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The Trouble with Justification

Reflections on lessons learned after Fukushima

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The Trouble with Justification

0 Introduction – did we learn anything *before* Fukushima?
1 What is good risk governance?
2 Unveiling moral pluralisms
3 Meanwhile in the real world
4 'Lessons learned': nuclear rationales after Fukushima
5 What does it all imply for the nuclear scientist & engineer?

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0 Introduction - did we learn anything *before* Fukushima?
Observations

- In society, there exist different opinions on the acceptability of nuclear as an energy technology option…

→ there is ongoing discussion about nuclear in energy policy context,
- as well popular as high intelligent;
- related to safety, climate change, waste, proliferation;

→ but without real progress in terms of developing 'better insight for decision making': since the early history of nuclear we are discussing why we should accept or reject it.

- What we see is that opposing rationalisations do not converge, but remain stuck over conflicting evidences. The result is an enduring polarisation and a lack of societal trust that hinders 'good risk governance' of nuclear energy.

→ 'good risk governance'? not in the first instance about why we should accept or reject it.

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0 Introduction - did we learn anything *before* Fukushima?
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- What we see is that opposing rationalisations do not converge, but remain stuck over conflicting evidences. The result is an enduring polarisation and a lack of societal trust that hinders 'good risk governance' of nuclear energy.

→ 'good risk governance'? in the first instance about how we could accept or reject it [why we should accept or reject it]

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1 What is good risk governance?

■ Traditional approach:

knowledge: Risk assessment in the sense of assessment of the potential adverse effects: (1) insight in radiation physics & radiobiology; (2) insight in causality, occurrence, impact characteristics;

(e)valuation: Once the assessment of the adverse effects is done, an evaluation exercise can assess the balance of benefits and burdens that come with the application of the risky practice.

■ In societal context, this traditional approach doesn't work:

knowledge: Cognitive hindrances prevent straightforward risk assessment in the above sense, as causality, occurrence and impact characteristics are to a certain extent *beyond control [time, nature, humans];*

(e)valuation: Moral pluralism and the difficulty of 'meaningful framing' prevents straightforward balance of benefits and burdens.

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1 What is good risk governance?
Claims

- Moral pluralism plays stronger than the complexity of acquiring knowledge

  moral pluralism: even if we would all agree on the scientific knowledge base for the assessment of the risk, opinions would still differ on its acceptability.

- If there is no evidence that would tell us what is the right thing to do when it comes to socially justifying the radiological risk

→ it will imply that policies that deal with radiological risk governance will have to rely on 'opinions that cannot be turned into facts';

→ and that policy choices, in these cases, can only be rational-political and not rational-scientific;

→ which means that 'societal trust' will need to be found 'in the method instead of in the proof'.

→ and that the only issue on which society may find consensus is on that of the method of justification

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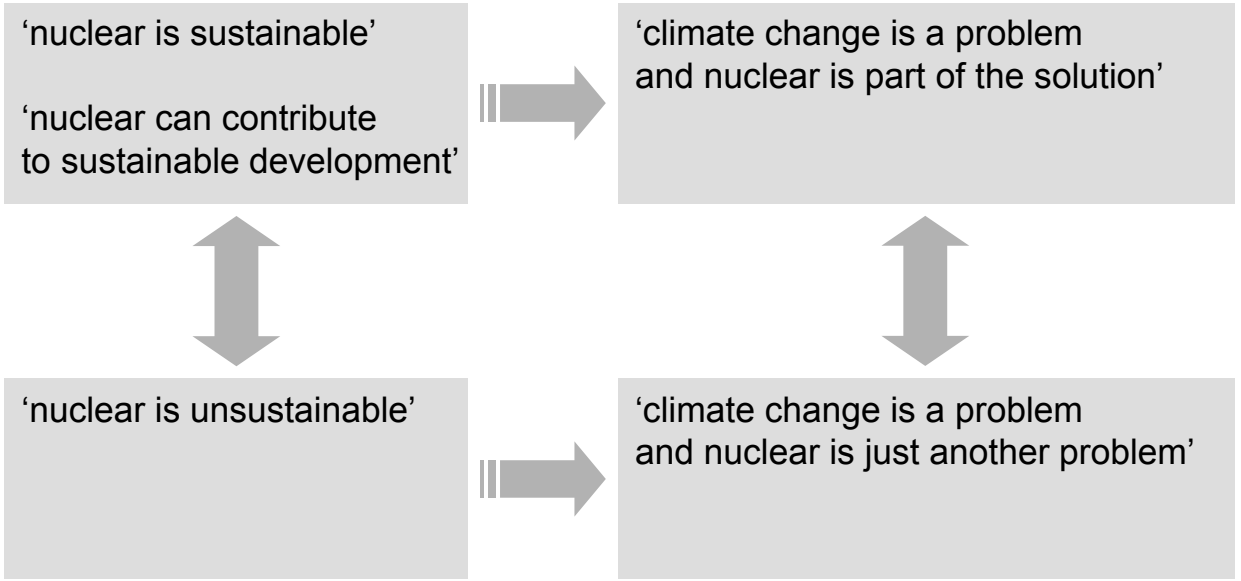
2 Unveiling moral pluralisms
Nuclear and the great divide

- Conflicting opinions on nuclear in relation to climate change and sustainable development



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2 Unveiling moral pluralisms
Nuclear and the great divide

- ▶ 'nuclear is sustainable'

- ▼ the stability and reliability of the fuel market
- ▼ the low carbon dioxide burden of the nuclear fuel cycle
- ▼ the competitive price of nuclear electricity in base load
- ▼ good NPP safety records of modern & 'safer' future plants
- ▼ fuel cycles can be made proliferation-safe
- ▼ available solutions for radioactive waste disposal

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2 Unveiling moral pluralisms
Nuclear and the great divide

► 'nuclear is not sustainable'

▼ the stability and reliability of the fuel market
▲ limited U resources
▼ the low carbon dioxide burden of the nuclear fuel cycle
▲ significant underestimated CO_2 emissions
▼ the competitive price of nuclear electricity in base load
▲ subsidies, not enough provisions for waste & dismantling
▼ good NPP safety records of modern & 'safer' future plants
▲ Fukushima, Chernobyl, TMI, old plants, human error
▼ fuel cycles can be made proliferation-safe
▲ warfare, irresponsible regimes, proliferation, terror
▼ available solutions for radioactive waste disposal
▲ no available solutions for radioactive waste disposal

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2 Unveiling moral pluralisms
Nuclear and the great divide

which issues **could be** cleared out by jointly generating knowledge in an open and transparent dialogue?

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▲	significant underestimated CO_2 emissions
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2 Unveiling moral pluralisms
Nuclear and the great divide

1, 2 & 3: cognitive complexity, but acquiring factual knowledge and applying causal reasoning is possible

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▲ limited U resources

2 ▼ the low carbon dioxide burden of the nuclear fuel cycle

▲ significant underestimated CO_2 emissions

3 ▼ the competitive price of nuclear electricity in base load

▲ subsidies, not enough provisions for waste & dismantling

→ It would be sufficient to acquire knowledge about 'the situation', as, from there on, straightforward causal reasoning can be applied

(this doesn't mean that acquiring sufficient knowledge is easy)

2 Unveiling moral pluralisms
Nuclear and the great divide

1, 2 & 3:	cognitive complexity, but acquiring factual knowledge and applying causal reasoning is possible
1 ▼	the stability and reliability of the fuel market
▲	limited U resources
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▲	significant underestimated CO_2 emissions
3 ▼	the competitive price of nuclear electricity in base load
▲	subsidies, not enough provisions for waste & dismantling
in addition	We could compare the different views and try to find out why they differ. We could draw conclusions out of this comparison that could inform policy
	It would not be too bad if we would turn out to be wrong
	The consensus can be adapted on continuous basis
	Also comparison of nuclear with alternatives is possible

2 Unveiling moral pluralisms
Nuclear and the great divide

4, 5 & 6: acquiring factual knowledge and applying causal reasoning is not possible; issues are troubled by moral pluralism

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2 Unveiling moral pluralisms
Nuclear and the great divide

4, 5 & 6: acquiring factual knowledge and applying causal reasoning is not possible; issues are troubled by moral pluralism

→ The issues are marked by a 'risk' that needs to be 'controlled'
→ Essential factors are beyond control: time, nature, humans
→ It is impossible to prove who is right and who is wrong
→ Comparison of views triggers values deeply rooted in cultures
→ All this complicates the comparison of nuclear with alternatives

4 ▼ good NPP safety records of modern & 'safer' future plants
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2 Unveiling moral pluralisms
Nuclear and the great divide

conclusion

in an open and transparent dialogue or not,
if issues are troubled by moral pluralism, it will mean that

1 → science may inform us about the technical and societal aspects of options, it cannot instruct or clarify the choice to make

2 → policy, in these cases, will have to rely on 'opinions that cannot be turned into facts'

3 → and that policy choices, in these cases, can only be rational-political and not rational-scientific

4 ▼ good NPP safety records of modern & 'safer' future plants
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2 Unveiling moral pluralisms

Risk governance: dealing with unstructured problems

Unstructured problems are problems where there exists a debate on the scientific facts as well as on the values at stake

→ Four models of 'governance'

	consensus on values	
consensus on the knowledge base	no	yes
no	unstructured deliberation	moderately structured pacification
yes	moderately structured negotiation	structured regulation

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2 Unveiling moral pluralisms
Risk governance: dealing with unstructured problems

Unstructured problems are problems where there exists a debate on the scientific facts as well as on the values at stake

→ Four models of 'governance'; examples

	consensus on values: no	consensus on values: yes
consensus on the knowledge base: no	unstructured deliberation *nuclear, [climate change]*	moderately structured pacification *mobile phones*
consensus on the knowledge base: yes	moderately structured negotiation *climate change*	structured regulation *traffic*

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2 Unveiling moral pluralisms
Risk governance: dealing with unstructured problems

Unstructured problems are problems where there exists a debate on the scientific facts as well as on the values at stake

→ Four models of 'governance'; examples
→ Deliberation: 'the act of justification'

	consensus on values: no	consensus on values: yes
consensus on the knowledge base: no	unstructured deliberation *nuclear, [climate change]*	moderately structured pacification *mobile phones*
consensus on the knowledge base: yes	moderately structured negotiation *climate change*	structured regulation *traffic*

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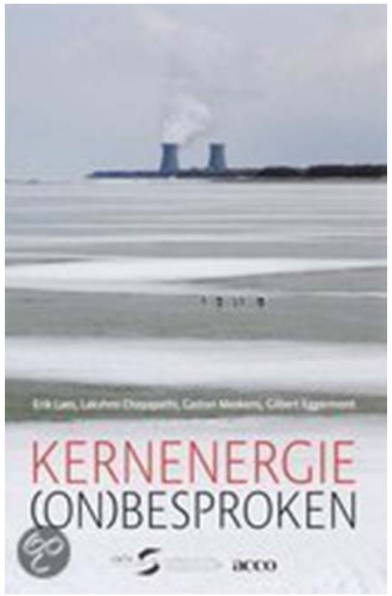
3 Meanwhile in the real world
Politics and morals

→ Avoiding political deliberations on nuclear / Belgium

- > 2007



"… there has never been a societal debate on nuclear in Belgium, neither on its introduction in the 50s-60s-70s, neither on the phase-out in 2003…"

- nuclear for Van Rompuy's 2009 federal budget fix

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3 Meanwhile in the real world
Politics and morals

→ Avoiding political deliberations on nuclear / EU

- Germany – UK; Merkel versus Cameron after Fukushima
- nimby and yimby in EU RW governance

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3 Meanwhile in the real world
Politics and morals

→ Avoiding political deliberations on nuclear / global

■ Focus on nuclear in global governance?
- UN Framework Convention on Climate Change (no)
- UN Commission on Sustainable Development (no)
- UN Non-Proliferation Treaty (yes)

↓ The CSD thematic cycle on energy (New York, 2006-2007) did not officially debate the issue of nuclear

↑ Opening the NPT Review conference 2010, Ban Ki-moon declared that "Advancing the peaceful uses of nuclear energy cannot be held hostage to either disarmament or non-proliferation."
http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=802

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3 Meanwhile in the real world
Science and morals (science – policy morals)

→ acknowledging uncertainties and unknowns

- Transmutation to reduce HLW lifetime to 300, 3000, … years?
- Getting straight on CO_2 emissions in the nuclear fuel cycle
- Science shopping for the Belgian 2030 energy outlook

→ stimulating transdisciplinary research

- EC: isolation of nuclear in energy research

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4 'Lessons learned': nuclear rationales after Fukushima
Self-confidence over a self-declared closed case?

- FORATOM 2050 Roadmap update

(http://www.foratom.org/)

(page 5) '… Whilst one should not prejudge the final outcome, it does seem unlikely from announcements made so far that there will need to be closures of nuclear power plants in the EU on technical safety grounds' .

(page 9) '…Completion and open publication of the results of the safety reassessments currently underway in Europe and elsewhere should help convince the public that nuclear power plants here are adequately protected against extreme conditions and that appropriate accident prevention measures are in place...'

(page 9) '…Fukushima is likely to have some effect on costs and new build timescales in the shorter-term but not to be a decisive factor affecting the longer term contribution of nuclear energy...'

- World Nuclear Association position

(Energy & Environment, Volume 22 – Number 7 – 2011 – page 945)

'The future of nuclear energy in most countries is likely to be much the same after the ramifications of the Fukushima accident are fully considered as it was before the accident, though there will be some safety benefits from lessons learned…'

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4 'Lessons learned': nuclear rationales after Fukushima
Self-confidence over a self-declared closed case?

- The only conclusion to draw from these statements is that these advocacy groups either think that
- societal trust is restored or that it even finally emerged due to Fukushima, or that
- societal trust is eventually relevant, but not their responsibility.

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5 What does it all imply for the nuclear scientist & engineer?
Nothing special, although…

- Many scientists and engineers in nuclear still claim it is only a matter of 'explaining the facts'...

  "…if people would (be able to) understand, they would see the evidence…"

- Making a point about nuclear, as a scientist, engineer, politician, citizen, environmental activist, … is essentially reasoning about
  - what you believe but cannot prove
  - what you hope but cannot guarantee

- Making a point about nuclear as scientist & engineer is not a de facto responsibility, but a choice

- As a start, scientists & engineers can (should) contribute to developing an 'advanced language' *about the science of* nuclear technology

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