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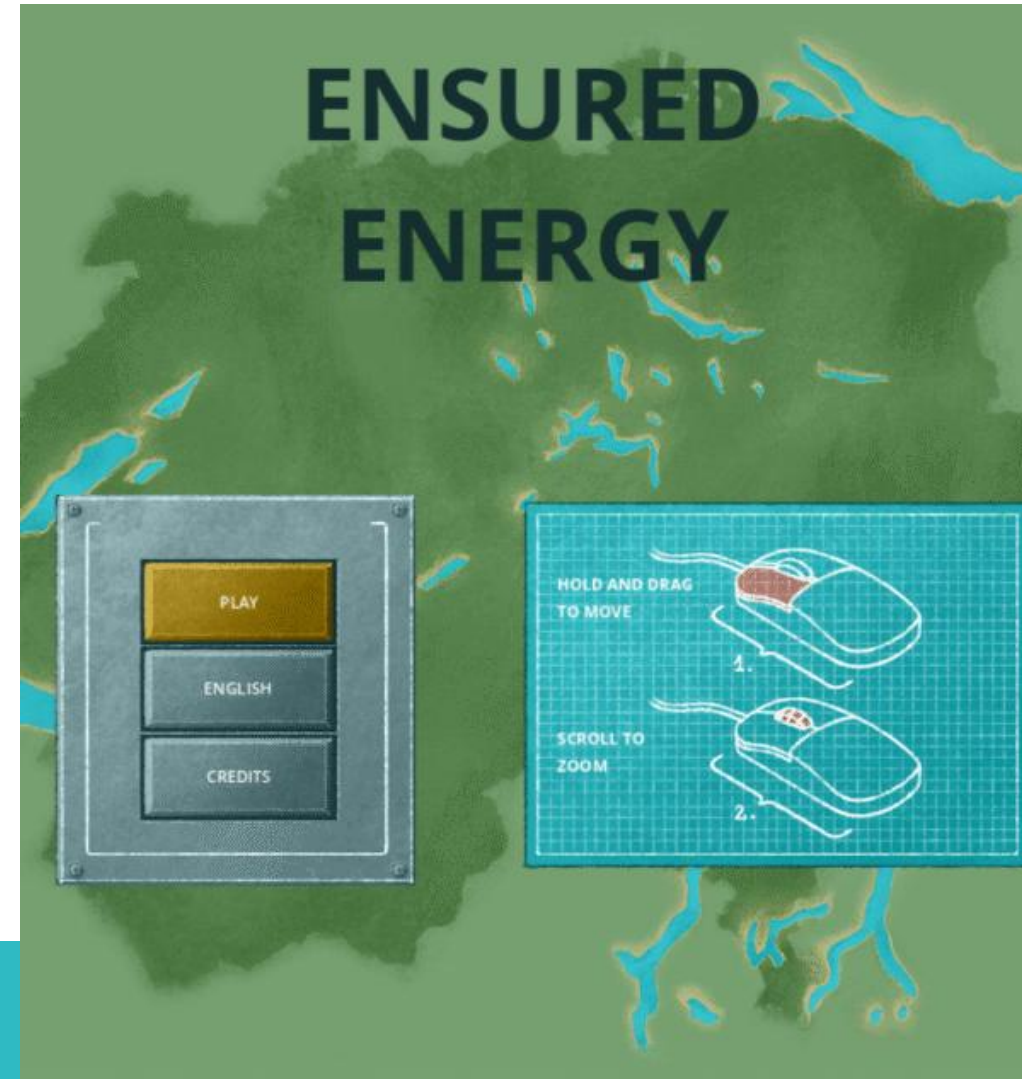
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SURE

wimby WIND IN MY BACKYARD

From Models to Meaning

Engaging Society through Scenarios and Games

Dr Evangelos Panos, Head of Energy Economics Group, Laboratory for Energy Systems Analysis
6th International Forum on Long-Term Scenarios (LTES) for Clean Energy Transition, IRENA, Bonn, 29 October 2025

Scenarios are about building meaning and trust
how to make complex model results resonate with daily life

Scenarios guide long-term energy choices,
but their impact depends on trust and understanding

⚙️ **The challenge:** turn scenario complexity into relatable stories

💡 **What we need**:

- Build capacity for interpretation

- Translate numbers into lived experiences

- Co-create narratives with stakeholders

- Expose trade-offs and uncertainties clearly

- Link model outputs to daily realities
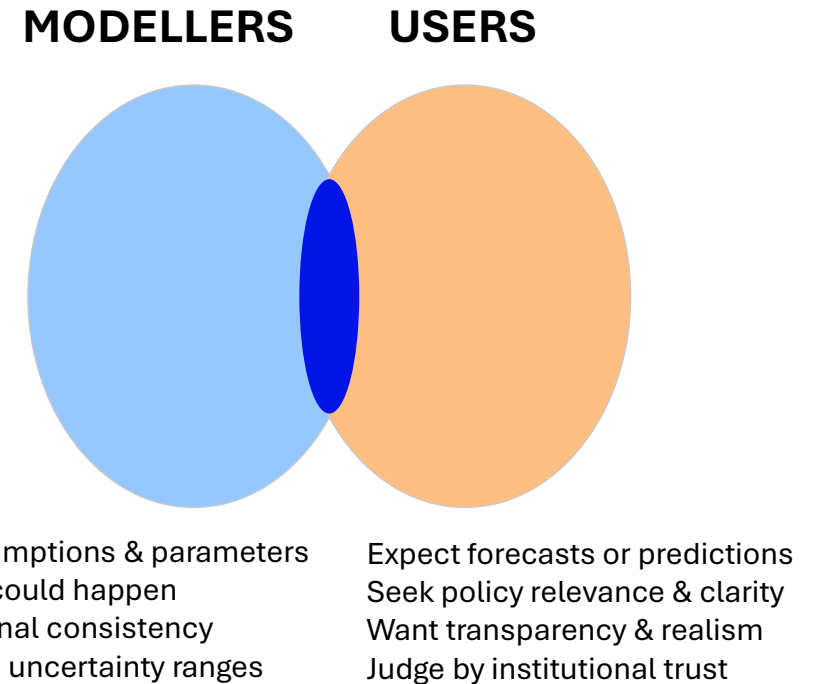
- Maintain credibility and openness

Our tools: Perception studies · Serious Game · MCDA · MUSA · Stakeholder Forums

The Perception Gap
How Non-Modellers Use Energy Scenarios

🔍 Insights from interviews with Swiss Stakeholders:

- Users trust institutions, not model depth

- Trust is highest in academic and public studies

- «Scenario» = assumptions for modellers, forecasts for users

- Users expect transparency and social realism

- Mixed views from users on whether scenarios show the most likely or the full range of outcomes

MODELLERS **USERS**

Focus on assumptions & parameters
Explore what could happen
Prioritise internal consistency
Communicate uncertainty ranges

Expect forecasts or predictions
Seek policy relevance & clarity
Want transparency & realism
Judge by institutional trust

Braunreiter, Lukas, and Yann Blumer. 2018. "Of Sailors and Divers: How Researchers Use Energy Scenarios." Energy Research & Social Science 40 (June): 118–26. https://doi.org/10.1016/j.erss.2017.12.003
Braunreiter, Lukas, Christina Marchand, and Yann Blumer. 2023. "Exploring Possible Futures or Reinforcing the Status Quo? The Use of Model-Based Scenarios in the Swiss Energy Industry." Renewable and Sustainable Energy Transition 3 (August): 100046. https://doi.org/10.1016/j.rset.2023.100046

Users call for more transparency and greater attention to social and political feasibility

Purposes of scenarios

Beliefs about scenarios
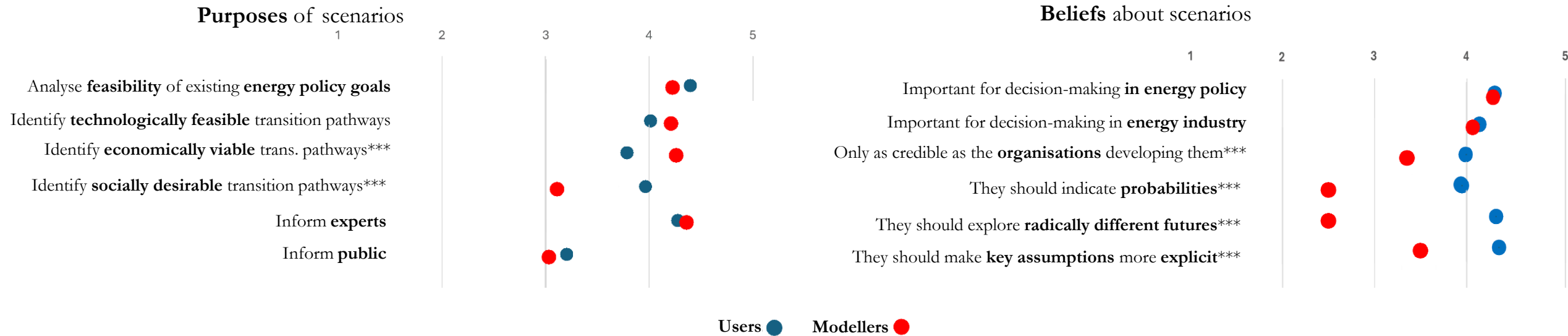
Note: Assessment by energy modelers (n = 105) and users (n = 244) of the importance of different purposes of model-based energy scenarios on a five-point scale. Dots represent group means, asterisks indicate significant differences between group means based on independent-sample t-tests (two-tailed), ∗∗∗p < 0.001

Note: Agreement by energy modelers (n = 105) and users (n = 244) to beliefs about model-based energy scenarios on a five-point scale. The dots represent group means asterisks indicate significant differences between group means based on independent-sample t-tests (two-tailed), ∗∗∗p < 0.001.

Blumer, Y., Wemyss, D., & Braunreiter, L. (2024). Beyond the usual suspects: Contrasting perspectives of developers and peripheral users of model-based energy scenarios. *Environmental Research: Energy*, *1*(4), 041001. https://doi.org/10.1088/2753-3751/ad96be

Making Scenarios Tangible: The Serious Game
Translate numbers into experiences

- Serious Games: games that do not have entertainment, enjoyment or fun as their primary purpose (Chen & Michael, 2005)

- *Ensured Energy* = online simulation of the Swiss energy system 2020-2050

- 6000 citizens/stakeholders invited; 2000+ responses; 750 completed ≥7 rounds

- Players allocate budgets, decide on energy imports, manage shocks

Play the game !!

https://sweet-sure.ch/game/

The serious game helps participants experience energy trade-offs first-hand and reflect on system complexity

Insights from the Serious Game
when stakeholders become scenario makers

Turns scenarios into interactive experiences – reducing complexity

- Lets players act, decide, and see outcomes

- Clarifies trade-offs, limits, and long-term lock-ins

- Builds intuition on how scenarios are formed

- Encourages reflection more than persuasion

- Slightly higher support for energy-related policies

- Limited impact on efficacy or attitudes

- Engages the interested more than the indifferent

- Promising tool — inclusiveness remains key

Simpson T., Jones S., Brückmann G., El-Ajou W., Moreira, E., Oltra Martinez B., Krause R., Multerer M., Stadelmann I. 2025. Ensured Energy – A simulation game to elicit preferences around Swiss energy transition pathways, under review

From Game to Deliberation: MCDA Workshops

transforming outputs into choices; stakeholders see how their priorities shape the energy system

- Reduce scenario complexity to a few key indicators

- Enable narrative co-creation and expose trade-offs and uncertainties

- Involve multiple experts as decision-makers to assess pathways

- Provide transparent weightings of 20 criteria across 4 dimensions — economic, environmental, socio-political, and resilience

- Discuss collective responses to shocks (weather, financial, societal, etc.)

- Turn model results into structured, value-based dialogue for policy insight

Siskos E., et al. A A multicriteria Group Decision Making framework for the evaluation of the sustainability and resilience of the long-term Swiss energy pathways. EURO Working Group 11-13 September, Polad

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Environmental Criteria

- Please vote your three most important environmental criteria, for the evaluation of the SURE long-term pathways for Switzerland, 1st, 2nd and 3rd, respectively.
- The ballot is valid only when ALL three choices are indicated.
- Vote using: × or +

Criteria	1st	2nd	3rd
E_1 - Impacts on ecosystems	☐	☐	☐
E_2 - Minerals depletion	☐	☐	☐
E_4 - Net use of fresh water	☐	☐	☐
E_5 - Natural land occupation	☐	☐	☐
E_8 - Greenhouse gas emissions	☐	☐	☐

Example shocks discussed collectively

Societal change | Cold spell | Financial shock | Nuclear power re-introduction | Heat wave

Two phases of preference elicitation

Voting phase: participants select their top-three criteria → aggregated to show transparent weightings

Criteria Weights across all participants in the SURE MCDA workshop

Legend:
- Economic Crriteria
- Environmental Criteria
- Sociopolitical Criteria
- Resilience Criteria

Group decision phase: participants, in groups, rank shocks by how strongly they threaten pathways
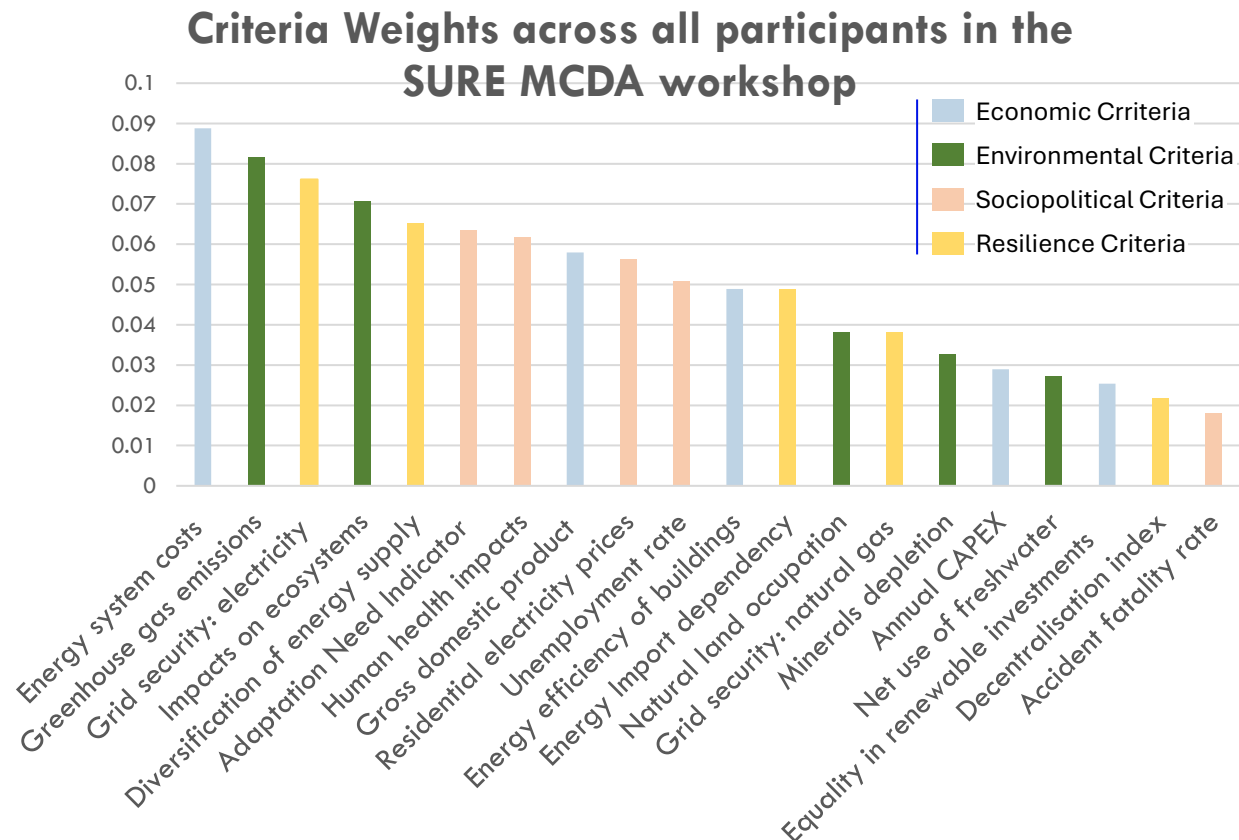
	Sh_0	Sh_1	Sh_2	Sh_3	Sh_4	Sh_5
P_1	0.65	-0.13	0.24			
P_2	0.73	0.35	..	-0.03	..	-0.75
P_3	0.48	..		..	-0.47	
P_4	0.62	0.21	..	..		..

The preferred pathway is selected, using **decision criteria** (minimax, min-max regret, La Place, etc.).
For example:

"Which pathway performs best on average?"
"Which pathway is most robust across shocks?"
"Which pathway performs best, under the worst shock?"

Engaging Local Communities
link model outputs to daily realities: jobs, affordability, ...

- Stakeholders differ in socioeconomic backgrounds and scenario understanding

- PSI applies the MUSA framework to assess technology and policy acceptance or satisfaction

- Tested in 5 European sites→ satisfaction with nearby wind turbines

- Local priorities differ: environmental concerns vs economic, societal and individual benefits

- Visitors and tourists show the lowest wind acceptance

- Acceptance is also shaped by exposure to wind farms, national politics, and household energy costs

- MUSA reveals value gaps and consensus levers

Ennstal (44)
Viana do Castelo (65)
Torres Vedras (50)
Evia (80)
Pantelleria (79)

Public discourse shows how local sensitivities shape perceptions

Turbine 'torture' for Greek islanders as wind farms proliferate

Agii Apostoli (Greece) (AFP) – **Until a few years ago, Agii Apostoli was** seaside village on the eastern coast of Evia, drawing a modest incom and fishing.

MUlticriteria Satisfaction Analysis (MUSA)
*moving beyond single «headline satisfaction scores» to reveal what really matters*

- Standard surveys only give overall satisfaction/acceptance

  (headline score = one number showing how satisfied people say they are)

- They don't explain why people feel that way

- MUSA uses non-linear satisfaction functions

- Identifies what matters most (e.g. environment, visuals, economics)

- Segments findings by location and stakeholder group

- Reveals what to improve, where, and for whom

- Enables socially grounded and fair technology deployment or policy acceptance

MUSA enriches standard survey with MCDA logic
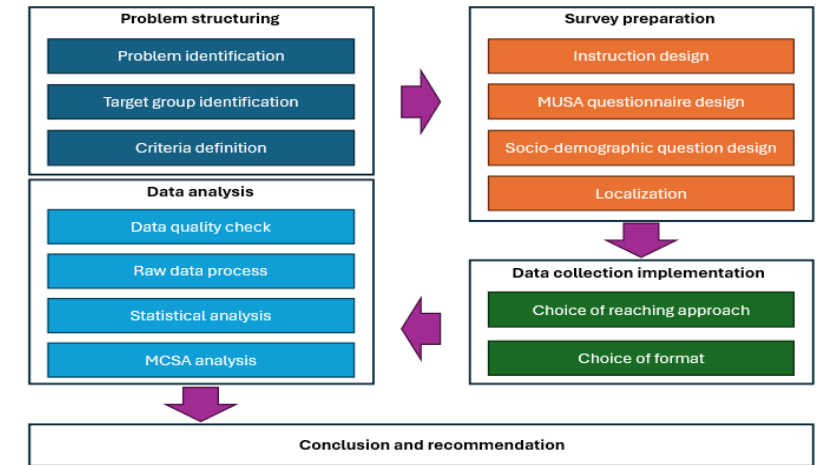
Multi-criteria satisfaction analysis guideline
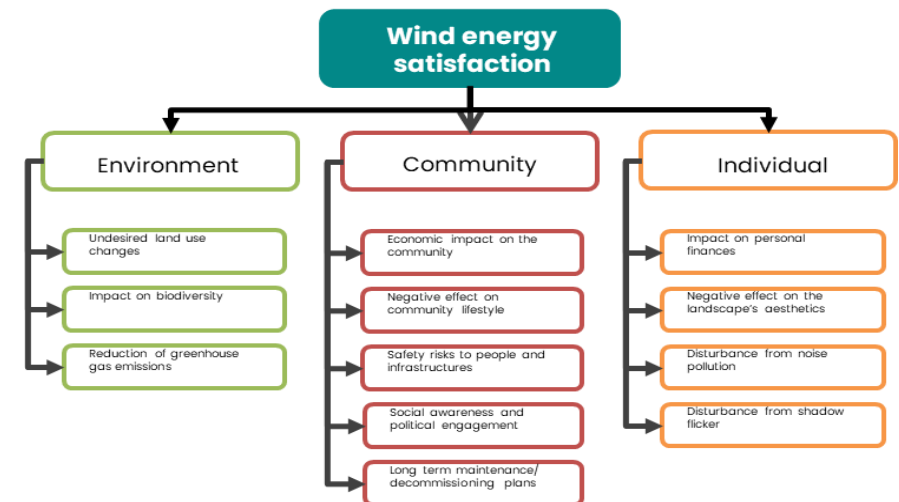
Criteria tree defined for MUSA in WIMBY project

Stakeholder Forum: From Dialogue to Shared Ownership
maintaining credibility and openess

- Bring together modellers, policymakers, business, and civil society

- Turn technical insights into policy-relevant messages

- Debate trade-offs, fairness, and feasibility of pathways

- Jointly interpret scenario results

- Build trust and alignment across institutions

- Co-shape adaptive policy pathways and research priorities

Other SURE Engagement Activities:

- "**7 Difference**" Flyer: quiz to spark dialogue on energy and sustainability

- "**Musical Chairs as Commons**": participatory game on resource competition and cooperation

- "**Policy Document**": an interactive, co-created output linking SURE's impact model with stakeholder insights

PSI Centers for Nuclear Engineering and Sciences & Energy and Environmental Sciences 10.11.2025

Bringing It All Together: The Scenario Communication Toolbox

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Tool	Function	Outcome
▪ Serious Game	▪ Immersion & learning	▪ Public engagement; makes scenarios tangible; fosters informed dialogue and awareness of system complexity
▪ MCDA Workshops	▪ Structured reflection	▪ Surfaces biases and priorities; increases transparency; builds ownership & trust
▪ Perception Surveys	▪ Map trust & expectations of modellers and users	▪ Exposes expectation and trust gaps; clarifies interpretation; supports accessible and targeted framing
▪ MUSA framework	▪ Satisfaction analysis	▪ Reveals local acceptance drivers; connects scenarios to lived experiences
▪ Stakeholder forums	▪ Co-creation spaces translating findings into policy guidance	▪ Amplify reach, built shared narratives across sectors; strengthen political support for transition pathways

These tools help move from models to meaning – building shared understanding, trust and ownership of the scenarios
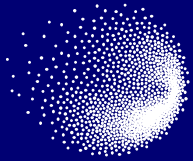
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