INTERNATIONAL RENEWABLE ENERGY AGENCY

Consultative Meeting on the IRENA Innovation Landscape Report for the Power Sector

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IRENA 7th Assembly Meeting
15 January 2017
Abu Dhabi, UAE

Consultative Meeting

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1 Innovation driving the Power Sector Transformation

2 IRENA Study - Innovation Landscape for the Power Sector Transformation

3 Opportunities for Engagement with member countries

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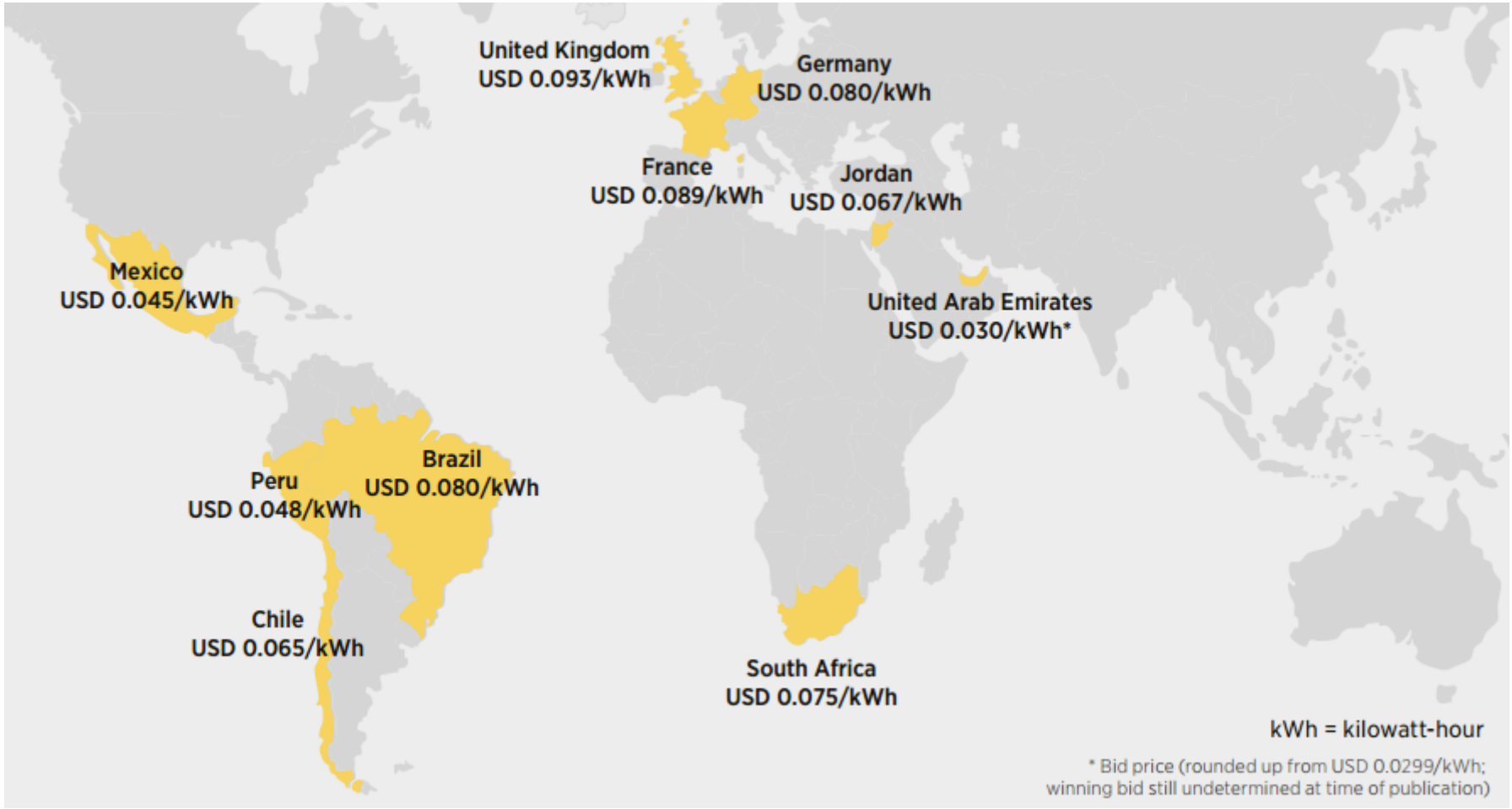
1 Innovation driving the Power Sector Transformation

The need for innovation

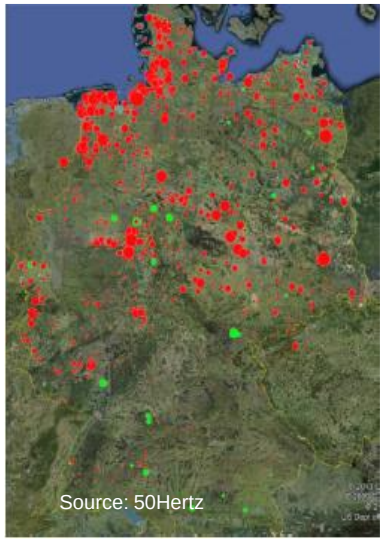
- The world needs to **decarbonise its energy system** by 2050
- **Market signals alone will NOT suffice**. Innovation has a crucial role to play
- **Technical solution**s need to be in place by 2030 to allow a transition by 2050
- Innovation covers **more than technology**: Business models, operation, regulation and policy innovation
- The power sector is **advancing faster than others** in the transformation -> electrification of end-use sector is an option

RE power technology is available and rapidly becoming competitive

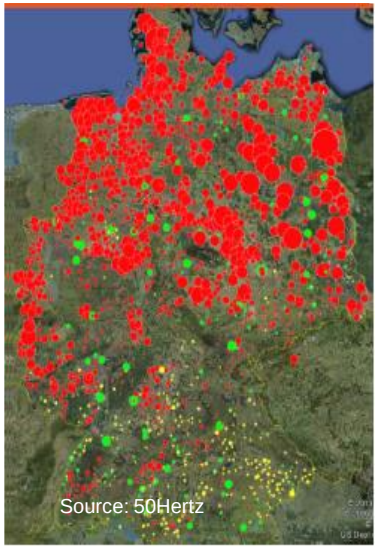


Source: IRENA (2016) Letting in the Light

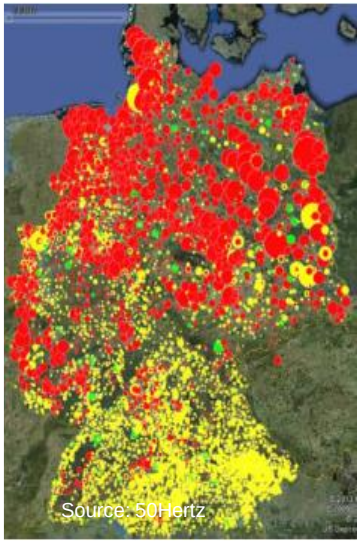
Fast deployment of Variable Renewable Energy (VRE) in some countries



around 30.000 plants



around 220.000 plants



around 1.500.000 plants

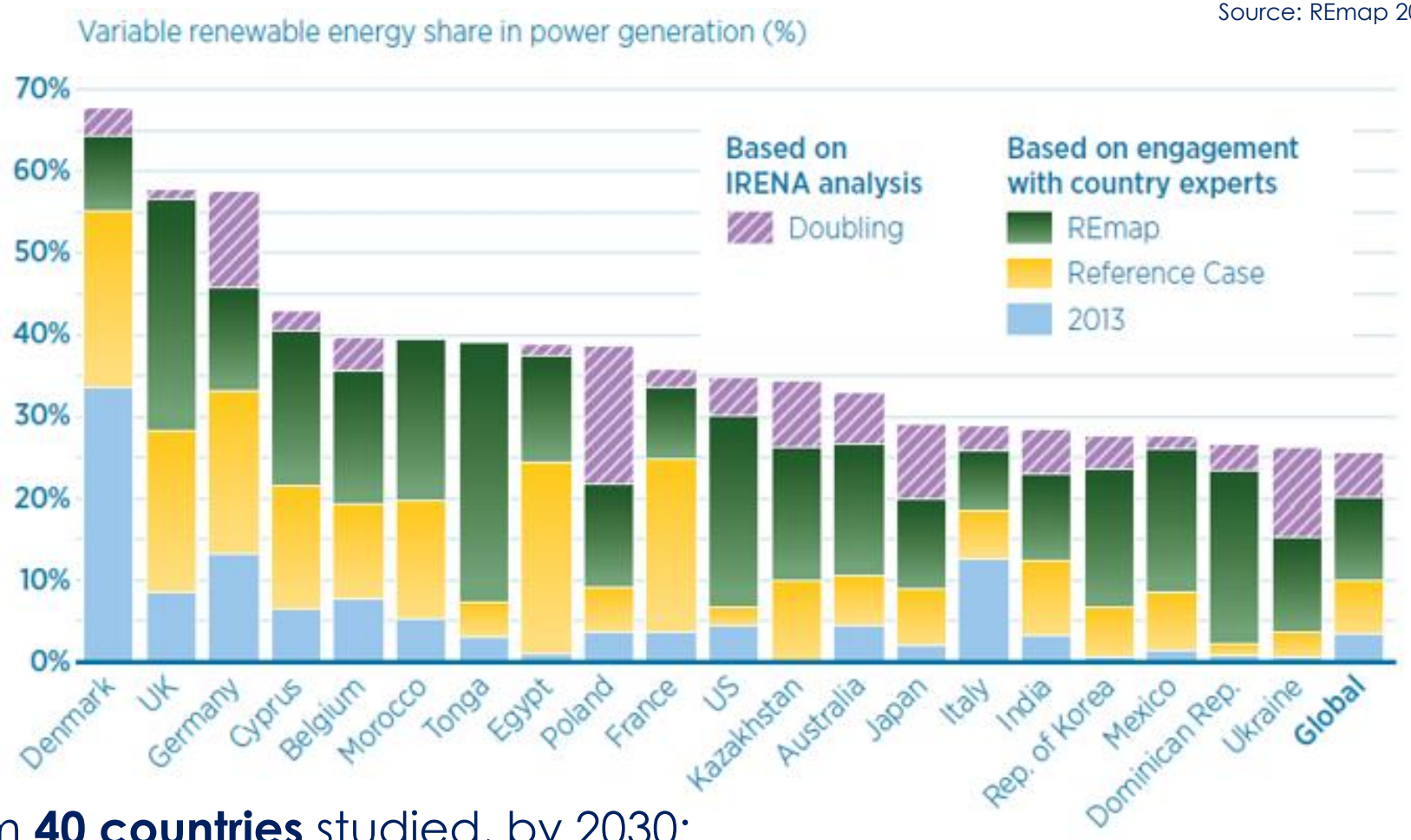
2000 2006 2014

Wind Photovoltaics Biomass

Source: 50Hertz

Share of VRE has reached a two digits number in some countries and expanding

Source: REmap 2016

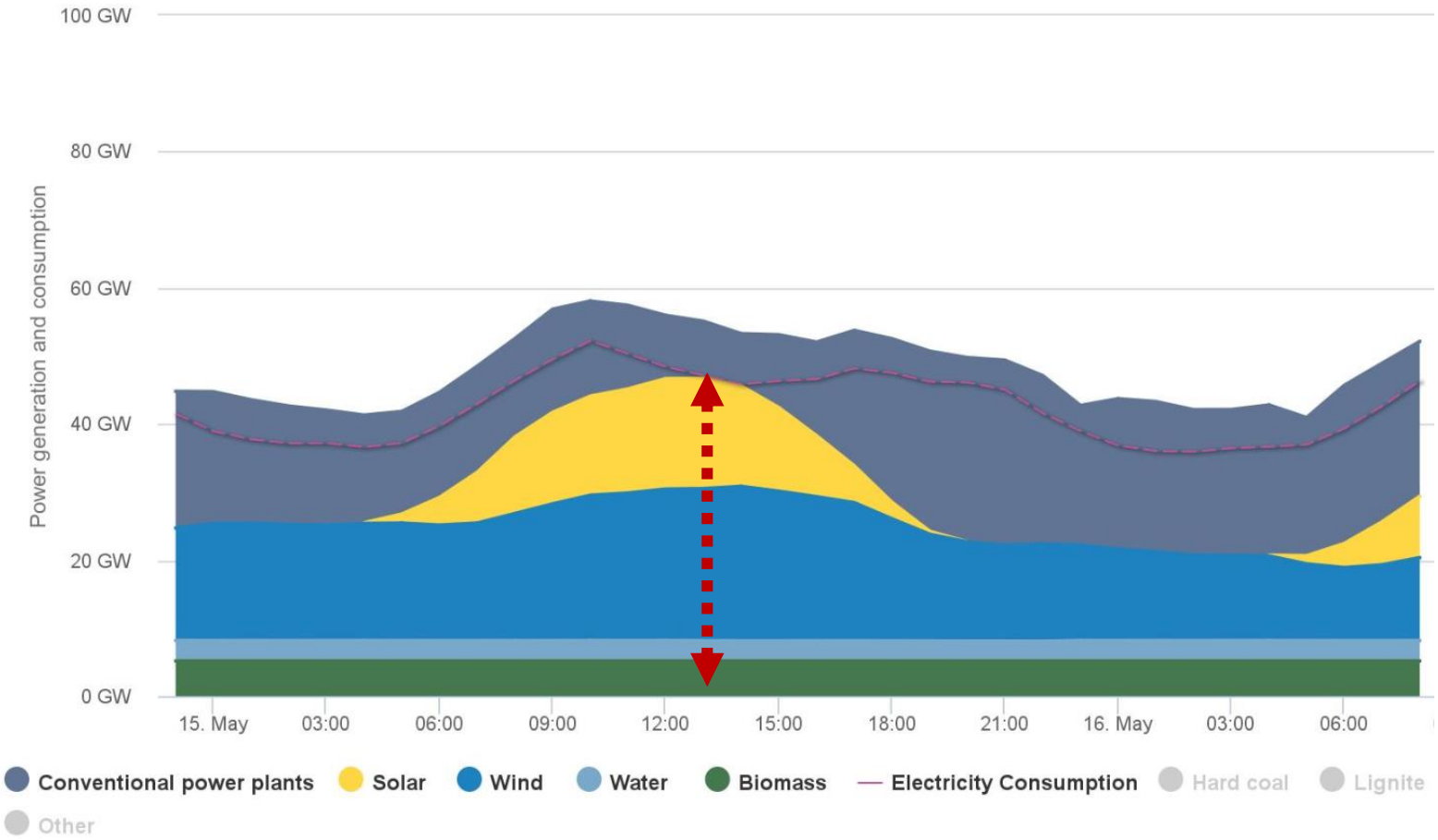


From **40 countries** studied, by 2030:

- In reference case, 15 countries **>10%** share
- REmap Options, 20 countries **>25%** share

Front runner countries – VRE generation capacity already exceeding peak demand

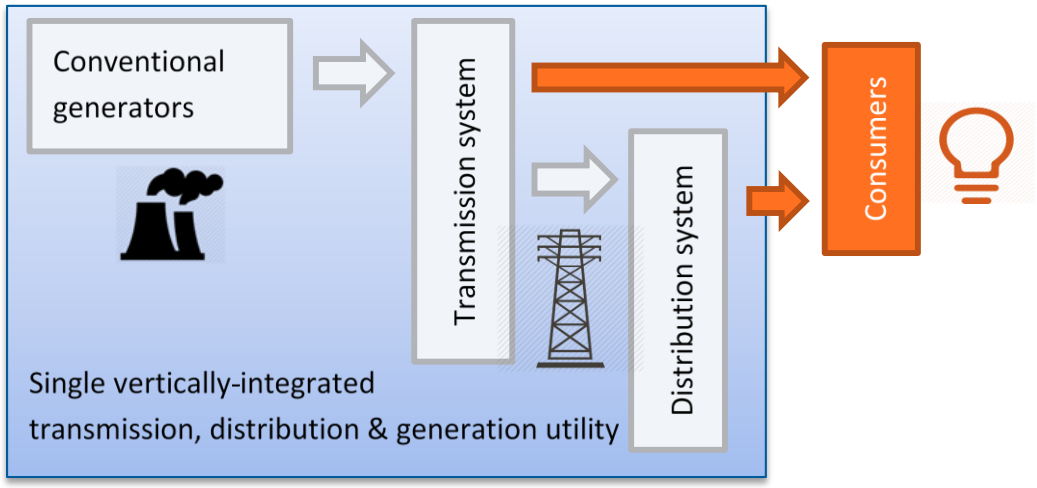
Germany, 15 May 2016



- Also Denmark, Portugal, California in the USA

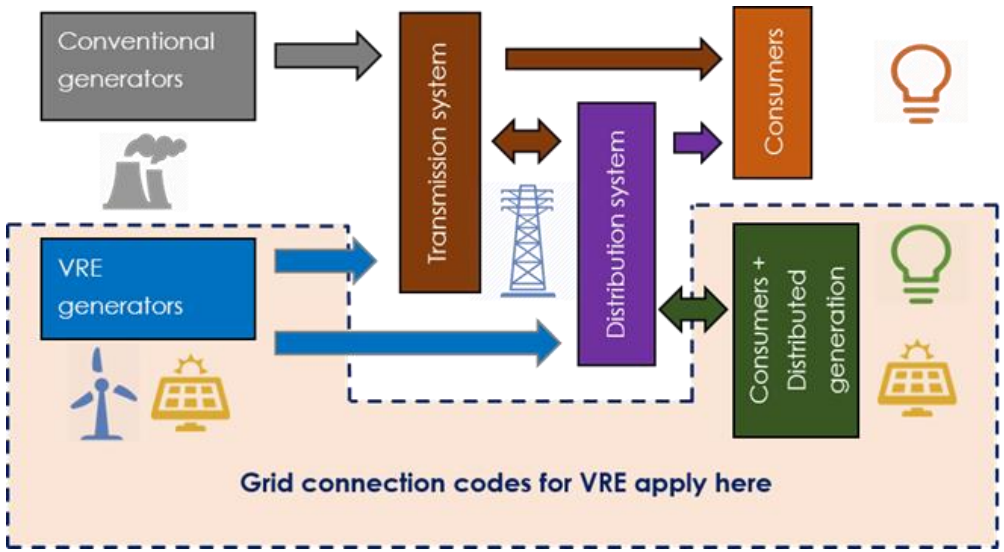
Source: Agora Energiewende

Power sector – change of paradigm



Traditional power system

- Centralized generation
- Utility owns grid and generators
- Internal rules and requirements



Unbundled power system

- Decentralized generation
- Separated ownership
- Need for grid code governance
- Digitalisation of the power sector

New regime calls for a holistic innovation approach

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POWER SECTOR TRANSFORMATION

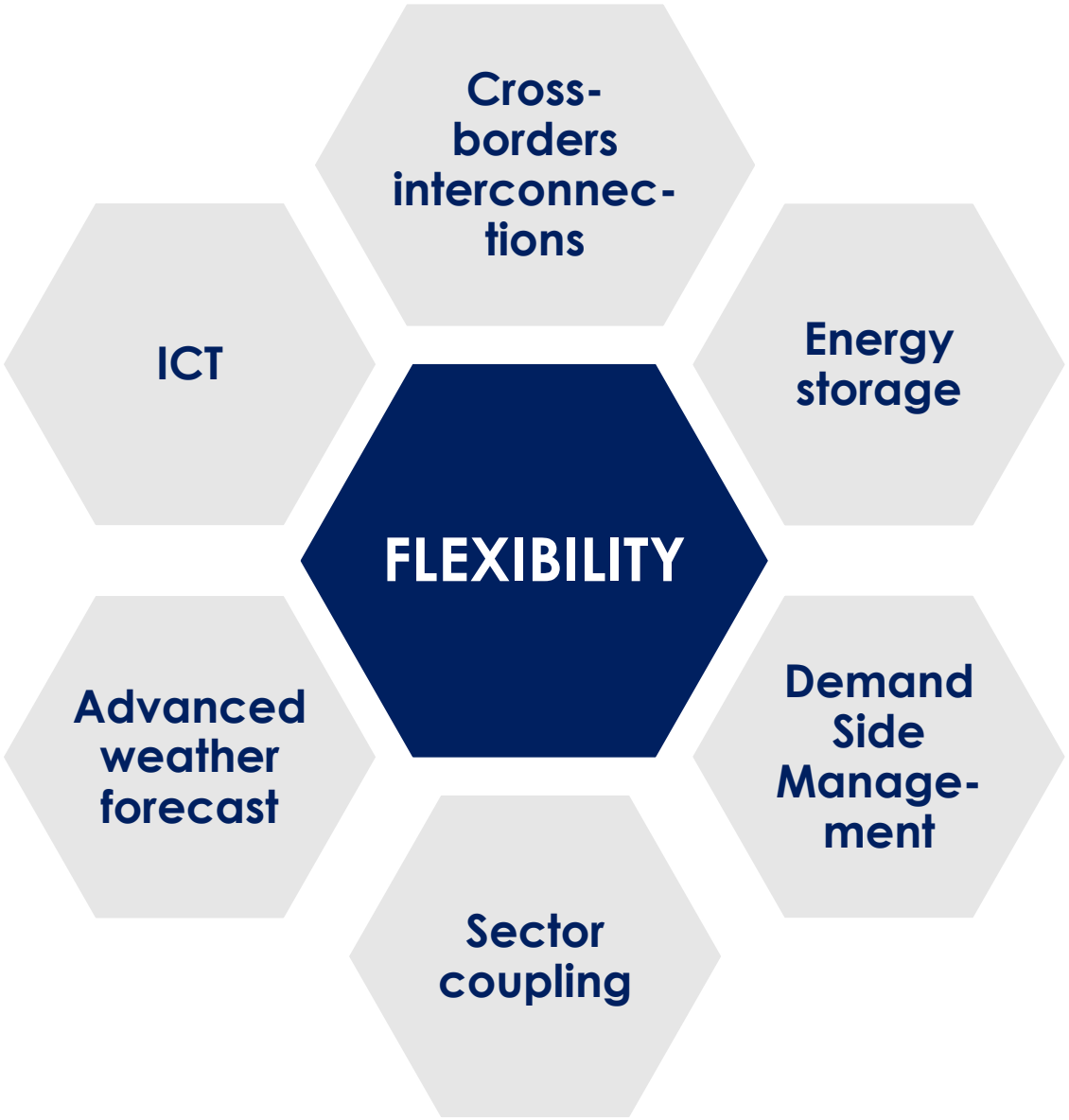
- Innovative **business models** for VRE
- Innovative **Market design & Financial instruments**
- **Enabling infrastructure** – system integration (ICT, DSM, Complementarities between RE sources)
- **Policies and regulations** to foster innovation

I. Market evolution

- From feed-in-tariffs to premium prices, CfD and auctions
- Trading from large blocks and long periods of stable prices towards real-time prices.
- New market actors – aggregators, EV charging stations

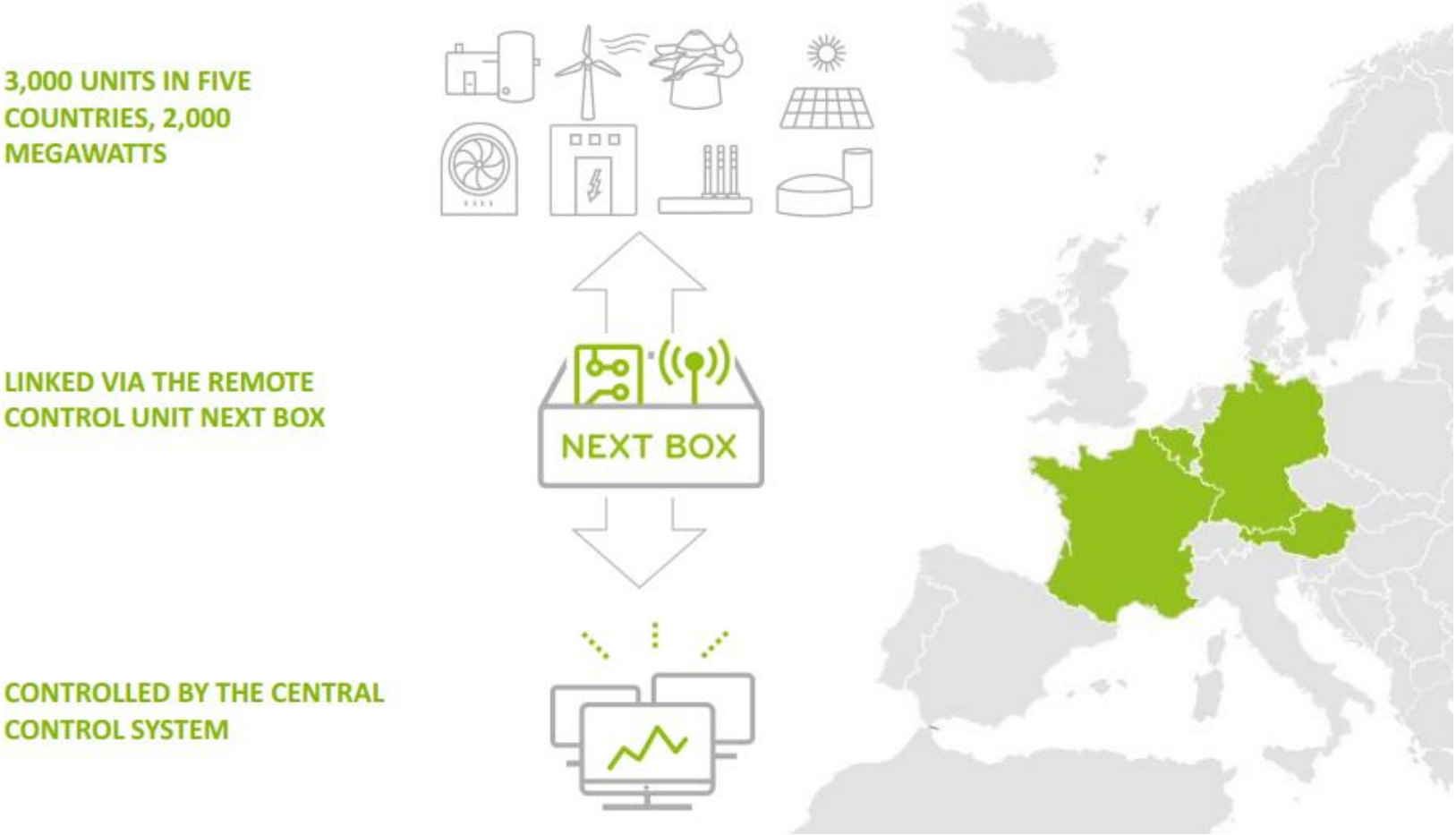
Image Source: Allposters

II. Infrastructure – flexibility options



III. Digitalisation of the power sector

E.g. Virtual power plants owned by millions



Source: Jochen Schwill (2016) The role of Virtual Power Plants in an increasingly decentralized energy sector, Next Kraftwerke,

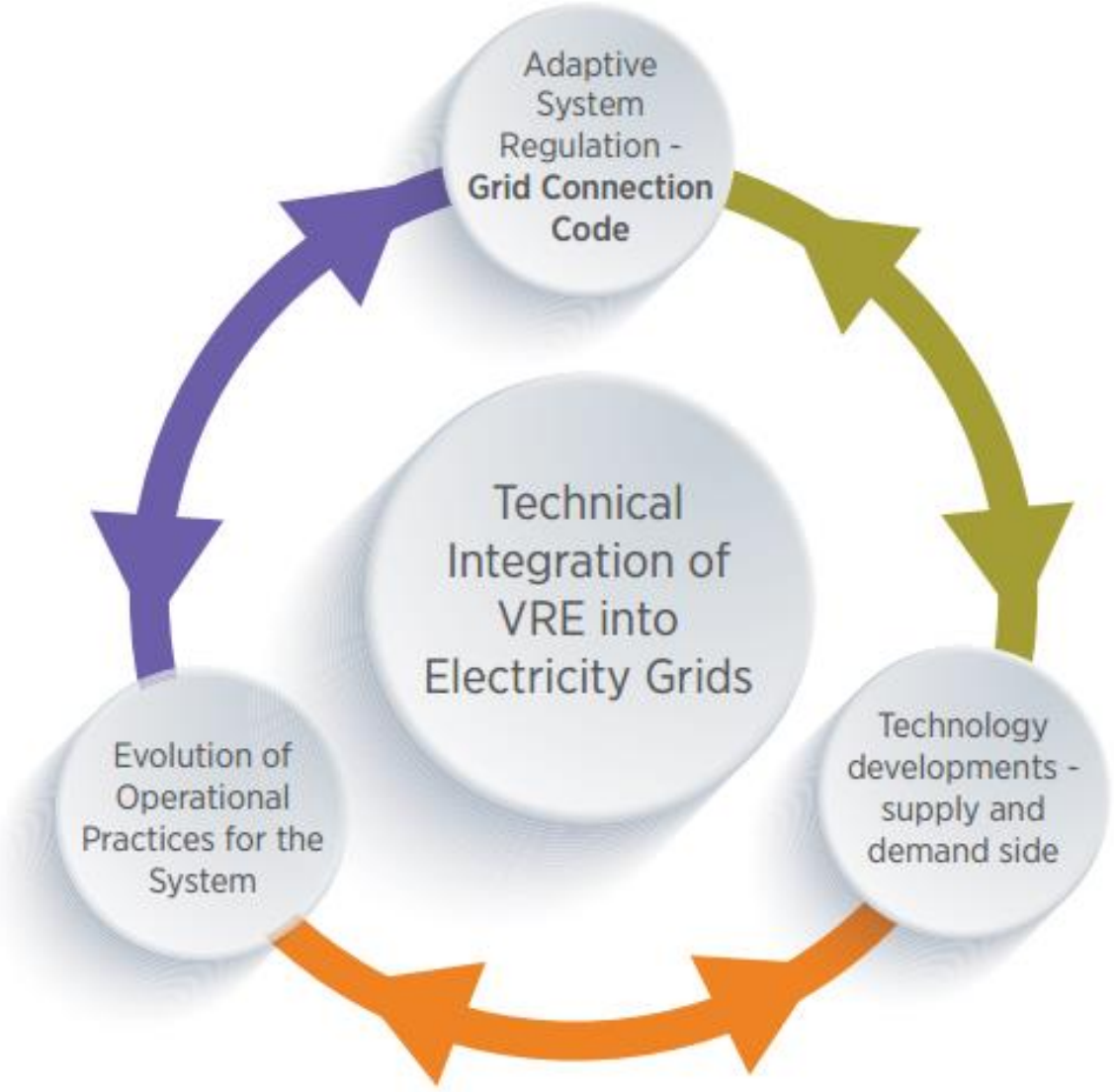
IV. Developing economies incubating tailored made solutions

Artificial intelligence for energy access

E.g. AZURI HomeSmart™: adaptive smart metering. Monitorinmg climatic conditions and automatically adjusting light brightness to meet the user's expected lighting duration

Image Source: ABB

V. Regulation stimulates technology innovation



Renewable power sector is very dynamic and innovative

Question:

From all these developments, what may work and what may not work in my country?

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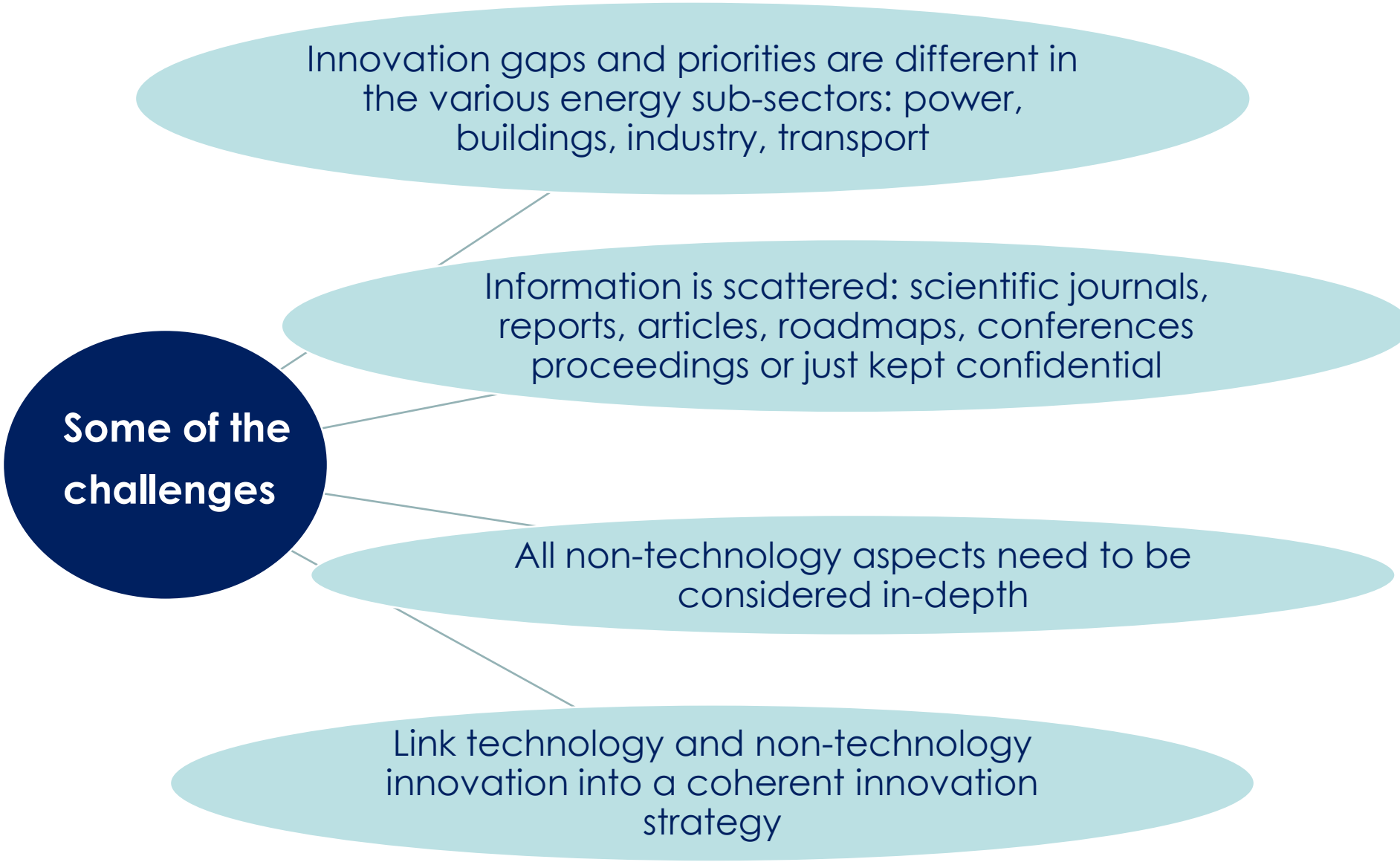
2 IRENA Study - Innovation Landscape for the Power Sector Transformation

IRENA Innovation Landscape Report



IRENA Innovation Landscape Report

Concept

- Present coherent and **practical view** on implementable innovation strategies for different sub-sectors
- Report every other year with a focus on a **different sub-sector**
- **Platform for engagement** with member countries to learn from good and innovative approaches

Objective

- ***Provide information*** to support countries in:
  - **Innovative approaches** to accelerate the transformation of the power sector, r**eplicable and implementable** in their country context
  - Implementing strategies that **do not overlook** any aspect for successful innovation
  - **Shift in technology focus**: from generation technologies to enabling technologies/system integration (e.g. storage, ICT)

Scope of the Report – from Innovation Week and Innovation Day

Innovation Week

- 200+ experts from public and private sector
- Discussions across the complete innovation life cycle, from R&D to commercialisation

Innovation Day

- Interaction with member countries after 11th Council Meeting
- Main feedback: Theme PST, look at non-technical aspects, replicable case studies

7th Assembly

- Ministerial Roundtable and Plenary Discussion on innovation

Theme for the first Innovation Landscape report

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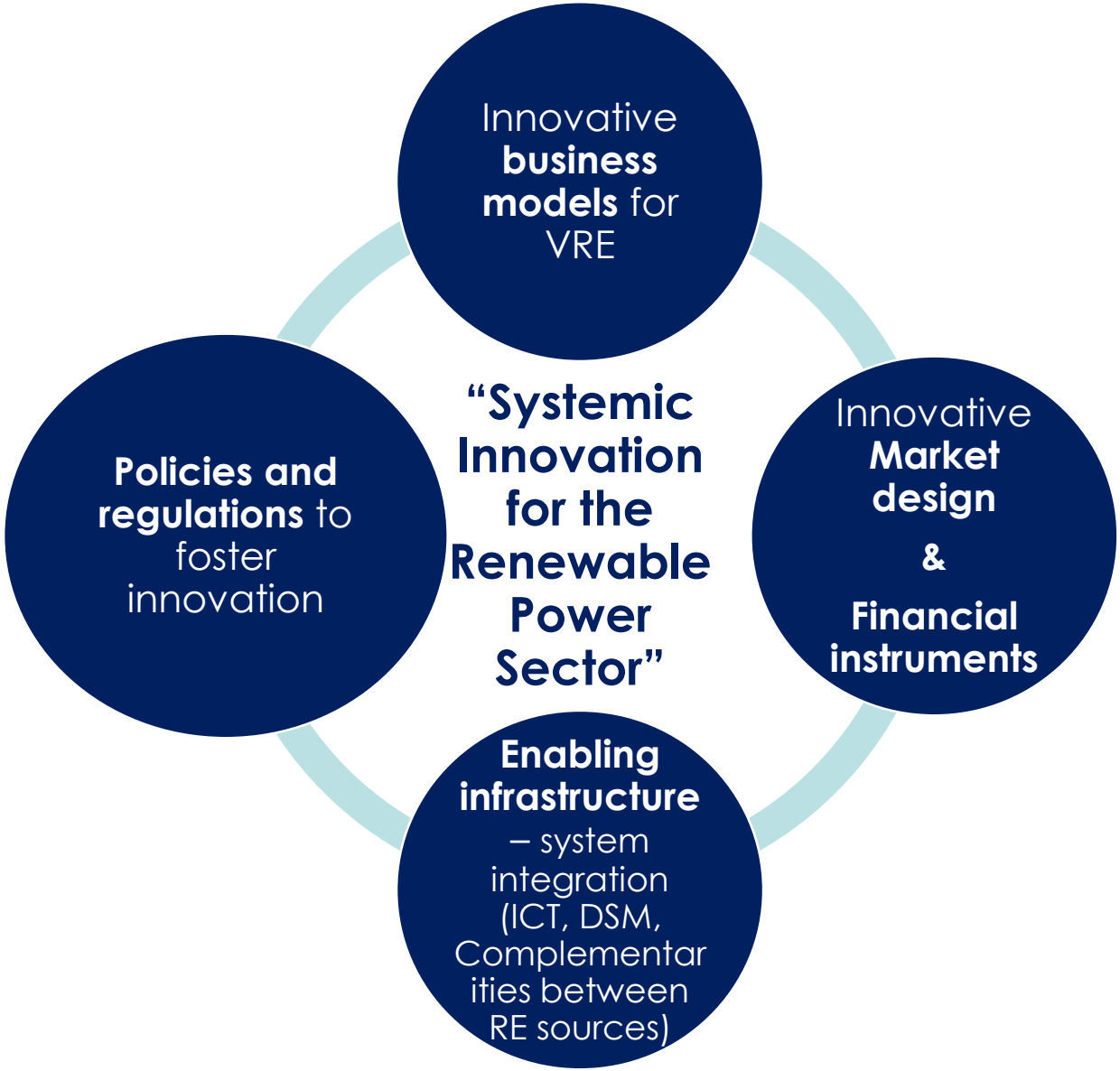

Process for the development of the report

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Data collection and analysis

- Latest information on promising innovations (*systemic innovation*) and in integration of technologies into energy systems (*system innovation*)
- Identification of potential game changers

Documenting case studies

- What are the latest innovative developments from industry, academia, governments
- Focus on systemic and system innovation

Synthesis

- What has worked and what has not worked?
- Under which conditions are these replicable and implementable?

Methodology

- Surveys with governments, private sector and academia
- Expert elicitation
- Literature
- IRENA's and other organisations information

Status and Next steps

Status

- Scoping paper
- Feedback from member countries and other stakeholders
- Collection of case studies started

Next steps - 2017

- Complete data collection
- Analysis of case studies
- Drafts circulated for discussion
- Final draft in Q4 2017

Engagement with countries and stakeholders

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3 Opportunities for Engagement with member countries

Opportunities for engagement with member countries

Actively engage in this work

- Three experts workshops
  - Host expert workshops
- National experts to work with IRENA staff
- In-kind contributions from country expert organisations
- Bridge with country industry

Questions for Discussion

- Are the priority areas define for the Innovation Landscaper Report towards a zero-carbon power sector covering all the relevant aspects ?

- What are other opportunities for member countries to actively engage in this work?

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Thank you

Contact us with your suggestions

Contact us at **inspire@irena.org** :

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- Francisco Boshell
- Alessandra Salgado