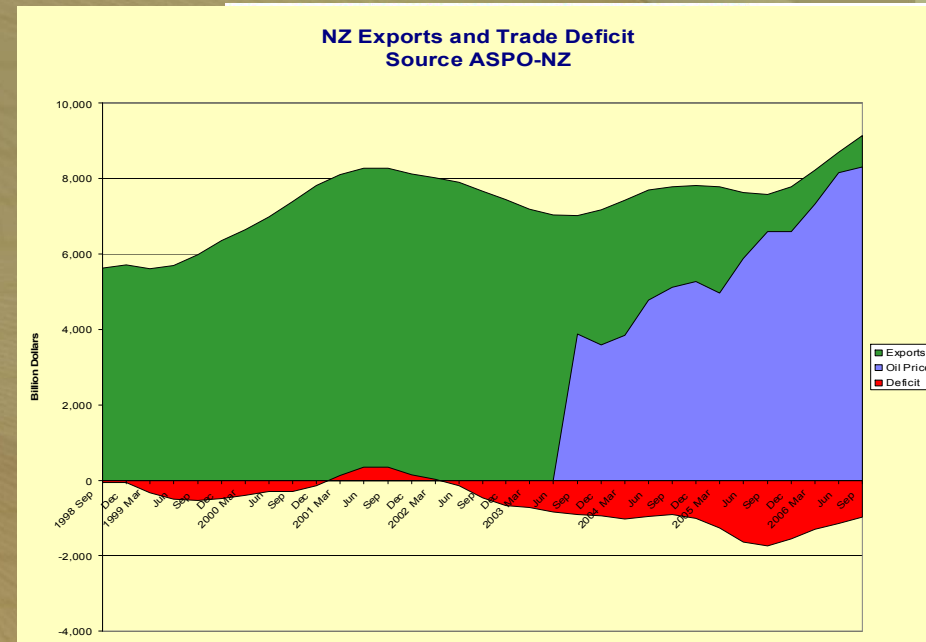
- 95% of all Transportation
- 15% used for industrial feedstock
- Food Production
- Water Supply
- Energy Production
- Just in Time Deliveries/warehousing
- Maintenance (Courier, spares)

Figure 5.1: 2004 Oil Consumption by Sector⁹⁷



Source: NZ Energy Outlook MED 2006

- GDP – Oil Consumption
- Growth Rates – Oil Consumption
- Globalisation
- Inflation
- Oil price volatility
- Energy prices to rise
- Raw material prices to rise
- Food prices to rise
- National deficit is deteriorating already



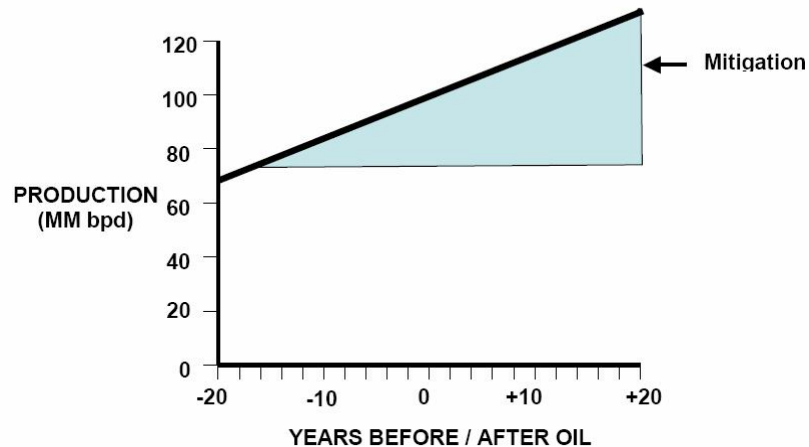
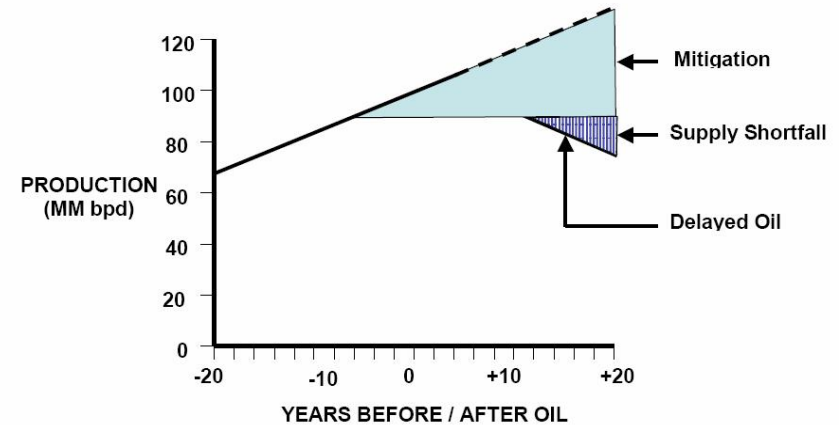
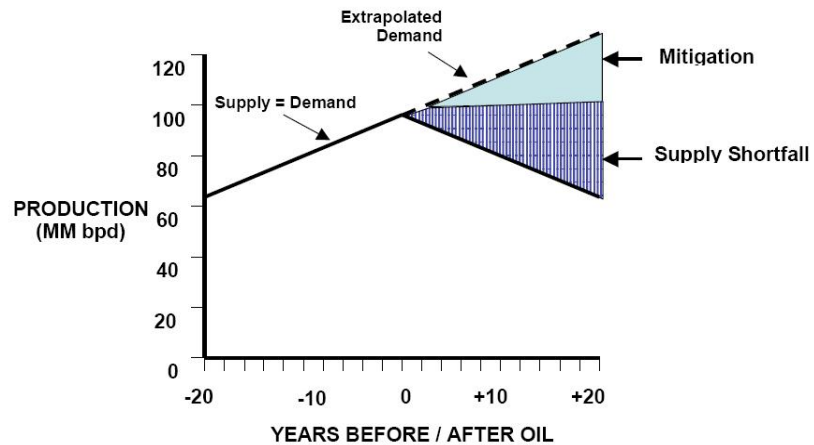
- Agriculture
- Forestry
- Tourism
- Transport
- Fisheries
- Manufacturing



- Prevention (Mitigation)
- Reduction
- Transference
- Acceptance
- Contingency

Mitigation

Peak Oil & Gas



Source: Hirsh Report US DOE

- Transitional Technology
- Infrastructure Change
- Settlement Patterns
- Transportation
- Efficiency
- Localisation Strategies



**Shocking the Suburbs:
Urban Location, Housing Debt and
Oil Vulnerability in the Australian City**

Jago Dodson and Neil Sipe

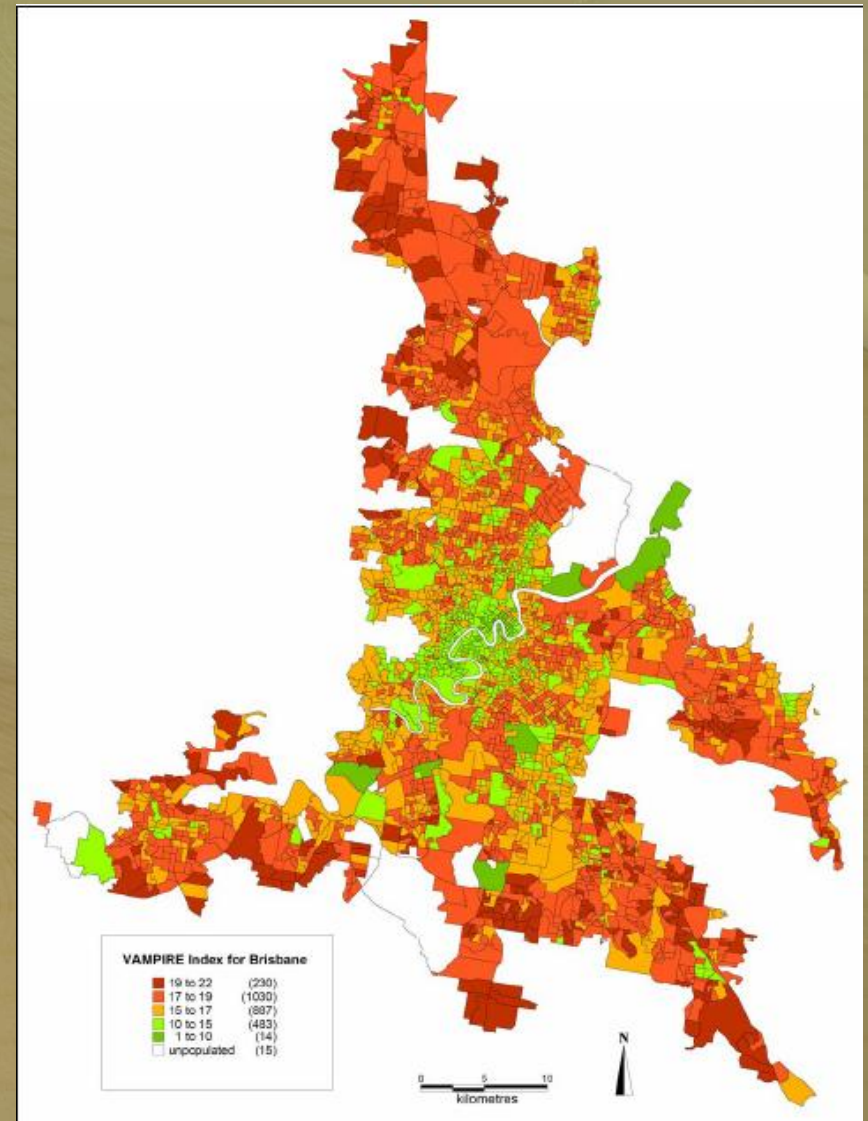
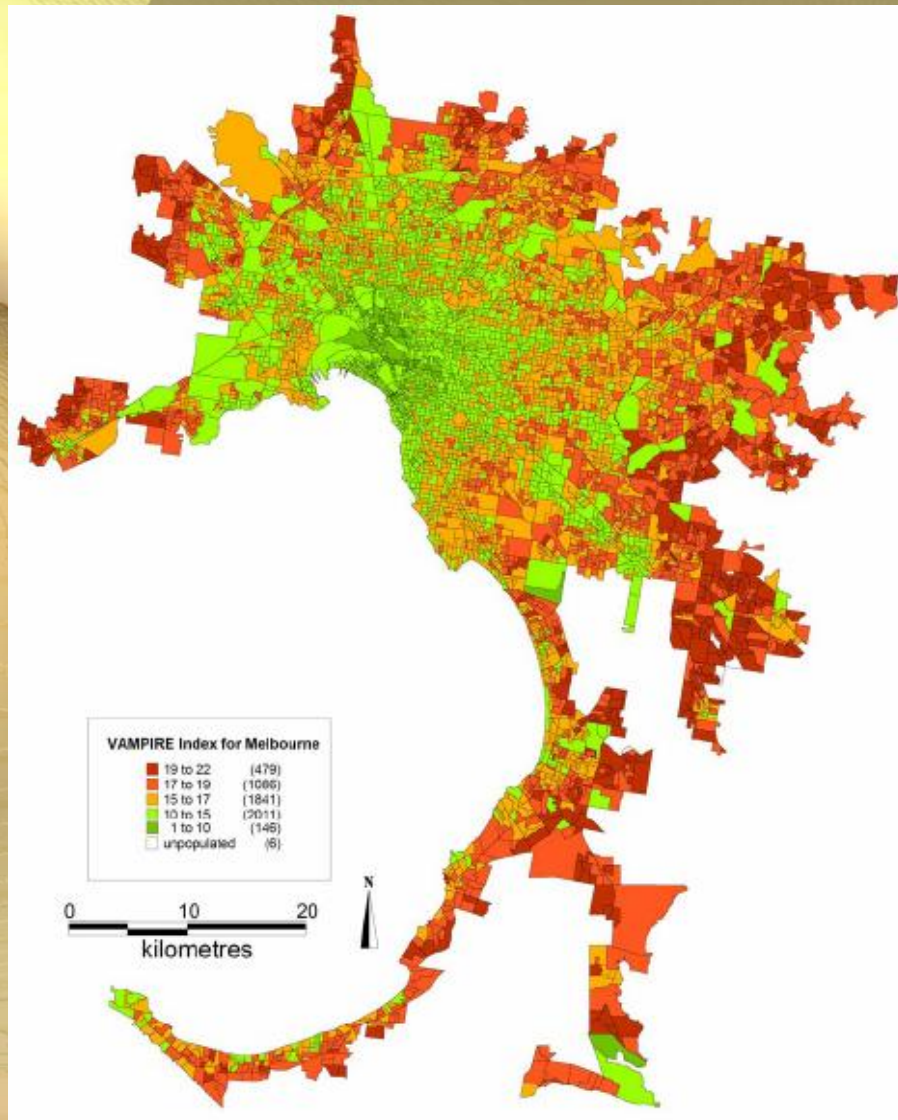


Urban Research Program

Research Paper 8
July 2006

Settlement Patterns

Peak Oil & Gas



Transferance/Substitution Peak Oil & Gas

- Biofuels
 - Ethanol
- } <10% of NZ needs
- Hydrogen (carrier only)
 - Coal
 - Nuclear (fission)
 - Fusion (50 years out)
 - Electricity
 - Wind
 - Solar
 - Hydro
 - Geothermal
 - Tidal

Transference

Peak Oil & Gas

Not possible

Acceptance

Peak Oil & Gas

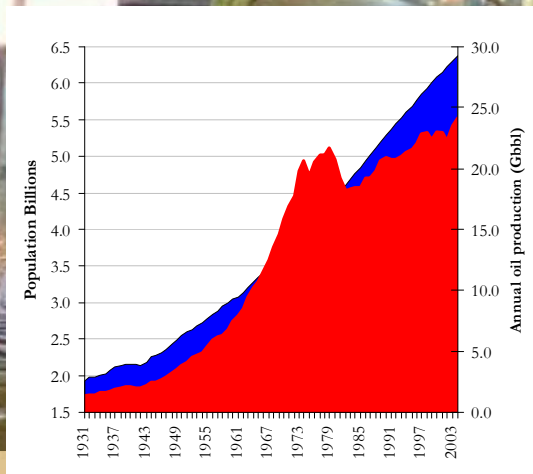


Photo credits MED 2012 Chan
Graph Dr J. Wilkinson, ASPO-AU

- Risk Assessment
- Preparation
- Precautionary Principle
- High Risk (certainty), high impact, timing uncertain
- Prepare for all high impact events

- There is no Problem
 - We have enough oil
 - There are secret technologies
 - They will invent something else
 - Deep Oil
 - We have never run out
- We will be saved (by)
 - The Market
 - Technology
 - The government

- It's too big
- It's someone else's problem
- It won't happen
- Let's wait until it's too late and then we can't do anything about it anyway
- Cargo Cult

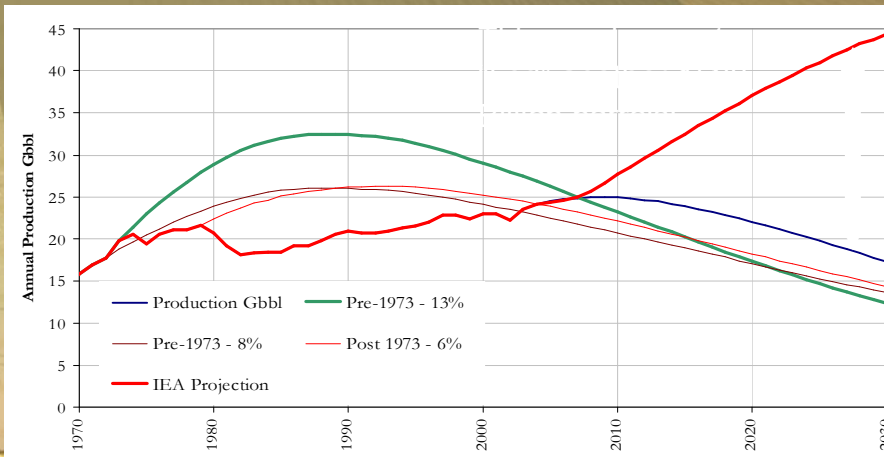
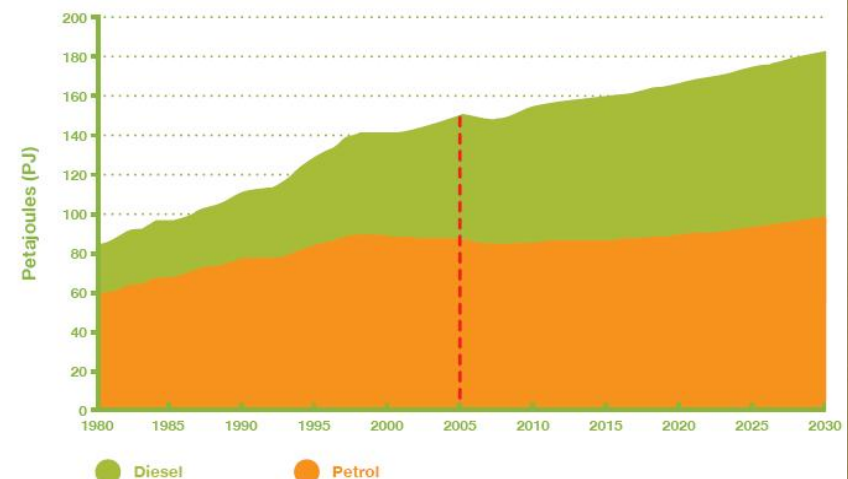


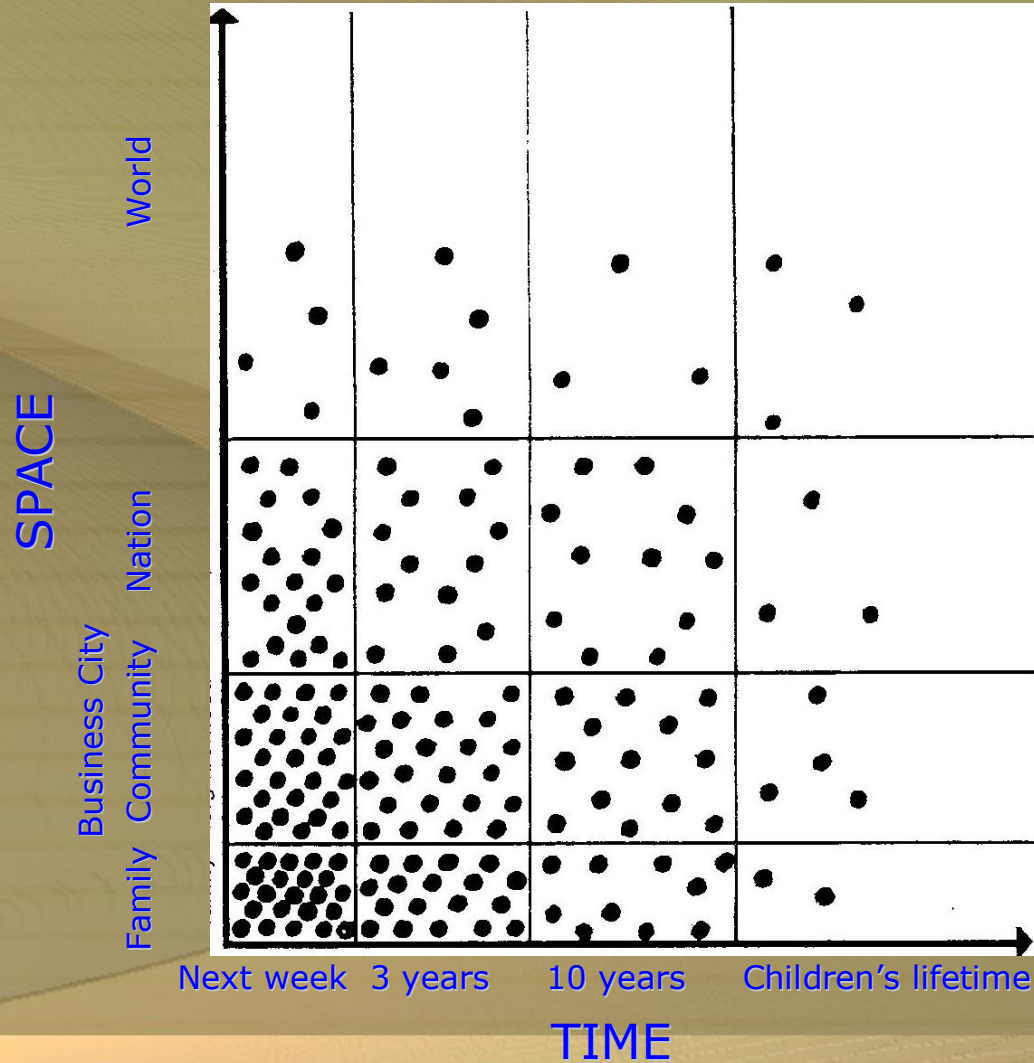
Figure 5.11: NZ On-road Vehicle Fleet – Energy Demand



- No media coverage
- Acknowledged by party leaders but not core ministerial Level (like MED)
- Local bodies won't touch it (except Dunedin)
- No strategic planning in LGA
- Absolutely no risk management in LGA
- There is a strong delusion that in democracies we elect reality rather than elect politicians to deal with reality

Human Perspective

Peak Oil & Gas



- Personal Mitigation (1-2 years)
- Business Mitigation (3-5 years)
- Community Mitigation (7-15 years)
- NZ Mitigation (15-20 years)

- Risk Analysis (Risk Profile)
- Identify suitable responses
- Select responses
- Planning, Resourcing, Controlling

WWW.ASPO.ORG.NZ

- Summary
- Reading list
- Web references
- Magazine references
- Presentation
- DVD's
- Source reports

- My father rode a camel. I drive a car. My son flies a jet airplane. His son will ride a camel. (Saudi saying)
- The project of suburbia represent a set of tragic choices because it is a living arrangement with no future. (JH Kunstler)
- the wheels are coming off the trolley and the trolley off the tracks. ... [I]n some deep and fundamental way things have broken down and can't be fixed, or won't be fixed anytime soon ... and tough history is coming. (Peggy Noonan , GW Bush Speechwriter)
- one barrel of crude = 25,000 hours of physical labor. One gallon of gasoline = 600 hours of back-breaking labor