

# ENERGY FOR SUSTAINABLE FUTURES

Ian Lowe

## Crucial role of energy

- **Why we live comfortably**
- **Mineral resources**
- **Drinking water**
- **Food production**

# Creating futures

- Not somewhere we are going
- Many possible futures
- Our choices
- Sustainable ?
- Able to be sustained !

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# The two big problems

**resources**

**environmental impacts**

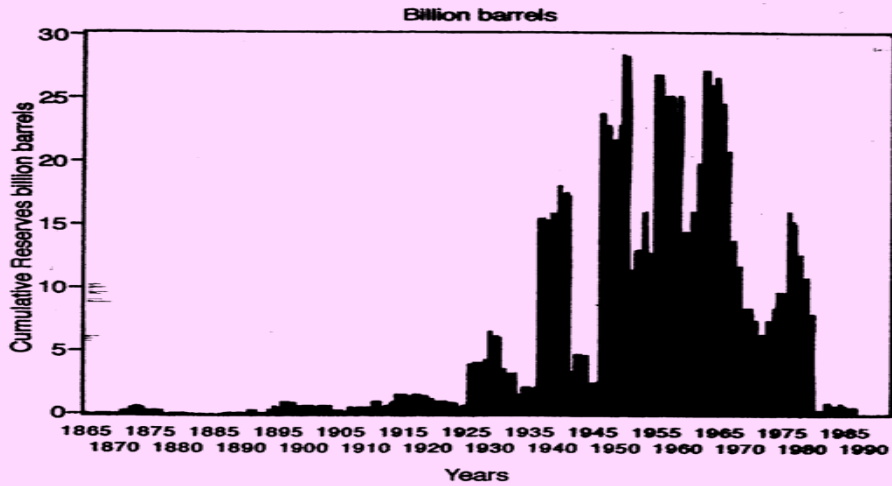
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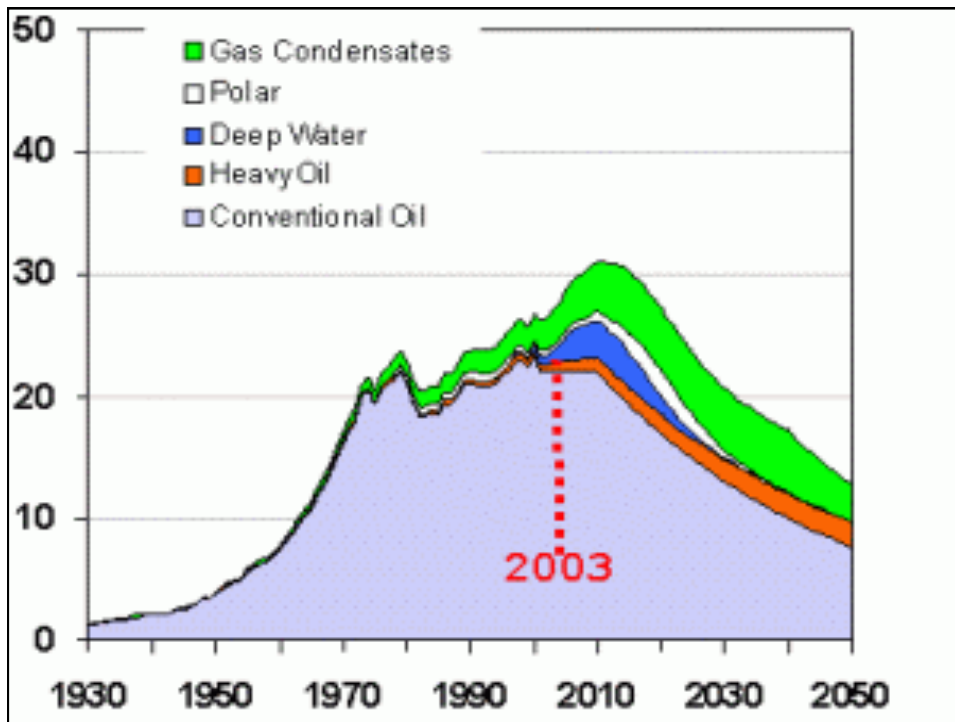
# Discovery of large oil fields

DISCOVERY IN GIANT FIELDS 1865 TO 1985  
5 year moving average



Note: Cumulative Reserves attributed to discovery year  
Giant Field > 500 billion barrels reserve

*The Golden Century of Oil 1950-2050: C. J. Campbell 1991, p. 28.*



# Unconventional oil

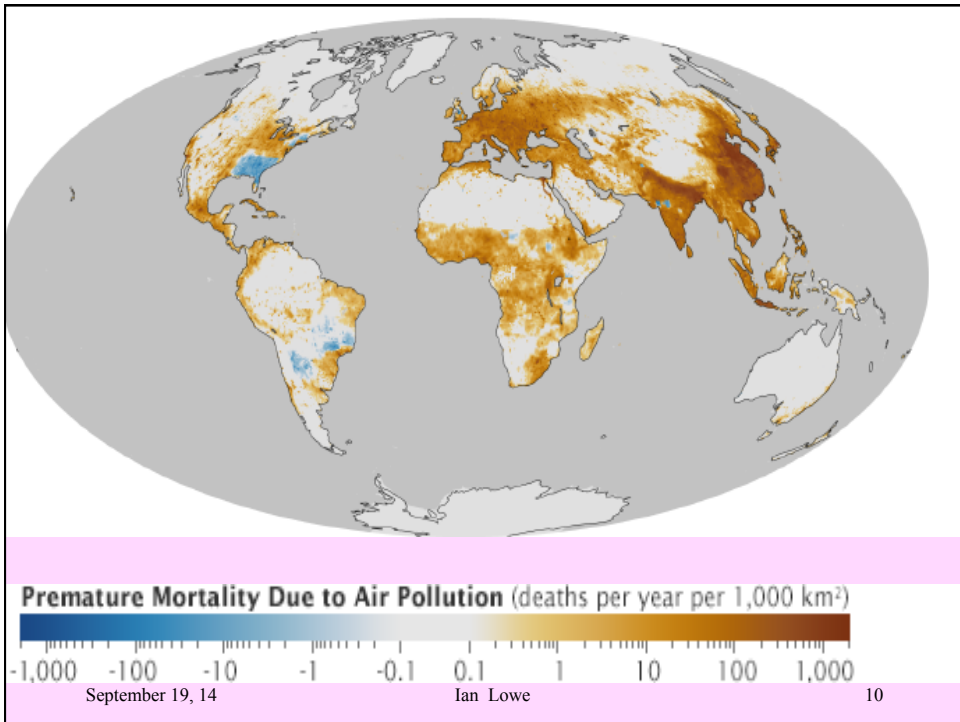
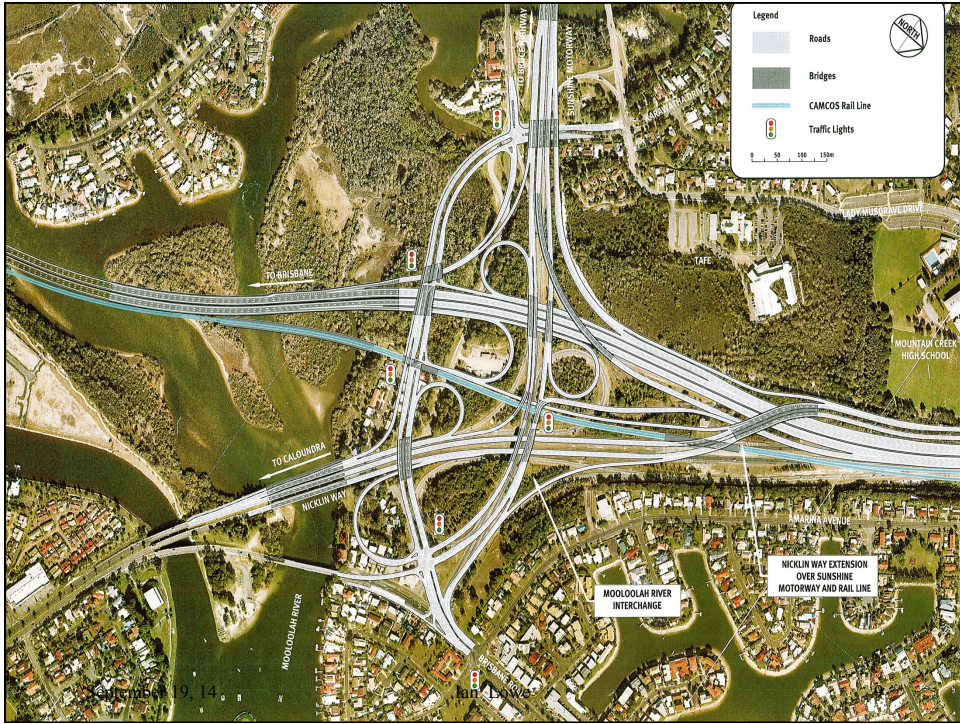
- Deep oceans
- Polar regions
- Tar sands
- Oil shales
- Cost, risks

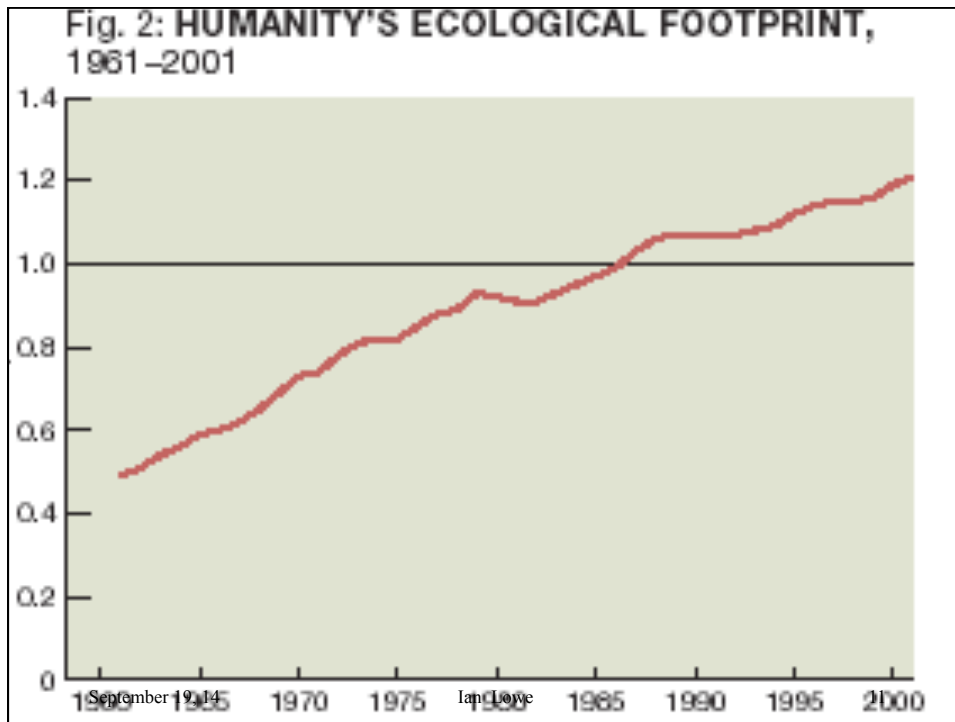
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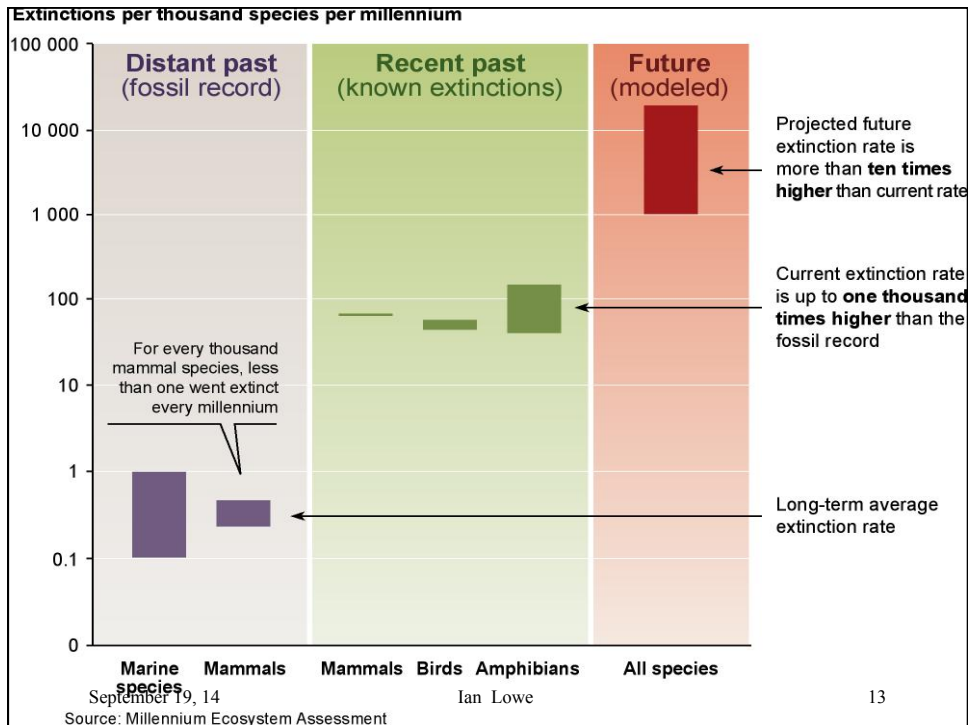
## **GEO4: “Unprecedented environmental change at global and regional levels”**

- **Increasing global average temperatures, widespread melting of snow and ice, rising global average sea level**
- **Unsustainable land use and climate change driving land degradation**
- **Aquatic ecosystems heavily exploited**
- **Water availability declining globally**
- **Almost all well-studied species declining in distribution, abundance *or both***

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## GEO 5 Summary

- “current observed changes to the Earth systems are unprecedented in human history”
- “several critical global, regional or local thresholds are close or have been exceeded...abrupt and possibly irreversible changes to the life support functions of the planet are likely to occur”

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## An example of non-linear change

