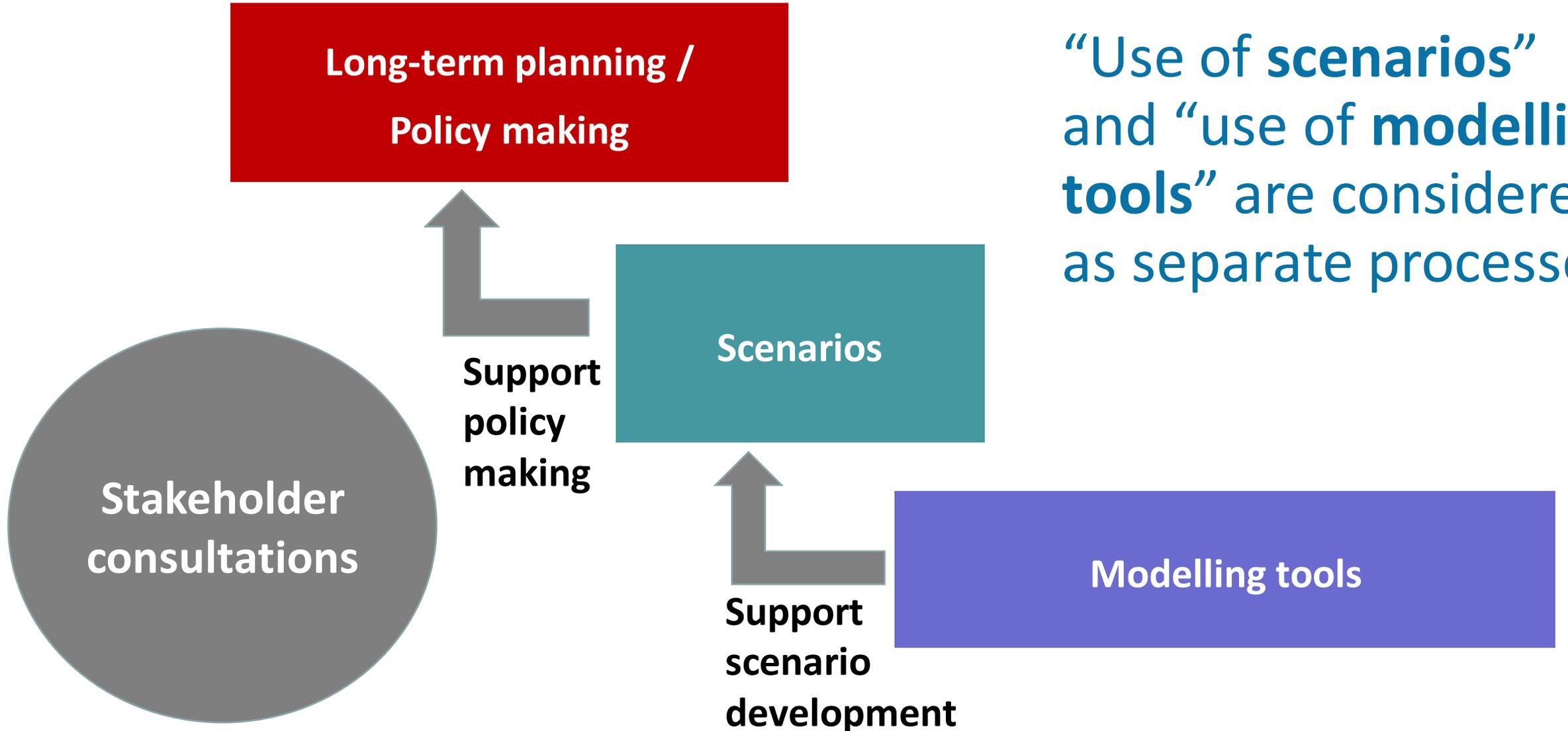


# Long-term energy scenarios for the clean energy transition

Asami Miketa, Senior Programme Officer  
IRENA Innovation Technology Center

Central Asia workshop: Long-term Capacity Expansion Planning with a High Share of Renewables  
13- 14 March, 2019, Astana

# How scenarios are used and developed



“Use of **scenarios**” and “use of **modelling tools**” are considered as separate processes

## Goal: Integrate renewables in the main stream of the energy planning

### Use of scenarios for policy making

- REmap transition scenarios to raise the RE ambition

### Development of scenarios for clean energy transition

- Addressing variable renewable in long-term planning
- REmap framework for end-use sector assessment
- Flexibility assessment

### Building and enhancing capacity

- Energy planning capacity building programme
- Capacity building framework discussions

# A campaign under the CEM

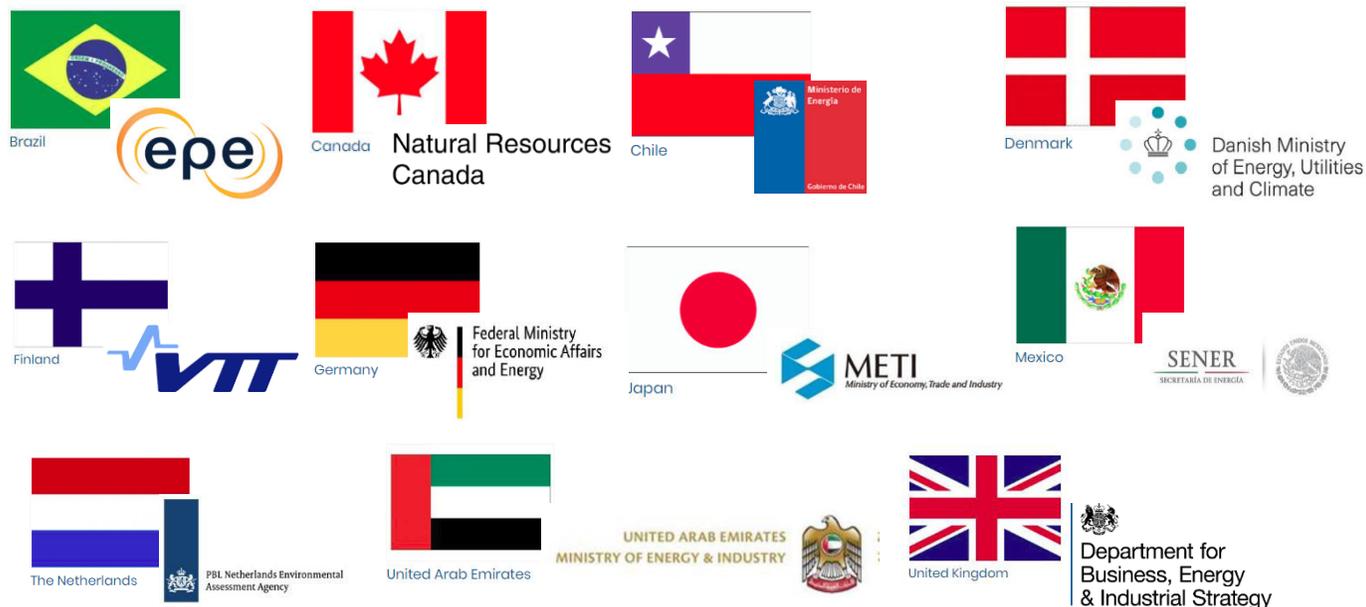
In 2018, Germany and Denmark proposed to launch a campaign to **promote the wider adoption and improved use of long-term energy scenarios for clean energy transition** to the members of Clean Energy Ministerial (CEM)

- CEM: A partnership of 26 countries
- Annual high-level Ministerial meeting
- Time-bound **campaigns** to raise ambition or increase visibility of topics of potential impacts



Long-term Energy Scenarios (LTES) for the Clean Energy Transition campaign was launched in 2018 May

## 11 Member countries



## 7 Technical partners



LTES Campaign is to be supplemented by IRENA's global platform - Energy Transition Scenarios Network (ETS-Net) to be launched in April 2019 at the LTES International Forum in Berlin

## Dedicated campaign events

Brazil LTES Workshop – February 2019  
Campaign Partner Forum – April 2019  
CEM Ministerial Meeting – May 2019

## Webinar series

Bi-weekly webinar series since  
November 2018  
500+ Registrants



## Campaign related events

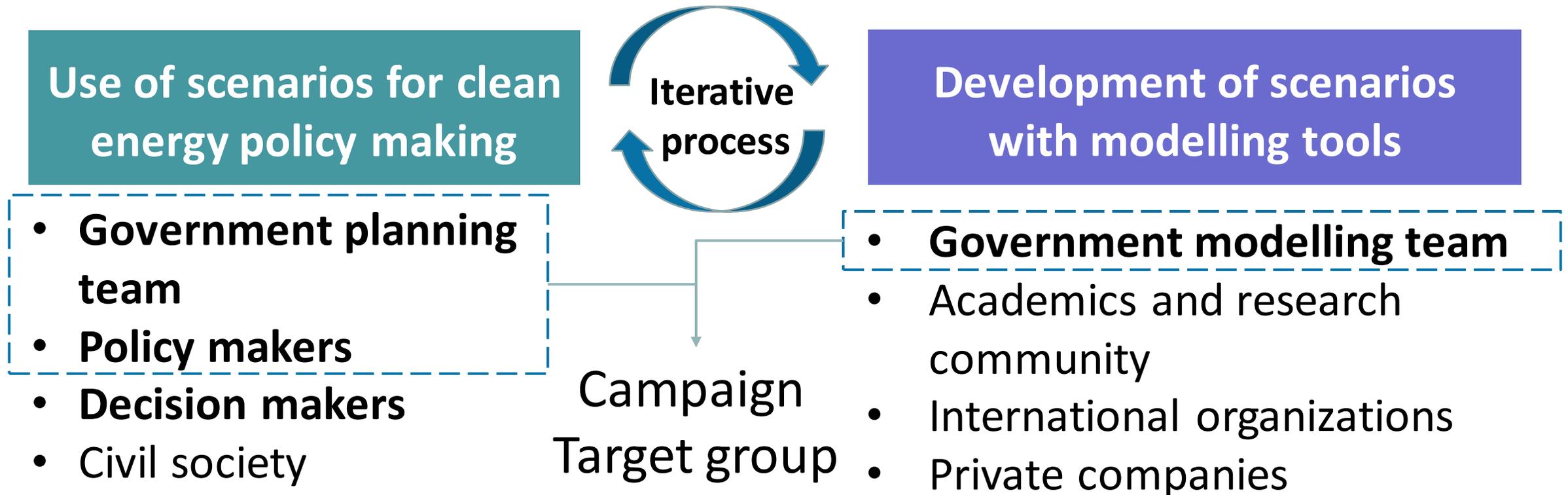
8 workshops/events in energy  
conferences in 2018

## Best Practice Report

Synthesizing over 100 topics discussed in  
the events  
(2019-2020)

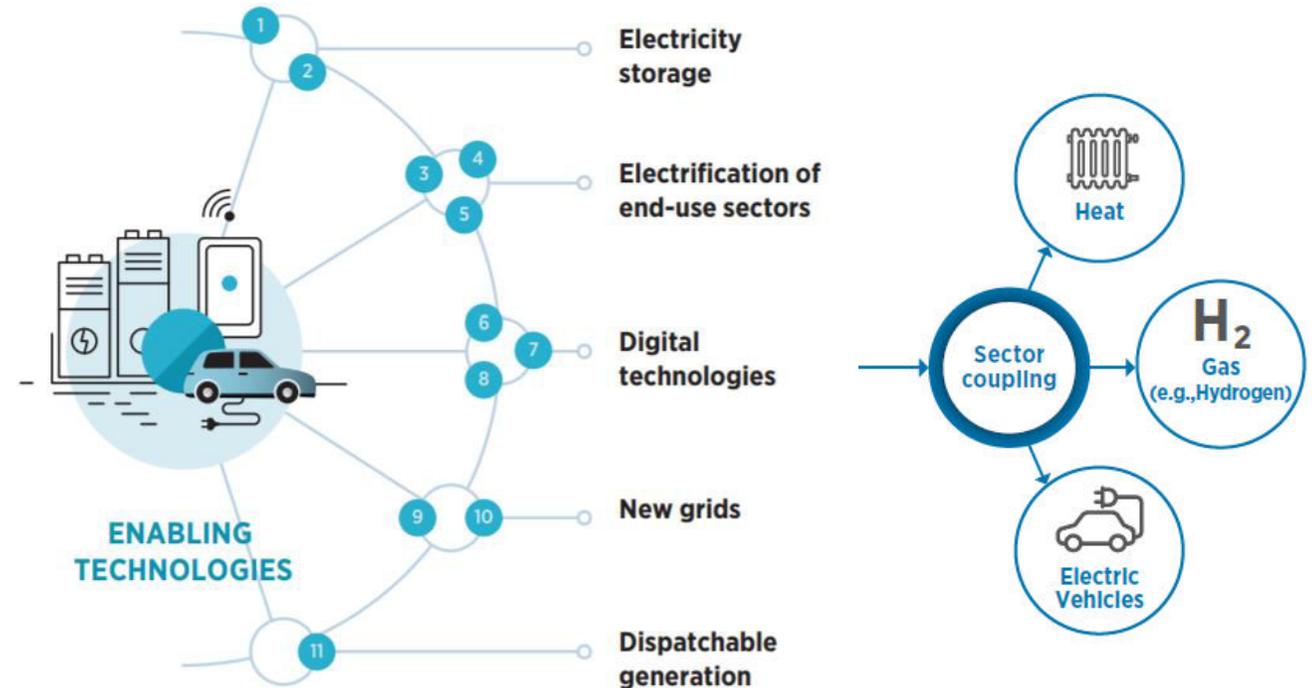


# Who use and develop scenarios



# Why long-term energy scenarios?

- » **Fundamental tool for policy making**
  - » National policy making
  - » Global policy debates / public opinion
- » **What is new?**
  - » Global decarbonization (Paris Agreement)
  - » Massive technology innovation within and around the energy sector
- » **Long-term visions for clean energy transition**
  - » Avoiding risks of making poor, short-sighted decisions.
  - » Represent transformative changes of energy systems (e.g., VRE, disruptive innovations in end-use, digitalization, etc.)



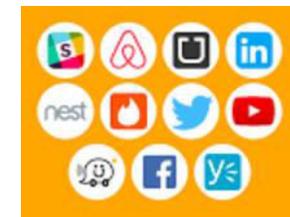
Artificial intelligence



Blockchain



Platform business model



IoT



Summary from “*Planning renewable energy strategies: Africa power sector, Achievements and way forward*”, Abu Dhabi January 2015



## **Long-term energy planning, if done properly,**

- » Creates consensus among stakeholders
- » Can help to avoid costly investment mistakes
- » Reduces uncertainties in policy directions/project selection
- » Sends investors signals on types & quantity of investment needs
- » Accelerate service delivery

# Latin American context

Summary from ““*Exchanging best practices to incorporate variable renewable energy into long-term energy/power sector planning in South America*”



**Colombia:**  
Basis for policy making, establishing **signals for investment** and capacity expansion needs

**Brazil:**  
To be used as a **basis for formulating public policies**

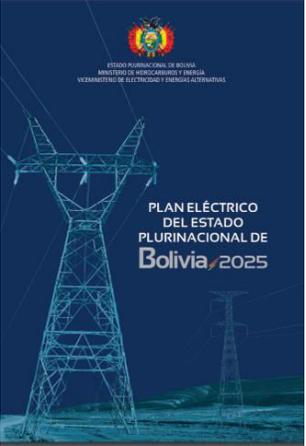
**Uruguay:**  
To design policies to support technologies to promote and **investment needs**

**Argentina:**  
To establish a framework of discussion for the **design of new policies** and for the **discussion with actors of the sector**.

# Planning reports from governments in LATAM



Argentina



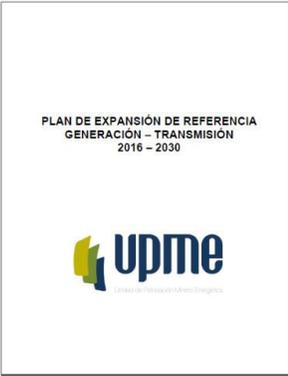
Bolivia



Brazil



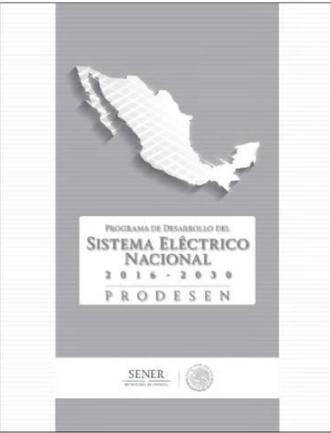
Chile



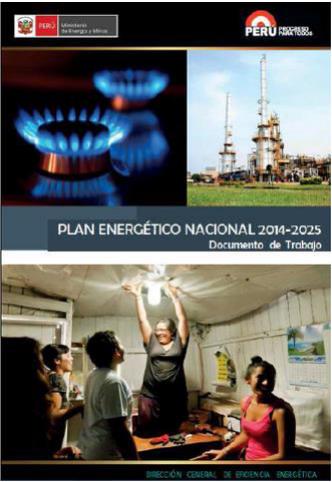
Colombia



Ecuador



Mexico



Peru



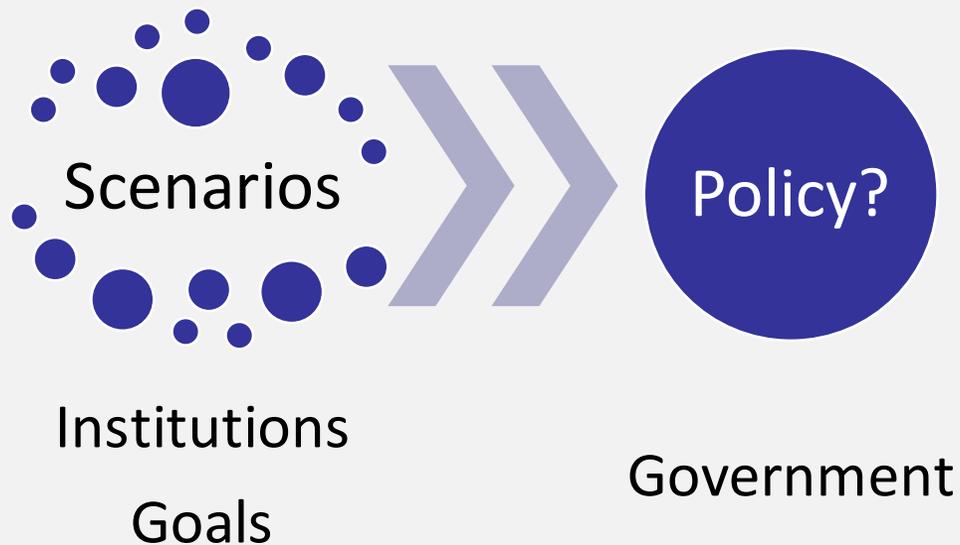
Paraguay

# Planning scopes in LATAM

Country	Scope	Planning horizon	Update
Argentina	Energy	2025	Annual
Bolivia	Electricity	2025	NA
Brazil	Energy	2050	5 -10 years
Chile	Energy	2046	5 years
Colombia	Electricity	15 years	Annual
Ecuador	Electricity	2025	2 years
Mexico	Electricity	15 years	Annual
Paraguay	Energy / electricity	2040 / 2025	5 / 2 years
Peru	Energy	10 years	2 years
Uruguay	Energy / Electricity	2035 / 2040	Annual

# Use of scenarios for policy making

**How to use the multiplicity of scenarios in the context of the clean energy transition?**



**Good practices:**

1. Improved credibility through participatory process
2. Communication to policy makers: transparency, inter-comparability and diversity of assumptions.
3. Consensus building vs. full range of exploratory scenarios for policy making

## Communication - Ministry of Energy Chile

Issue

- Clarity of energy scenario assumptions and methodology for the design of actual policies.

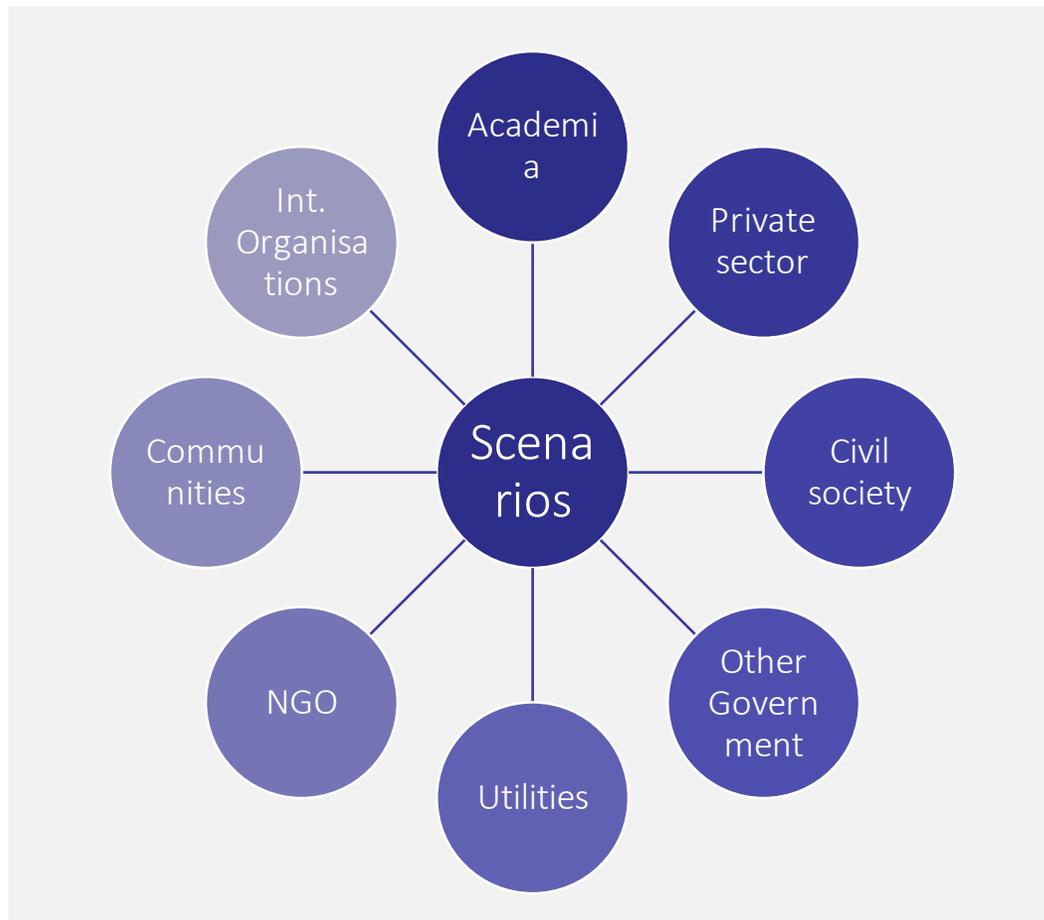
Good practice

- Scenarios have to be part of a compelling social and political narrative that is clearly communicated to policy makers and other users.



Ministry of Energy of Chile has a dedicated ‘energy scenario committee’. Details of activities and applied methodologies for long-term energy scenario building can be found easily online.

## Multi-stakeholder participatory processes for scenarios



### Future energy scenarios – National Grid



Engaged with over **650 stakeholders** in the public, private and academia sectors.

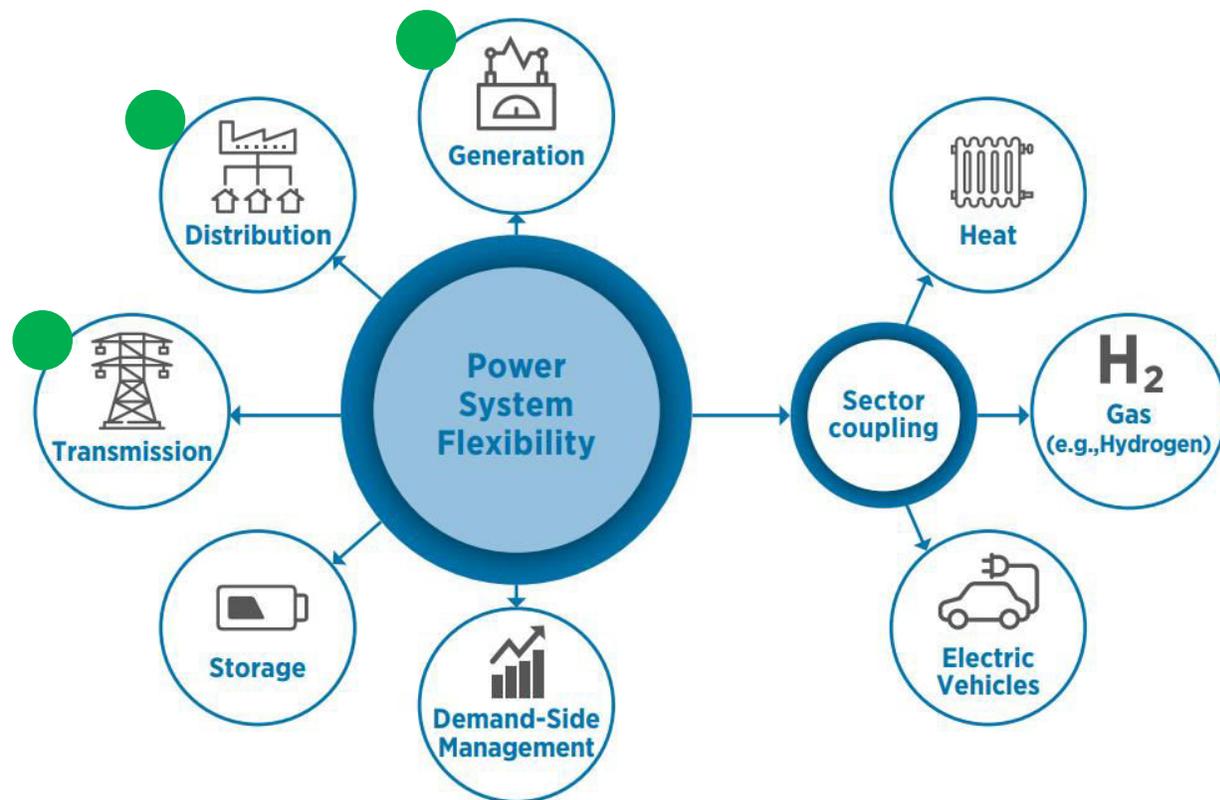
### Consultation on scenario framework - Bundesnetzagentur



Engaged with over **1500 stakeholders** to define scenarios of network expansion.

# Development of scenarios for clean energy transition

What are the main methodological issues in modelling long-term energy scenarios?

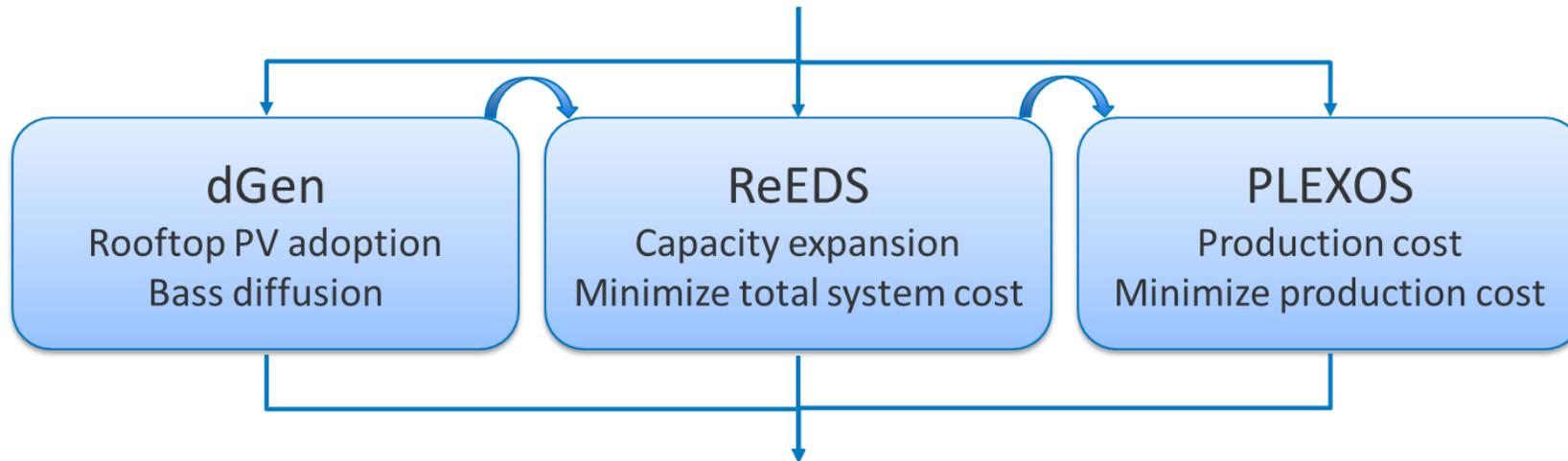


Identified challenges:

1. Forced caps for VRE – low geospatial and time resolution
2. Representation of the full spectrum of renewable options and sector coupling alternatives.
  - Too optimistic for CCS and pessimistic about high shares of VRE.
3. Disruptive innovations and exogenous drivers – non-energy actors influence on the energy sector.
  - “2<sup>nd</sup> phase of renewables” (Autonomous driving, end-use electrification, etc.)
  - Changing environment – consumer behavior

## Use of right tools – NREL USA

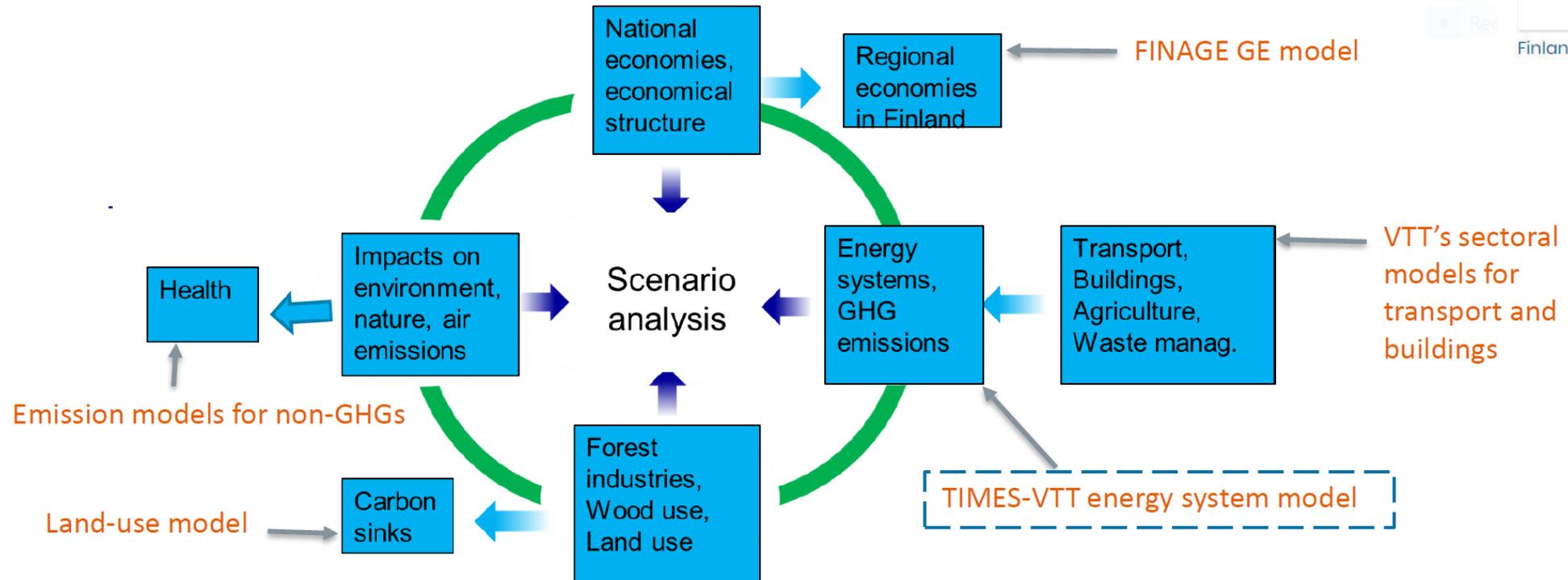
42 Scenarios Definitions



2018 Standard Scenario Results

- Some questions do not need sophisticated tools
- Different tools are good at different things
- Often best tool is a combination of existing tools rather than the creation of a new tool

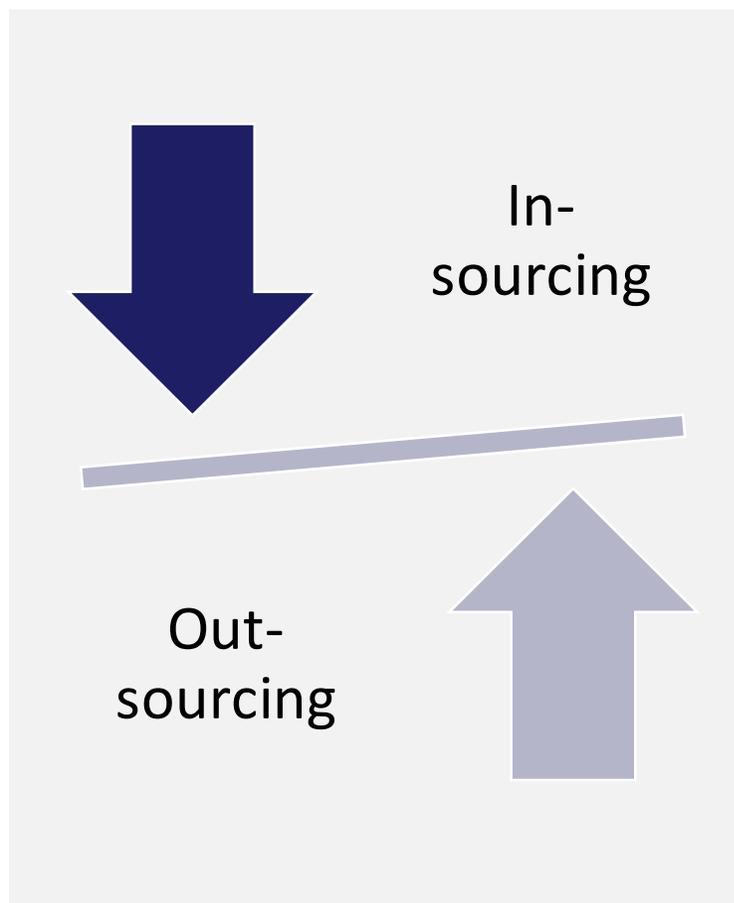
## Multi-model framework for policy impact – VTT Finland



Five research organizations, 20-40 researchers, more than 10 models to analyze the impacts of the 2030 policies in Finland's national economy, energy economy, use of natural resources, emissions, health, ....

# Approaches to capacity enhancement

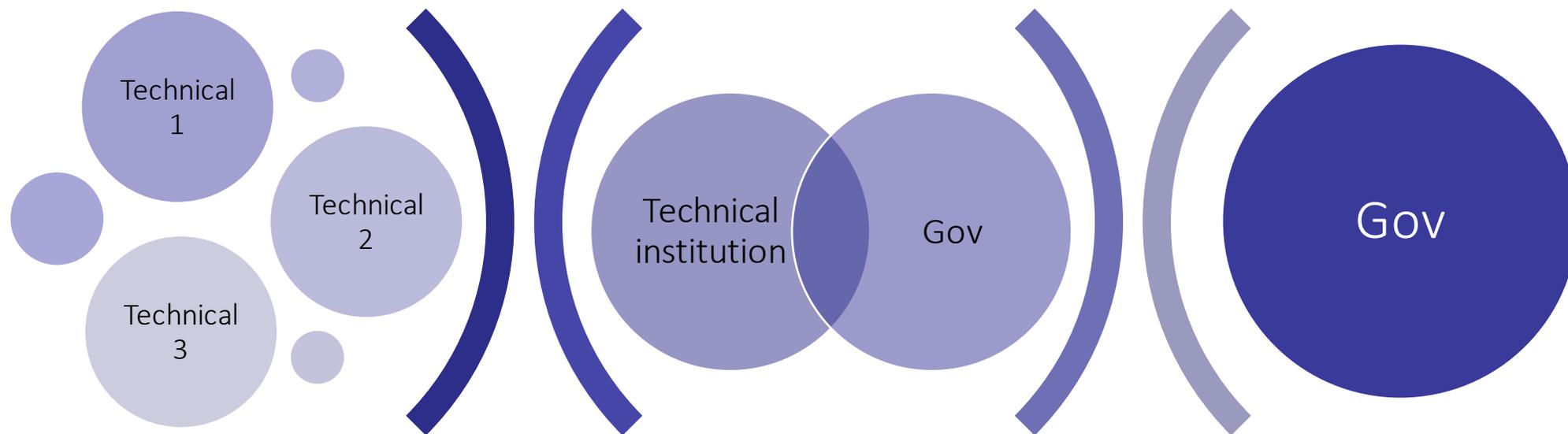
How and where should capacity be built for effective scenario planning?



Good practices:

1. Allocation of scenario planning vs modeling capacity
  - Government, technical institutions, consultants, academia
  - Dedicated or competition base
2. Type of capacity to be built within the government
  - Modelling or understanding models
  - Quantitative and/or qualitative
3. Ownership of tools
  - Open source vs. paid

## Various ways of managing scenario capacity in different countries



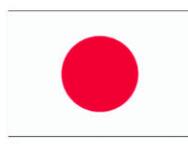
100% out-sourcing

50/50

100% in-sourcing



Germany



Japan



Finland



The Netherlands



Denmark



Brazil



Chile



United Kingdom



Canada



Mexico



United Arab Emirates

Objective: (1) exchange **best practices** in long-term energy planning with VRE and (2) identify **possible gaps**

- What is the scope of “Long-term energy planning”
- Why discuss planning gaps?
- Key planning considerations for VRE integration in the long-term planning

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