IRENA Innovation & Technology Centre Climate Change and Energy

Bonn, 7 June 2023

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International Renewable Energy Agency

LTES
LONG-TERM ENERGY SCENARIOS

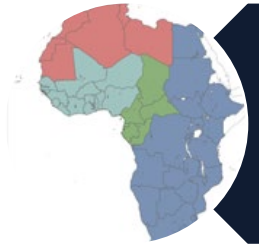
Session 1: Scenarios for the Energy Transition: Insights from the Long-Term Energy Scenario (LTES) Network

Bonn, 7 June 2023

IRENA's long term energy planning support portfolio

1. Institutional Capacity Building

National masterplan development



Regional model analysis and planning

Energy planning for NDCs

https://www.irena.org/Energy-Transition/Planning/Long-term-energy-planning-support/Capacity-building-for-energy-planning-and-modelling

2. Planning model development and applications

- SPLAT Starter model kits
- Renewable data for planning

"Planning and prospects for renewable power in Africa series" since 2012

3. IRENA LTES Network

Peer-to-peer learning

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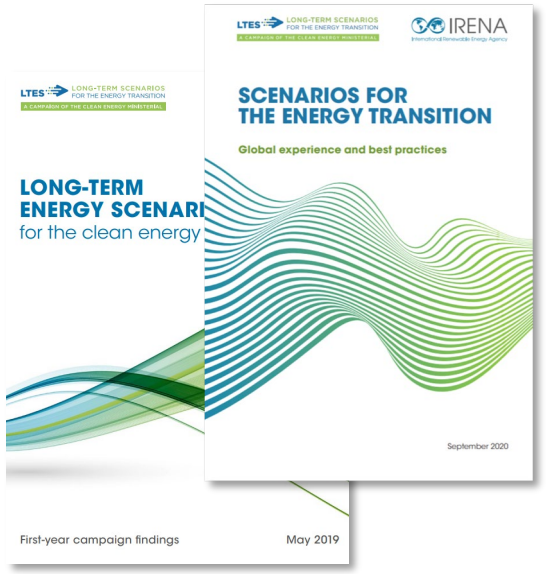
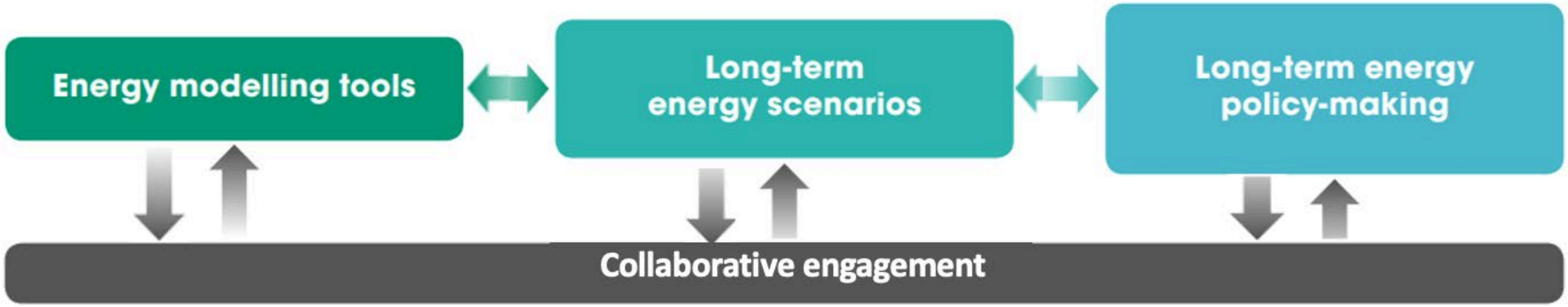


https://www.irena.org/energytransition/Energy-Transition-Scenarios-Network

Long-Term Energy Scenarios Initiative and Network

A transparent and open LTES development process is essential for the clean energy transition



Source: IRENA 2020, *Scenarios for the Energy Transition (adapted)*

Long-Term Energy Scenario (LTES) Network

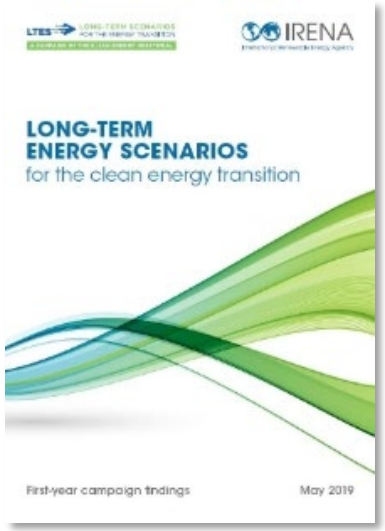
Focus

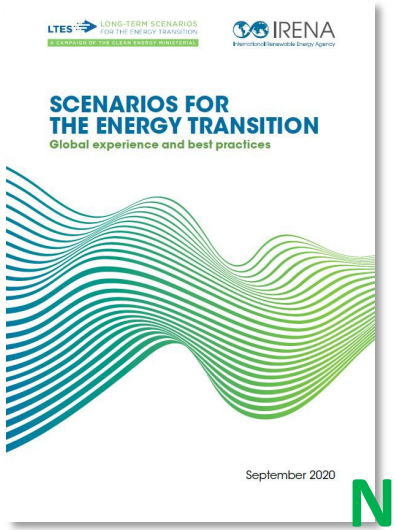
01 Strengthening scenario development

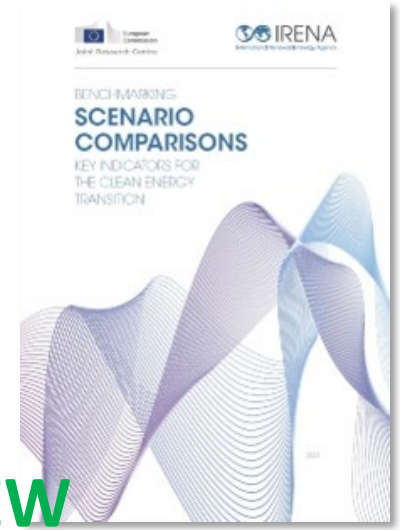
02 Improving scenario use

03 Identifying capacity-building approaches

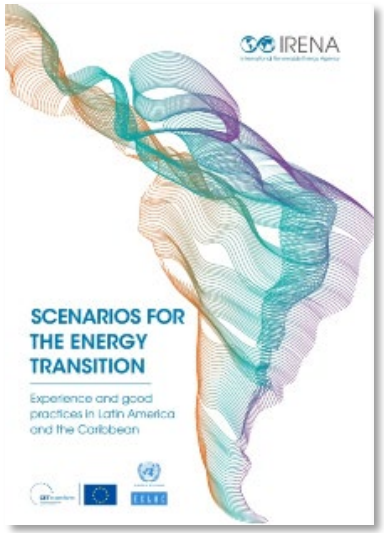
Practices and experiences collected







NEW



How are countries enhancing energy scenarios?

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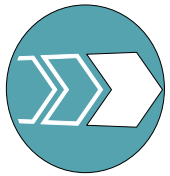
STRENGTHENING SCENARIO DEVELOPMENT

Establishing a strong governance structure

Expanding the boundaries of planning scenarios



IMPROVING SCENARIO USE

Clarifying the purpose of scenario building

Transparent and effective communication

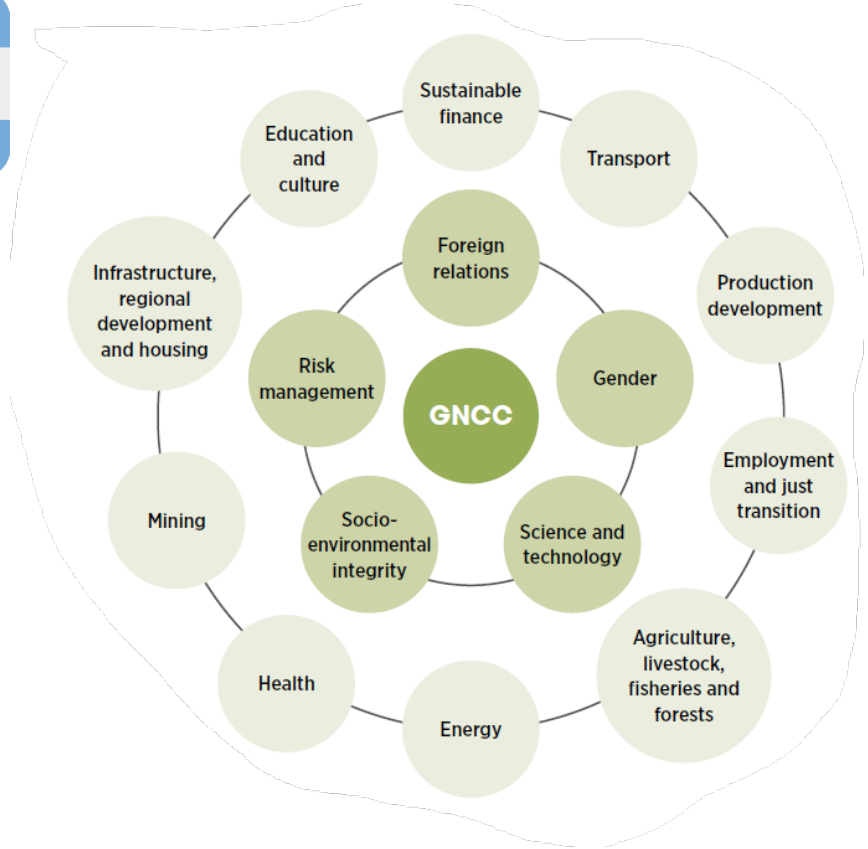
IDENTIFYING CAPACITY-BUILDING APPROACHES

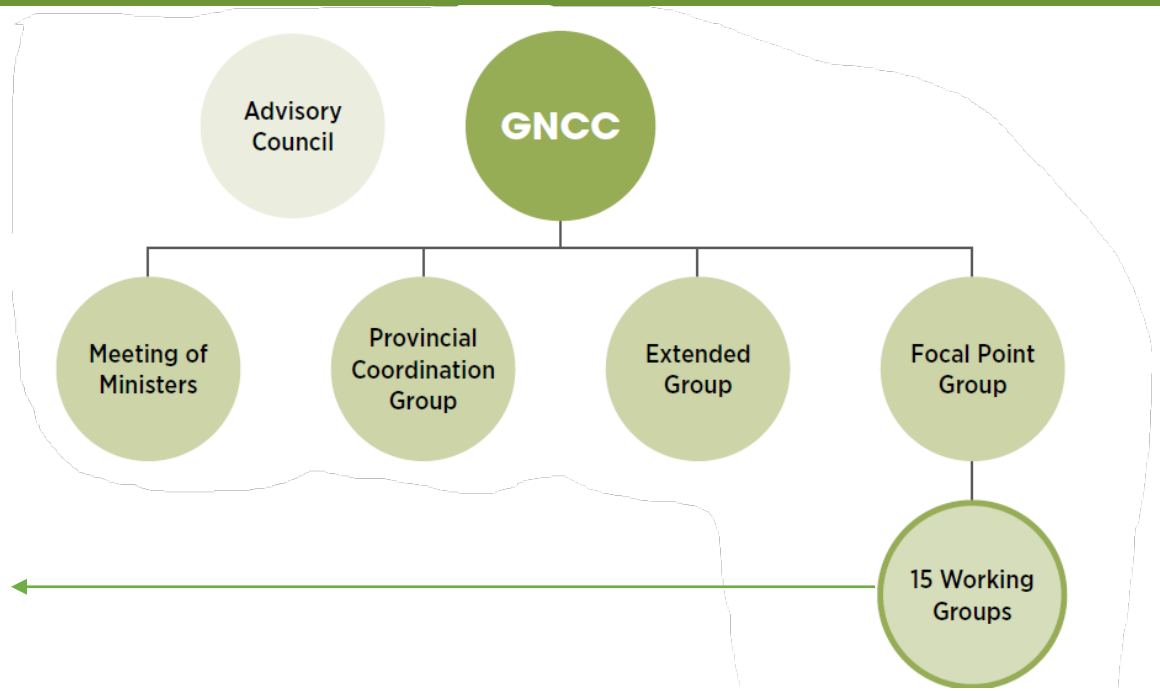
Building the right LTES capacity within governments

Developing robust governance structures

Enhancing institutional coordination: by legal mandate

Argentina

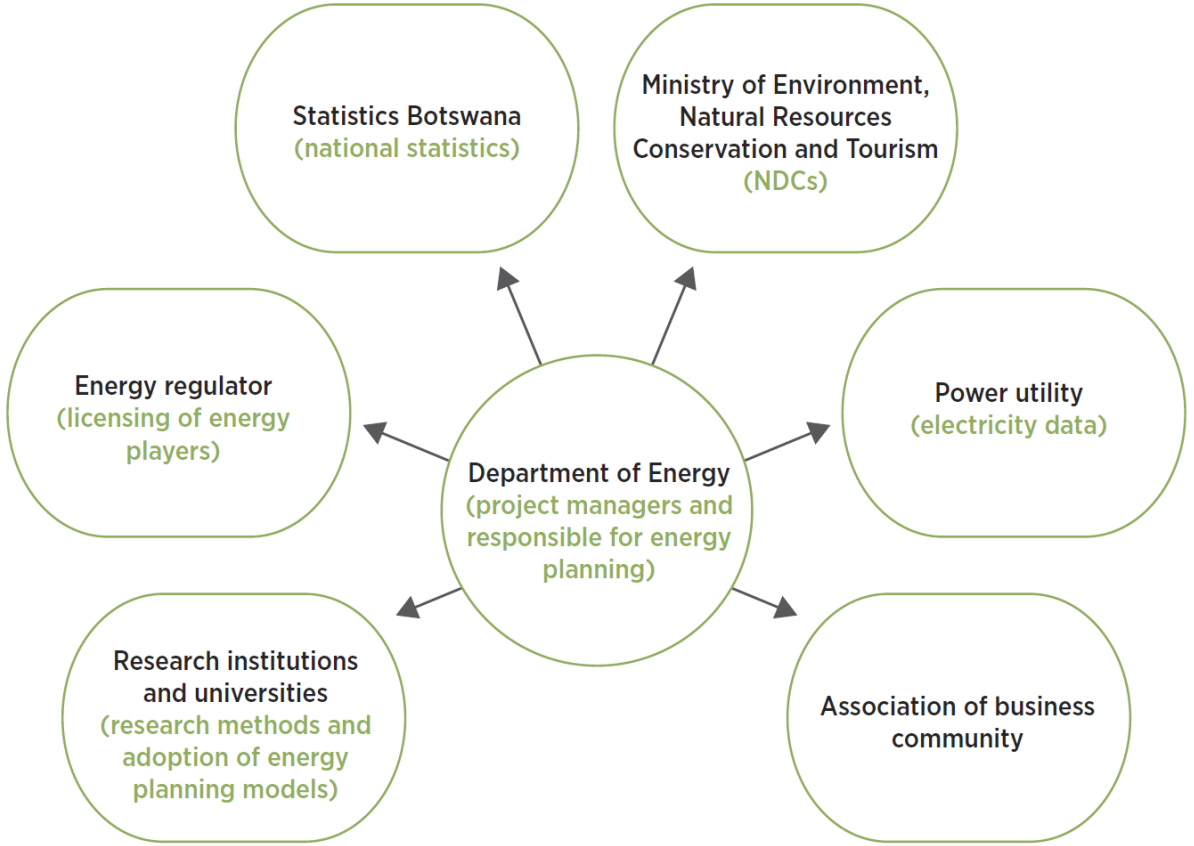




Developing robust governance structures

Enhancing institutional coordination: other institutional arrangements.

Botswana



Source: Setlhare (2021).

Technical Team

- Establish a dedicated team with resources and required expertise
- Capacity building on energy planning tools
- Train, refresh and retain the team
- Review energy model if possible on yearly basis

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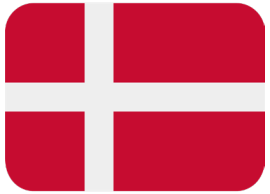
Encouraging participatory processes

Different mechanisms, scopes, target groups, governance, tools.

Belgium

Finland



Denmark

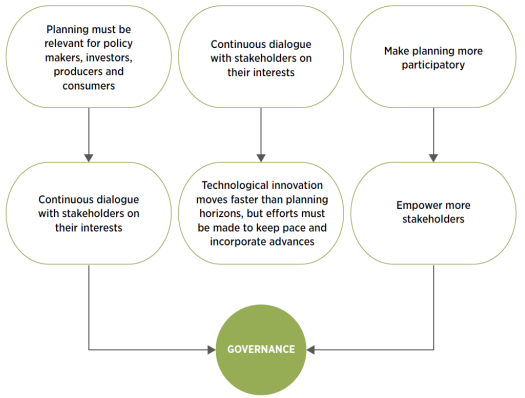
Brazil

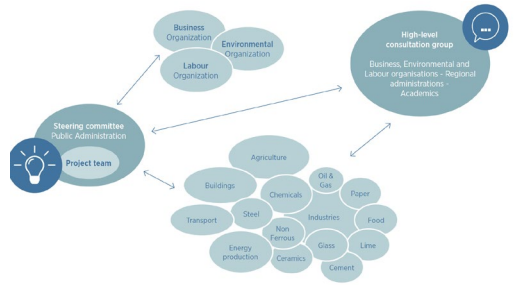
Chile

South Africa

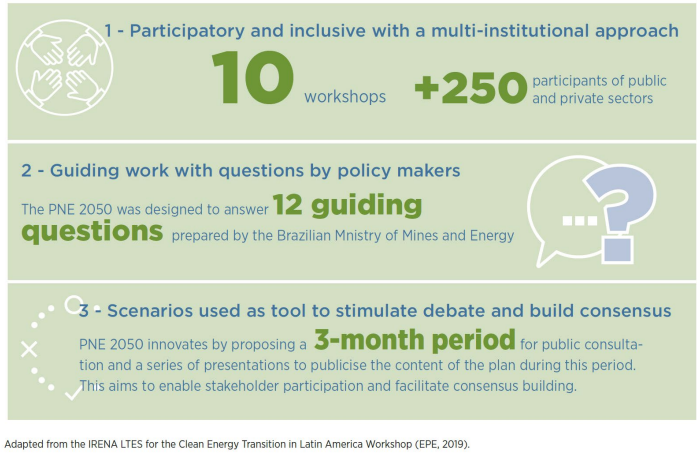
Italy

Colombia





Adapted from the 2nd LTES International Forum
(Federal Public Service Health, Food Chain safety and Environment, 2020).

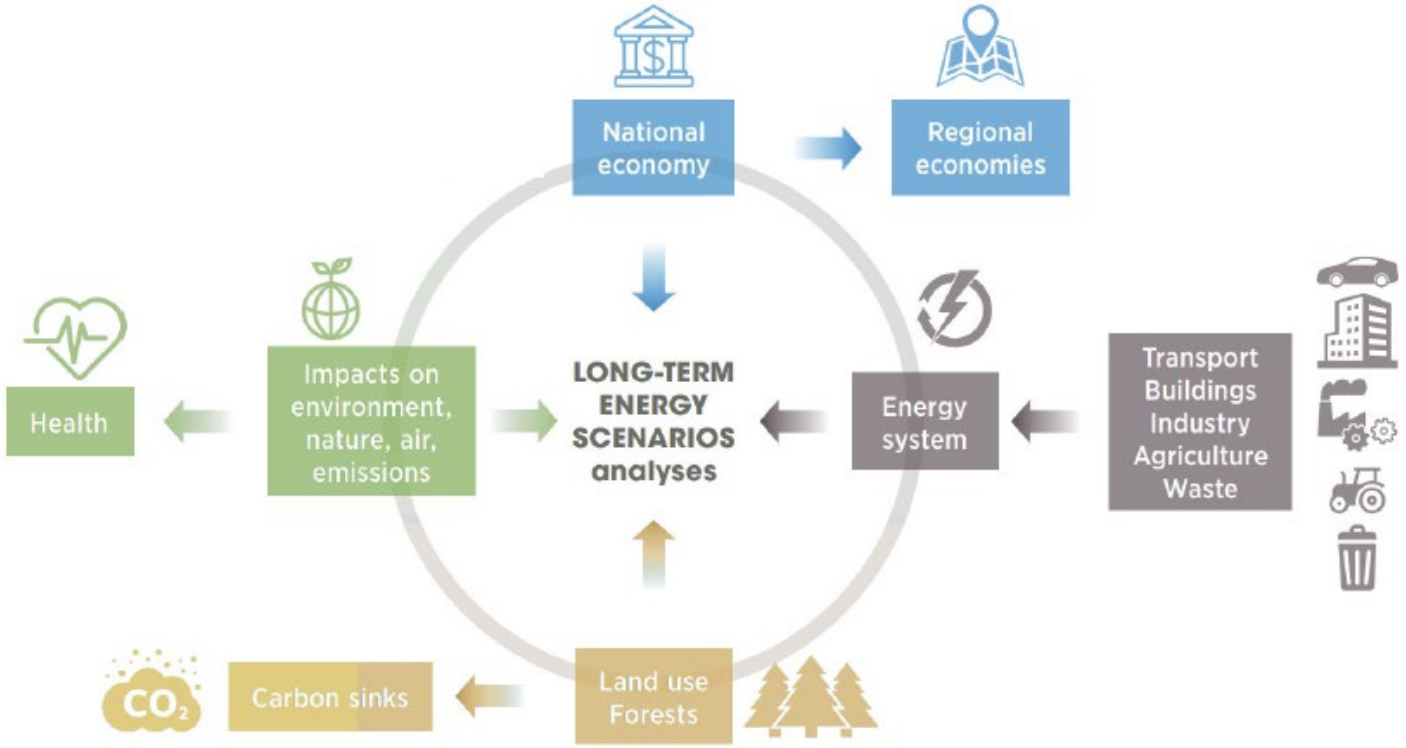


Adapted from the IRENA LTES for the Clean Energy Transition in Latin America Workshop (EPE, 2019).

Expanding the boundaries of scenarios

Address innovation, incorporate interactions between sectors, integrate socio-economic analysis into LTES

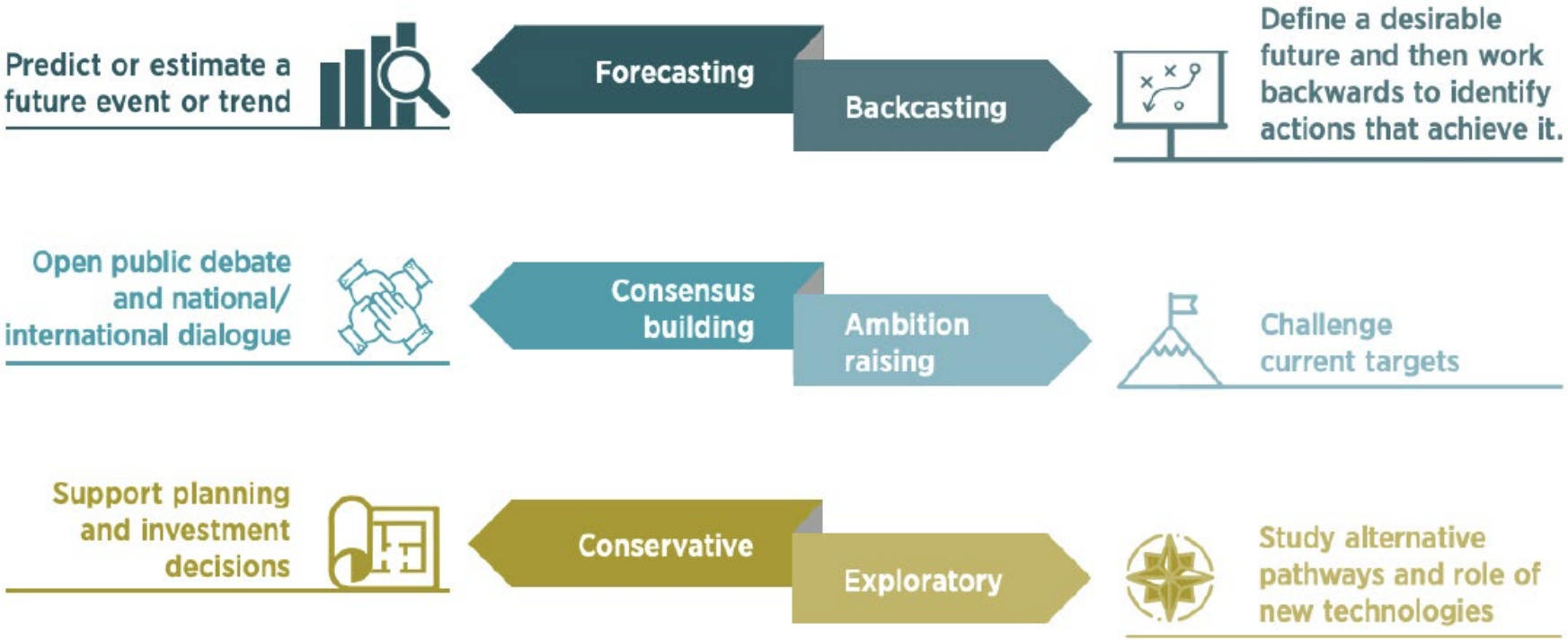
Finland



Helps to understand the realistic impacts and consequences of a just transition, allowing governments to make more informed decisions.

Defining the purpose of LTES and ensuring transparency

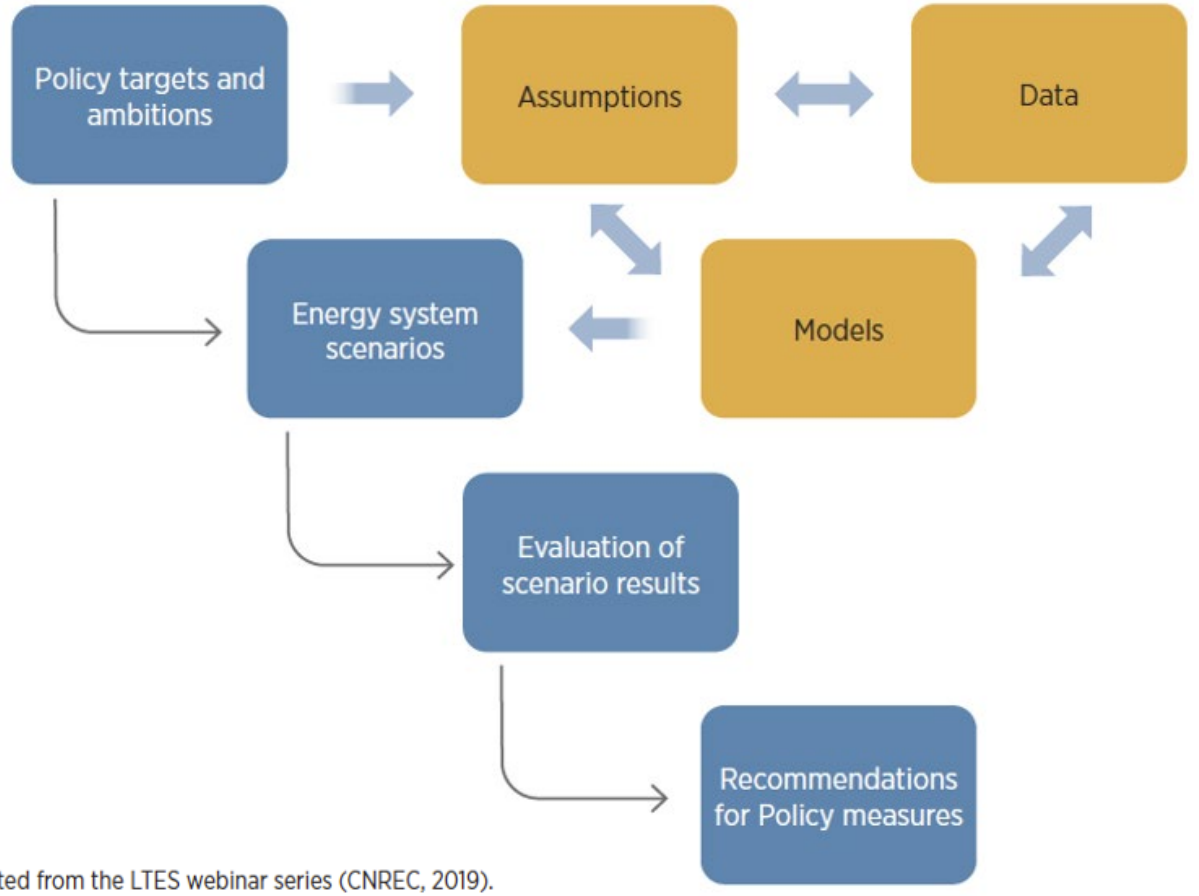
Types of uses of LTES for planning the clean energy transition



Defining the purpose of LTES and ensuring transparency

Backcasting: LTES resulting in recommendations and policy measures for the energy transition

China

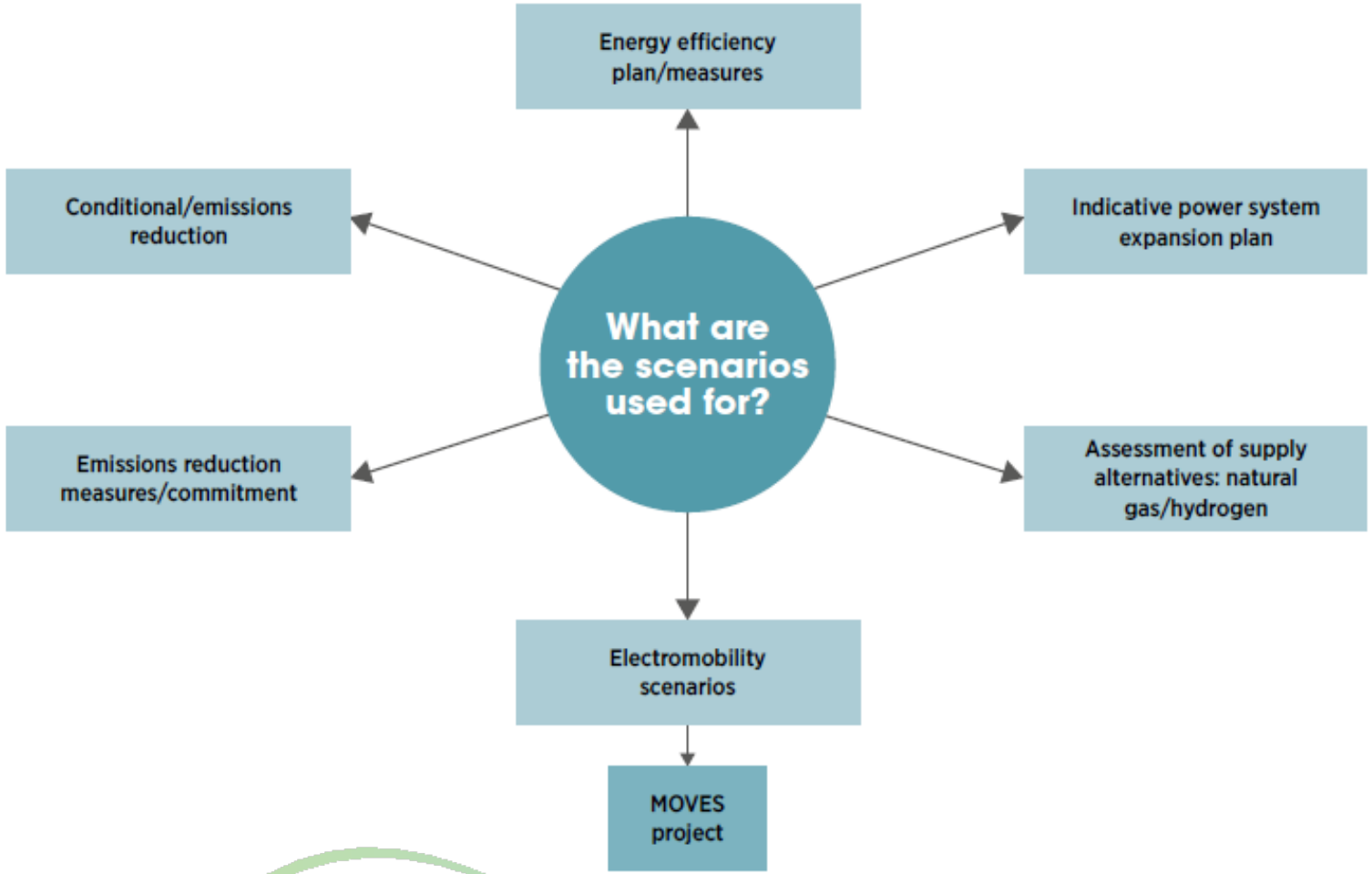


Adapted from the LTES webinar series (CNREC, 2019).

Defining the purpose of LTES and ensuring transparency

Explore technology and policy options for the decarbonisation of the energy sector

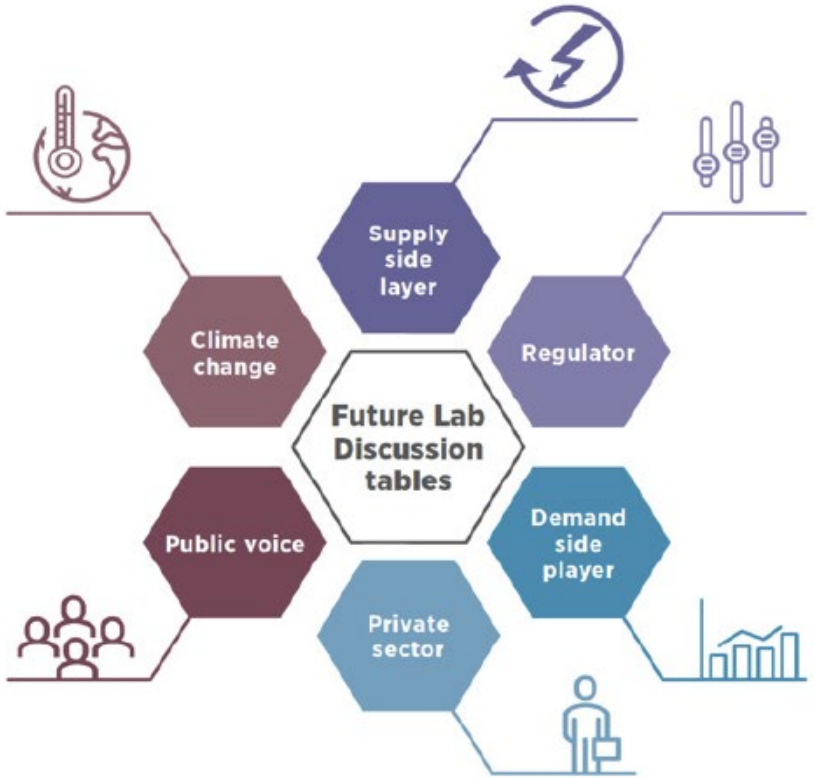
Uruguay



Defining the purpose of LTES and ensuring transparency

A game to improve scenario transparency: The FutureLab communication exercise used by policy makers

UAE



Source: (Ministry of Energy and Infrastructure, United Arab Emirates, 2019).

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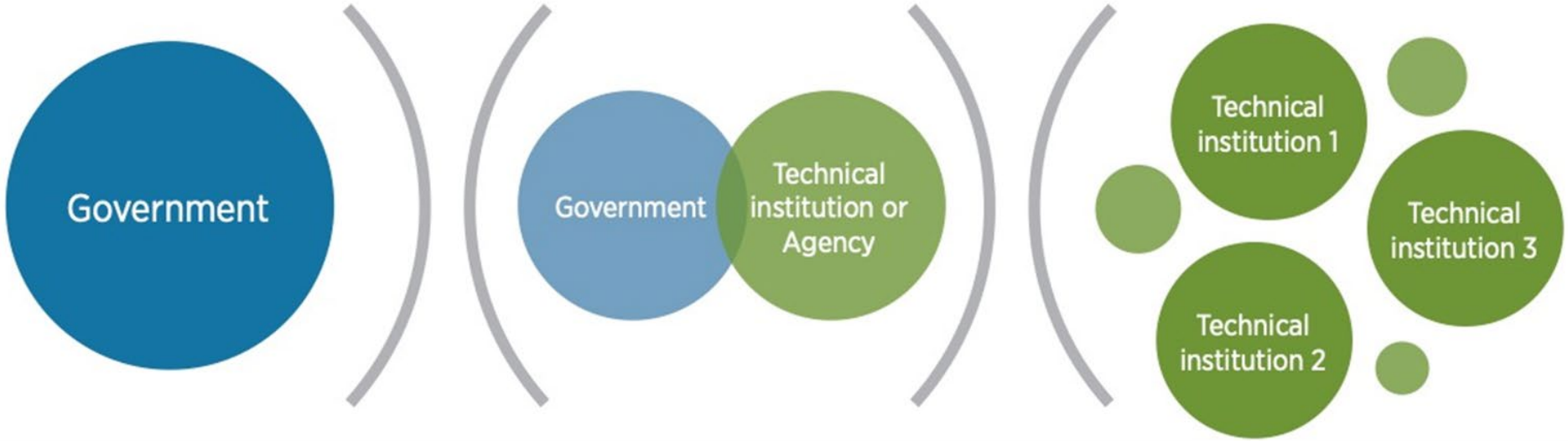
Building the right LTES capacity within governments

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

50/50

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



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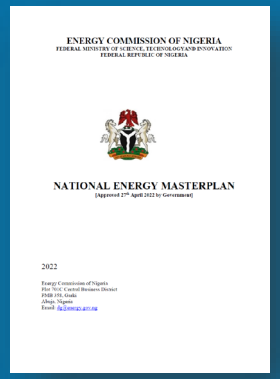
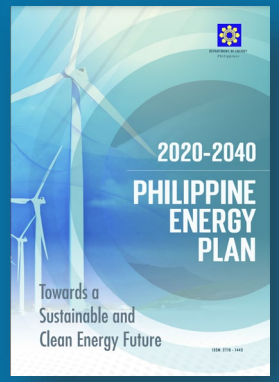
Long-Term Energy Scenarios and Low-Emission Development Strategies: Stocktaking and Alignment

LTES

Brazil



Nigeria

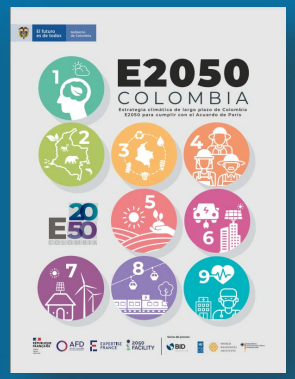


Philippines

LT-LEDS

Fiji

Spain



Colombia

Introduction

LTES
LONG-TERM ENERGY SCENARIOS

LTES (Long Term Energy Scenarios)

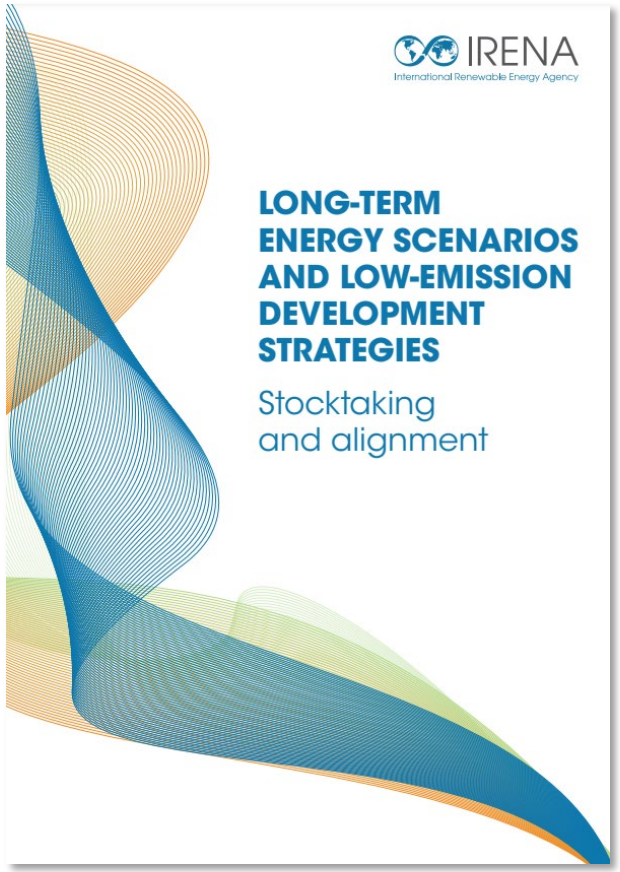
- Ensuring a secure, affordable and sustainable energy supply
- Scope: energy or power sector, over the coming 15-30 years

LT-LEDS (Long-Term Low-Emission Development Strategies)

- Mid-century goals for a just transition to global net zero emissions
- Scope: whole economy until 2050 or later

Aim: comparative analysis of institutional processes and technical coverage of scenario-based LTES and LT-LEDS

Approach of the report



Scope

- LTES: only recent documents (>5 years) with a planning horizon of at least 15 years
- LT-LEDS: only scenario-based

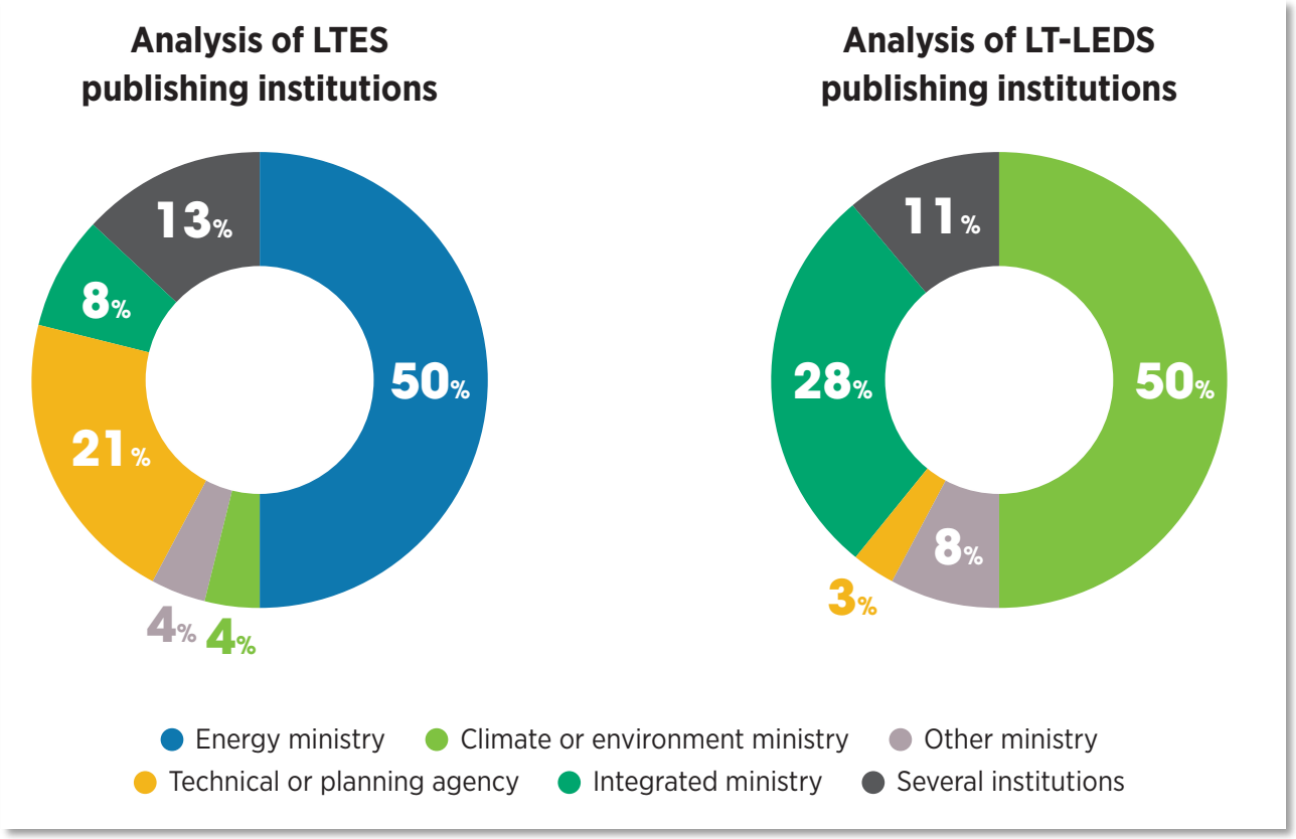
→ 60 scenario-based documents analyzed (36 LT-LEDS and 24 LTES) from 45 countries. 12 countries with both LTES and scenario-based LT-LEDS

Surveys

- Institutional and technical survey
- Completed or validated by countries

Institutional results

Publishing institutions, stakeholder consultations and net-zero targets



Technical results

LTES
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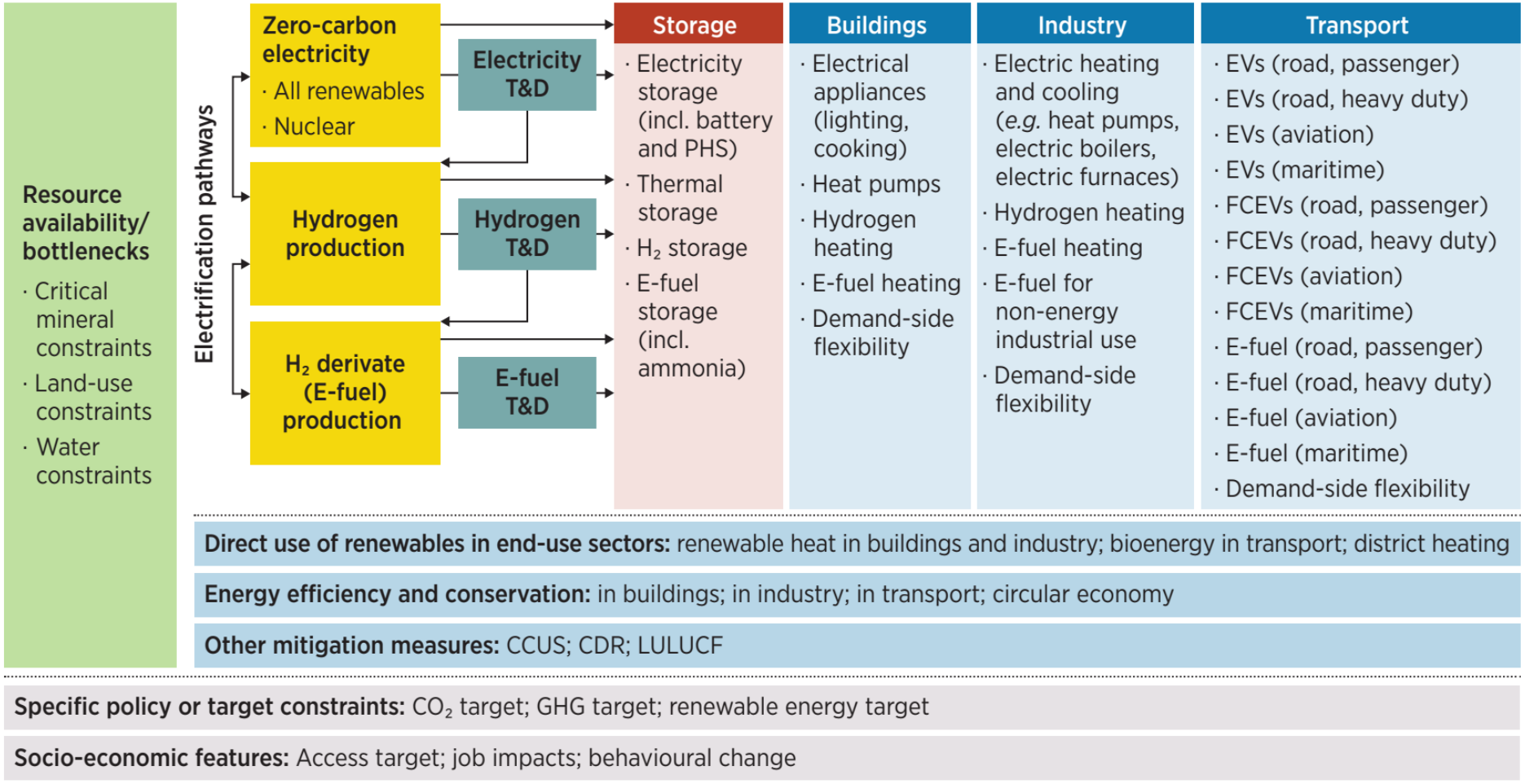
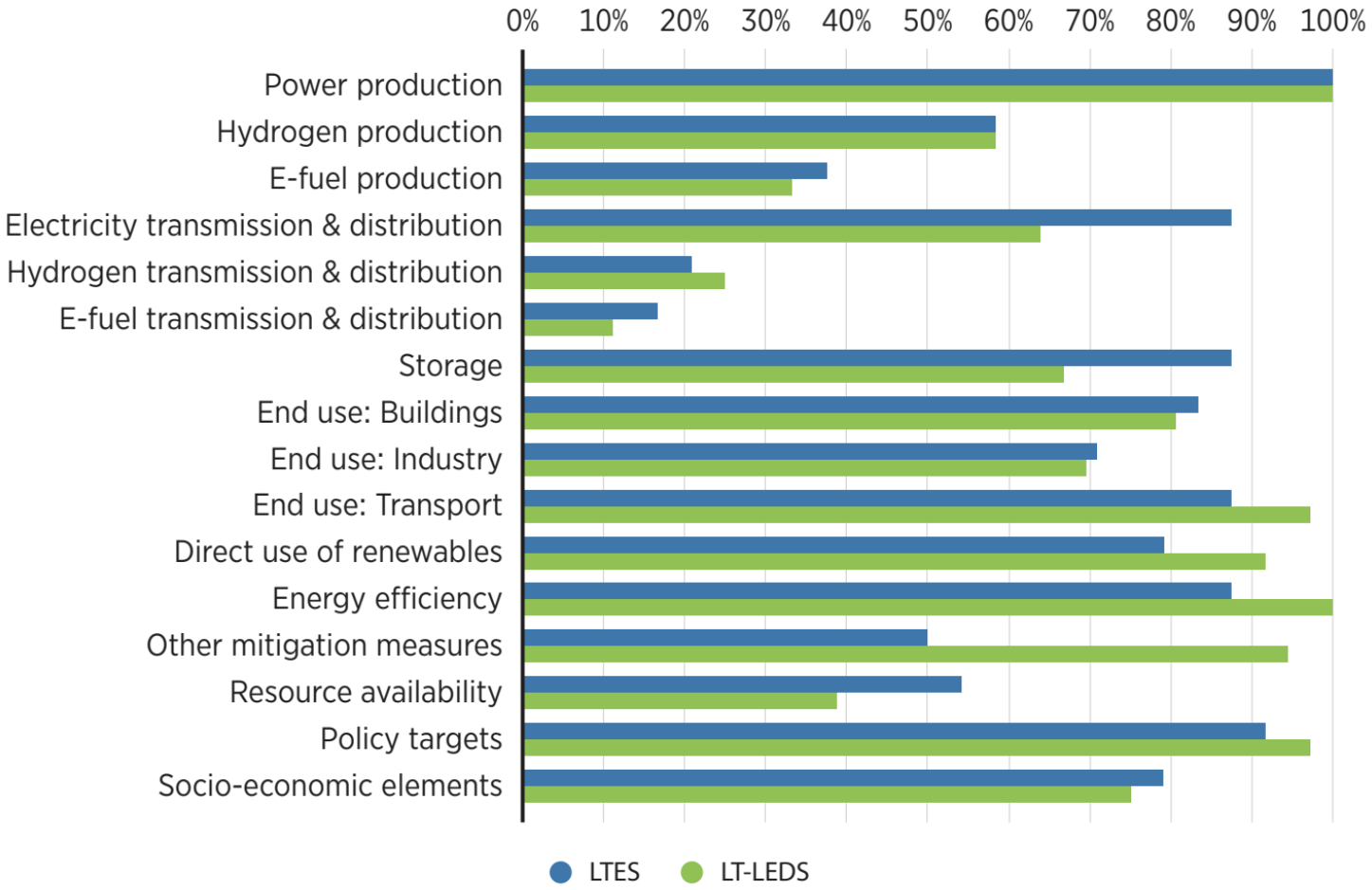
Energy transition landscape



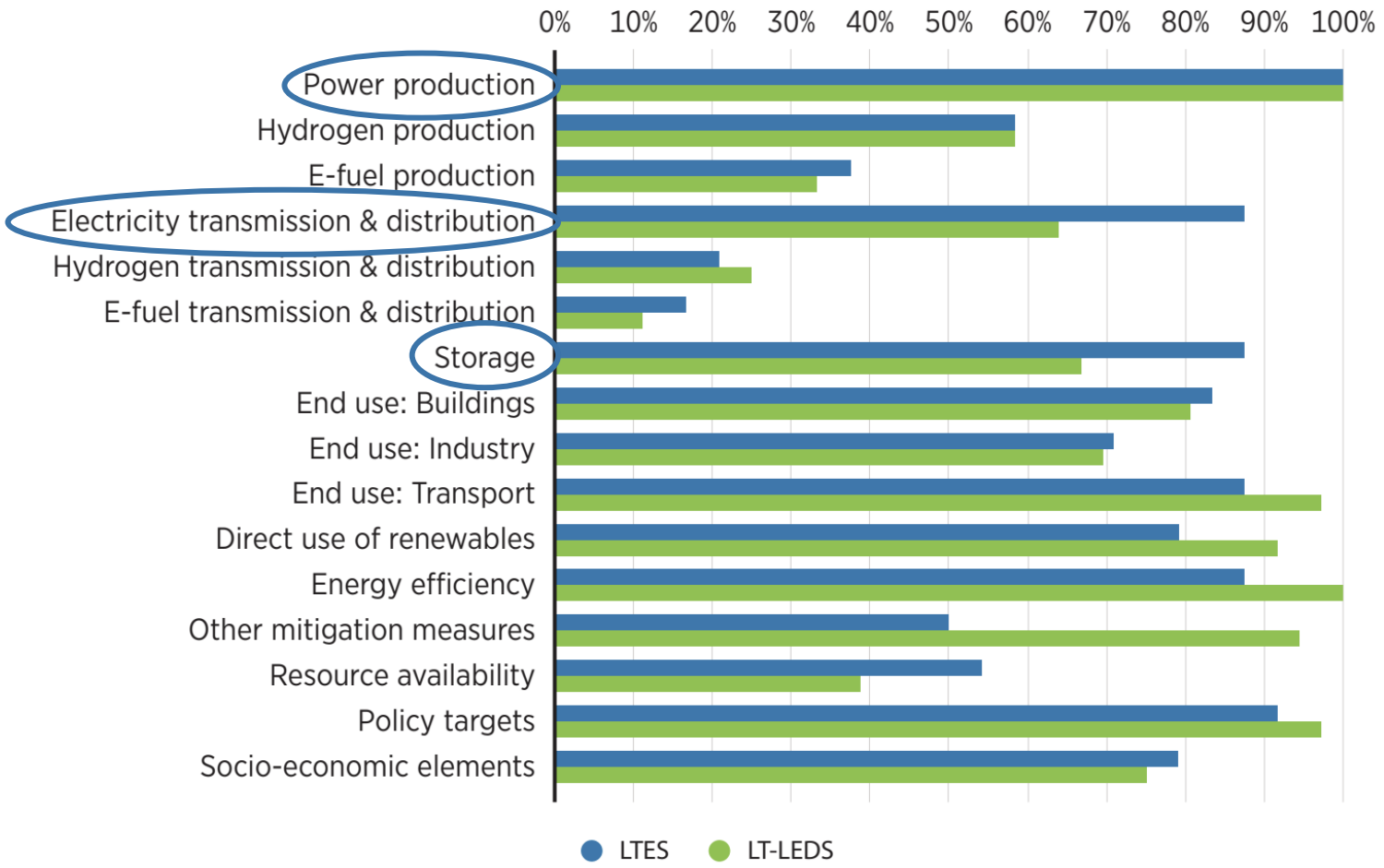
Technical results

What can LTES and LT-LEDS scenarios learn from each other?



Technical results

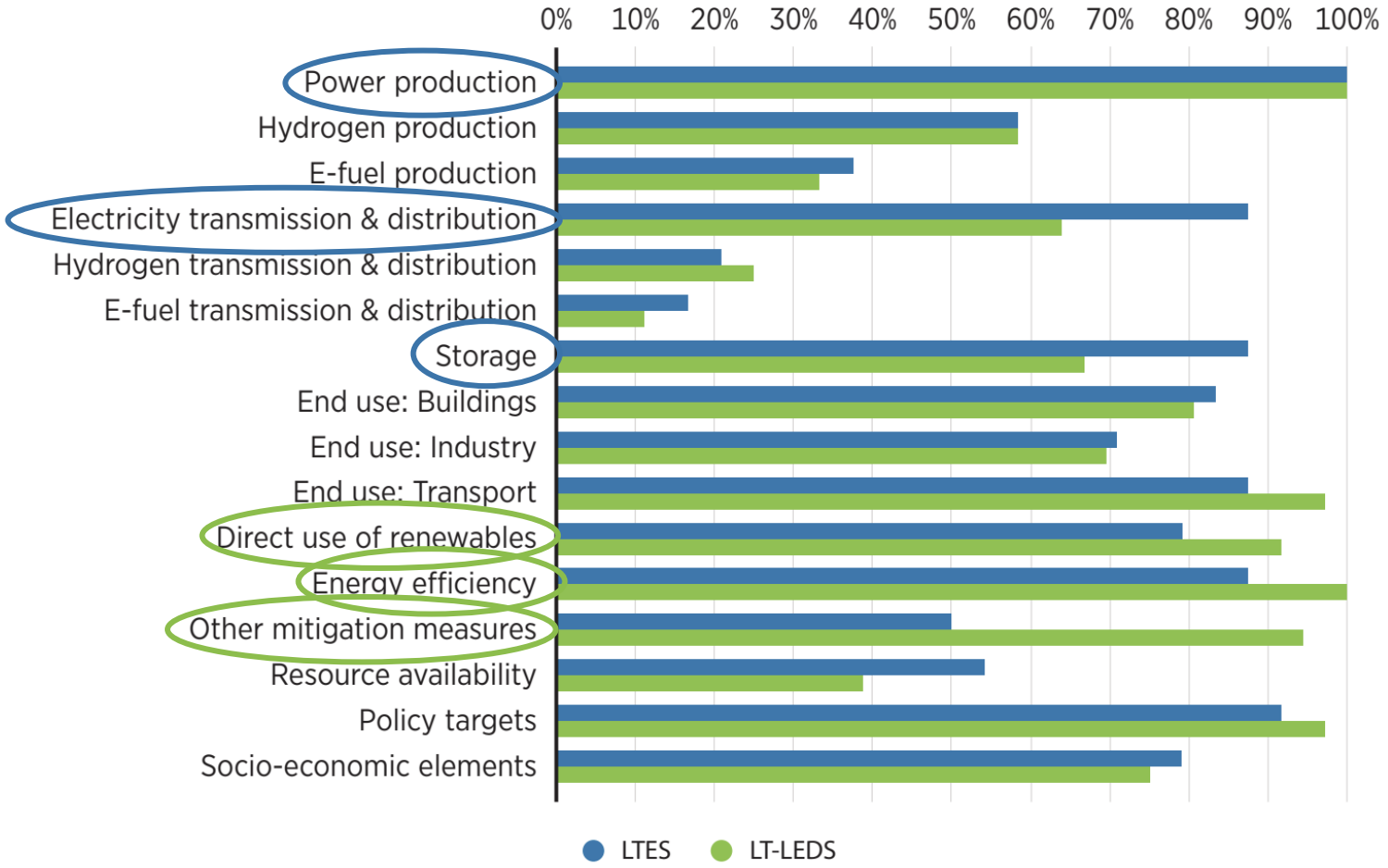
What can LTES and LT-LEDS scenarios learn from each other?



- Generally, LTES represent **power sector elements** like generation, T&D and storage more comprehensively than LT-LEDS

Technical results

What can LTES and LT-LEDS scenarios learn from each other?



- Generally, LTES represent **power sector elements** like generation, T&D and storage more comprehensively than LT-LEDS
- LT-LEDS tend to represent **measures outside of electrification** like the direct use of RE, efficiency and other mitigation measures better than LTES

Conclusion

LTES
LONG-TERM ENERGY SCENARIOS

- The analysis in this report shows a generally **good level of alignment between LTES and LT-LEDS scenarios**
- Common observations with LT-LEDS Synthesis report, including the **role of renewable energy, electrification, and energy efficiency as crucial for net-zero targets**
- **Socio-economic elements** such as job impacts and health are usually not present in scenarios but still **feature in the majority of the LT-LEDS text**
- Wider adoption of scenario-based planning approaches for LT-LEDS can lead to further **stakeholder engagement** and **data-based dialogue**, and **greater buy-in from other sectors**
- LT-LEDS present **opportunities for energy, climate, and development policymaking** to come closer and communicate mutual objectives and targets

National Energy Transition Planning Dashboard

LTES
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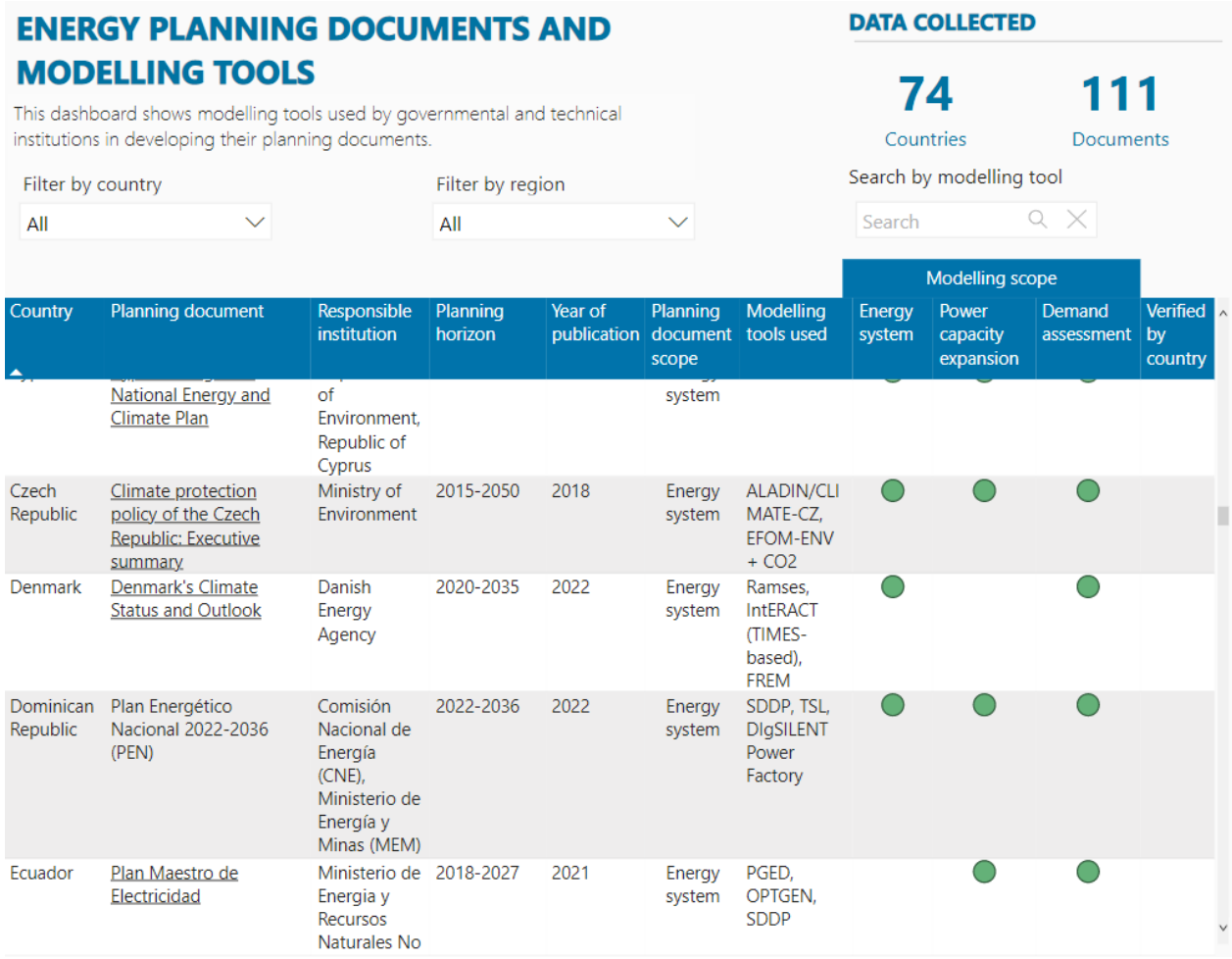
Global repository of energy planning documents

Continuously updated with new information

Available on the IRENA website



ENERGY PLANNING DOCUMENTS AND MODELLING TOOLS

This dashboard shows modelling tools used by governmental and technical institutions in developing their planning documents.

DATA COLLECTED

74 Countries

111 Documents

Filter by country: All

Filter by region: All

Search by modelling tool: Search

Country	Planning document	Responsible institution	Planning horizon	Year of publication	Planning document scope	Modelling tools used	Modelling scope: Energy system	Modelling scope: Power capacity expansion	Modelling scope: Demand assessment	Verified by country
	National Energy and Climate Plan	of Environment, Republic of Cyprus			system					
Czech Republic	Climate protection policy of the Czech Republic: Executive summary	Ministry of Environment	2015-2050	2018	Energy system	ALADIN/CLIMATE-CZ, EFOM-ENV + CO2	●	●	●	
Denmark	Denmark's Climate Status and Outlook	Danish Energy Agency	2020-2035	2022	Energy system	Ramses, IntERACT (TIMES-based), FREM	●		●	
Dominican Republic	Plan Energético Nacional 2022-2036 (PEN)	Comisión Nacional de Energía (CNE), Ministerio de Energía y Minas (MEM)	2022-2036	2022	Energy system	SDDP, TSL, DIgSILENT Power Factory	●	●	●	
Ecuador	Plan Maestro de Electricidad	Ministerio de Energia y Recursos Naturales No	2018-2027	2021	Energy system	PGED, OPTGEN, SDDP		●	●	

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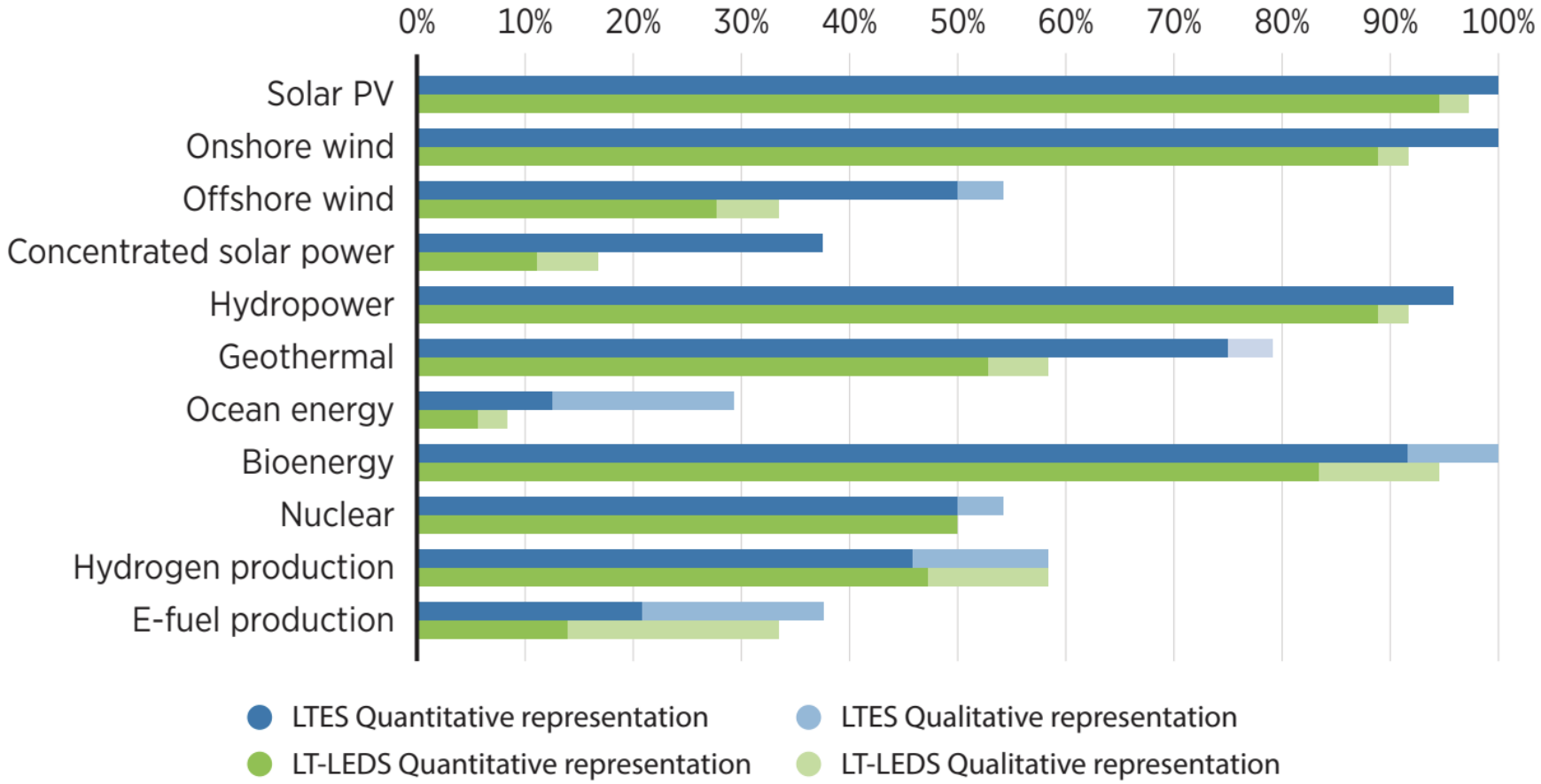
Thank you!

Back-up

Technical results

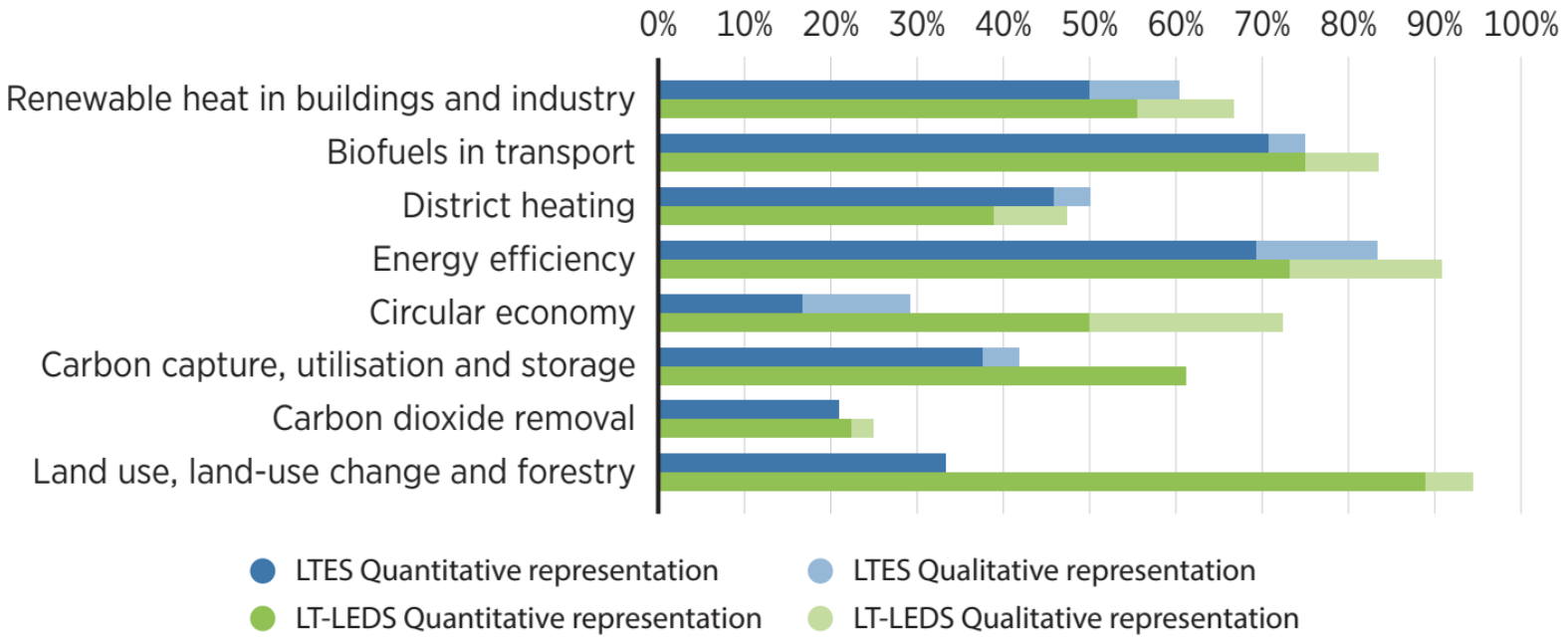
Inclusion of electricity generation and production of hydrogen and e-fuels in LTES and LT-LEDS scenarios

- In **both LTES and LT-LEDS scenarios**, most commonly included renewable generation technologies are **solar PV, onshore wind, bioenergy** and **hydropower**
- **Production of hydrogen** is included in over half of LTES and LT-LEDS, **e-fuel production** in over a third



Technical results

Inclusion of non-electrification pathways in LTES and LT-LEDS scenarios

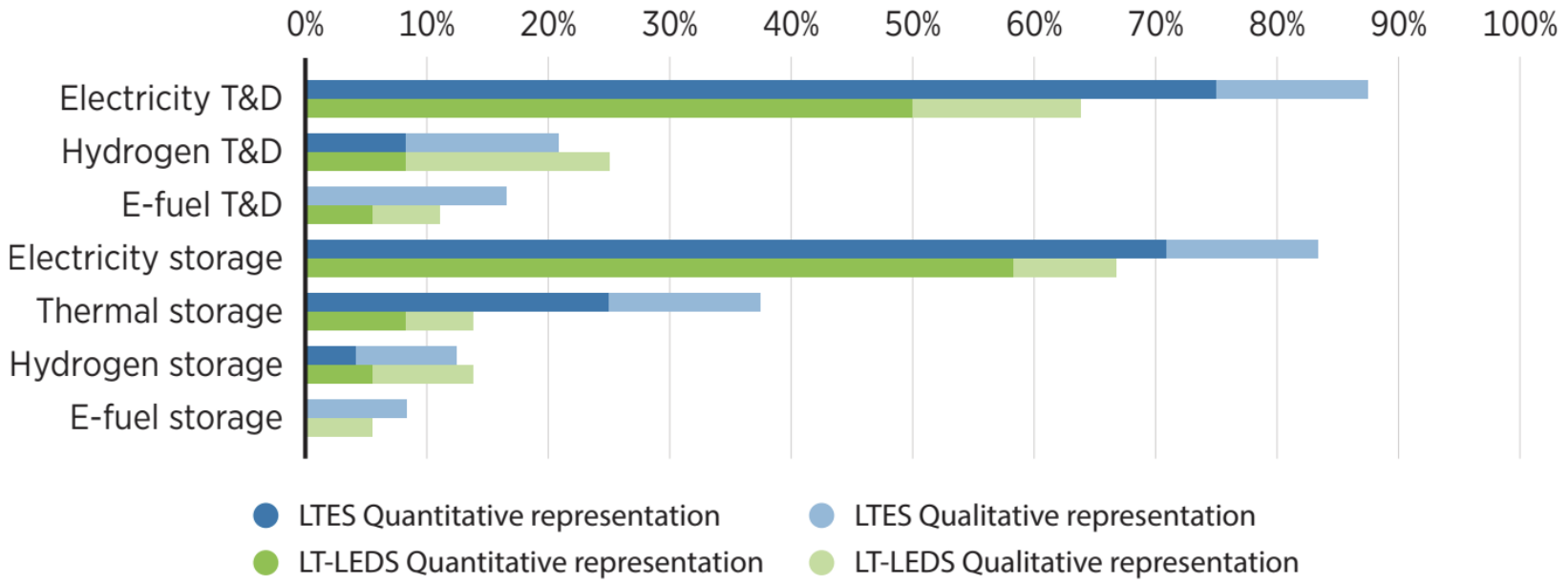


- **Non-electrical use of energy** tends to be better represented in LT-LEDS scenarios than LTES
- Carbon removal options like **CCUS, CDR** and **LULUCF** are also represented more in LT-LEDS than LTES

Technical results

Representation of energy infrastructure in LTES and LT-LEDS scenarios

- **Power sector infrastructure** is well represented in LTES and LT-LEDS scenarios
- Hydrogen and e-fuel infrastructure are **underrepresented** in today's official scenarios
- More extensive assessment could lead to new insights regarding **crucial infrastructure**

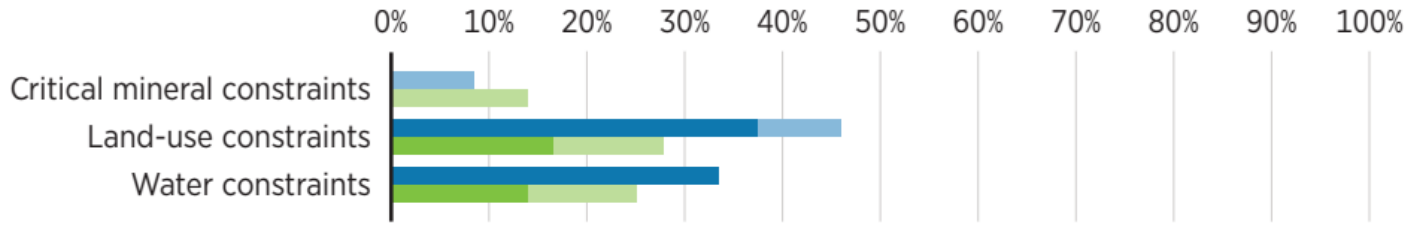


Technical results

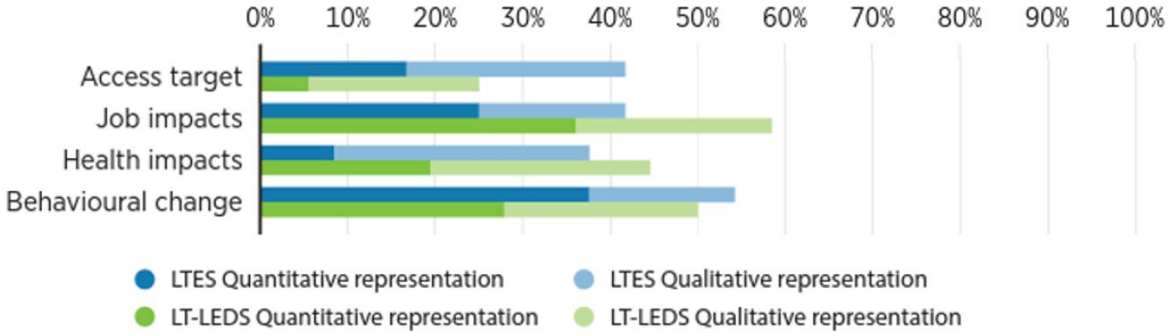
Representation of natural resource constraints and socio-economic elements

Natural resource constraints, especially **critical minerals**, are underrepresented in LTES and LT-LEDS scenarios

Representation of natural resource constraints in LTES and scenario-based LT-LEDS scenarios



Representation of contextual elements in LTES and scenario-based LT-LEDS scenarios



Quantitative representation of **socio-economic elements** was found in **less than half** of all LTES and LT-LEDS

Recommendations for for LTES and LT-LEDS development