IRENA INNOVATION WEEK 2023

Strategic Considerations for Sector Coupling in Long-Term Energy Scenarios

September 28, 2023
9:30-11:30 (CEST)

IITC, Bonn, Germany

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International Renewable Energy Agency

IRENA INNOVATION WEEK 2023

Opening remarks

Asami Miketa
Head Energy Transition Planning and Power Sector Transformation
IRENA Innovation and Technology Centre

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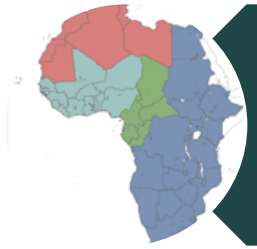
IRENA's long-term energy planning support portfolio

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

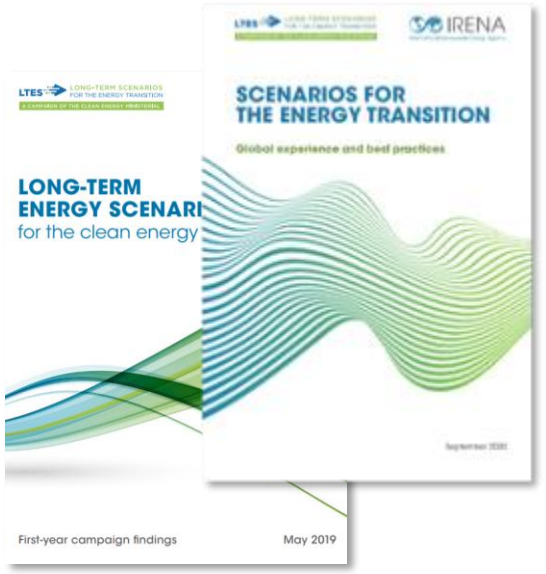
- SPLAT Starter model kits
- Renewable data for planning

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

3. IRENA LTES Network

Peer-to-peer learning

LTES
LONG-TERM ENERGY SCENARIOS



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

Long-Term Energy Scenarios Network

Overview

- Provides a global platform to exchange national LTES practices among scenario practitioners.
- Promotes wider and more effective use of LTES for the clean energy transition in governments.
- +60 countries examples synthesized in analytical reports.
- Over 70 international and regional events and webinars organized.

29 members

Austria	Denmark	Japan	Portugal
Bosnia and Herzegovina	Dominican Republic	Kenya	Saudi Arabia
Brazil	Egypt	Latvia	United Arab Emirates
Canada	El Salvador	Lithuania	United Kingdom of Great Britain and Northern Ireland
Chile	Finland	Mexico	United States of America
Colombia	Germany	Kingdom of the Netherlands	
Costa Rica	Ghana	Peru	
Cyprus	Italy	Philippines	

13 technical partner institutions

United Nations Climate Change
WORLD RESOURCES INSTITUTE
ИНЭИ РАН
JISEA Joint Institute for Strategic Energy Analysis
THE WORLD BANK IBRD • IDA | WORLD BANK GROUP
WORLD ENERGY COUNCIL
iea International Energy Agency
etsap
European Commission
CNREC CHINA NATIONAL RENEWABLE ENERGY CENTRE
国家电网有限公司 STATE GRID CORPORATION OF CHINA
The European Commission's science and knowledge service
Joint Research Centre
RSE Ricerca Sistema Energetico
GET.transform Transforming Energy Sectors Globally

Long-Term Energy Scenarios Network

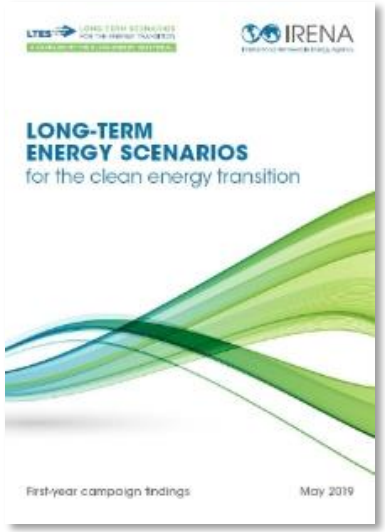
Focus

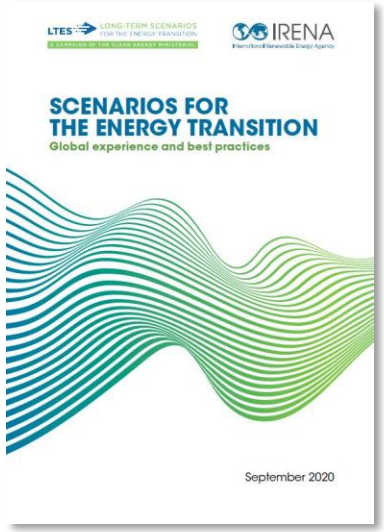
01 Strengthening scenario development

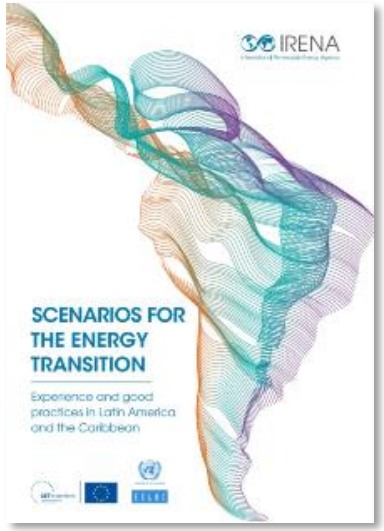
02 Improving scenario use

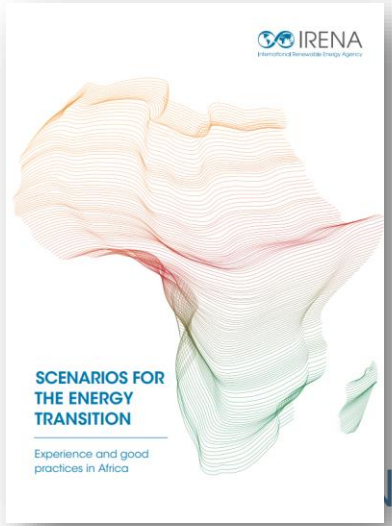
03 Identifying capacity-building approaches

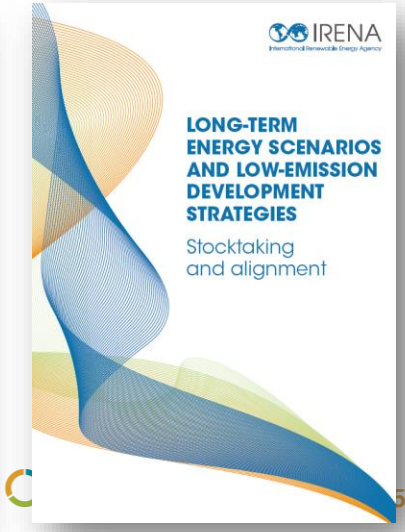
Practices and experiences collected



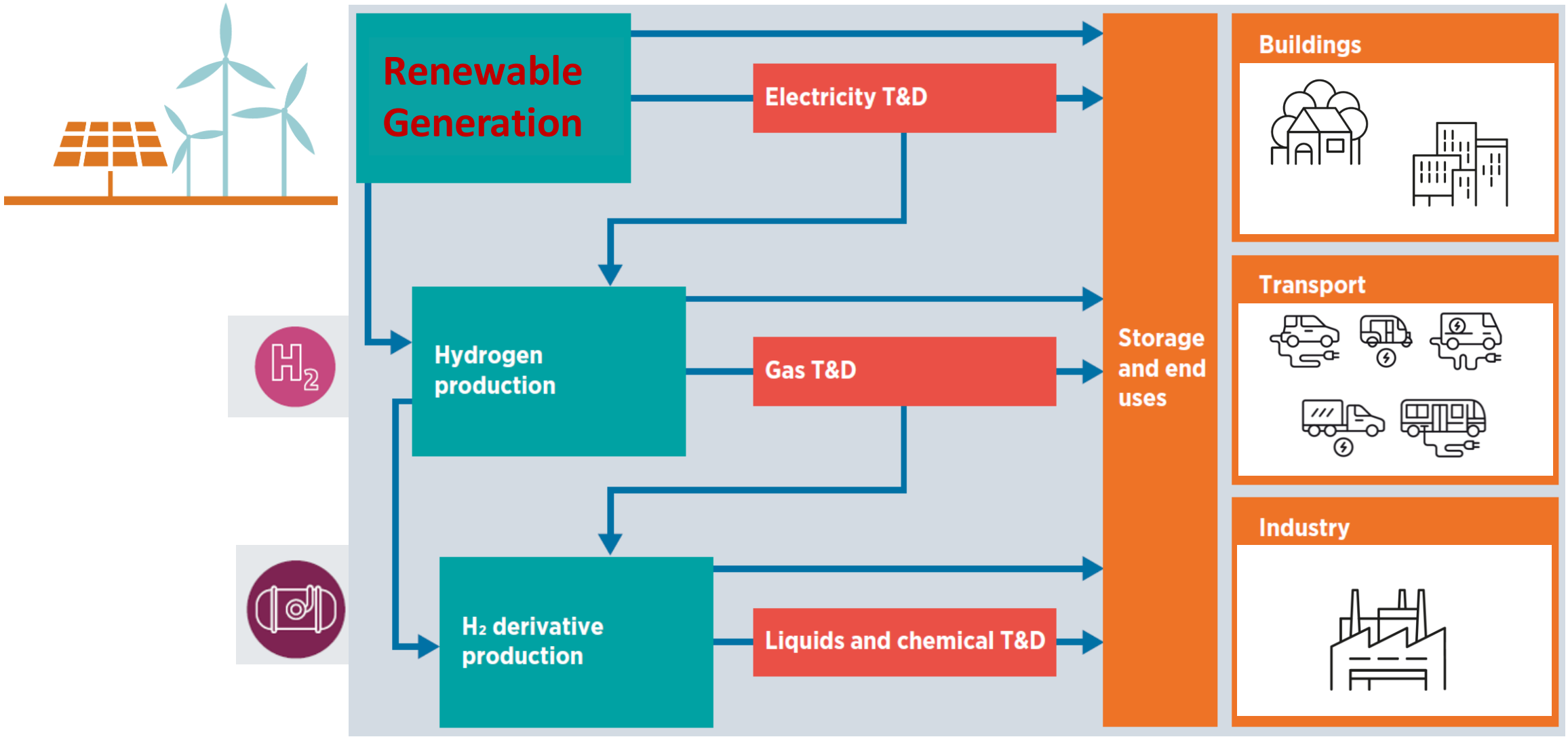








Electrification pathways: power to X



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Scene Setting Presentation

Angela Khanali Mutsotso
Associate Professional Clean Energy Transition Scenarios and Network
IRENA Innovation and Technology Centre

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IRENA Scene-Setting Presentation:

“LTES Network Insights: – Global experience on the use of Energy Scenarios to accelerate the clean energy transition”

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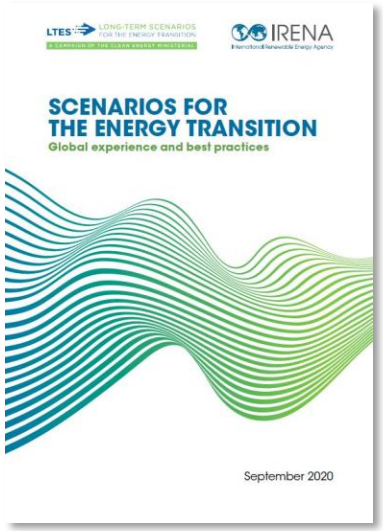
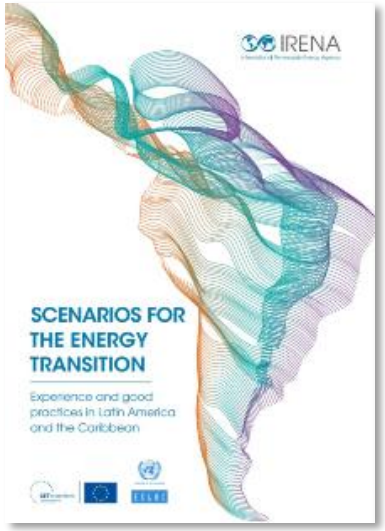
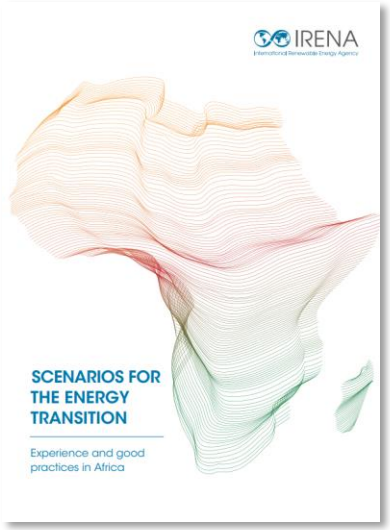
Importance of Sector Coupling in Long-Term Energy Scenarios

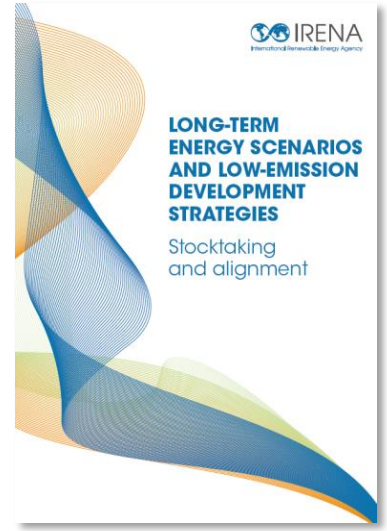
From the global dialogue on LTES:

- Decarbonization of multiple sectors.
- Increased flexibility and system resilience.
- Economic efficiency.
- Holistic energy system planning.
- Stimulating innovation.
- Meeting climate goals.









Initial insights from the LTES Network

- In scenarios for 100% RE, solar and wind are the mainstream technologies and are supported by storage solutions. **Sector coupling is pivotal** for connecting and electrifying all sectors, enhanced by power-to-X and hydrogen-to-X strategies.
- **Flexibility is a significant concern,** this includes the integration of technologies like hydrogen production, electric vehicle charging, demand response, and thermal energy storage to accommodate the variable renewable energy sources.

4th International Forum on LTES December 2022

From the session: "Role of 100% renewable electricity for the energy system transition in scenarios"

Initial insights from the LTES Network

- For developing energy scenarios, **collaboration with Transmission System Operators** (TSO) is key to ensure that the electricity infrastructure evolves appropriately and timely to accommodate the changing energy landscape.
- **Policy-making is heavily influenced** by these detailed analyses, ensuring that targets are met in a realistic and efficient manner.
- There is a growing attention to **system stability and the flexible operation of technologies** like electrolyzers. This ensures that the energy system remains efficient and resilient to fluctuations.

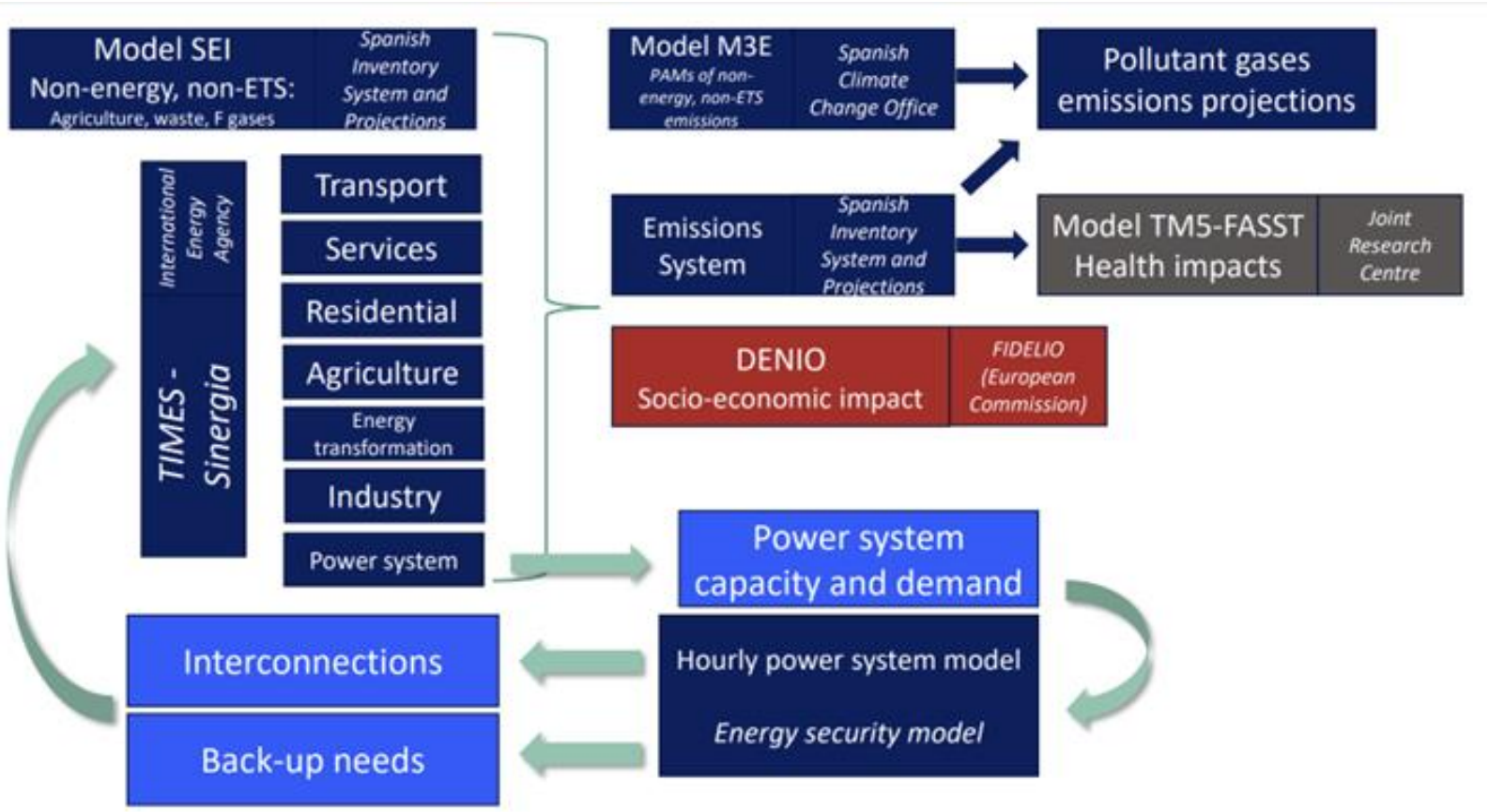
4th International Forum on LTES December 2022

From the session: "Role of 100% renewable electricity for the energy system transition in scenarios"

Initial insights from the LTES Network

Models on incorporating global hydrogen insights for national LTES

Spain



4th LTES Forum (Dec 2022) *Session 5: Incorporating global hydrogen insights for national LTES narratives*

Initial insights from the Innovation Landscape Report (2023)

Electricity and Gas Transmission System Operator Sector Coupling Strategies[1]

Germany | The Netherlands

- Study published by TSOs TenneT (electricity) and Gasunie (gas) shows how the Netherlands and Germany can achieve the Paris climate targets using a more integrated energy system.
- Close collaboration between the gas and electricity infrastructure is key in guaranteeing the reliability of the energy system and integrate increasing shares of variable solar and wind energy.

IRENA (2023), Innovation landscape for smart electrification: Decarbonising end-use sectors with renewable power, International Renewable Energy Agency, Abu Dhabi.

Initial insights from the Innovation Landscape Report (2023)

Electricity and Gas Transmission System Operator Sector Coupling Strategies[2]

To reach its very ambitious climate targets ENTSO-E and ENTSOG jointly published their Scenario Report Ten-Year Network Development Plans 2022.

They use new sector-coupling methodologies and dedicated modelling tools to optimise overall system efficiency and flexibility of use, as well as capture the interactions among end-use sectors at different geographical scales and with other carriers.

Energinet (Denmark), has combined the operations of its electricity and gas systems into a joint system operator subsidiary. The expectation is that joint operations will make it easier for Denmark

IRENA (2023), Innovation landscape for smart electrification: Decarbonising end-use sectors with renewable power, International Renewable Energy Agency, Abu Dhabi.

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Panel Discussion

Exploring Sector Coupling in Long-Term Energy Scenarios: Challenges, Opportunities, and Future Direction

Christopher Gross
GET.transform Team Lead

Martin Hartvig
Senior Engineer

Claire Nicolas
Senior Energy Economist

Kaare Sandholt
Chief International Expert

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Closing Remarks

Asami Miketa
Head Energy Transition Planning and Power Sector Transformation
IRENA Innovation and Technology Centre

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Thank you!

Contact Us At LTES@IRENA.org