Global Resource Depletion:

A roadmap towards sustainability?

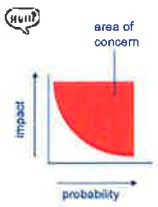
Peak Summit, Alcatraz, Italy, June 28, 2009

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Way ahead: which decisions to take?

- Reality too complex to fully understand
  - inherent limitations on predictability of the future
  - keep wide safety margin
  - allow for "black swans"
- Multiple futures or opposite scenario's
  - which options have intrinsic values either way (least regret options)?
  - which options "hedge" against risks (probability x impact)?



Risks

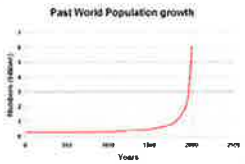
Balance between fear and unfunded optimism

Threats:

- Energy crisis
- Financial crisis (if energy can't grow, debt can't grow)
- Resource crisis (including metals, water, agricultural products)
- Natural disasters, environmental degradation and climate change
- Armed conflicts and war (including cyber warfare)
- Political instability and extremism
- Pandemics
- .....

is it?





These threats are interrelated and partly have the same drivers like population growth

Risks

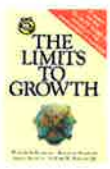
When will it happen?

- Energy scarcity: coming decade
  (peak oil 2012? peak fossil fuels 2020?)
- Financial crisis: right now
  no return to "business as usual"?
- Metal minerals scarcity: coming decade
  driven by energy scarcity
- Scarcity of water and agricultural products: increasing
- Environmental degradation: right now
- Armed conflicts and war: increasing
  man's natural tendency to compete for scarce resources
- Political instability and extremism: coming decade?
  demographic time bombs in Middle East and Northern Africa, populism in Western World
- Pandemics, (accelerating) climate change, World War III:
  disputed probability and impact, possibly far-reaching consequences

Risks

Too late to prevent painless transition

Weren't we warned ?!

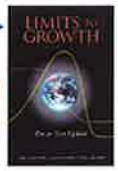


1972:



2004:





Inertia is not just a law of physics

"Hope for the best, prepare for the rest"

Not so much crisis prevention but crisis management

Solution frameworks

1. Use less or "managed austerity"
   most important solution but reluctant human behaviour leads to low priority
2. Longer product lifetime
3. Recycling and reuse of materials
4. Substitution of materials
5. Develop adapted new products
6. Stockpiles

Solution frameworks

Use less or "managed austerity"

Technical solutions:

- Useful products instead of disposables
  - basic necessities
    warmth (shelter), water, food, clean air, sanitation
  - human relations
    example: telecommunication
  - useful luxuries
    example: musical instruments
- Localisation and less complexity
  reduced distribution and transmission losses, more resilient and robust society

Solution frameworks

Use less or "managed austerity"



Policy solutions:

- Sound advice to decision makers
  Politicians are extremely skilled in postponing decisions on disputed items
  ASPO in politics? Scientists in politics?
- Education of the population
- Living "here and now" and acting accordingly
  It's easier to make noble plans for the future than taking real action now
- Frugality (using less) as opposed to greed
  nature doesn't maximise but optimises within its very broad system boundaries
- Emphasis on the human dimension to avoid the pitfall of overprivileged technology
- Offer hope and purpose
- How to "measure" wealth and prosperity?
  Include human arts and preserved nature as ways of providing well-being?

Solution frameworks

Longer product lifetime

- Reduce complexity for improved quality



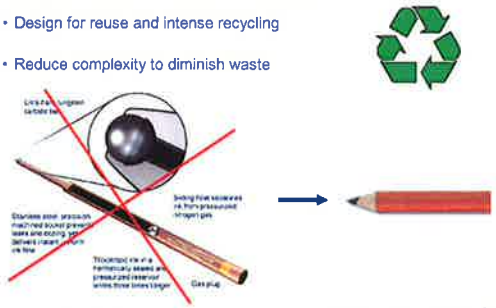
- Design for maintenance and repair



Solution frameworks

Recycling and reuse of materials

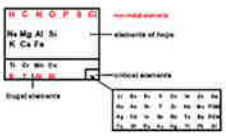
- Design for reuse and intense recycling
- Reduce complexity to diminish waste



Solution frameworks

Substitution of materials

- Substitute scarce metals using the "Elements of Hope"



- Design for use of Elements of Hope
- Dematerialisation (e.g. digital photography)
  beware of Jevon's paradox!

Solution frameworks

Develop adapted new products

- Learn from the past when society was much less energy intensive, when we were much less affluent in a material sense
  example: low alloy steels from 1930s



- Make products suitable for replacements or upgrades of components
  example: retrofit of ships and airplanes



Solution frameworks

Stockpiles

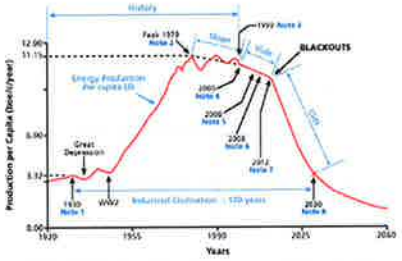
- Keep buffers to cope with supply disruptions and to enable peak shaving

Simplest and easiest to realize solution, however not sustainable in itself



Problem

Decreasing energy production per capita

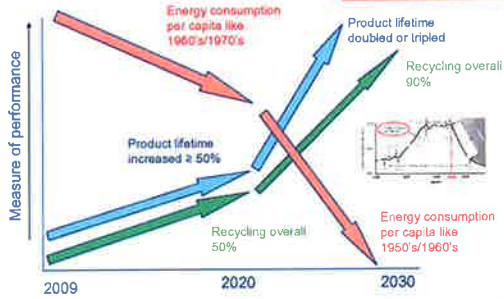


Original source: The Olduvai Theory by Richard C. Duncan, 1989

Solution frameworks

Roadmap towards sustainability?

requires "managed austerity" and design philosophy



Stay positive!



Stay positive!



Questions? Discussion?

