

# Global Resource Depletion: A roadmap towards sustainability?

'Peak' Summit, Alcatraz, Italy, June 28, 2009

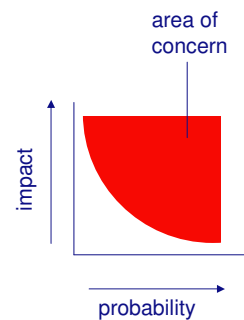


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## Way ahead: which decisions to take?

- 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

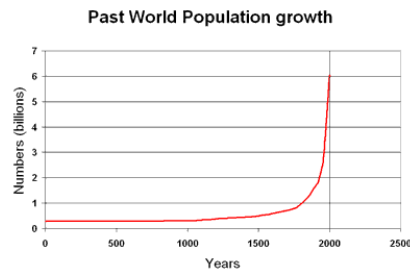
### Threats:

- 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



3

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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

4

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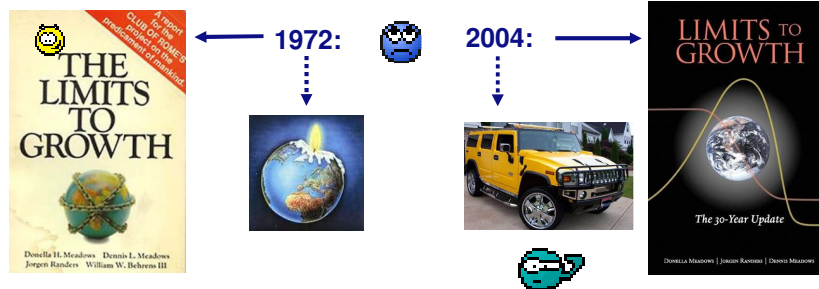
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Risks

## Too late to prevent painless transition

Weren't we warned ?!



Inertia is not just a law of physics

“Hope for the best, prepare for the rest”

Not so much crisis prevention but crisis management

5

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## 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

6

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Solution frameworks

## Use less or “managed austerity”

### Technical solutions:

- Useful products instead of disposables
  - basic necessities  
temperature (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

7

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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?



8

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Solution frameworks

## Longer product lifetime

- Reduce complexity for improved quality



- Design for maintenance and repair



9

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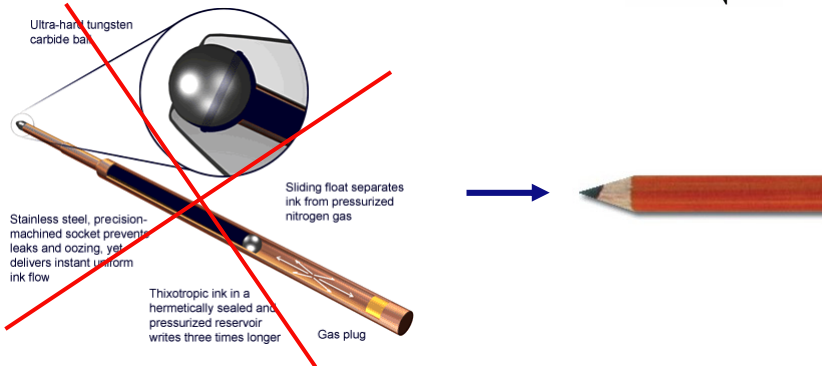
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Solution frameworks

## Recycling and reuse of materials

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



10

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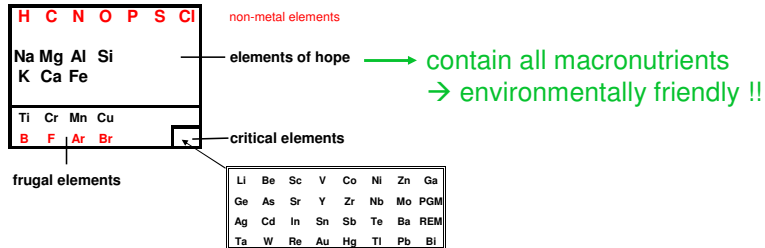
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Solution frameworks

## 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!

11

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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



12

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Solution frameworks

## Stockpiles

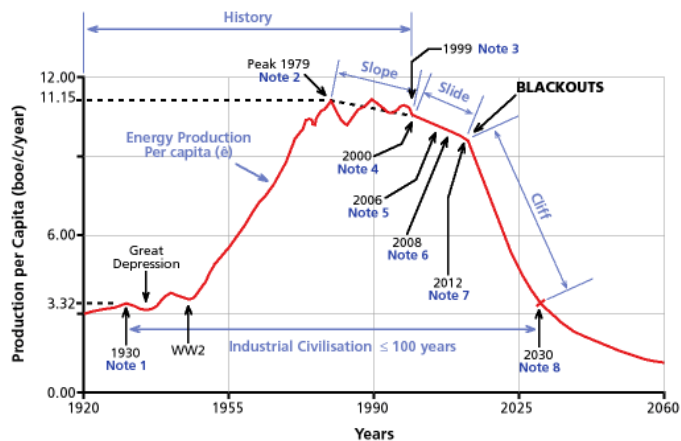
- Keep buffers to cope with supply disruptions and to enable peak shaving

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



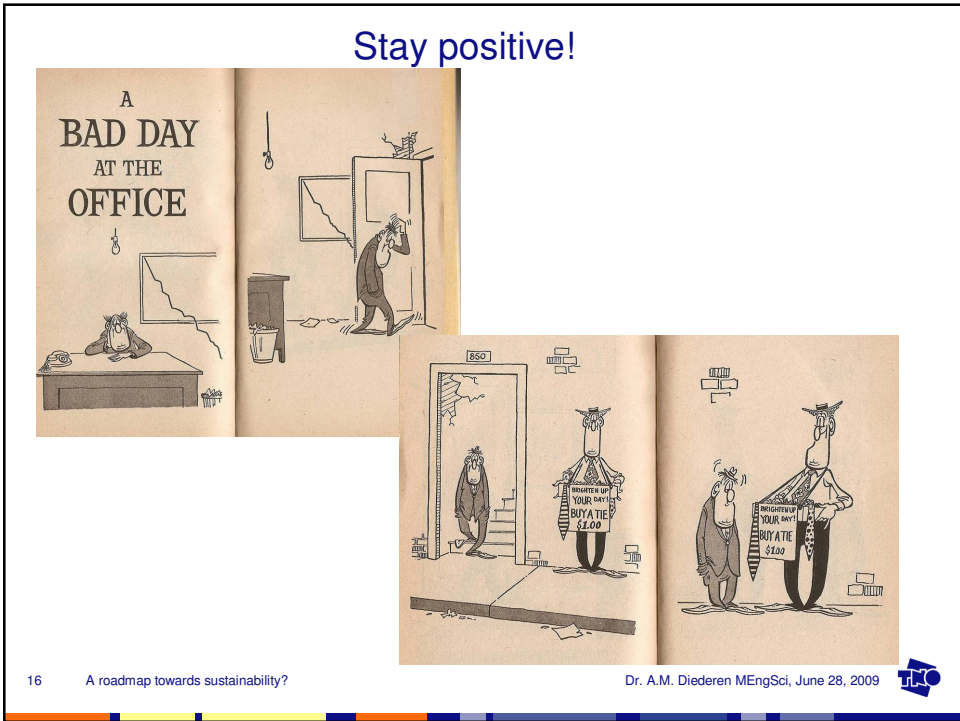
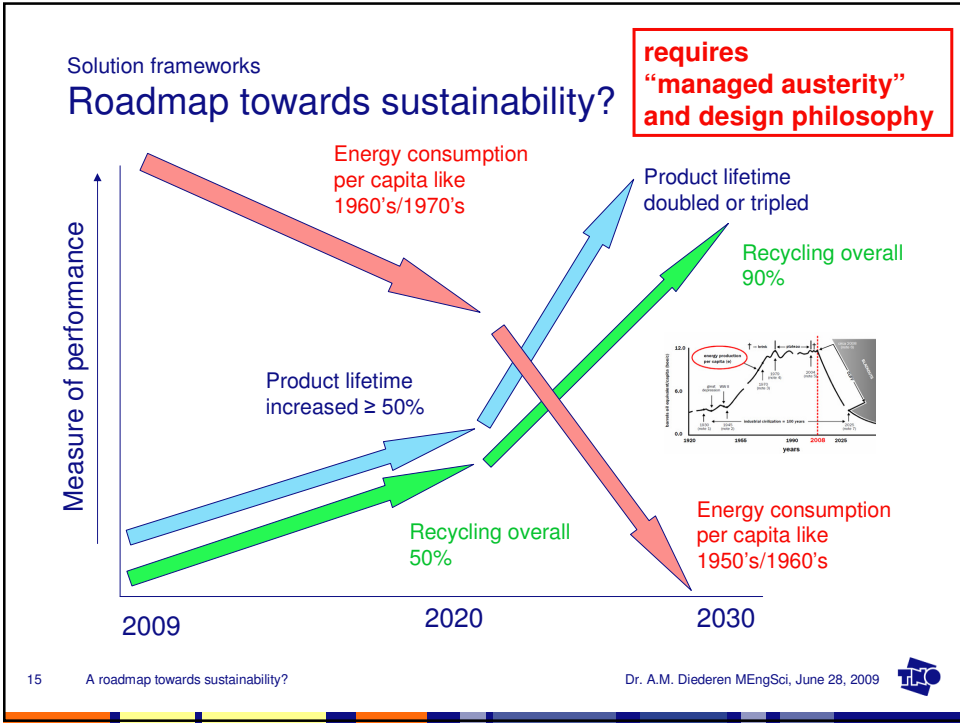
Problem

## Decreasing energy production per capita



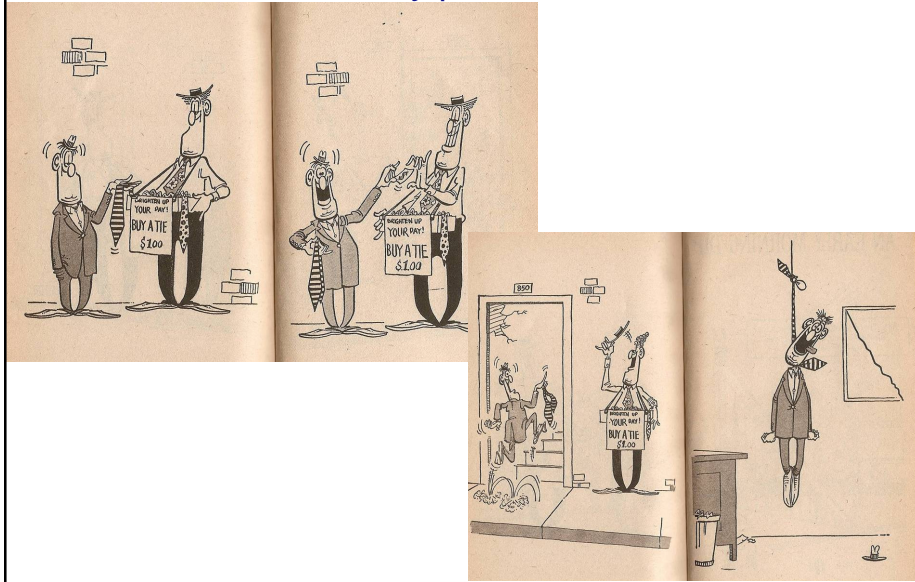
Original source: The Olduvai Theory by Richard C. Duncan, 1989







## Stay positive!



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## Discussion

How to reconcile future needs with short term needs?

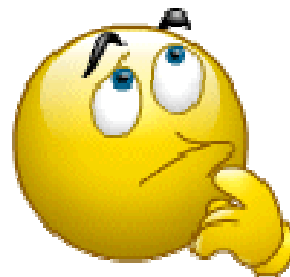
Balance between sense of urgency and offering hope and perspective?

How to convince and mobilize politicians?

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.....?

.....?



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