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International Renewable Energy Agency

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FlexTool

TRAINING FOR ASEAN

OPENING SESSION: IRENA projects and initiatives in ASEAN – a renewable energy roadmap and flexibility analysis

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IRENA's Engagement in ASEAN

Badariah Yosiyana, Programme Officer, Southeast Asia
Flextool Virtual Training, 2 June 2020

About IRENA

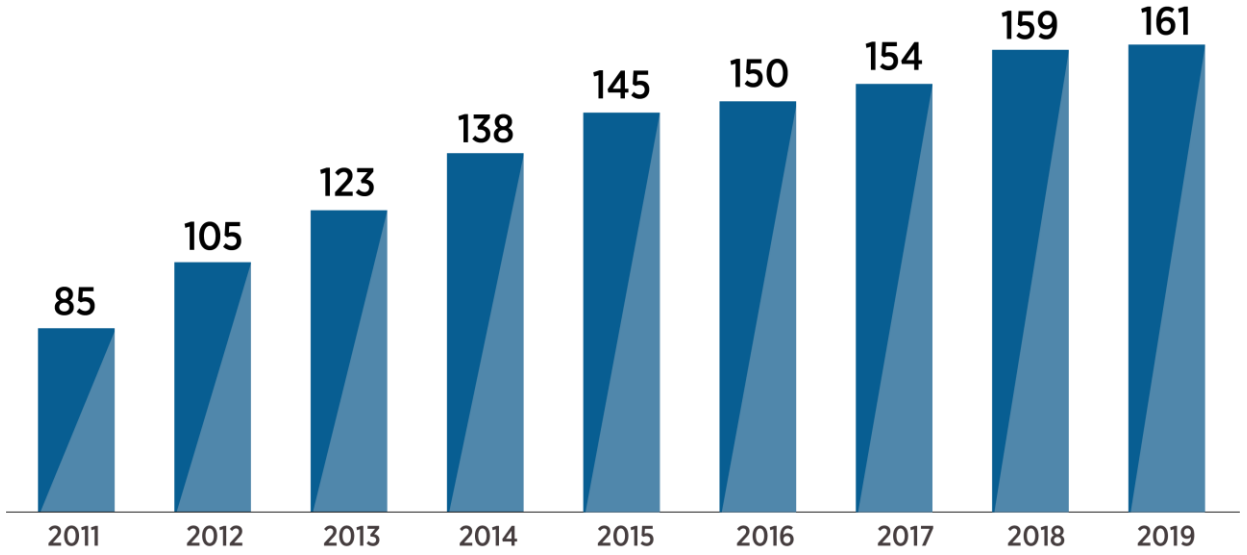
Established in 2011.

161 Members
22 States in accession.

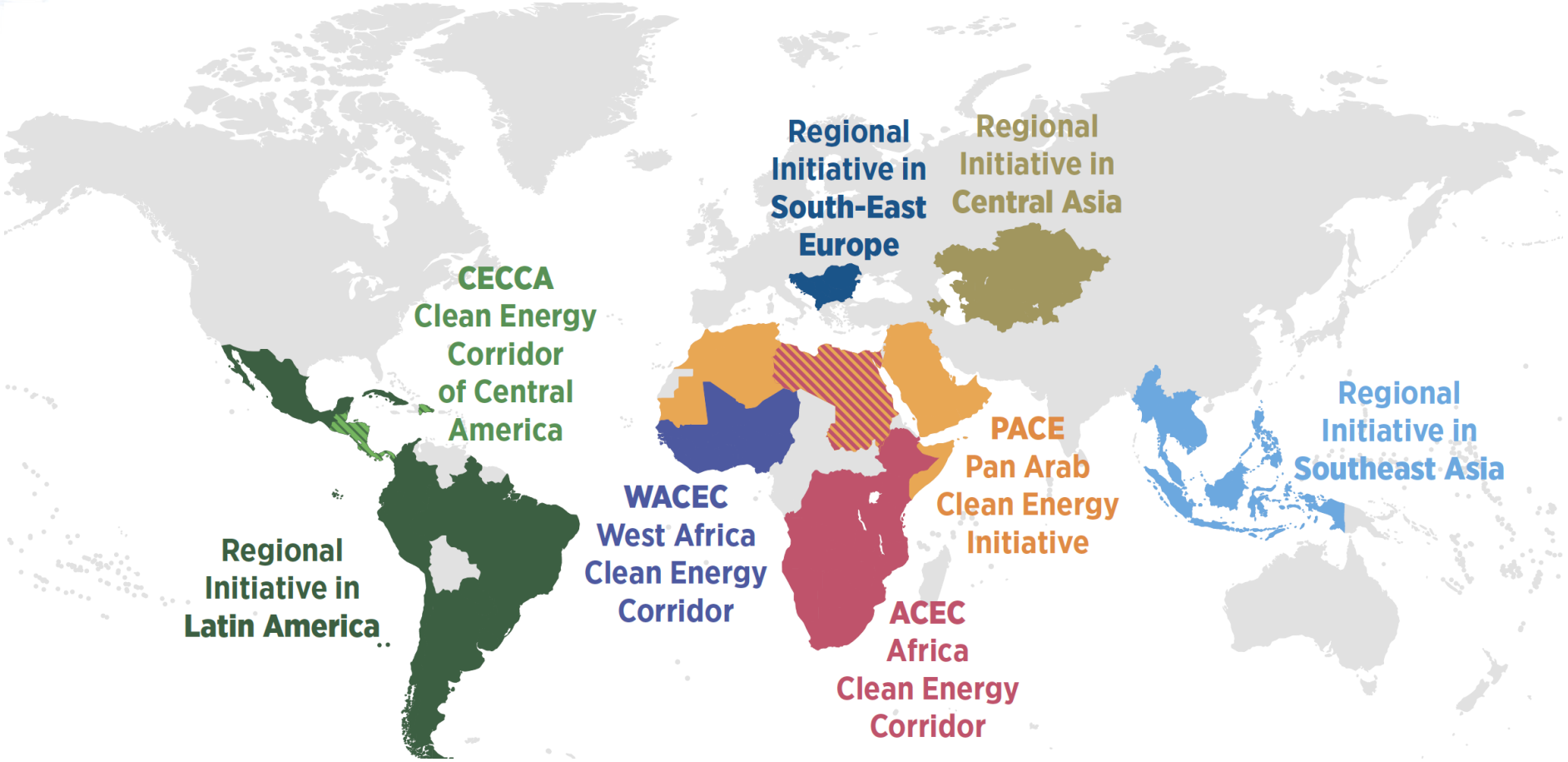
Mandate: to promote the widespread adoption and sustainable use of all forms of renewable energy

IRENA serves as:

- Centre of excellence for knowledge and innovation
- Global voice of renewables
- Network hub
- Source of advice and support



IRENA Regional Initiatives



Strengthened dialogue with ASEAN: MoU and Associated Action Plan

ASEAN-IRENA MoU signed on 30 October 2018
at the 36th AMEM
in conjunction with the Singapore International Energy Week

Areas of Cooperation:

Energy planning, including integration of high-shares of renewables	Assessments and roadmaps for accelerated deployment of renewables	Enabling policy and regulatory frameworks to scale up deployment
Renewable energy project facilitation support	Capacity Building as a cross cutting priority	Renewable energy technology assessments

Supporting the region in renewable energy agenda

- **RE Workshops** on Policy Support Mechanisms for Southeast Asia, Nov 2018 in **Kuala Lumpur**, Accelerating Investments in Southeast Asia, May 2019 in **Da Nang**, and Regional Project Facilitation, Aug 2019 in **Brunei Darussalam.**

- **Renewable Energy Innovation Day, Sept 2019 in Bangkok (in conjunction with AMEM/AEBF)**
  Focusing on innovative solutions for reliable integration of VRE in power system, digital technologies, storage and hydrogen

- **Participating in energy events of ASEAN Member States**
  Roundtable discussion on Global Energy Transformation: A Roadmap to 2050 at **Singapore International Energy Week (SIEW)** at 31 October 2019; **Indo EBTKE Conex** in November 2019; **Vietnam Energy Partnership Group** in December 2019, etc.

Working together to go further – priority for 2020/2021

- **ASEAN RE Outlook Update and Regional Power Flexibility**
  Larger energy transition view to 2050, using REmap and Flextool tools as basis
- **Biomass strategy for sustainable bioenergy production in Southeast Asia**
  To develop regional strategy on scaling up the use of biomass for accelerated deployment of sustainable and modern bioenergy
- **Webinars on various RE topics**
  Two to three webinars will be conducted on various RE topic: Flextool webinar training for Southeast Asia on June,2
- **Country roadmaps (REmap/RRA) and Power Flexibility Assessment for Indonesia and Malaysia, Socio-economic benefits of RE for Indonesia**
- **IRENA Investment Forum in 2021**
- **Participating in energy events of ASEAN Member States**

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IRENA's Renewable Energy Roadmap, REmap

ASEAN

REmap/Flextool

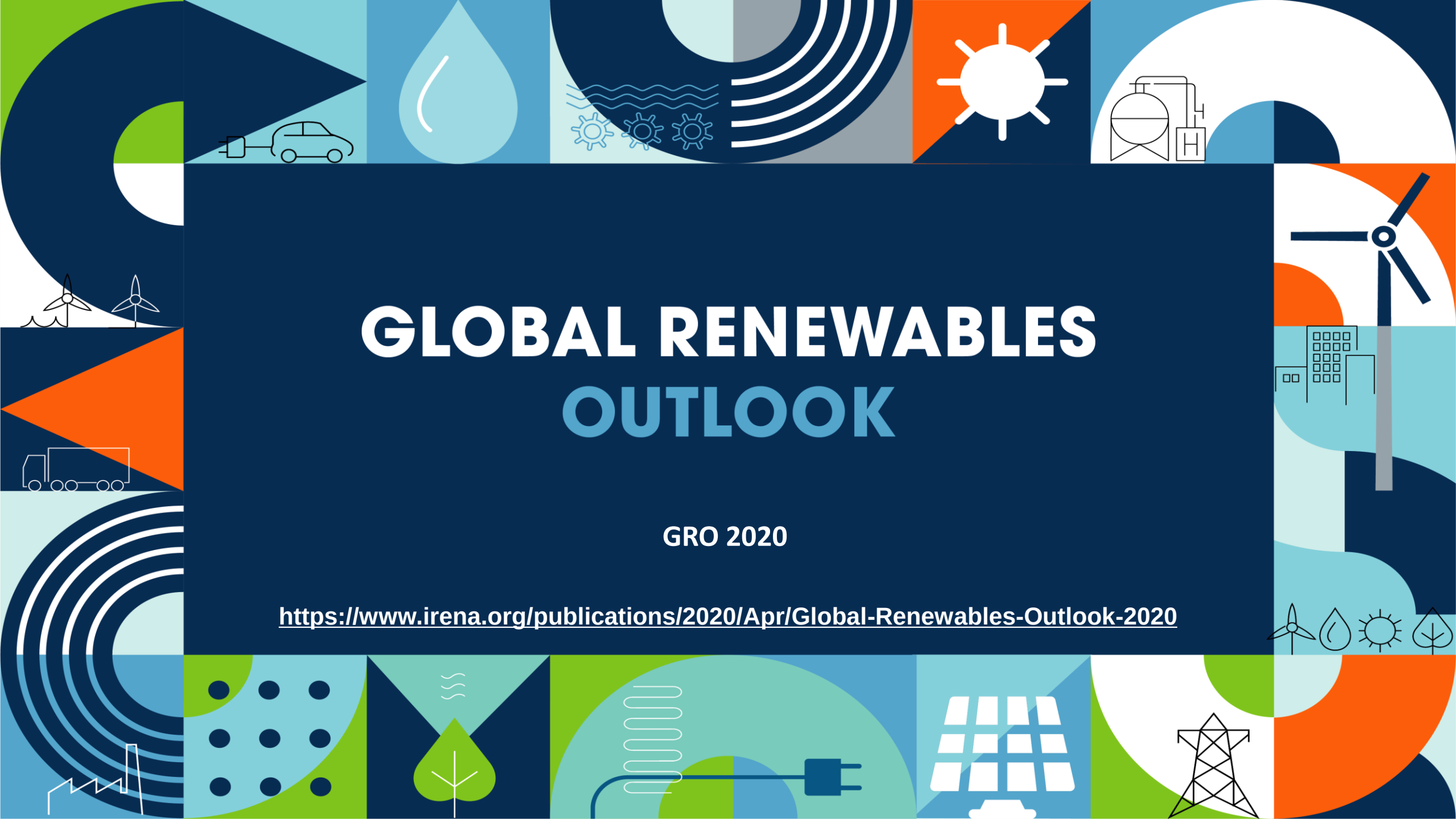
Webinar, 15 May 2020

ASEAN Renewables Outlook and Related Activities

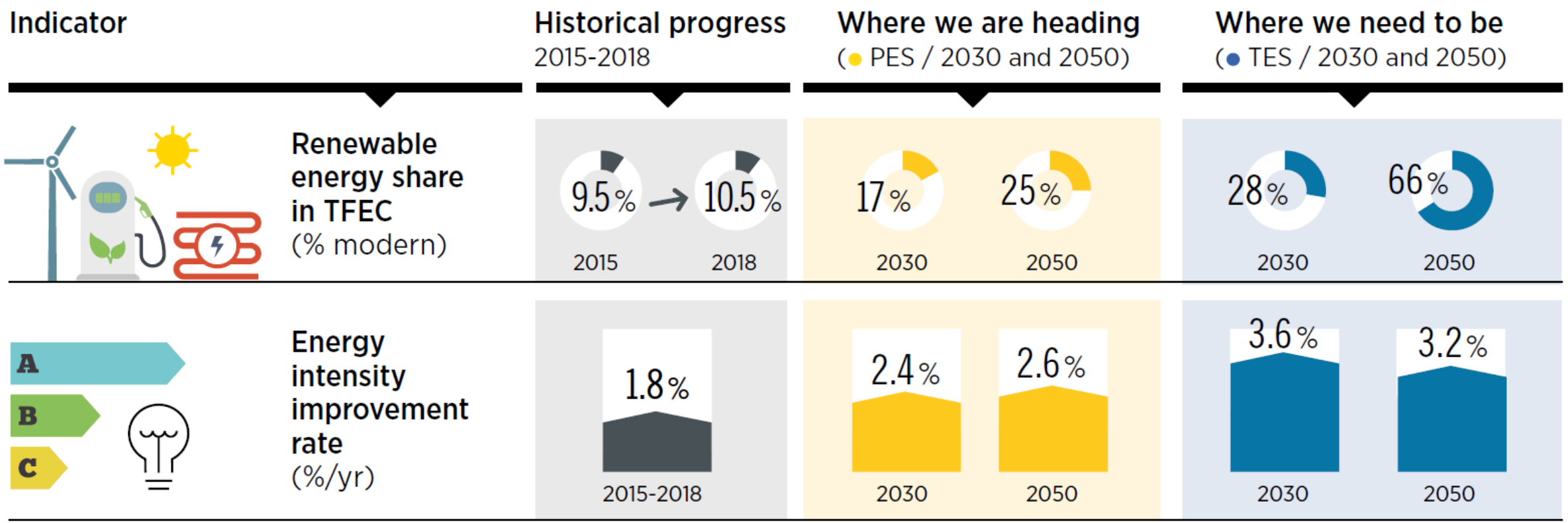
ASEAN Renewables Outlook regional report

- Successor to the 2016 Renewable Energy Outlook for ASEAN
- Outlook to 2050 for 10 AMS and regional implications, cooperation opportunities, investments, technologies, costs, emissions, NDCs
- Focus on two main pathways:
  - *Planned Energy Scenario* (PES) – current and planned policies (Ref Case)
  - *Transforming Energy Scenario* (TES) – emphasis on RE and EE, but not limited to these technologies. Alignment with Paris Agreement (REmap Case)
- Project kick-off June 2020, final report Q3/Q4 2021

- In parallel regional power system analysis (FlexTool), and two country power analyses
- In parallel two country outlooks (REmap, FlexTool)
- Outlook will also be used for macro-economic analysis (separate report and workstream)
- Used for IRENA Investment Forum planned for 2021

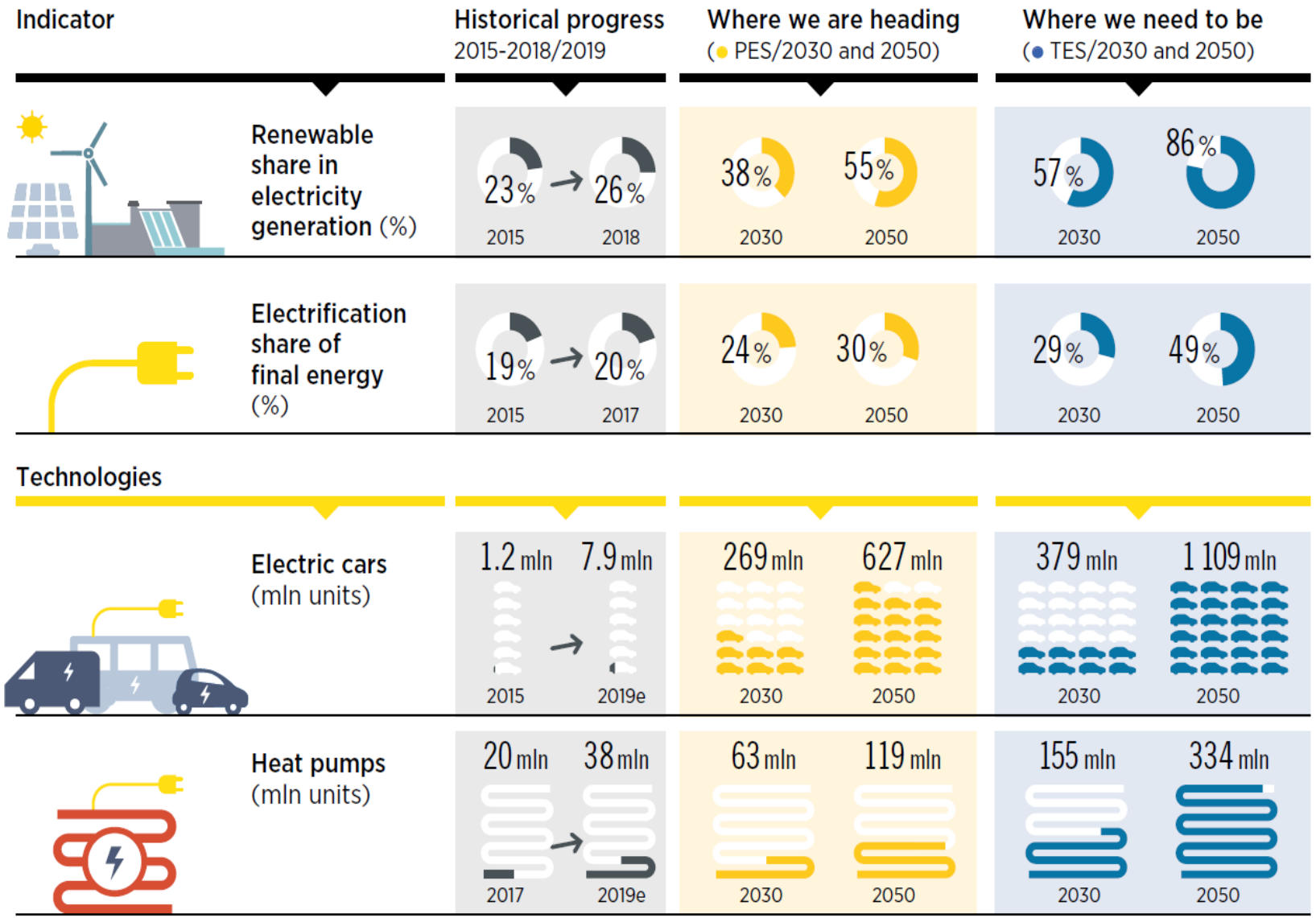

GLOBAL RENEWABLES
OUTLOOK
GRO 2020
https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020

GRO 2020: Renewables in the world's energy mix: Six-fold increase needed



- **Energy efficiency improvements must be scaled up** rapidly and substantially.
- **Renewable energy and energy efficiency together offer over 90% of the mitigation measures** needed to reduce energy-related emissions in the Transforming Energy Scenario.

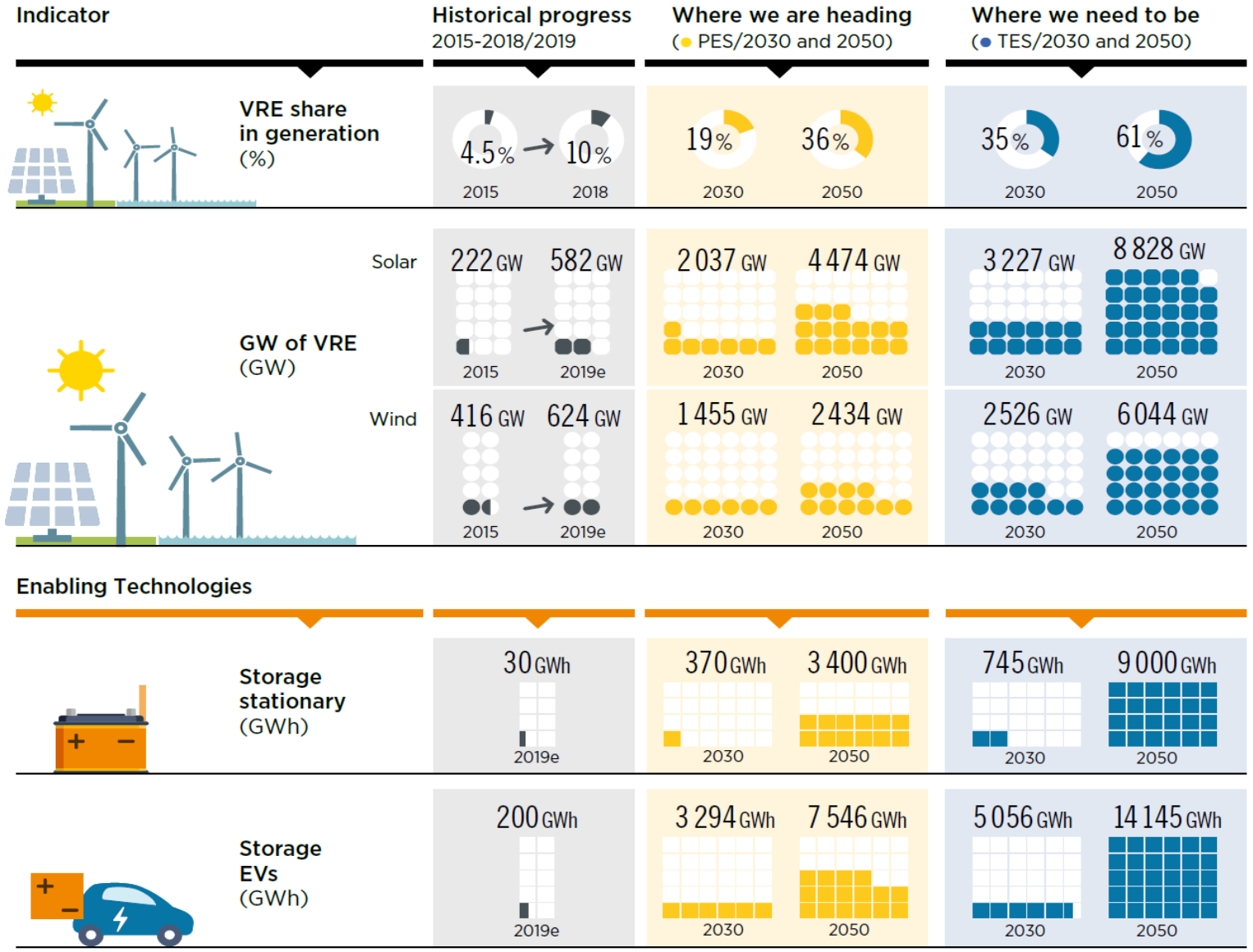
GRO 2020: An increasingly electrified energy system



- **Renewable power generation technologies are setting records for low costs and new capacity** despite falling renewable energy subsidies and slowing global GDP growth.
- **The rate of growth in the percentage share of electricity** (percentage point "ppt") **in final energy needs to quadruple**, from an increase of 0.25 ppt/yr to 1.0 ppt/yr.
- **The electrification of end uses will drive increased power demand to be met with renewables**

GRO 2020: The need for power system flexibility

- **Flexibility in power systems is a key enabler for the integration of high shares of variable renewable electricity** – the backbone of the electricity system of the future.
- **Power systems must achieve maximum flexibility**, based on current and ongoing innovations in enabling technologies, business models, market design and system operation.
- On a technology level, **both long-term and short-term storage will be important for adding flexibility**.



GRO 2020: Global energy decarbonisation: Different regional transition paths

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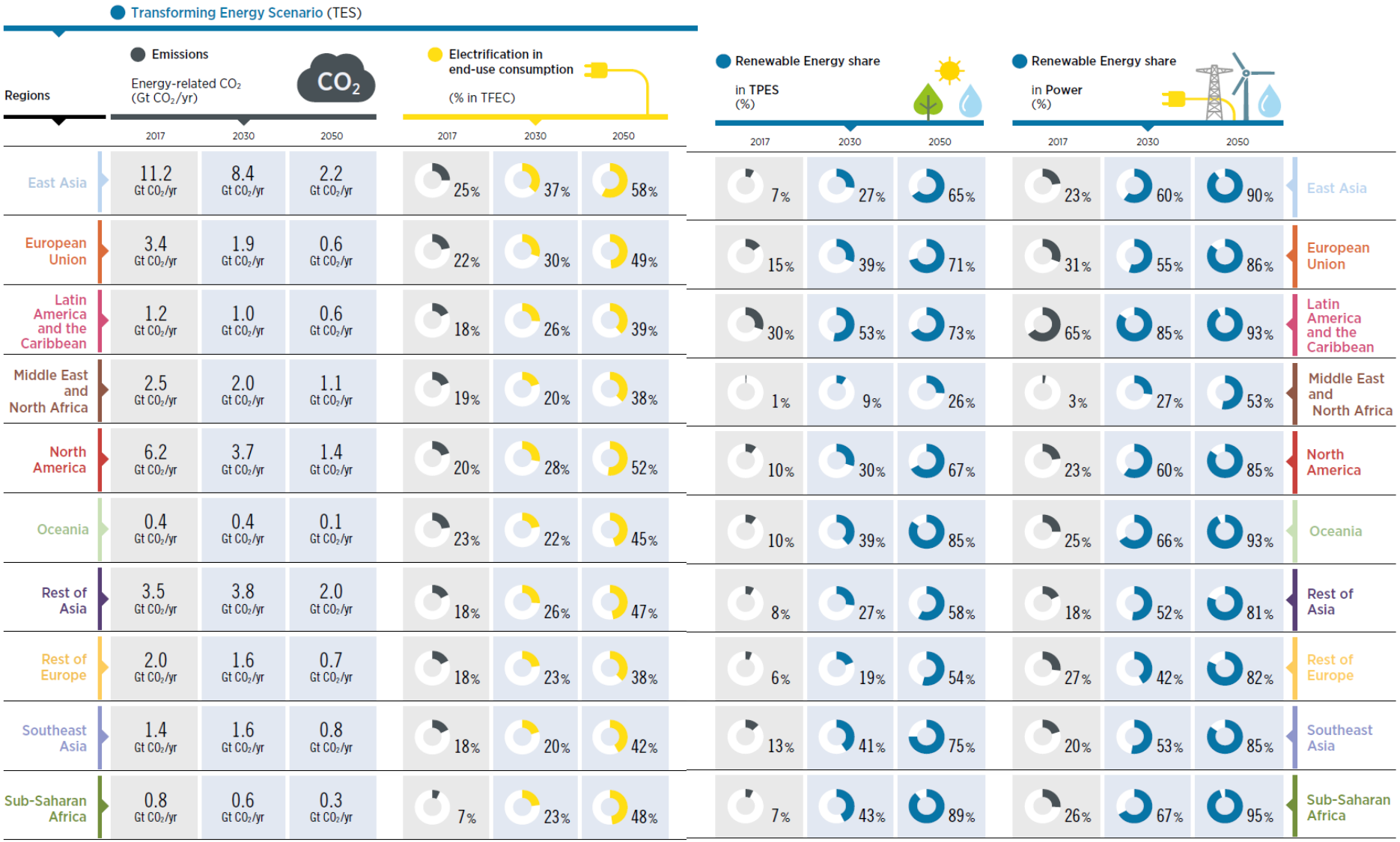

- **Ramping up regional ambitions will be crucial** to meet interlinked energy and climate goals
- Despite varied transition paths, all regions would see **higher shares of renewable energy use**, with **South East Asia** poised to reach more than **85%** shares in total energy mixes by 2050.

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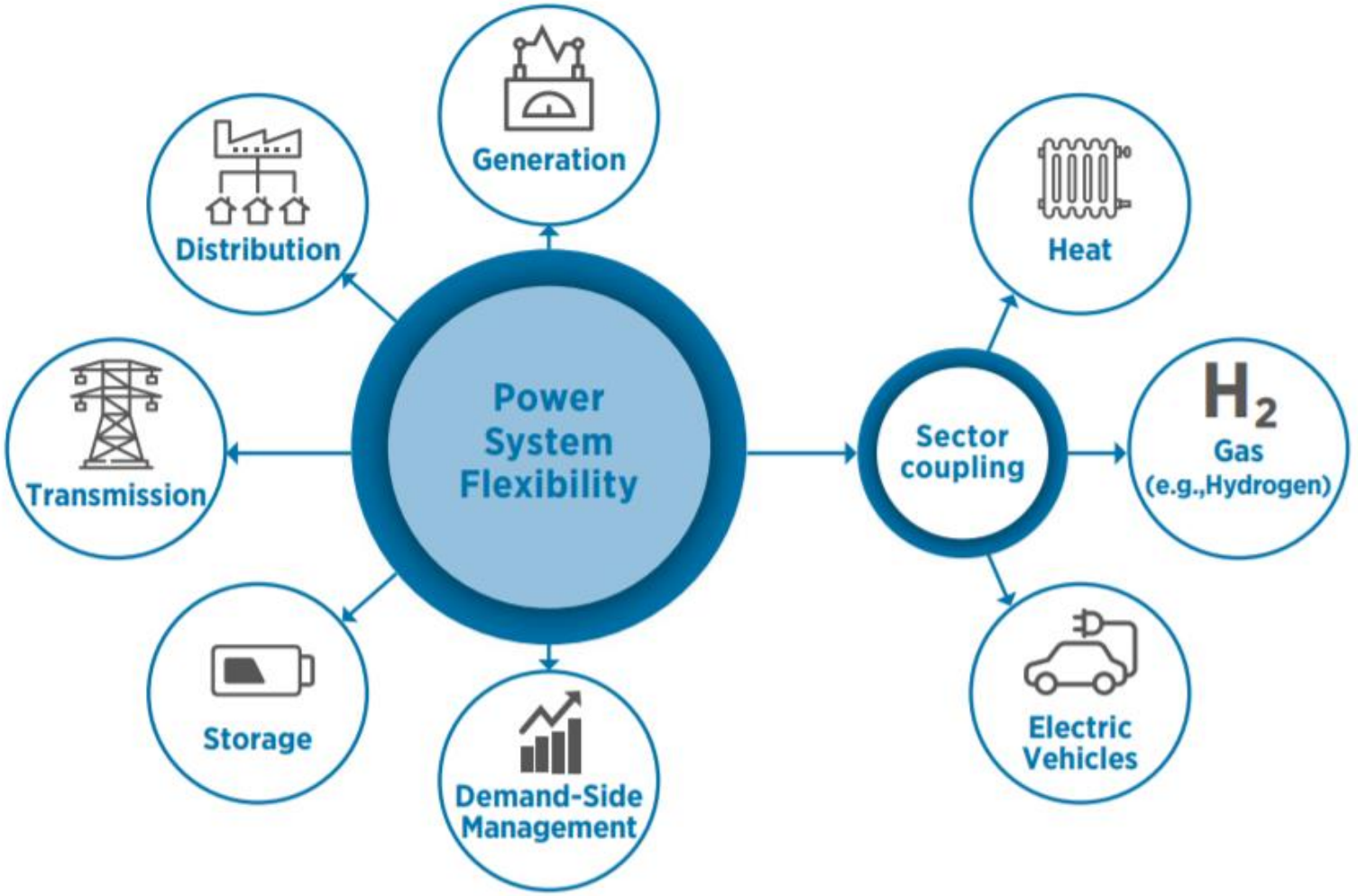
Flexibility Assessment for ASEAN, Flextool

IRENA FlexTool Training for ASEAN region, 02 June 2020

Power System Flexibility according to IRENA



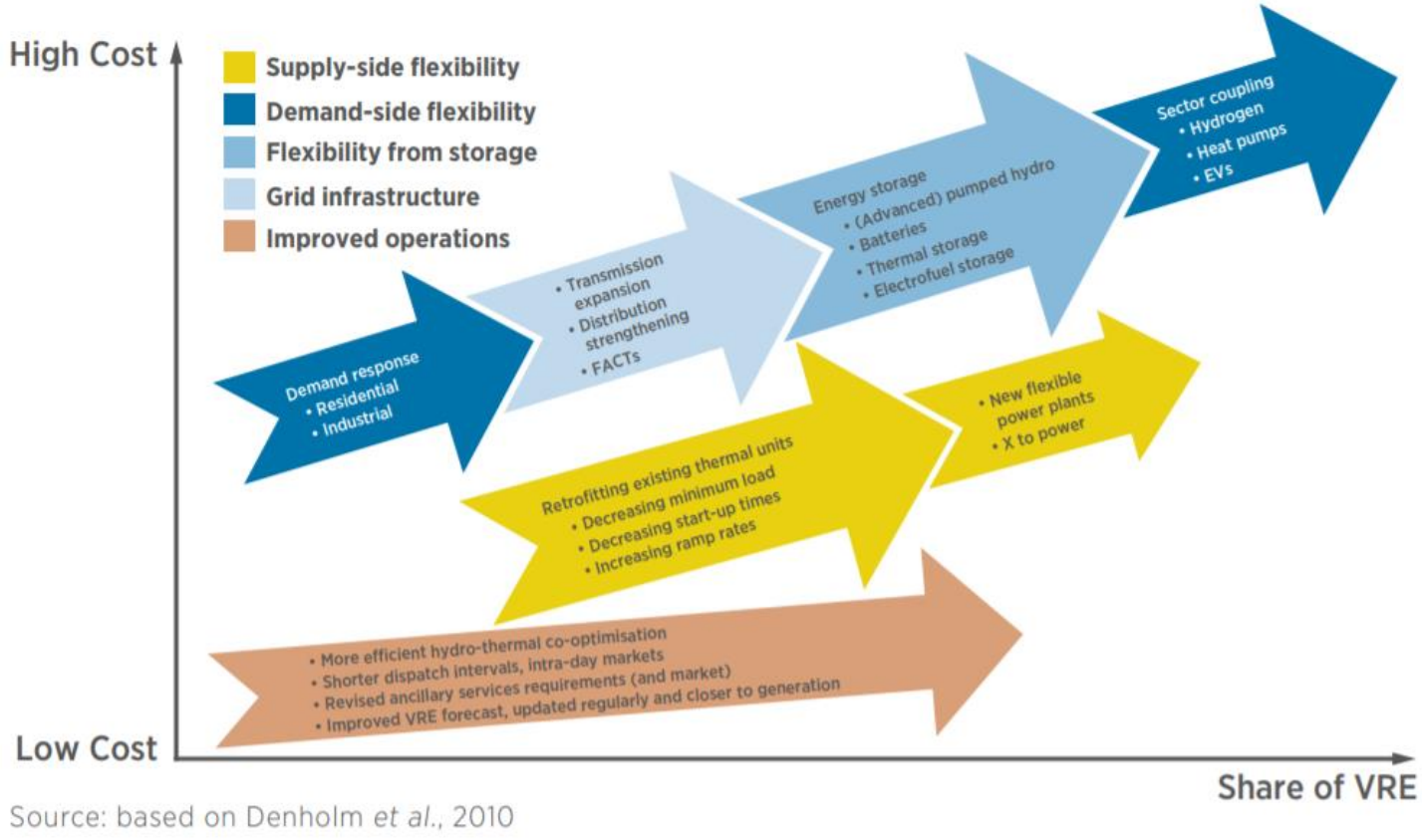
Flexibility according to IRENA (2018):

"*Flexibility is the capability of a power system to cope with the variability and uncertainty that VRE generation introduces into the system at different time scales, from very short to the long term, avoiding curtailment of VRE and reliably supplying all the demanded energy to customers*"

A combination of solutions is needed

IRENA FlexTool

- **Main flexibility sources**
  - **Generation**
    - Hydro, gas
  - **Grid**
    - Variable rating lines, T&D enhancement
    - Smart Grids
  - **Storage**
    - Pumped Hydro
    - Batteries
    - V2G
  - **Demand Response**
    - Conventional: DSM, aggregation
    - Sector coupling: Heat pumps, boilers, H2
  - **Market/Institutional**
    - Unlock flexibility/remove barriers
    - Regulation needs to support flexibility



Source: based on Denholm *et al.*, 2010

IRENA FlexTool: Present and Future

Present and Future Work

1. *Assessing Regional Integration*
   a) Central America (Panama, first country)
   b) ASEAN (Thailand, first country)

2. *FlexTool Training*
   a) Cuba (November 2019)
   b) Latin America (19 May 2020)
   c) ASEAN (2 June 2020)
   d) MENA (July 2020)

Objectives of the flexibility assessments

The **IRENA FlexTool** performs both **capacity expansion** and **economic dispatch** of a power system with a focus on power system flexibility

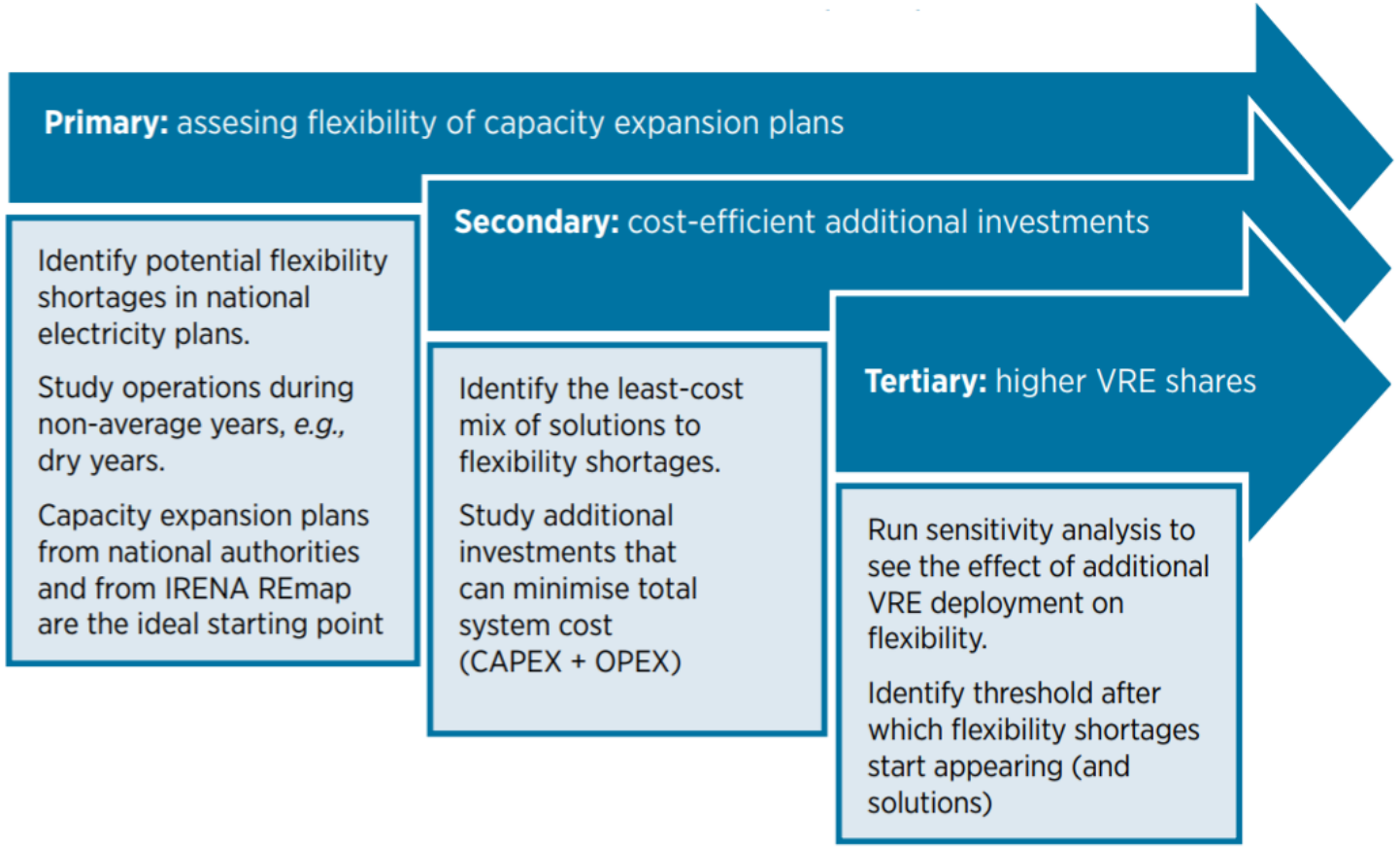
Objectives of the FlexTool studies

1. Analyze **power system flexibility** using a base year (e.g., 2017)

2. Analyze **power system flexibility in the future** using **REmap projections** and national expansion plans

3. Analyze the **value of regional integration**

4. Study if there could be **cost-efficient additional investments in more VRE or flexibility solutions** (e.g., sector coupling)



Regional and Country Assessment

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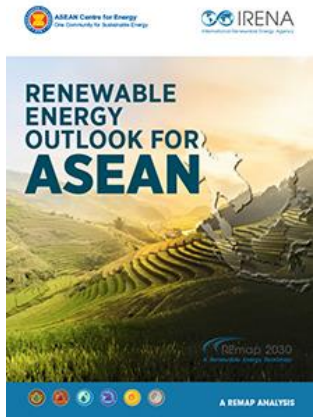
Regional perspective:

- Takes into account countries individual capabilities and evaluate potential complementarities to **support increasing shares of renewables in the region.**

2021 Edition



Individual country perspective:

- Takes into account countries individual capabilities and challenges to achieve increasing shares of renewables at the national level.

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