



Communicating and responding to uncertainties in scenarios

Adaptability and Policy Orientation

Bonn, September 2024

Uncertainties in Long-Term Energy Scenarios (LTES)

Managing uncertainties in long-term energy scenarios is a complex but crucial challenge for effective energy policymaking. Energy transition, fossil fuel price volatility, technological advances and climate change are just some of the factors that add uncertainty to long-term energy planning.

Why is it important to manage uncertainty?

Greater robustness of decisions: By considering a wide range of possible futures, energy policies can be designed to be more resilient to external conditions.

Avoiding misguided investments:

Planning that does not take uncertainty into account can lead to investments in technologies or infrastructure that become obsolete or technically or economically inefficient.

Maximizing the benefits of the energy transition:

Proper management of uncertainty can help identify the opportunities and risks associated with the energy transition, allowing decisions to be made that maximize long-term benefits.





Translating Uncertainty into Viable Policy Frameworks.

To translate uncertainties into viable policy frameworks, it is necessary to:

Set clear but flexible objectives: Energy objectives must be clear and measurable, but also flexible enough to adapt to a changing environment.

Promote innovation and flexibility: It is essential to encourage research and development of new technologies, as well as to create regulatory frameworks that allow rapid adaptation to new market conditions.

Involve stakeholders: Stakeholder participation is crucial in the creation of energy scenarios, as it ensures that the perspectives and needs of all relevant actors are considered.

Strengthen international cooperation: The energy transition is a global challenge that requires the cooperation of all countries and must be considered in energy policies. Policy frameworks must be designed taking into account the interconnections between national energy systems.

Incorporate uncertainty into decision-making: Decision-makers must be aware of uncertainty and use available tools to assess risks and opportunities.las oportunidades.





Applied Methodology in El Salvador





An uncertainty factor: it is a variable, economic, social, environmental, regulatory, political, hypothesis whose evolution in the future has a relevant degree of uncertainty and impact on energy planning, and will be modified in each scenario. Examples: creation of an industrial hub, construction of a national train line, electric mobility, green hydrogen, etc.

Input scenario: the evolution narrative of each uncertainty factor is defined

Case of El Salvador: Mathematical models that describe each energy chain, with approaches according to the level of aggregation required (bottom-up or top-down) and tools that represent the complexity of the energy system in an organized way, in addition to research, studies, and multidisciplinary inputs.

Optimizing electrical demand (GWh)

El Salvador example case: One scenario including nuclear energy to supply electricity for government infrastructure projects

This scenario derived in the governmental decision to explore a Nuclear Power Plan Program with support from the IAEA.



- 1. Future projects (final and candidate)
- 2. Evolution of fuel prices (Fuel Oil, Diesel, Brent, LNG, Henry Hub, uranium, etc.)
- 3. Imports and exports
- 4. Maintenance
- 5. Energy storage
- 6. Geographic locations of projects

Optimizing electrical demand (GWh)



García, J.J. and Urrutia. A (2022) Prospectiva Energética - Unpublished Results

Conclusions



Energy scenarios play a crucial role in generating political support and decision-making, providing a clear, evidence-based framework for understanding future energy needs and opportunities.

Well-informed politicians:

- Data-driven decisions.
- More tools for risk management

Economic planning:

- Investment targeting
- Resource allocation

International cooperation engagement

- Capacity building
- Financing opportunity

Stakeholder engagement:

Increase possibility to have consensus between the public, private and general population sectors.









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