

LESSONS LEARNED AND INSIGHTS FROM STRATEGIC STUDIES

Alexis Geisler-Roblin (NTW) **CLIMATE WP**



Co-funded by the European Union under Grant Agreement n° 101166718

Lesson: the relevant climate question changes with facility type, lifecycle phase and timescale.

CONSTRUCTION AND OPERATION

Mainly concerned with extreme weather and infrastructure performance, disrupt operations, compromise surface barriers, site access, and worker safety.

Heavy rainfall

Flooding

Heatwaves

Desertification

Erosion

Coastal hazards

POST-CLOSURE

Focus on system evolution, barrier performance and exposure pathways, ultimately affecting the safety case.

Infiltration

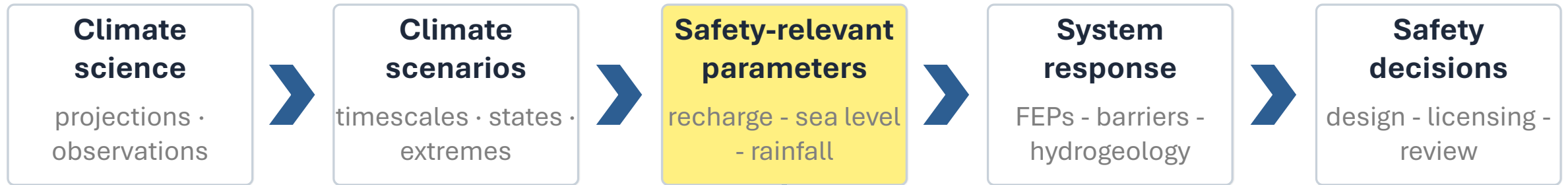
Groundwater flow

Landscape evolution

Sea-level change

Permafrost/glaciation

Lesson: climate information becomes useful only when it is translated into decision-relevant inputs.



Where CLIMATE repeatedly found the methodological gap

Scale & extremes

Climate-model output exists, but safety assessment often needs different spatial and temporal scales, especially for infrequent extremes.

Century to millennium gap

Near-term projections and geological-scale scenarios are stronger than the intermediate time window for some concepts.

Uncertainty propagation

The key is not to eliminate uncertainty, but to make assumptions traceable and carry uncertainty into system response and decisions.

Lesson: Harmonize the logic. Common language and proportionality improve transparency and comparability.

Shared European framework

- ① **Scenario logic** How climate futures are selected and bounded
- ② **Translation rules** How climate variables become safety inputs
- ③ **Uncertainty treatment** How uncertainty is documented & propagated
- ④ **Monitoring & review** How new observations trigger reassessment



Proportionate National Implementation

- Ⓐ **Facility type** surface - near-surface - DGR
- Ⓑ **Climate context** Climate - coast
- Ⓒ **Programme maturity** screening → structured scenario assessment
- Ⓓ **Regulatory context** national requirements and licensing stage

Lesson: Integrating technical work, knowledge transfer and stakeholder engagement from the start makes Strategic Studies more effective.

Connect disciplines early

RWM experts, climate scientists, modellers, regulators and civil society need a sustained interface. The goal is access to expertise → not to recreate climate science inside RWM.

Design outputs from the start

Define the role, audience and boundaries of the White Paper, Synthesis Report, Domain Insight and other products early, with clear ownership in the tasks that generate the evidence.

Treat knowledge transfer as core work

Training should be planned early, audience-first and interactive → not as a final summary of the WP.

Knowledge products should remain useful after the project ends.

Integrate technical and societal learning

Civil-society interaction improved the framing of scenarios, communication and future research needs.