AVRIL "Addressing Variable Renewables in Long Term Planning" Project Context and Aim

Consultation with Stakeholders

- IEW 2014, 2015
- AVRIL expert meeting, March 2015
- Interviews

Policy makers

Energy planning officials

System operators

"Deploying variable renewables (VRE) is beneficial."

"Our country should adopt ambitious long-term VRE targets."
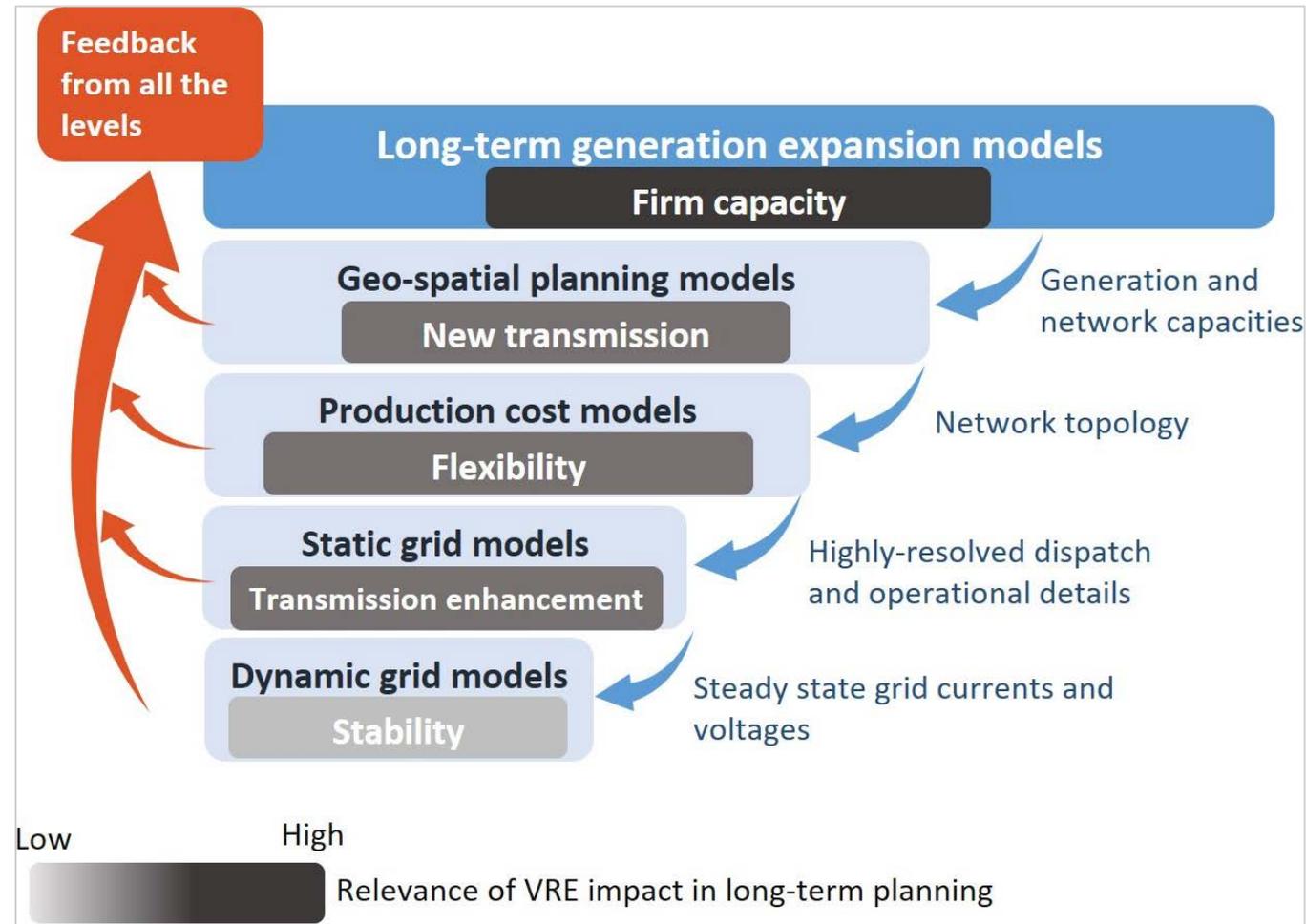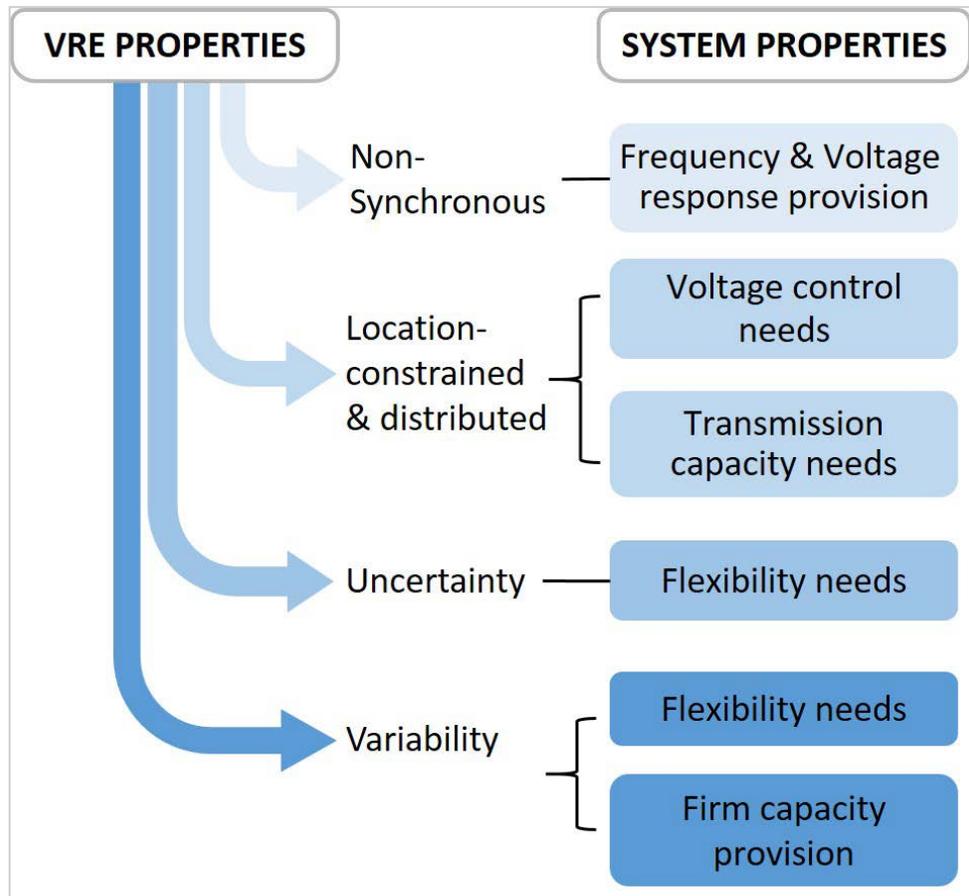
"VRE's short-term variability endangers power system reliability"

"There is an upper limit of X% VRE"

AVRIL 2017 Publication: How can we evaluate impacts of variability? Are we using right tools?

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AVRIL 2017 Report: Addressing Decision Makers

VREs have unique characteristics that have economic implications for power systems

Better Coordination is required in planning
Some implications have near term relevance
All implications become relevant at high VRE penetrations

AVRIL 2017 Report: Addressing the Planning Practitioners

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Impact Modeling | **Parametric assumptions** | **Country application examples** | **Data sources and tools** | **Pre-processing Methodologies**

Planning impact addressed	Solutions	Complexity of implementation
All	Increasing temporal and spatial resolution (Section 4.2)	Low
Firm capacity	Better calibration of time slice using VRE generation data (Section 5.1)	Low
Firm capacity	Incorporating capacity credit (Section 5.2)	Low
Flexibility	Incorporating constraints on flexibility provision (Section 6.1)	Low
Flexibility	Validating flexibility balance in a system (Section 6.2)	High
Flexibility	Coupling with production cost models (Section 6.3)	High
Transmission capacity	Linking investment needs with VRE expansion (Section 7.1)	Low
Transmission capacity	Site-specific representation of generation and transmission needs (Section 7.2)	Low
Stability constraints	Representing stability constraints (Chapter 8)	High

← Low   High →

AVRIL Regional Workshops

2017 – Buenos Aires, Argentina – LATAM

- Co-organised by IRENA and Argentina's Ministry of Energy and Mining; with representatives from NREL, OLADE, and the World Bank
- Representatives from **ten Latin American countries - Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay**

2019 – Astana, Kazakhstan – Central Asia

- Co-organised by IRENA and Ministry of Energy of Kazakhstan; with representatives from ADB, USAID, EBRD, UNECE, UNDP
- Representatives from **five Central Asia countries - Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan**

2019 – Amman, Jordan – Arab region

- Co-organised by IRENA, League of Arab States, IsDB and RECREEE
- Representatives from **ten Arab countries - Algeria, Bahrain, Egypt, Iraq, Jordan, Libya, Palestine, Qatar, Saudi Arabia, and Somalia**

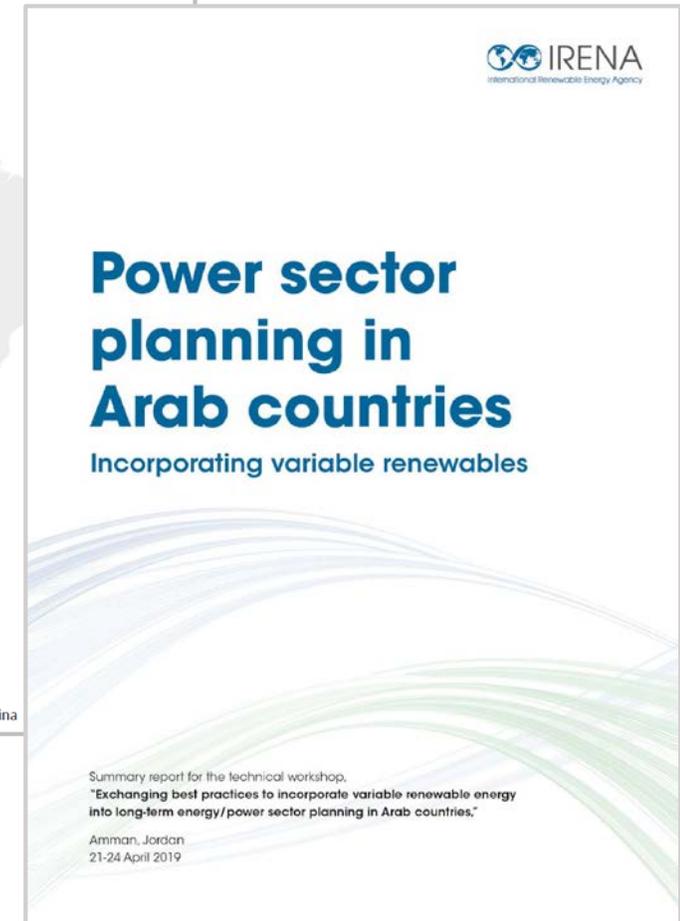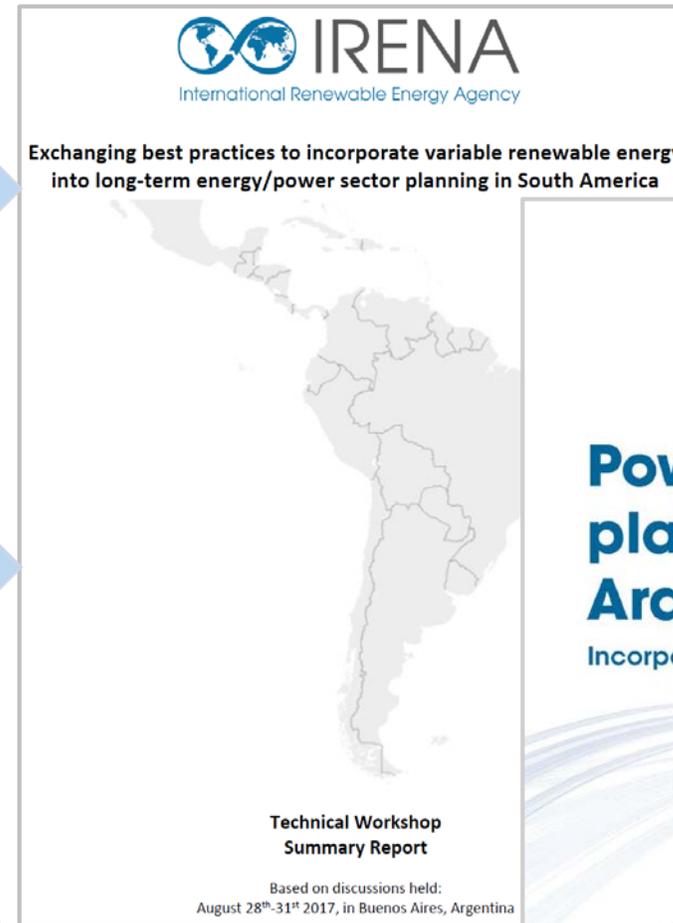# AVRIL Regional Workshop Findings

Country Profiles

» Planning Framework
» VRE representation approaches
» Known Challenges

Country Surveys

• Tool sets
• Improvement Priorities

Regional Synthesis

• Regional front runners
• Benchmarking to global front runners
• Future follow-up areas

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Exchanging best practices to incorporate variable renewable energy into long-term energy/power sector planning in South America

Technical Workshop Summary Report

Based on discussions held:
August 28th-31st 2017, in Buenos Aires, Argentina

Power sector planning in Arab countries

Incorporating variable renewables

Summary report for the technical workshop,
"Exchanging best practices to incorporate variable renewable energy into long-term energy/power sector planning in Arab countries,"

Amman, Jordan
21-24 April 2019

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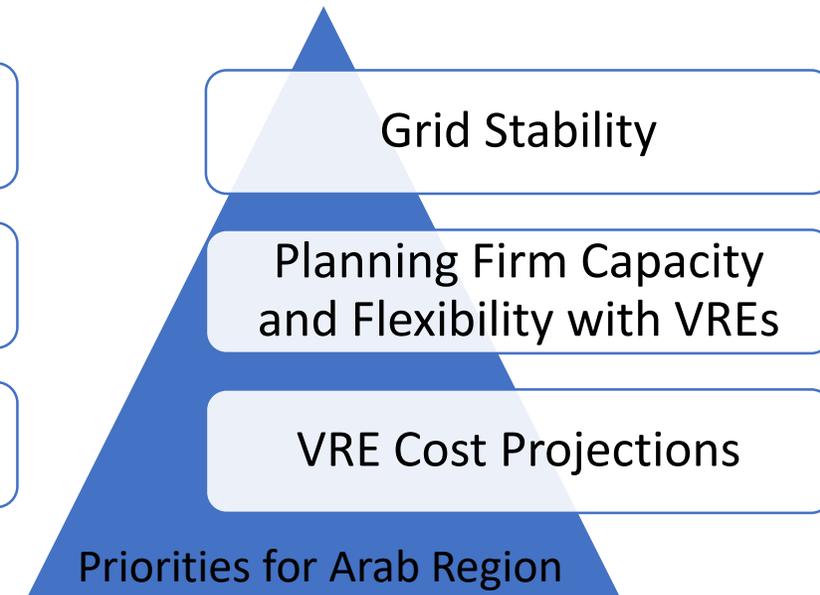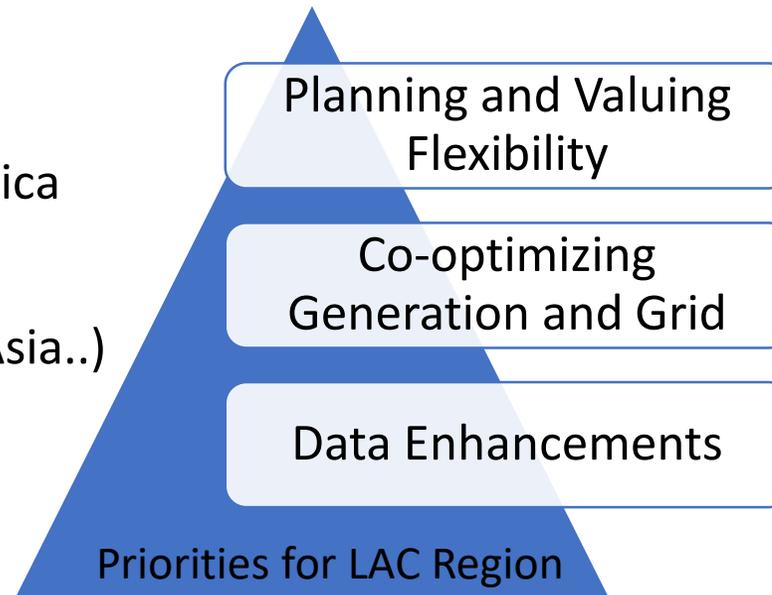
AVRIL Project: Ongoing Work

AVRIL Updates

- IRENA expert workshop: Addressing Geospatial aspects of VREs in long term planning, 12-13th December, Bonn-Germany

- AVRIL spinoff report on geospatial modeling aspects

- Future Thematic Areas under radar:

    - Modeling high VRE penetration with demand side innovations

    - Handling VRE stochastics

AVRIL Regional Follow-up Workshops

- Follow-up workshops for Latin America and Arab Regions

- Other Regions (Central Asia, South Asia..)

Planning and Valuing Flexibility

Co-optimizing Generation and Grid

Data Enhancements

Priorities for LAC Region

Grid Stability

Planning Firm Capacity and Flexibility with VREs

VRE Cost Projections

Priorities for Arab Region

Promote effective use of Long-term Energy Scenarios (LTES) for the clean energy transition

LTES Network
IRENA Long-term Energy Scenario Network

Launched April 2019

IRENA member countries and Technical institutions Partnerships with regional bodies

LTES → LONG-TERM ENERGY SCENARIOS FOR THE CLEAN ENERGY TRANSITION

Launched in May 2018

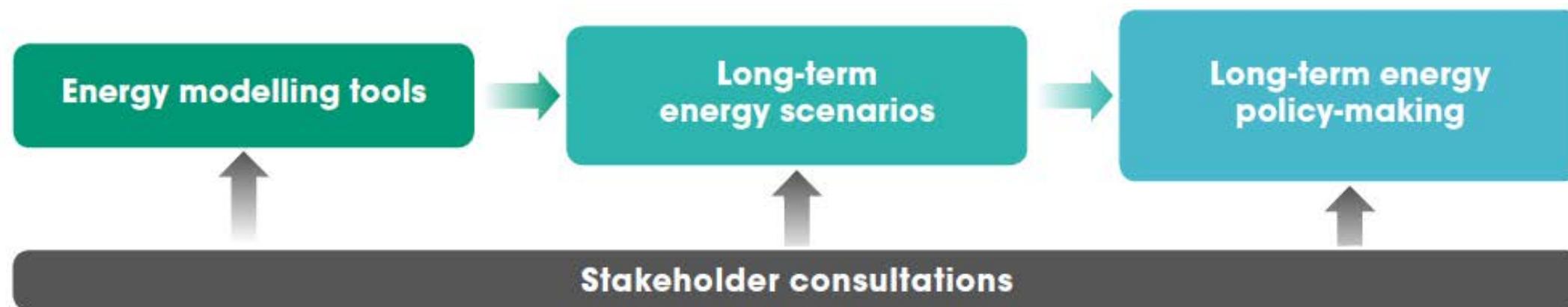### A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

12 member countries

7 Technical partners

Mental model – Scenario use and development

Focus areas

1 STRENGTHENING DEVELOPMENT

Key question:

How can scenarios be developed to better account for potentially transformational changes?

2 IMPROVING USE

Key question:

How can scenarios be better used for strategic decision-making by governments and investors?

3 BUILDING CAPACITY

Key question:

What approaches can enhance institutional capacity for scenario planning?

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Five key recommendations for improved…
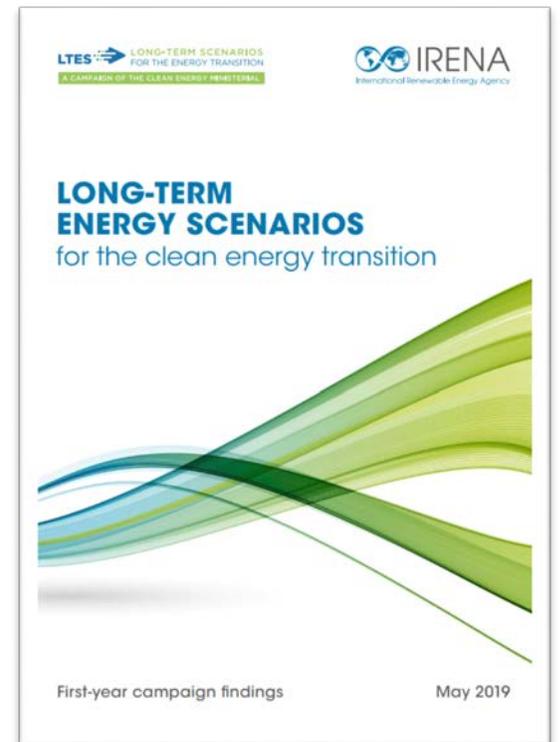
…Development of LTES

1 **Establish a strong governance structure** for the scenario development process

2 **Expand the boundaries** of the scenarios being developed

…Use of LTES

3 **Clearly convey the purpose** of the scenarios you build and use

4 **Be transparent** and explore effective scenario communication methods

…Capacity for LTES

**5** **Build the right type of scenario capacity** within governments

LTES ⟶ LONG-TERM SCENARIOS FOR THE ENERGY TRANSITION
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

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LONG-TERM ENERGY SCENARIOS
for the clean energy transition

First-year campaign findings   May 2019

May 2019

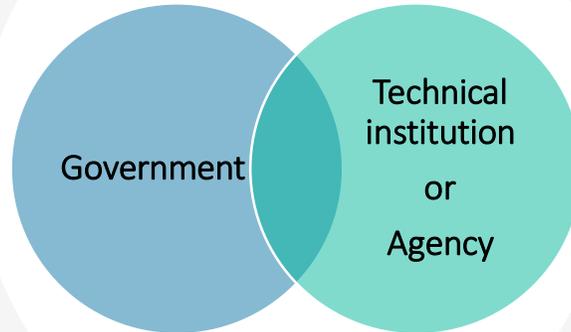# Where is scenario capacity allocated and developed?

Various ways of managing <u>national</u> scenario capacity in countries…

In-sourcing
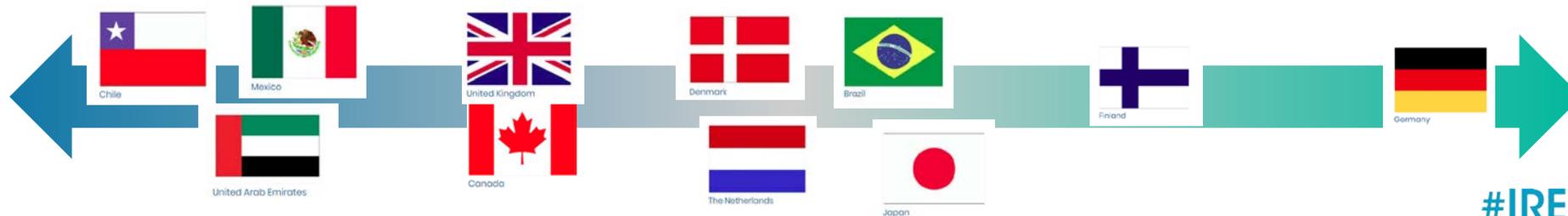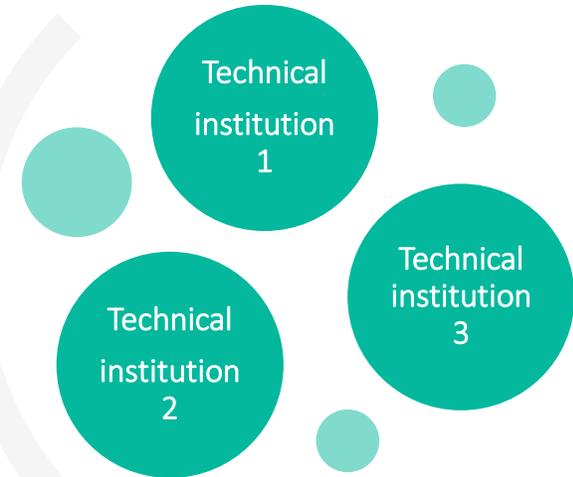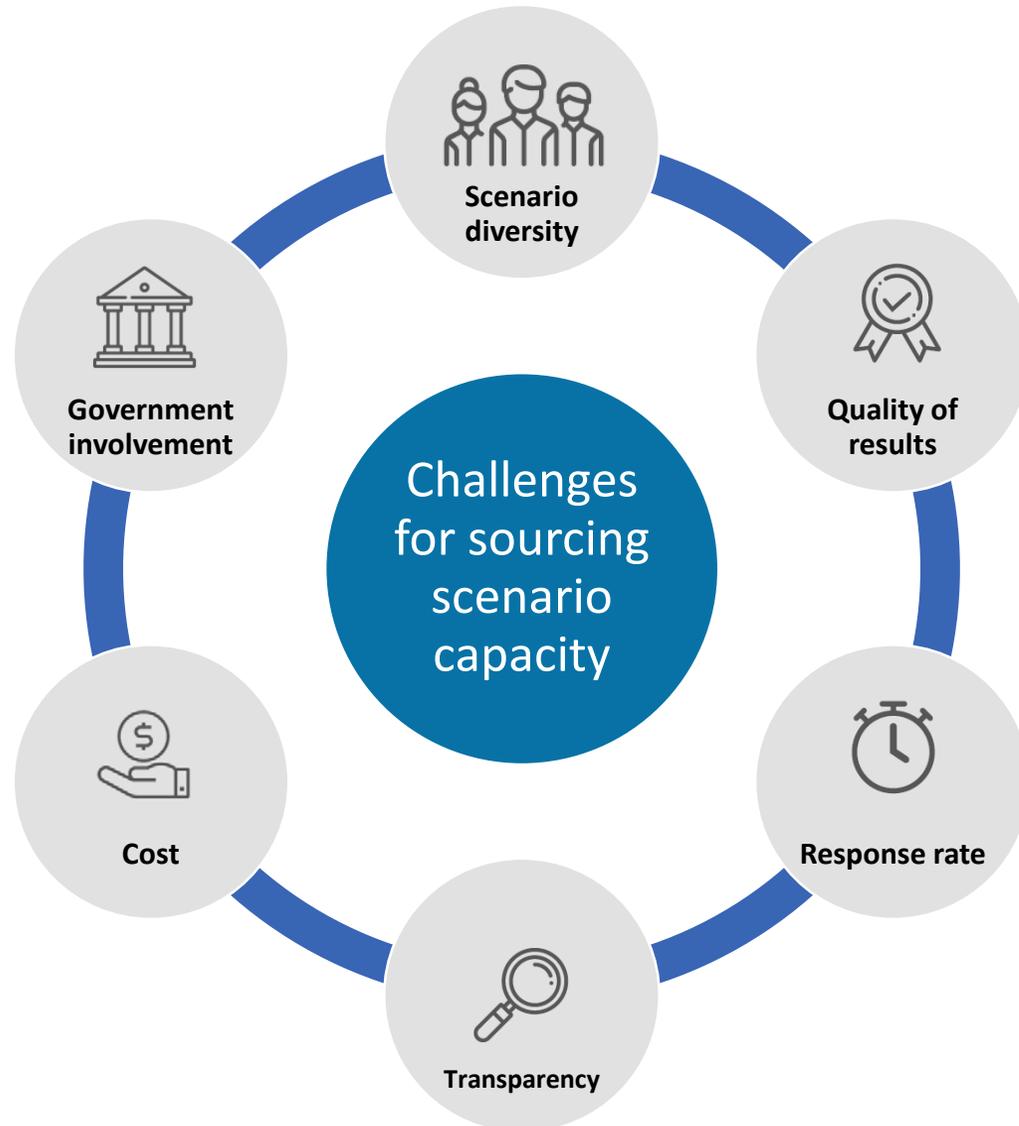**LTES capacity allocated solely within ministries or energy agencies**
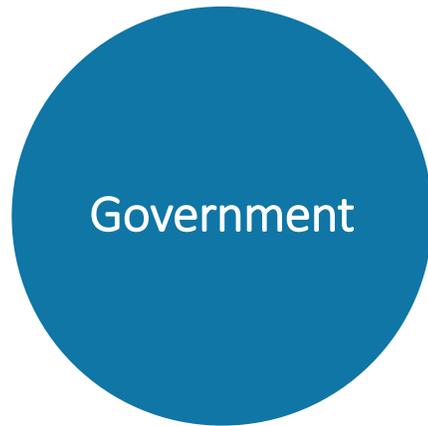
50/50

Out-sourcing
LTES capacity out-sourced to research/technical institutions or consultancies

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Key success factors – Improving LTES capacity

Challenges for sourcing scenario capacity

- Scenario diversity
- Quality of results
- Response rate
- Transparency
- Cost
- Government involvement

When it is decided to...

...In-source	...Out-source
• Quality assurance (e.g. engaging with academia)	• Absorptive capacity within a government to understand the modelling results
• Team or agency dedicated to modelling and scenario building	• Full disclosure of scenario data and modelling methodology
• Setting an institutional process for regular updates of LTES	• Access to enough high-quality research institutions

IRENA Second International Forum
Long-term Energy Scenarios for the Clean Energy Transition

International gathering of experts who are either using or developing long-term energy scenarios to support policymaking and planning for the clean energy transition

Discussion topics

- Electrification scenarios for a carbon-neutral energy system

- Incorporating economic and financial risks of the clean energy transition in LTES

- Representing systemic innovation in energy demand and consumer behaviour in LTES

- Stakeholder engagement in the LTES process for a just transition

- Exploring the global landscape of LTES narratives and assumptions

- Robust and resilient LTES building processes scenarios

2019 International LTES Forum - Berlin

25-27 March, 2020 Berlin
(back-to-back with the Berlin Energy Transition Dialogue)

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WEBINAR SERIES

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International Renewable Energy Agency

Next webinars

❑ **TUESDAY, 17 March 2020 • 10:00 – 10:30 CET**
  "Innovations for 100% renewable power: a systemic approach"

❑ **Wednesday, 1 April 2020 • 10:00 – 10:30 CET**
  "Global Renewables Outlook-IRENA's view on key technologies for the Energy Transformation to 2050"

Thank you!

innovationday@irena.org