NUCLEAR POWER

Another Depletion Problem

Uranium is an abundant element, but...

- Rich (i.e. usable) ore is
  - soft rock which contains at least one part uranium oxide per 10,000, *or*
  - hard rock which contains at least one part uranium oxide per 5,000.

Beyond that threshold...

THE NEGATIVE ENERGY BALANCE

You put in more energy than you get out.

So, how much rich uranium ore is there?

- Baseline for measurement: Nuclear power provides energy at about 2½ percent of global energy demand.
- To make a difference, it would need to supply (e.g.) all the world's electricity...
- It could do that for six years.
- Or it could (nominally) provide hydrogen to drive the world's transport...
- It could do that for two years.

But there are some assumptions about waste management in there

Stages in the nuclear process and their waste implications

- Mining and milling
- Enrichment
- Generation
- Decommissioning

- Tailings should be neutralised with limestone, made insoluble with phosphates, sealed.
- Depleted uranium hexafluoride: should be containered and buried.
- High-level waste: should be containered and buried.
- 1000 cu m high-level waste to be buried.

And if waste disposal standards are ignored?

- Nuclear power could supply all the world's electricity for twelve years.
- Or drive the world's transport system for four years.
- And then it would need to dispose of its waste - but without the energy to do it.

But 2½ percent for 40 years is better than nothing?

When the world piles into nuclear power...

- A seller's market / excess profits.
- Still trivial: 5 percent for 20 years?
- Massive expansion will lower standards.
- Prospect of terrorist use will rise towards certainty.
- The low-level waste problem.
- The cost / distraction problem.
- The structure problem.
- The net energy problem.
- Systems failure.

POST-PEAK
THE THREE ENERGY STRATEGIES

- Conservation
- Structural change
- Renewables