

**NNWI WEBINAR:
SMR Deployment in the Context of European Energy Transition**

REPOWER

Strategies to rapidly transition energy infrastructure to
emissions-free energy sources to address climate
change

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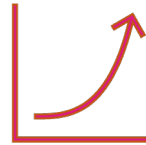
<https://www.terrapraxis.org/>

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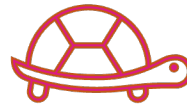
**TERRA
PRAXIS**

KEY RISKS TO THE ENERGY TRANSITION

Massive Growth & Unmet Demand



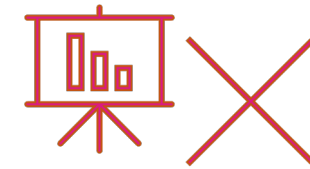
Slow Project Development



Cumbersome Permitting



Stranded Assets and Communities



Flawed Decarbonization Models

WHAT SHOULD THE SMR INDUSTRY DO?

1. Deliver on Promise

2. Streamline Regulations



Make a Product



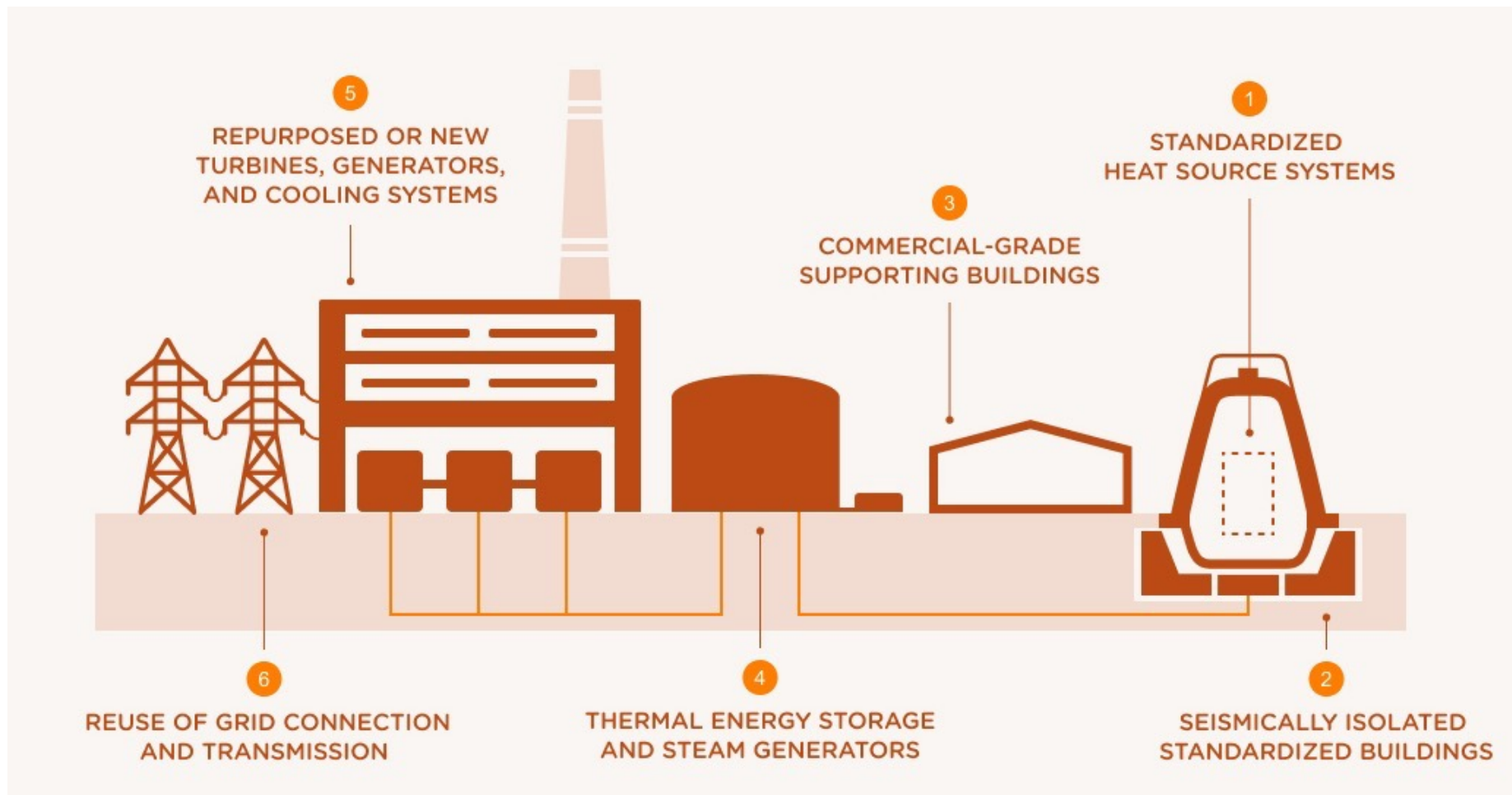
- Think in terms of **cost**↓, **speed**↑ and, **scale**↑.
- **Standardize** most of the structure, system and components along with the supply chain to deliver them → **Modular by design (DfMA)**.
- Design for a large enough set of sites but with sufficiently **common** characteristics to enable highly standardized design.
- Design special features to **isolate** the plant from the variation in the set of chosen sites.
- Design to be **repeatable** with no safety relevant variation.

EXAMPLE: REPOWERING COAL

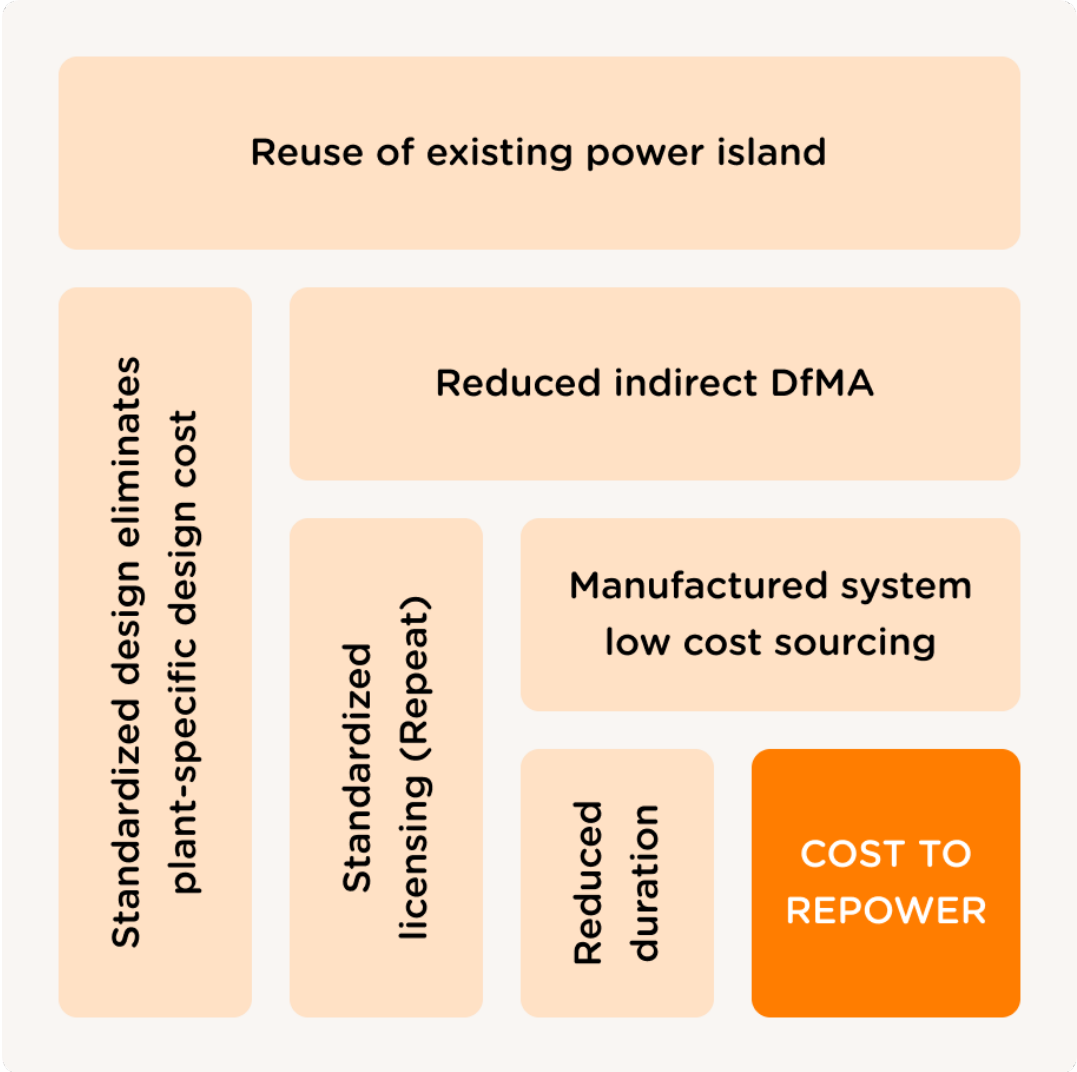
Built Systems Must Enable Scale and Speed



2TWe
2050



FASTER DELIVERY, LOWER COMMERCIAL RISK



TIME	COST	RISK
13 Years	\$10k/kWe	High
5 Years	\$2k/kWe	Low

● Conventional ● REPOWER

TRANSITION REQUIRED BEYOND THE POWER SECTOR

- Seventy-five percent of primary energy use is outside the power sector (e.g., data centers, steel, cement, aviation, marine shipping).
- Developing emission-free substitute fuels and decarbonizing other high-carbon sectors will require an enormous amount of emissions-free energy.
- The project's scale necessitates energy models that go beyond cost optimization, representing feasible solutions and influencing policy and investment for large-scale decarbonization.

ENERGY MODELS TO ASSESS THE RISK TO THE TRANSITION

Feasibility/Reality Check

Land

Transmission

Critical minerals

Project development process

Repurpose Assets

Use existing infrastructure

Diversify Pathways

Decisions under uncertainty

Quantifying risk

Diversification of energy sources

TRANSFORMING MODELING: MODELING INDUSTRIAL DECARBONIZATION

- **Companies are the actors of decarbonization..**
 - **But this is not the vision of most models.**
 - Because of hypotheses and simplifications
 - No management of risk
 - No consideration for supply chain
 - Capacity expansion « happens » exactly when needed, and does not require anticipation etc. This includes transmission lines etc. which generates risk for companies
 - Because of the questions asked to models
 - ***What policy is right assuming that industry will adapt?***
as opposed to
 - ***What can policy do to facilitate transition by industry?***
 - **Modeling the decision-making for companies requires specific considerations and models.**
 - **Gap in existing models**
 - **Our approach:**
 - Centered around incorporating such concerns into modeling
- Is Industrial end-user representation accurate (based on their needs)?
 - Investment Decisions: Are they modelled and based on realistic assumptions?
 - Are there realistic assumptions on capacity expansion with planning time?
 - Do end-users depend on grid power exclusively or own source?
 - Model Design: Academic exercise or industry tool?
 - Is the risk to transition mapped according to the industrial end-user?

A joint paper with the IAEA endorsing this method will be published in Q3 2024

CLIMATE X PROSPERITY

Thank you

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