

Double standards between existing and new nuclear power plants?

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Introduction

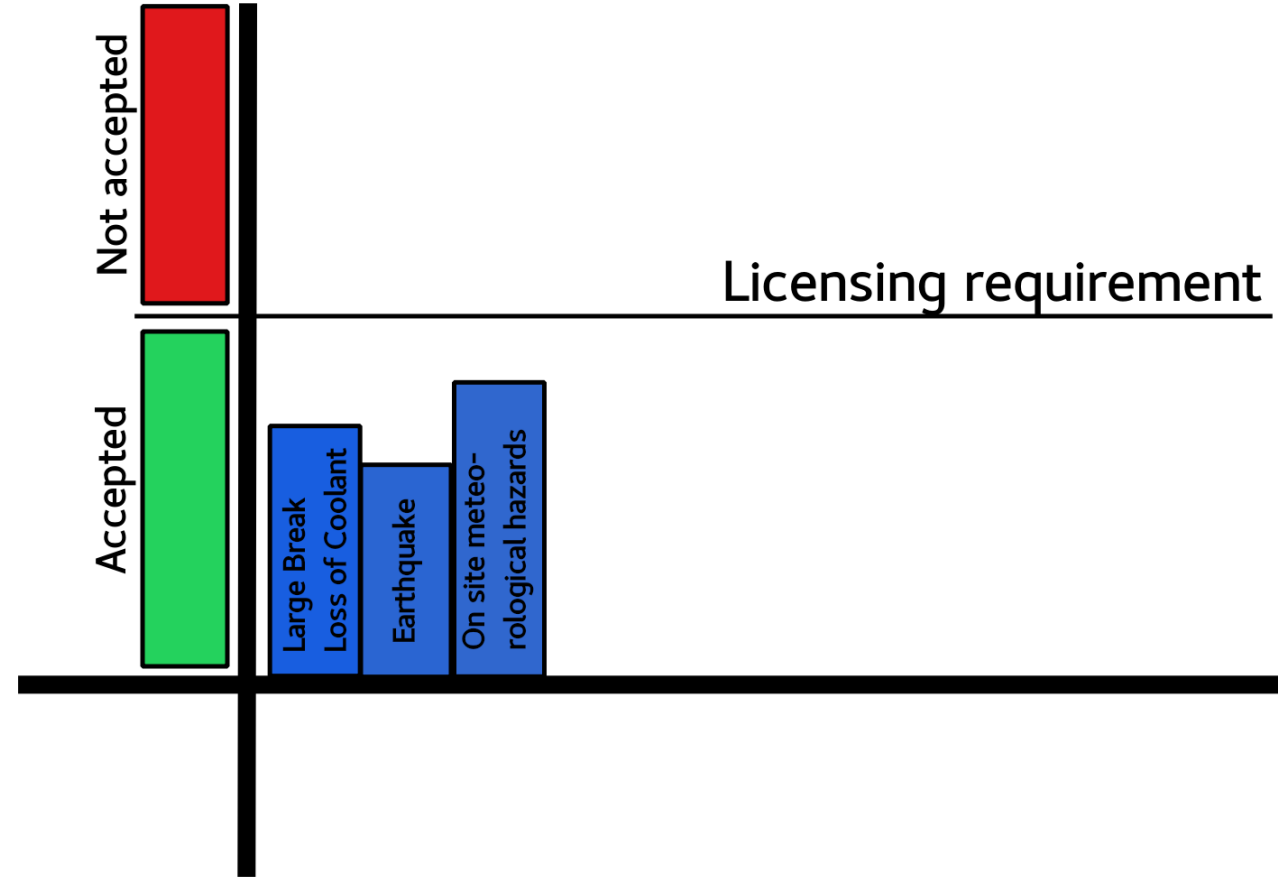
- European Nuclear Power Plants: in average more 36 years of operation
- Most European NPPs received their operating license 1970s / 1980s
- In the mean time three major accidents happened
 - Three Mile Island Unit 2
 - Chernobyl Unit 4
 - Fukushima Daiichi Units 1-4
 - Many smaller accidents and incidents
- State of the art of nuclear safety advanced

“Safe to Operate”

- To receive an operating license plants must demonstrate that they are “safe”
- But: “safe”, as nothing can ever happen, under no circumstance cannot be shown
- Instead “safety case”
 - Analyzes spectrum of possible initiating events (e.g. pipe breaks)
 - Analyzes their consequences
 - Shows that engineered safety systems can control accident sequences and that consequences are limited
- Not analyzed initiating events => residual, accepted risk, which should be sufficiently small

Licensing analysis 1970s

CONSEQUENCES



Since then:

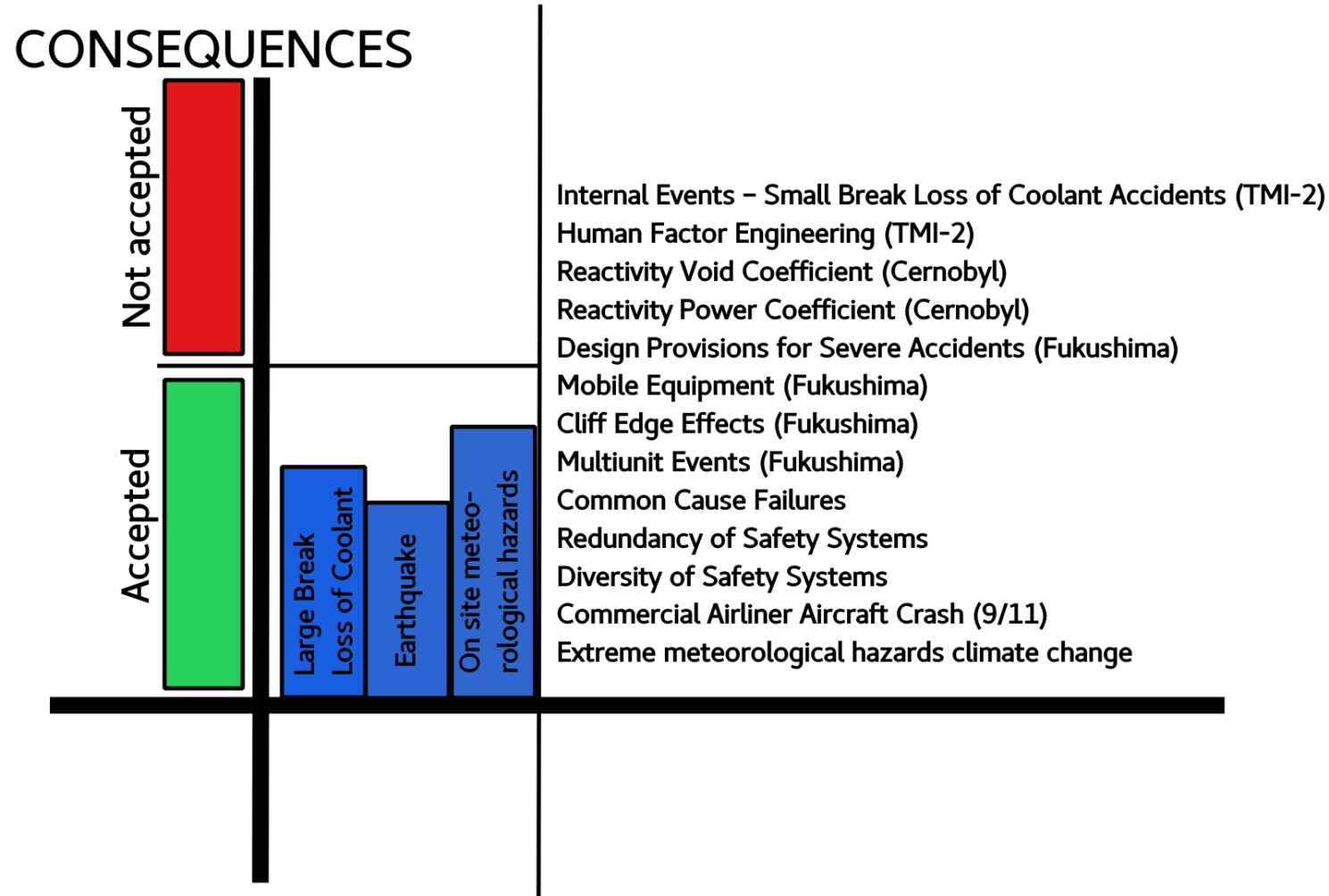
Three Mile Island Accident

Chernobyl Accident

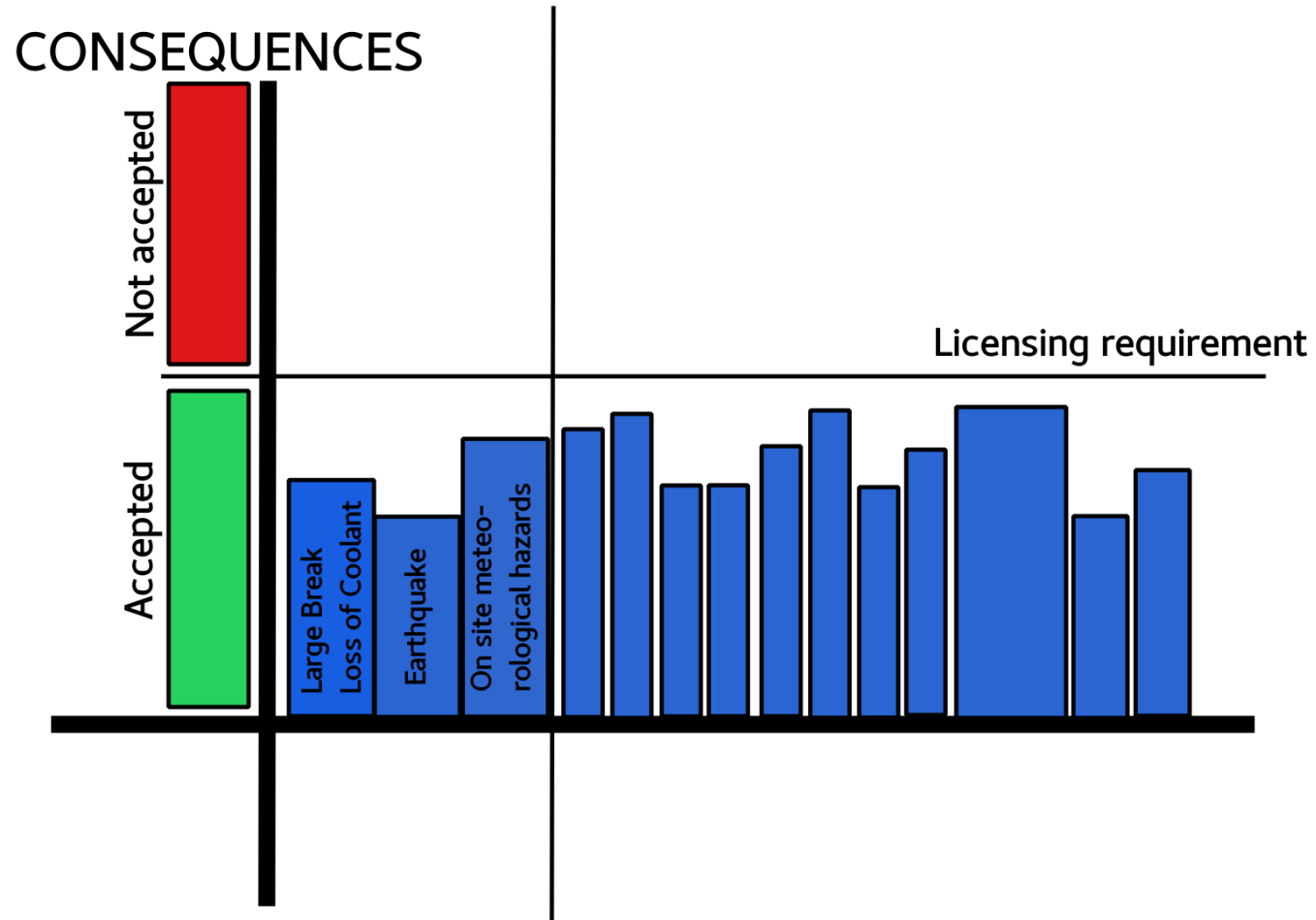
9/11 Terrorist Attack

Fukushima Accident

Additional analysis required



Requirements for new nuclear power plant today



But:

What to do with the existing NPPs?

IAEA – Specific Safety Requirements

SSR 2/1 - Design

- Application of safety standards:

“The IAEA safety standards are applicable, as relevant, throughout the entire lifetime of all facilities and activities — existing and new — utilized for peaceful purposes and to protective actions to reduce existing radiation risks.”

- Which means, there should not be double standards when it comes to nuclear safety.

IAEA – Specific Safety Requirements

SSR 2/1 - Design

- But, same section, a few paragraphs later

“many of the IAEA safety standards, in particular those addressing aspects of safety in planning or design, are intended to apply primarily to new facilities and activities. The requirements established in the IAEA safety standards might not be fully met at some existing facilities that were built to earlier standards. The way in which IAEA safety standards are to be applied to such facilities is a decision for individual States”

- Open for individual states to decide

Convention on Nuclear Safety

Vienna Declaration on Nuclear Safety

“**New nuclear power plants** are to be designed, sited, and constructed, consistent with the objective of preventing accidents in the commissioning and operation and, should an accident occur, mitigating possible releases of radionuclides causing long-term off site contamination and avoiding early radioactive releases or radioactive releases large enough to require long-term protective measures and actions.”

“Comprehensive and systematic safety assessments are to be carried out periodically and regularly **for existing installations** throughout their lifetime in order to identify safety improvements that are oriented to meet the above objective. Reasonably practicable or achievable safety improvements are to be implemented in a timely manner.”

Situation in Europe – Nuclear Safety Directive 2014

Article 8a (1)

Member States shall ensure that the national nuclear safety framework requires that nuclear installations are designed, sited, constructed, commissioned, operated and decommissioned with the objective of preventing accidents and, should an accident occur, mitigating its consequences and avoiding:

- (a) **early radioactive releases** that would require off-site emergency measures but with insufficient time to implement them;
- (b) **large radioactive releases** that would require protective measures that could not be limited in area or time.

Situation in Europe – Nuclear Safety Directive 2014

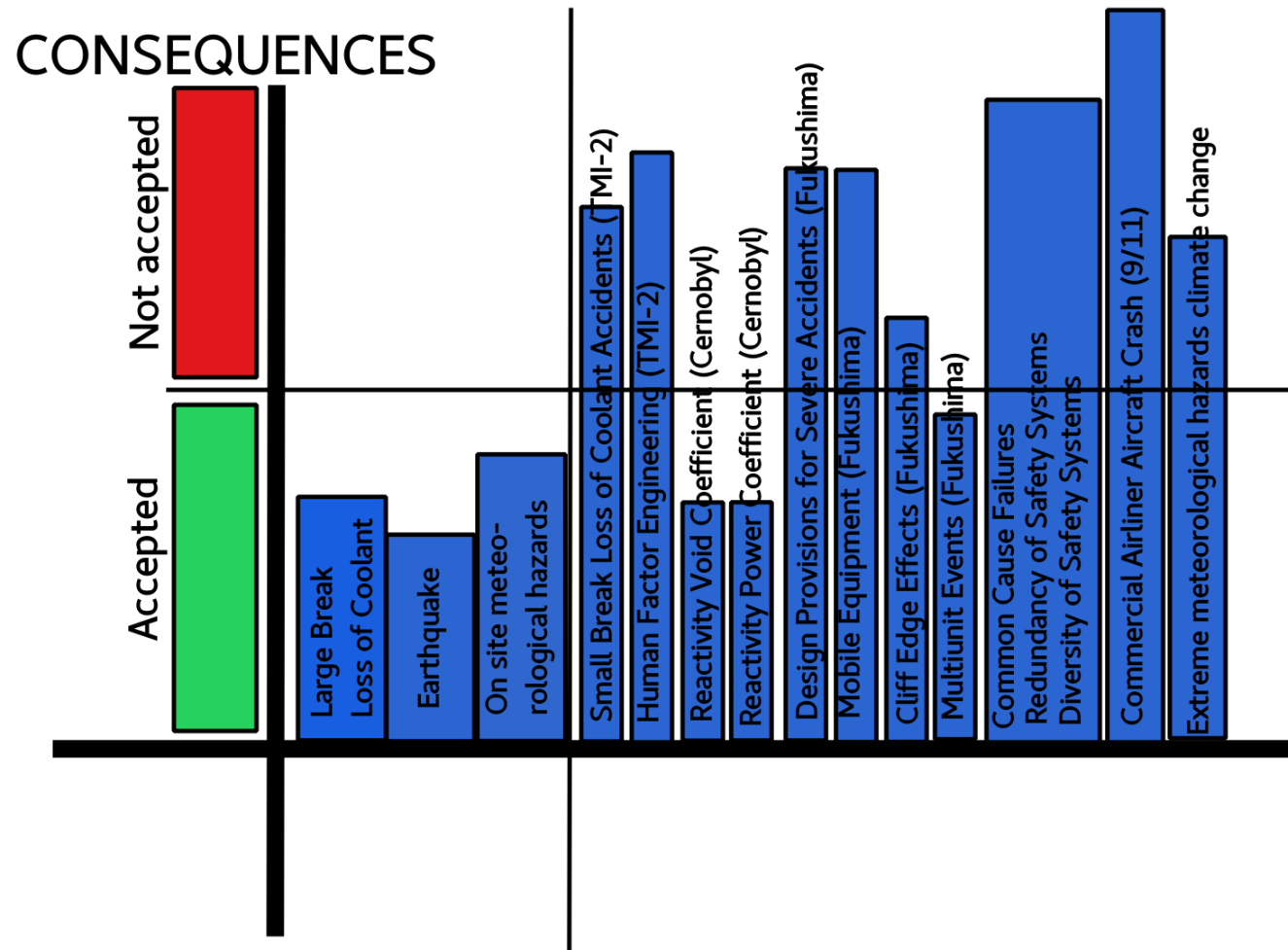
Article 8a (2)

Member States shall ensure that the national framework requires that the objective set out in paragraph 1:

(a) applies to nuclear installations for which a construction license is granted for the first time after 14 August 2014;

(b) is used as a reference for the timely implementation of reasonably practicable safety improvements to existing nuclear installations, including in the framework of the periodic safety reviews as defined in Article 8c(b).

NSD application to an existing NPP

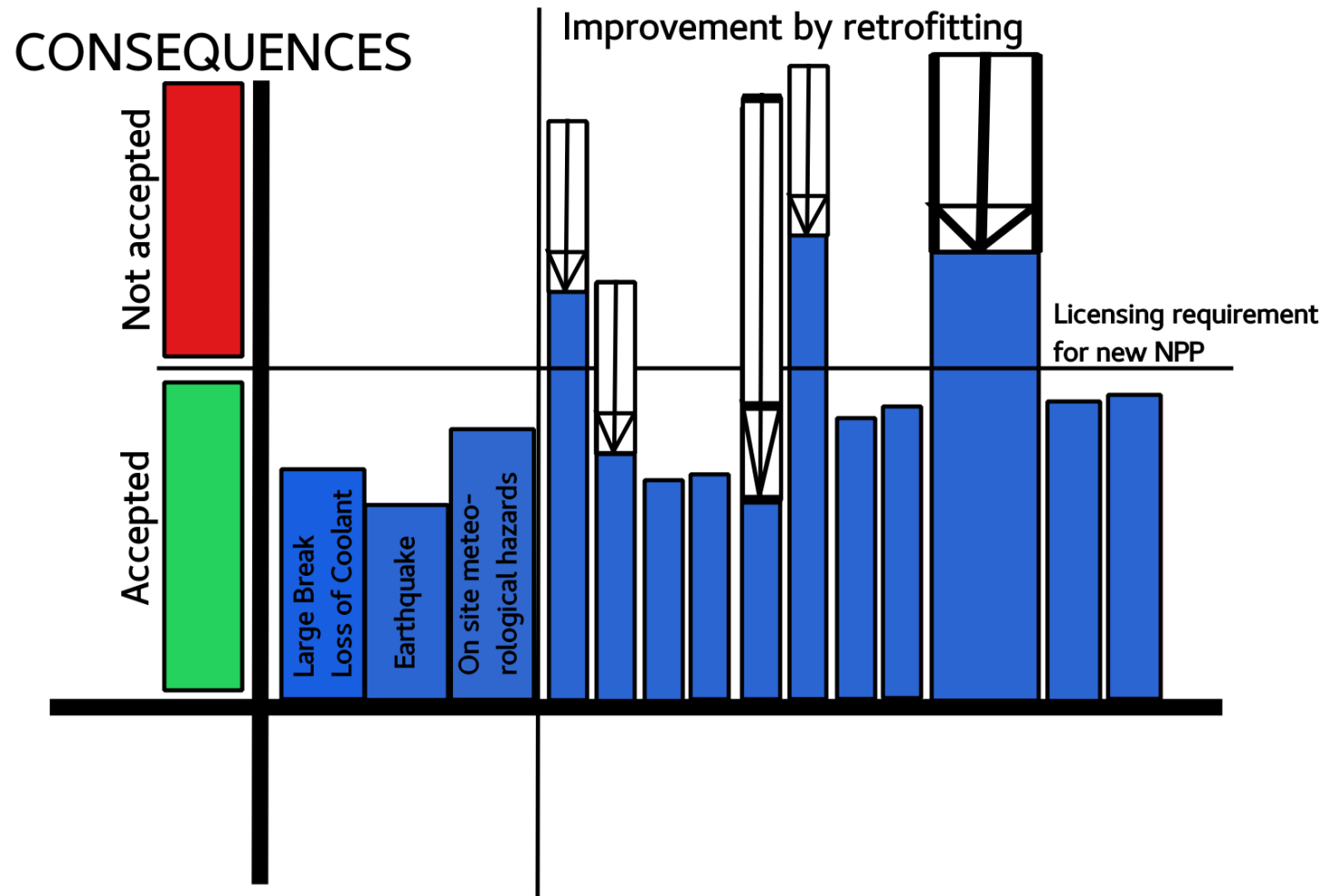


Existing NPP should use current standards as reference

Identify safety improvements that can be “reasonably practicable” implemented

And implement them in a timely manner. Result may look like this:

NSD application to existing NPP



After retrofit, the existing NPP

Will have implemented safety improvements, were reasonably practicable

But will not adhere to the safety levels required for new NPP

And will not systematically identify the deviation from the safety levels required for new NPP

How to do it differently

- After Fukushima accident Japan shut down all its nuclear power plants
- Nuclear safety authority laid down state of the art safety standards which are a prerequisite for an operating license for all its nuclear power plants
- Operators of NPP could reapply for a license by providing a state of the art safety assessment
- Operators decided to permanently shut down roughly half of the fleet
- 25 reactors applied for new license after Fukushima accident which was granted for nine reactors, other applications are under review

Conclusion

- There are double standards on nuclear safety in Europe
- New nuclear power plants have to adhere to the state of the art of nuclear safety
- Existing plants may not only deviate from the state of the art – there is not even a requirement to systematically assess how much existing plants deviate from the state of the art
- We are accepting a risk from existing plants that we would not accept from new plants
- Large part of new nuclear generating capacity is planned from life time extension, very small part from new builds