



NORCE and geothermal energy

User4GeoEnergy presentations

May 2023



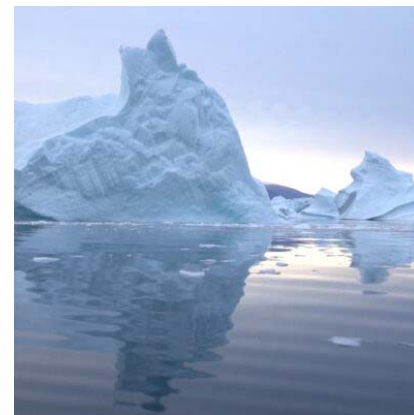
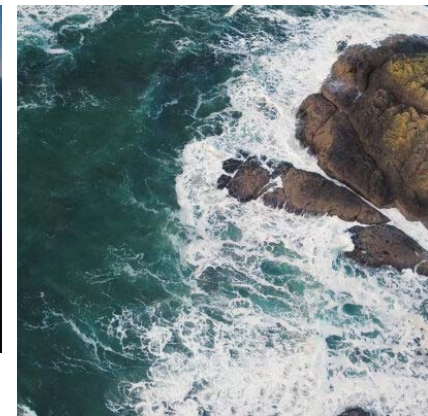
Four strategic focus areas in NORCE

Energy of the future

Sustainable seas and coasts

Climate and environmental risk

Safe and good societies





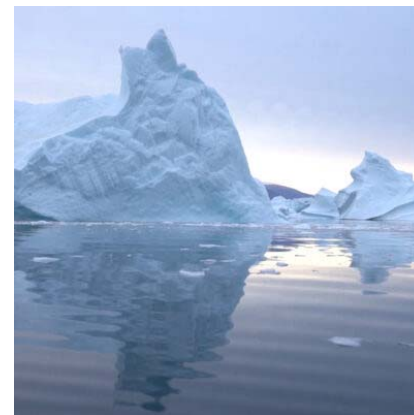
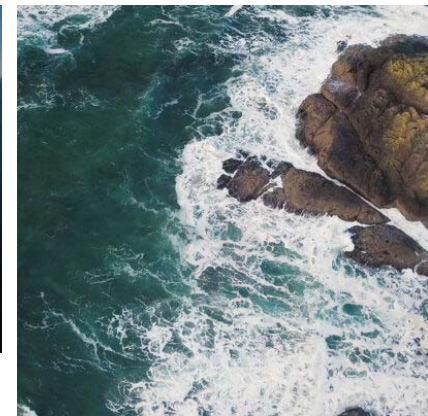
Four strategic focus areas in NORCE

Energy of the future

Sustainable seas and coasts

Climate and environmental risk

Safe and good societies





Geothermal energy – task example

Norway: The technology is successfully used for low temperature heat, but very little known – why?

What is the status in other European countries?

If the status is different, why is that?



Tool: Societal Embeddedness Level (SEL)

Four dimensions:

1. Environment
2. Stakeholder involvement
3. Policy and regulations
4. Market and financial resources



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Green	Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Green	Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red

The four dimensions



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Green	Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red

Four levels



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Green	Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red

Green: This level is reached for this dimension



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Green	Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red

Red: This level is not reached for this dimension



SEL and technology

- A high technology readiness level (TRL) requires a high SEL
- A low SEL is OK for a low TRL



SEL example

New technology? OK

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Light Green	Yellow	Red
Stakeholders	Green	Light Green	Red	Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Green	Green	Yellow	Red
Stakeholders	Mature technology? Not OK			Red
Policy and Regulations	Green	Yellow	Red	Red
Market and Resources	Green	Yellow	Red	Red



SEL example

	SEL 1	SEL 2	SEL 3	SEL 4
Environment	Light Green	Dark Green	Yellow	Light Red
Stakeholders	Light Green	Dark Green	Light Red	Light Red
Policy and Regulations	Light Green	Yellow	Light Red	Light Red
Market and Resources	Light Green	Yellow	Light Red	Light Red

Developing technology?
Focus here



Thank you. Takk.
Merci. Gracias. Obrigado.

Ellen Nordgård-Hansen
enor@norceresearch.no

Kirsti Midttømme
kimi@norceresearch.no

norceresearch.no

NORCE