

Sustainable Energy



Behnam Taebi

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IDEAL Climate

To be discussed

- A brief history of sustainable development
- Philosophical challenges to the notion of sustainability
- Sustaining what? Why? For Whom?
- Sustainability in energy discussions
- The case of nuclear energy

A potted history I

- The Limits to Growth – 1972
 - The Club of Rome
 - Growth is not endless and depends on *finite* resources
- Our Common Future - 1987
 - The Brundtland commission
 - First systematic introduction of sustainable development
 - ...“meets the needs of the present without compromising the ability of future generations to meet their own needs.”
- Earth summit in Rio de Janeiro – 1992
 - Sustainable development enters policies: *Precautionary Principle*
 - Agenda 21 – a blueprint of actions on global national and local level
 - A voluntary “non-binding” aim to reduce Greenhouse Gases (GHG)

A potted history II

- Intergovernmental Panel on Climate Change (IPCC)
 - Assessment 1996: “discernible human influence on climate”
 - Assessment 2001: “stronger evidence that most of the warming ... is attributable to human activities”
- Kyoto as amendment to Earth Summit in Rio – '97
 - To reduce and stabilize GHG – voluntary commitments
 - Emission trading was introduced
- Bon, The Hague, Marrakesh, Buenos Aires etc
- Copenhagen in December 2009
 - Some agreements, but no legally binding treaties

To grow or not to grow?

- No-growth lobbyists and developing countries
 - The club of Rome retained that growth must be limited
 - Dire need for growth in Southern countries
- Brundtland def. attempts to offer a solution
 - It does imply limits but no absolute limits
 - “limitations ... on environmental resources and by the ability of the biosphere to absorb the effects of human activities”

Three pillars of sustainable development

- Social justice grounds sustainable development
- Sustainability is supported by three main pillars
 1. Fair distribution of wealth among contemporaries
 - *intragenerational* justice - reducing global poverty
 2. Fair distribution of wealth between generations
 - *intergenerational* justice
 3. Sustainability also refers to the relation with nature

The Brundtland definition

- ...“meets the needs of the present without compromising the ability of future generations to meet their own needs”
- What does the notion of “need” entail?
 - For the present and future generations
- Tragedy of the commons – Garrett Hardin
 - Commons as communal grazing of livestock

Commons as communal grazing of livestock



Philosophical challenges

- 3 challenges to alleged ethical obligation to future people
1. The non-identity problem
 - *Obligation* implies having *right* and future people don't exist
 - How can we harm not existing people
(Parfit)
 2. The ignorance problem
 - We don't know what they need
 - We don't even know that they will be
 3. The distance problem
 - To which future people do we have obligations? To what extent?

However...

- We can assume that
 - there will be people in the future
 - their interests can be affected by us.
 - they need – at least - clean air, water and a protected climate
- We have all access to the same environment & resources
 - It is not unreasonable to consider limitations on *our* actions to protect *their* interest
- How far in the future should we care?
 - Negative duties are more compelling and extend further

Positive duties are duties to benefit someone
Negative duties are duties not to harm

Why sustainability in energy discussion

- Two main issues of sustainability
 - Dealing with non-renewable resources
 - Affecting the environment
- Two dimensions of sustainability
 - Social justice in a *spatial* sense
 - Social justice in a *temporal* sense
- Two aspects of energy discussion
 - Energy consumption
 - Energy production

Spatial relates to the space dimension; also intragenerational issues
Temporal relates to the time dimension; also intergenerational issues

Focusing on conflicting interests

- We must first be clear on the definition
 - How do we interpret sustainability?
 - How do we cope with conflicting interests?
- Considering sustainability as a *moral value*
 - From which we can derive other contributing values
 - Addressing the interests of different generations
 - ...and their conflicts

Values are things that we hold paramount
Moral values refer to how we understand *good life*

Sustaining what?

- Sustaining environment and human kind's safety
 - Leaving the nature no worse than we found it
 - Protecting public health
- Sustaining human welfare
 - Resource durability or availability of non-renewable resources
 - Economic durability

Sustaining the environment

- Why should we care about the environment?
 - Should it primarily serve human interest? *Anthropocentrism*
 - Does it have an intrinsic value? *Non-anthropocentrism*
- Unreasonable to expect *no* change in environment
 - How to repair/compensate for inevitable changes
 - E.g. climate change and toxic waste

Instrumental value means that something serves some other good
Intrinsic value means that there is no need for *instrumental* references

Sustaining health and safety

- We should not jeopardize safety of future people
 - This is a negative duty
- How far in the future should we offer such protection?
 - Is it feasible to offer exactly the same level of protection?
 - Also for the distant future?
- Should we distinguish between different future people?
 - The example of nuclear waste disposal and Yucca Mountains
 - 15 millirem for the coming 10,000 years
 - 350 millirem for the period beyond; later adjusted to 100 millirem

Rem is a unit for measuring health impact of radioactivity also referred to as radiotoxicity

Sustaining natural resources

- Sustainability is interpreted here as durability (of resources)
 - Obviously we can't stop using non-renewable resources
 - So we should provide compensation for depletion (Barry)
- Moral relevance of the status quo
 - There is no moral relevance for the present situation
 - Previous generations survived with much less (Beckerman)
 - If future generations are not responsible for the situation they find themselves in, we have to compensate them (Barry)
 - The status quo is quite conservative as it neglects population growth

The status quo refers to the present situation

Renewable resources

- Focus on renewable resources
 - So we won't be depleting anything
 - Those resources will renew themselves in a reasonable time
- Also renewable brings about certain considerations
 - E.g. biofuel and food scarcity, land use (tropical forest) etc
- Myopic to refer to sustainability only as durability
 - Sustainability is a complex notion that relates to many different considerations

Economic durability

- For an energy source to be sustainable
 - It must be economically durable
- Is this the primary concern in a moral discussion?
- Durable *for whom*
 - Whose interest are we taking into account? For what period?
 - Are future interests as important as the present ones?
 - Economist introduce here the concept of *discounting*

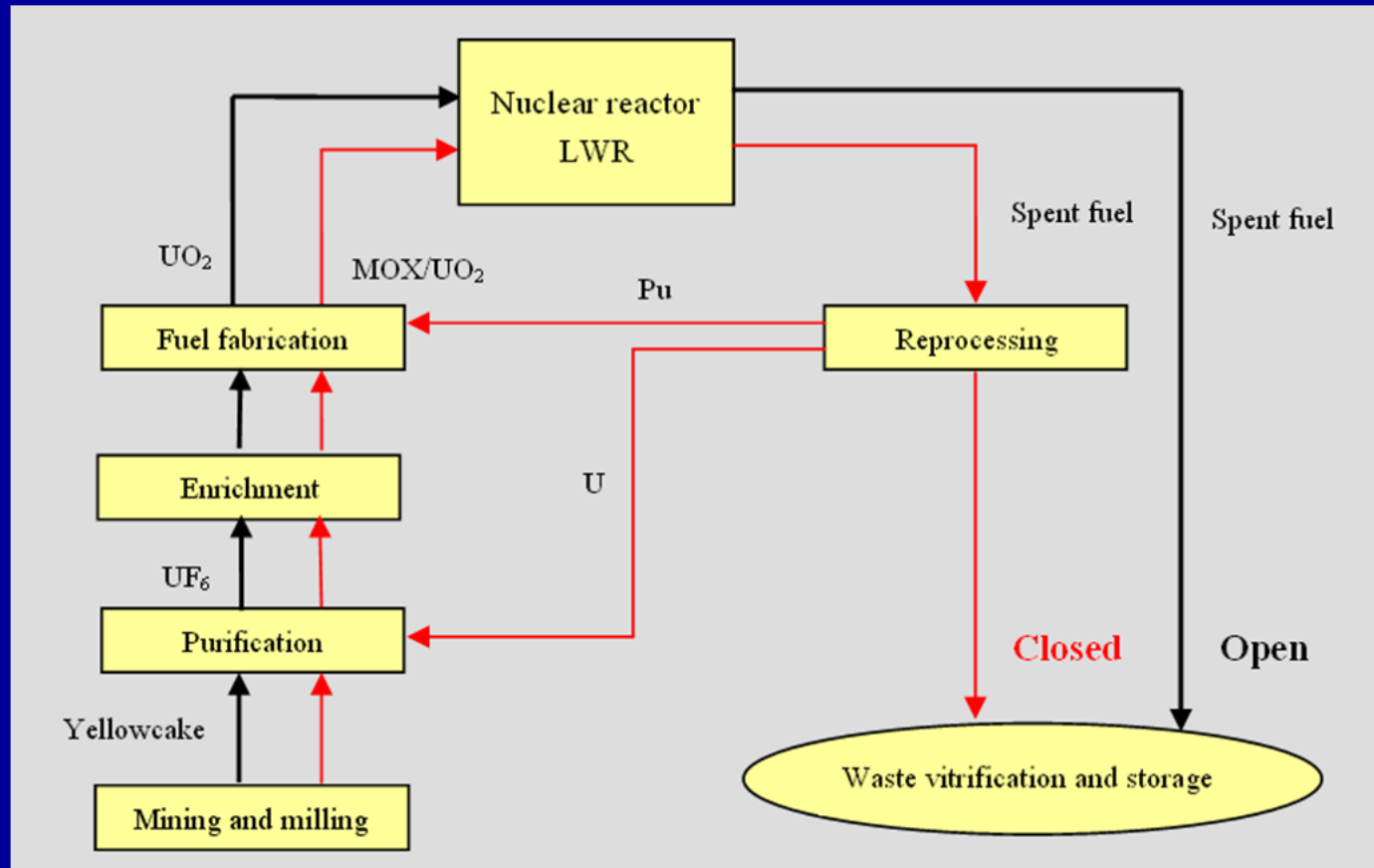
Is nuclear energy sustainable?

- ...“affordable, reliable electricity” that does not put “the earth’s climate in jeopardy,”
(Bonser 2002)
- ...the safety of plant operation as well as proliferation concerns
(Stevens 1997)
- under certain conditions “there is a basic case for treating nuclear energy as a contribution to sustainable development at least in a “transitional role towards establishing sustainable energy”
(Bruggink et al 2002)
- ...nuclear power is inherently “unsustainable, uneconomic, dirty and dangerous”
(GreenPeace 2006)

Which fuel cycle is more sustainable?

- There are two methods for producing nuclear power
 1. To use uranium once in a reactor (available resources at least 100 years) resulting in radiotoxic waste for 200,000 years;
 2. To recycle and reuse *the waste*. Available resources for thousands of years; waste life time is 10,000 years
- Would you say that nuclear is a sustainable option?
- Which fuel cycle do you consider more sustainable?

Two fuel cycles



Adding complexity to the case

- Method 1 (Open fuel cycle) is cheaper and has less short-term consequences for the environment and less potential hazards for human beings
- Method 2 (closed fuel cycle) is more expensive and brings about more short-term risks; however it reduces many long-term concerns

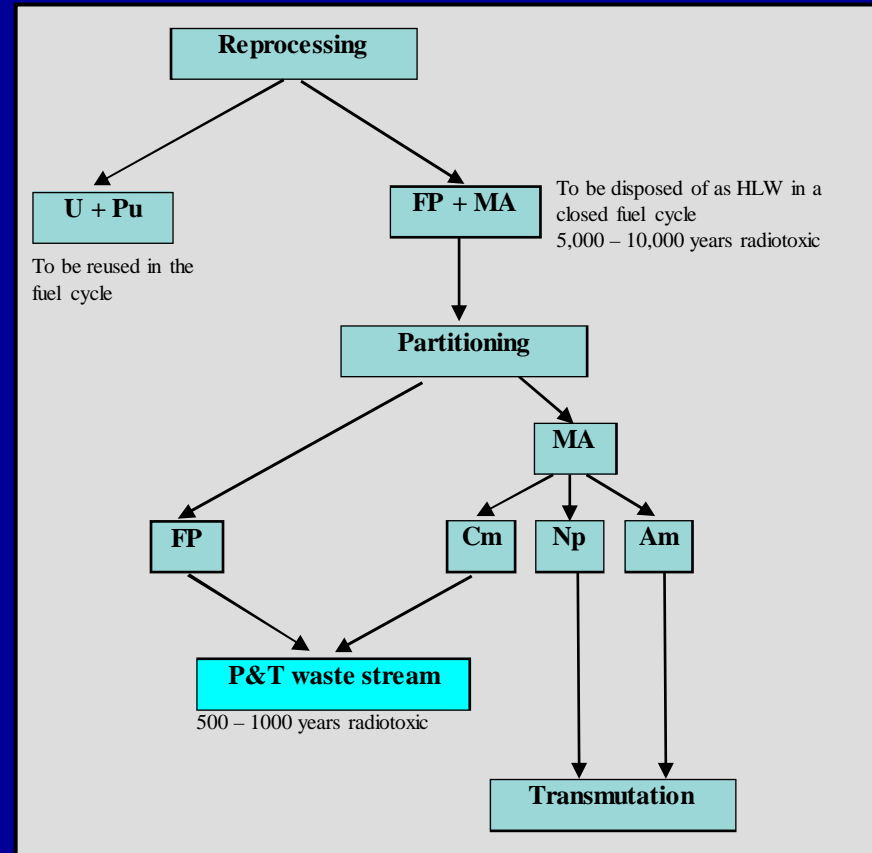
Operationalization of values

	Supply certainty		Radiological risks to environment		Affordability		Radiological risks to public		Proliferation	
	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long
Open	+	-	+	-	+	-	+	-	+	-
Closed	+	+	-	+	-	+	-	+	-	+

- Which fuel cycle is *more* sustainable?
- Whose interest should be decisive here?

Partitioning and Transmutation

- FP - fission products
- MA - minor actinides
- Cm - curium
- Np - neptunium
- Am - americium



Are we there yet?

- In energy two aspects are very relevant
 1. Availability of resources
 2. How it affects the environment and public health
- Both aspects have a spatial and temporal dimension
- Sustainable development *could* be a very useful notion
 - In the future of energy discussions; both consumption and provision
- IF we manage to identify interest at stake
 - And address conflicts of interests properly
 - Indeed, 'proper' here as a *normative* dimension