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GLOBAL RENEWABLES OUTLOOK

https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020

IRENA's Global Renewables Outlook and implications for the ASEAN region

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REmap products

Global

- Status of the energy transition
- Perspective for the global energy system to 2050 based on current and planned policies (the Reference Case).
- Detailed REmap transition pathway to 2050 – an energy pathway aligned with the well-below 2oC target of the Paris climate goals.
- **6 global reports ('14, '16, '17, '18, '19, '20)**

Regional

- Assessment of technology options and regional disaggregation
- Identification of key technologies and trends, and cross-country opportunities
- 4 regional reports (Africa, SEE, **ASEAN** and EU)
- 2 in preparation (CA, **ASEAN 2.0)**

Country

- Insights for policy and decision makers for areas in which action is needed at a country level
- 13 country reports for major economies
- **2 near finalization, 2 more in pipeline**

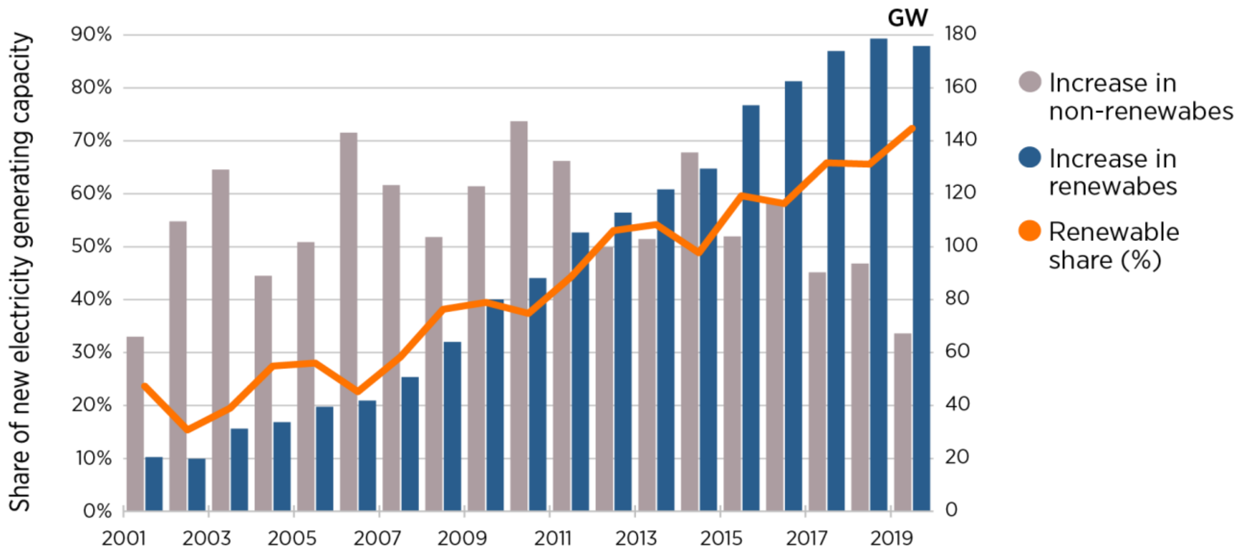
Thematic

- Provide detailed technical and economic analysis on specific topics (i.e. Future of Wind/Solar PV,RE investments, stranded assets, district heating and cooling etc.)
- **9 thematic studies**

Renewables continue to dominate new capacity expansion

Context pre-COVID19: Renewable energy competitiveness dominating new capacity expansion

- Global leading role: ~70% the share of renewable energy over total capacity expansion in 2019. Reaching one third of global installed capacity.
- Significant cost decrease in the past decade and RE projects gaining competitiveness over fossil fuel.
- COVID19: negative impact in all energy markets in the short term. However, **raising sustainability awareness** - on the agenda.



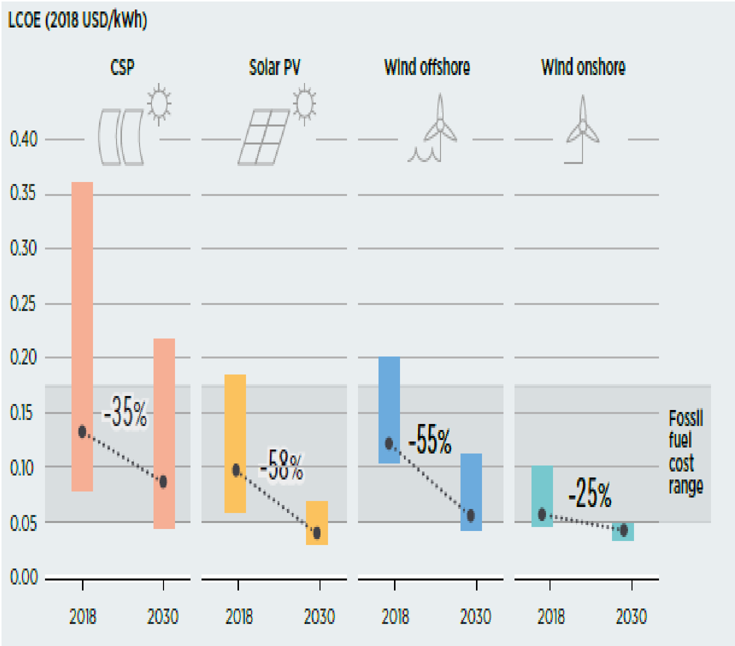
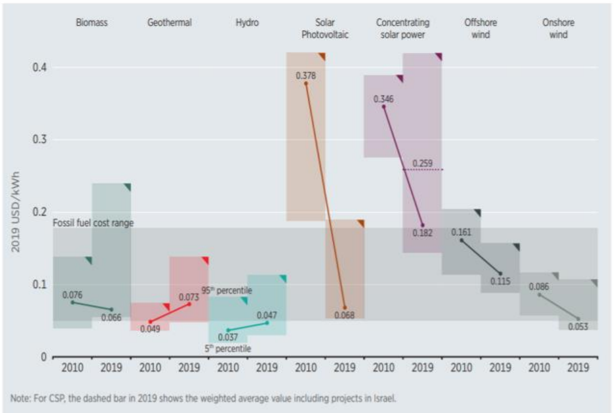


Figure ES.1 Global weighted average levelised cost of electricity from utility-scale renewable power generation technologies, 2010 and 2019



Note: For CSP, the dashed bar in 2019 shows the weighted average value including projects in Israel.

Note: This data is for the year of commissioning. The thick lines are the global weighted-average LCOE value derived from the individual plants commissioned in each year. The project-level LCOE is calculated with a real weighted average cost of capital (WACC) is 7.5% for OECD countries and China and 10% for the rest of the world. The single band represents the fossil fuel-fired power generation cost range, while the bands for each technology and year represent the 5th and 95th percentile bands for renewable projects.

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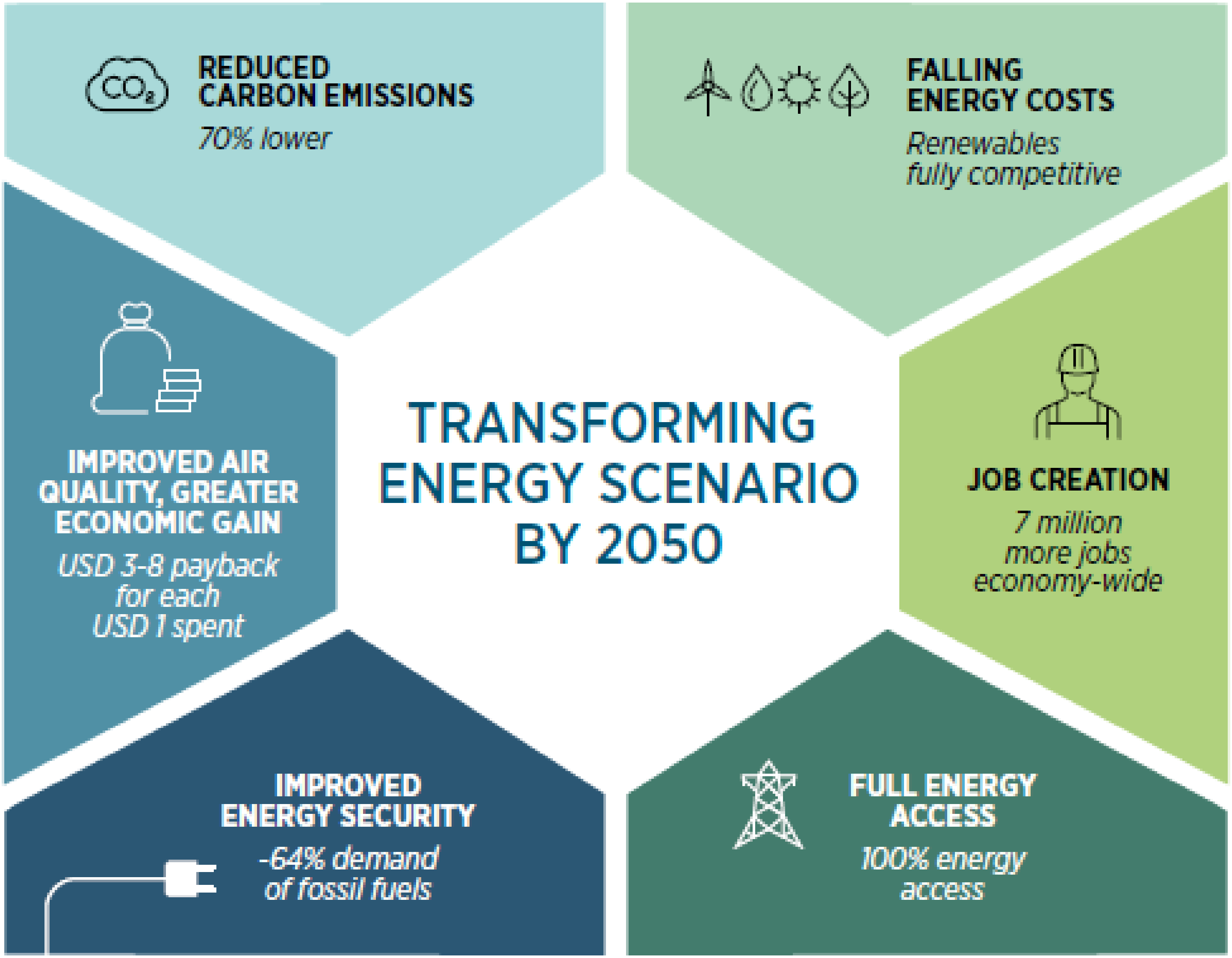
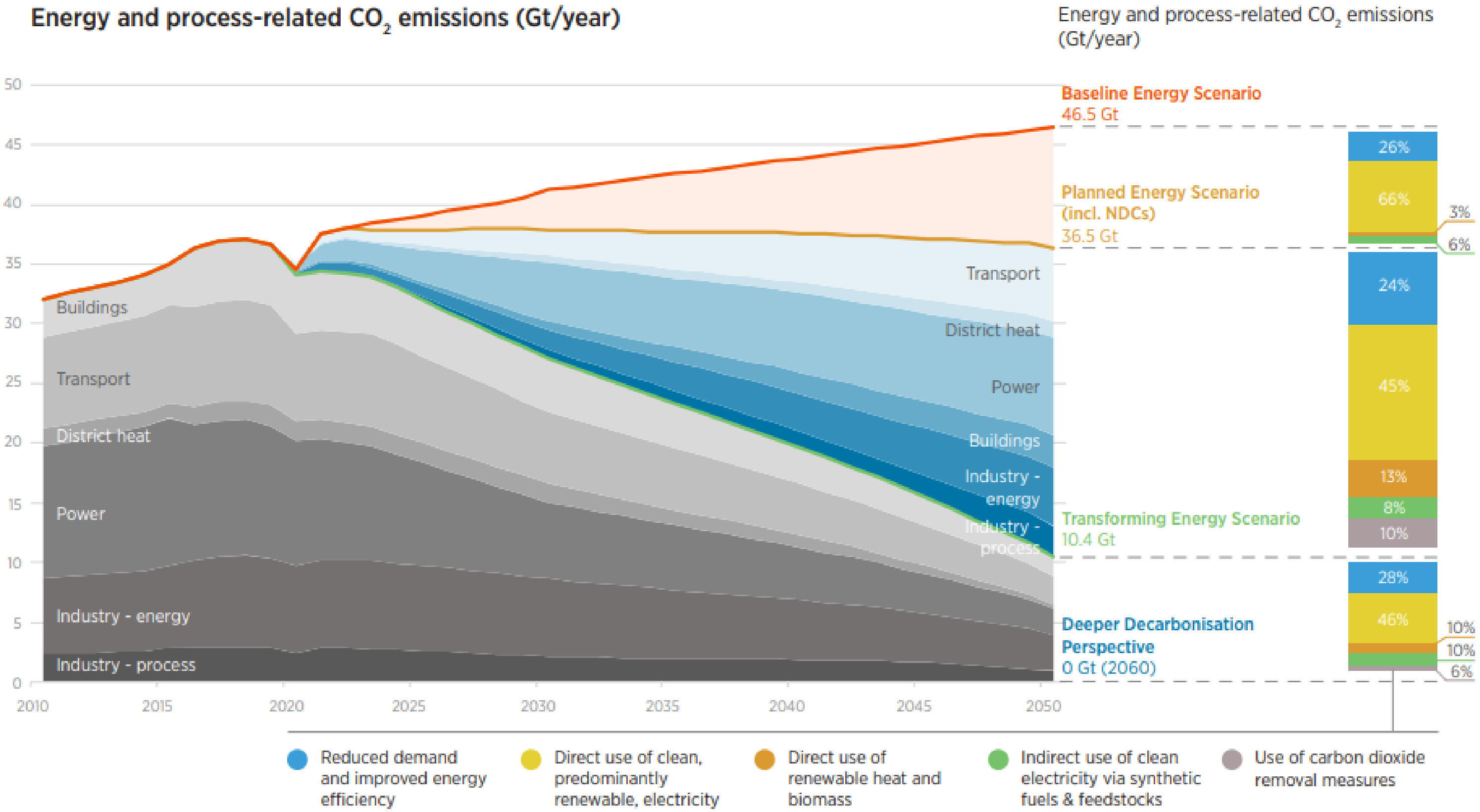
Transforming the energy landscape



1. Emission reduction
2. Increased competitiveness
3. More jobs
4. Universal access
5. Air quality
6. Energy security

Renewables and efficiency key to meeting global climate goals

- To achieve the **Transforming Energy Scenario,** energy-related CO_2 emissions need to fall by 3.8% per year on average until 2050.
- Annual energy-related CO2 emissions would need to decline at least **70% below 2018 levels by 2050**.
- Over half of the necessary reductions come from renewables and one quarter from energy efficiency measures.
- When including direct and indirect electrification (such as green hydrogen and technologies like EVs), the total reductions increase to over 90% of what is required.
- The **Deeper Decarbonization Perspective** shows how emissions can be further reduced to zero



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

Indicator	Historical progress 2015-2018	Where we are heading (● PES / 2030 and 2050)	Where we need to be (● TES / 2030 and 2050)
Renewable energy share in TFEC (% modern)	9.5% (2015) → 10.5% (2018)	17% (2030); 25% (2050)	28% (2030); 66% (2050)
Energy intensity improvement rate (%/yr)	1.8% (2015-2018)	2.4% (2030); 2.6% (2050)	3.6% (2030); 3.2% (2050)

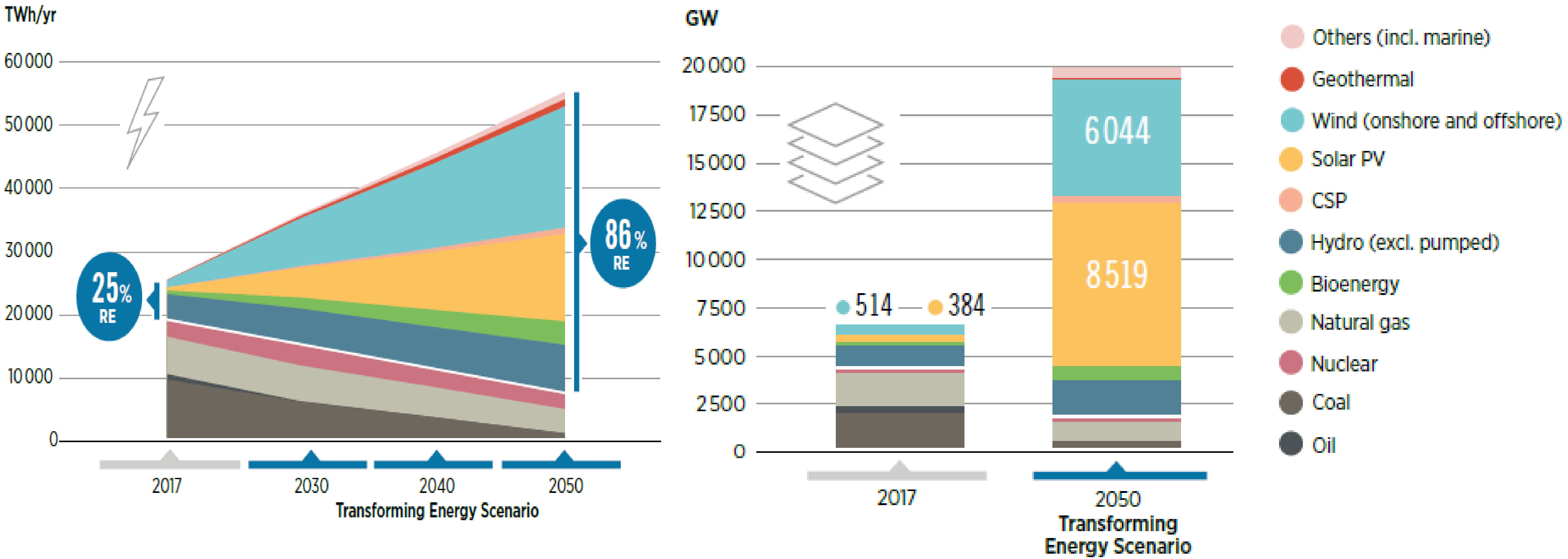
- **Energy efficiency improvements must be scaled up** rapidly and substantially.
- **Renewable energy and energy efficiency together offer over 90% of the mitigation measures** needed to reduce energy-related emissions in the Transforming Energy Scenario.

An increasingly electrified energy system

Indicator	Historical progress 2015-2018/2019	Where we are heading (● PES/2030 and 2050)	Where we need to be (● TES/2030 and 2050)
Renewable share in electricity generation (%)	23% (2015) → 26% (2018)	38% (2030); 55% (2050)	57% (2030); 86% (2050)
Electrification share of final energy (%)	19% (2015) → 20% (2017)	24% (2030); 30% (2050)	29% (2030); 49% (2050)
Technologies			
Electric cars (mln units)	1.2 mln (2015) → 7.9 mln (2019e)	269 mln (2030); 627 mln (2050)	379 mln (2030); 1 109 mln (2050)
Heat pumps (mln units)	20 mln (2017) → 38 mln (2019e)	63 mln (2030); 119 mln (2050)	155 mln (2030); 334 mln (2050)

- **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**

Solar PV and wind will lead the way in the power sector



- **Wind power would be a major electricity generation source, supplying more than one-third of total electricity demand. Solar PV power would follow, supplying 25% of total electricity demand.**
- **Power system capacity would need to grow to 20 000 GW by 2050, with over 70% of it coming from solar PV and wind.**

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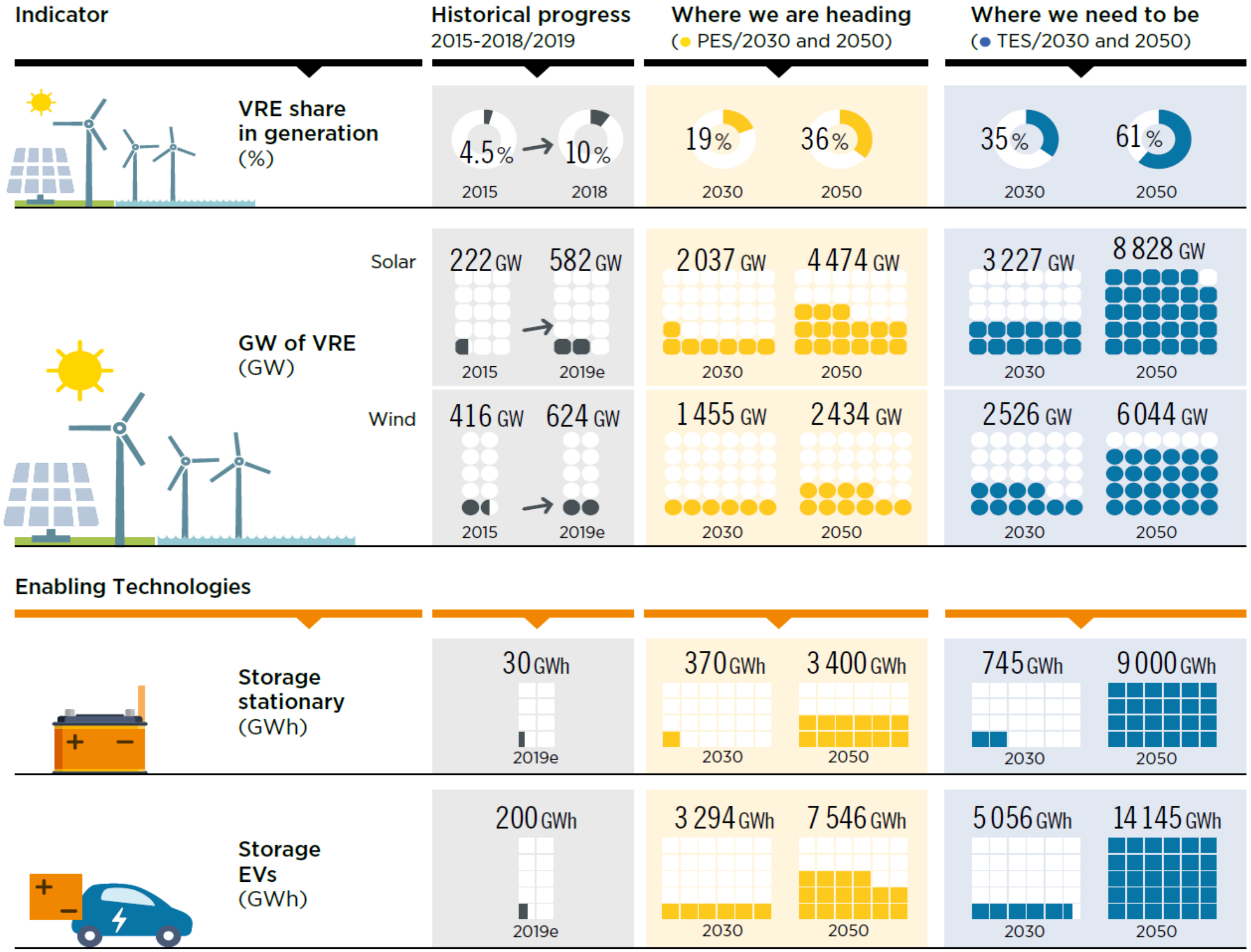
The need for power system flexibility

- **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**.



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Vital to any future energy system: Hydropower and bioenergy

Indicator	Historical progress 2015-2017/2018/2019	Where we are heading (● PES/2030 and 2050)	Where we need to be (● TES/2030 and 2050)
Hydropower (GW)	1 099 GW (2015) → 1 189 GW (2019)	1 356 GW (2030); 1 626 GW (2050)	1 444 GW (2030); 1 822 GW (2050)
Pumped hydro storage (GW)	112 GW (2015) → 121 GW (2019)	200 GW (2030); 300 GW (2050)	225 GW (2030); 325 GW (2050)
Share of TPES provided by bioenergy (%) **(total)**	8.7% (2015) → 9.5% (2018)	9% (2030); 10% (2050)	12% (2030); 23% (2050)
Share of TPES provided by bioenergy (%) **(modern)**	4.1% (2015) → 5.1% (2018)	8% (2030); 10% (2050)	12% (2030); 23% (2050)
Liquid biofuel production (bln litres)	129 bln ltr (2015) → 136 bln ltr (2017)	285 bln ltr (2030); 393 bln ltr (2050)	378 bln ltr (2030); 652 bln ltr (2050)

Note: The total bioenergy share includes traditional uses of biofuels. In PES their use is reduced considerably by 2030, but not entirely phased out, whereas in PES their use is entirely phased out by 2030.

- **Hydropower can bring important synergies to the energy system of the future.** In the Transforming Energy Scenario, hydropower capacity would need to increase 25% by 2030, and 60% by 2050.
- **Bioenergy will become increasingly vital in end-use sectors.** In the Transforming Energy Scenario, it plays an important role, particularly in sectors that are hard to electrify, such as in shipping and aviation and in industry, both for process heat and use as a feedstock.

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IRENA's Transforming Energy Scenario pathway for Southeast Asia

Emissions

Energy-related CO_2 ($Gt\ CO_2/yr$)

	2017	2030	2050
Emissions	1.4 $Gt\ CO_2/yr$	1.6 $Gt\ CO_2/yr$	0.8 $Gt\ CO_2/yr$

Renewable energy share in power generation (%)

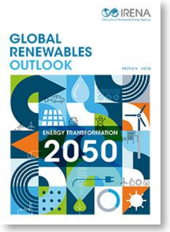
	2017	2030	2050
Renewable share	20%	53%	85%

Clean energy investments (USD billion per year)

	2016-2030	2016-2050
Investments	143 USD bln	141 USD bln

Improved energy efficiency leading to lower energy consumption per capita

Southeast Asia	2017	2030 (PES)	2040 (PES)	2050 (PES)	2030 (TES)	2040 (TES)	2050 (TES)
		Where we are heading			Where we need to be		
Energy consumption per capita (GJ/capita)							
Consumption (TFEC) per capita	28	29	35	40	29	33	35



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South East Asia: Actions needed

Knowledge creation with **better statistics for renewables**, and wider exchange **of best-practice and technology information** is needed across ASEAN.

End-use sector efforts should be significantly expanded as they make up two-thirds of the effort required to close the gap in realising ASEAN's **renewable energy target** for 2025, and make up a significant portion of the longer-term potential needed to transform the region's energy system over the coming decades.

Power system flexibility needs to be ensured and transmission grid capacity should be expanded and strengthened for renewables integration**. Electrification of end-uses** is also an key solution that will play a more important role in the future and it requires a resilient and robust grid.

Bioenergy markets should be created by facilitating the sustainable, affordable and reliable supply of bioenergy feedstocks, and wider, efficient use of modern bioenergy across all applications, in particular to replace traditional forms .

Align energy and climate polices and plans and use those as a central pillar for post COVID recovery. Countries should align climate and sustainability targets with national energy plans, and they should value these plans beyond just the effect on the energy sector and take a more holistic, socio-economic view as the energy transition across ASEAN as is more economically and socially beneficial then business as usual.

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Michael Renner, Programme Officer
“Measuring the Socio-Economic Footprint of the Energy Transformation”

IRENA’s socio-economic impact analysis

Annual reviews of employment in renewables

Analyses of local capacities

Assessing gender equity in renewable energy

Measuring the socio-economic impact of renewables

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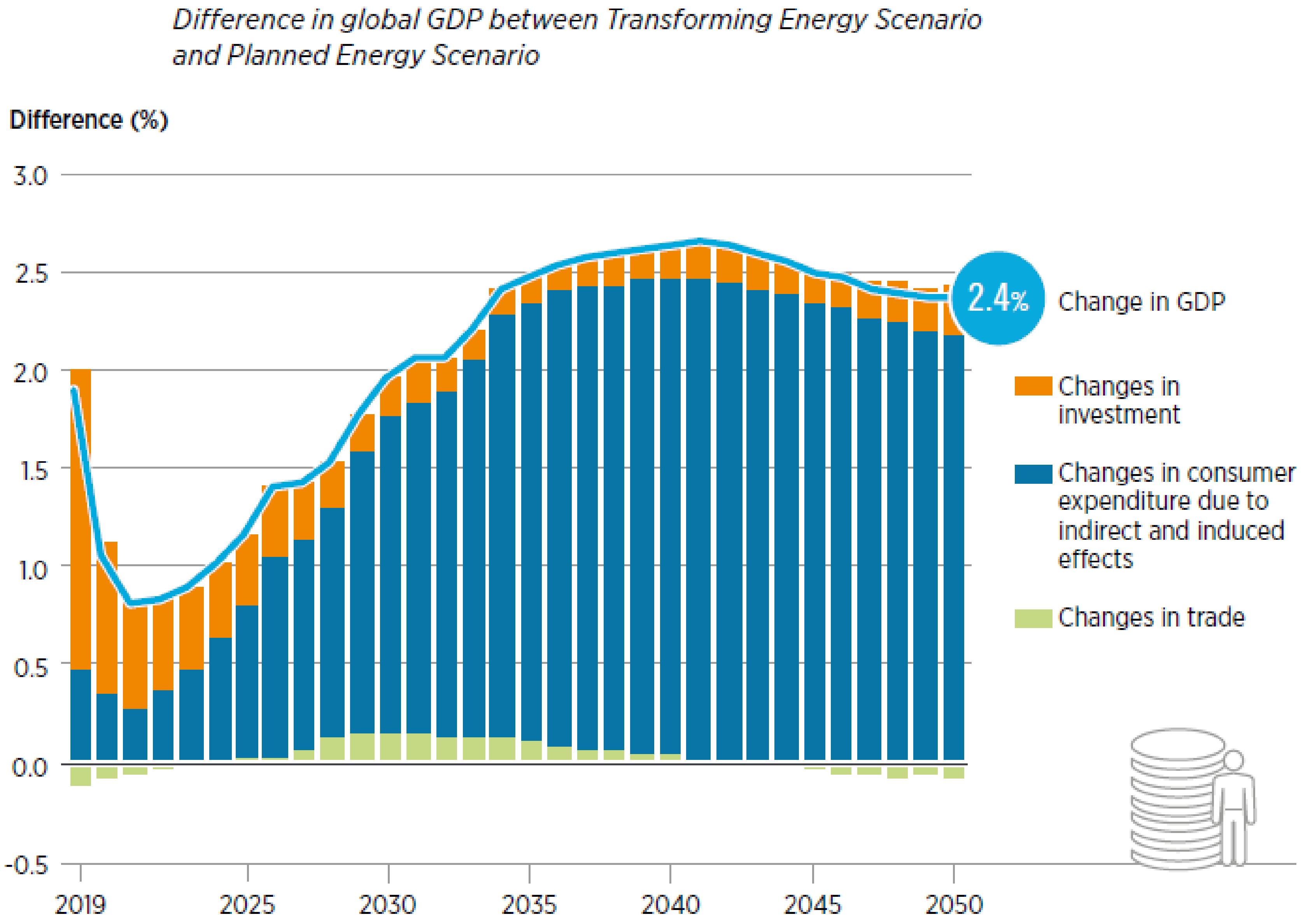
Global GDP projection to 2050



- The Transforming Energy Scenario boosts global GDP in 2050 by 2.4% over the Planned Energy Scenario.
- The cumulative gain from 2019 to 2050 amounts to USD 98 trillion.

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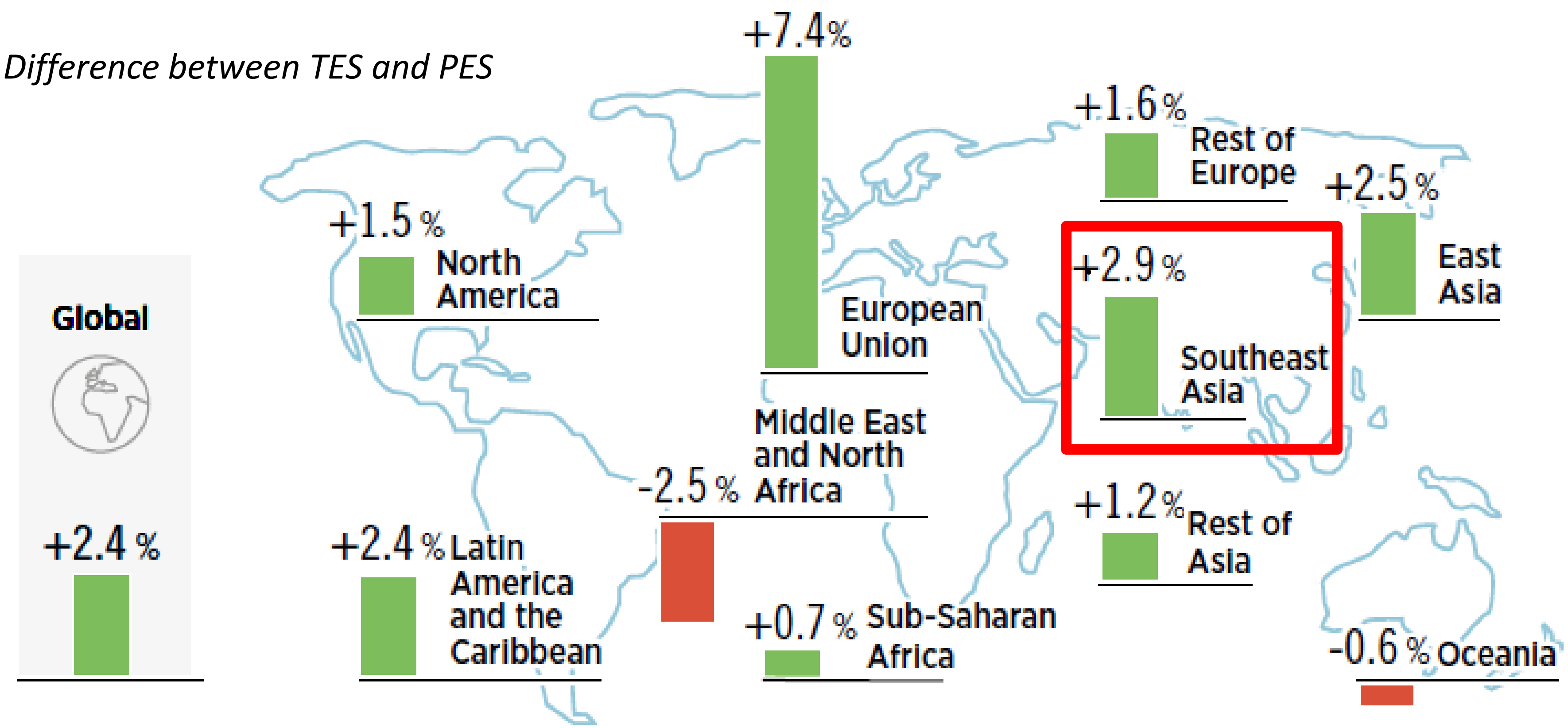
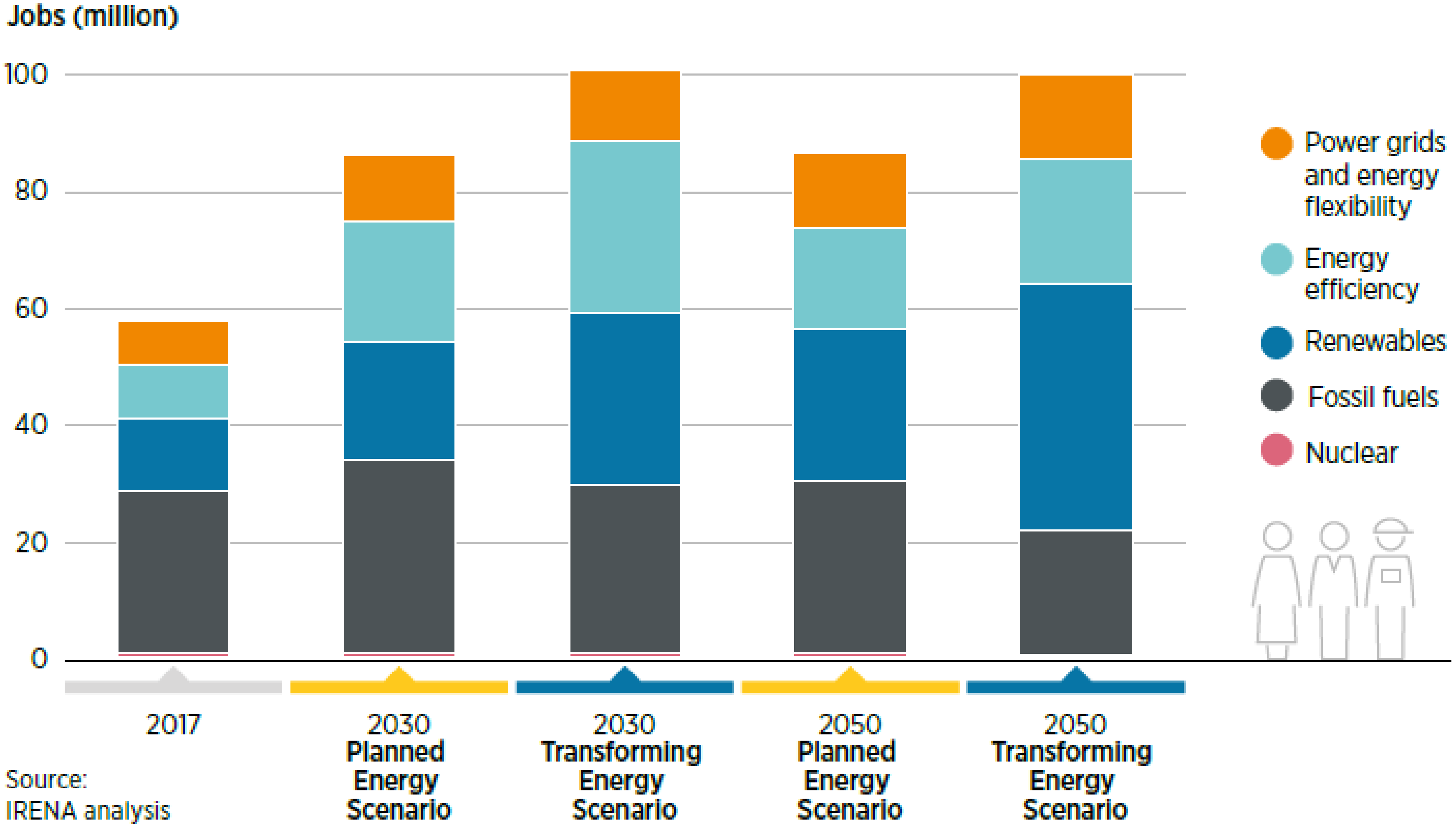
Almost all regional economies gain, including Southeast Asia



- Except for two regions, all parts of the world see their GDP rise under the Transforming Energy Scenario.
- Diverging regional GDP results arise from differences in energy roadmaps and macroeconomic structures, as well as trade patterns among regions.

Energy sector jobs: Renewables gain, fossil fuels shrink

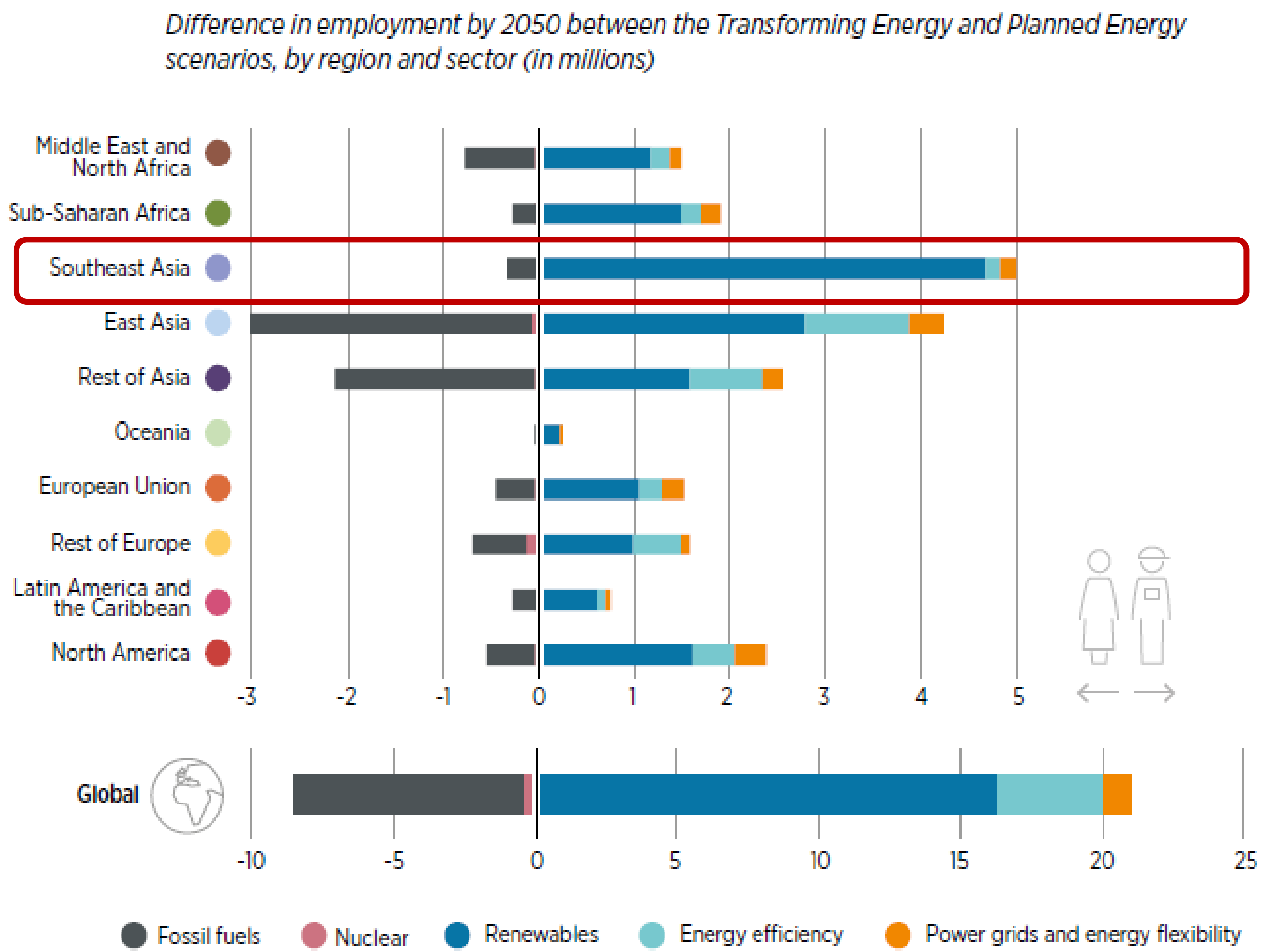
Global energy sector jobs under the Planned Energy and Transforming Energy scenarios, in 2017, 2030 and 2050



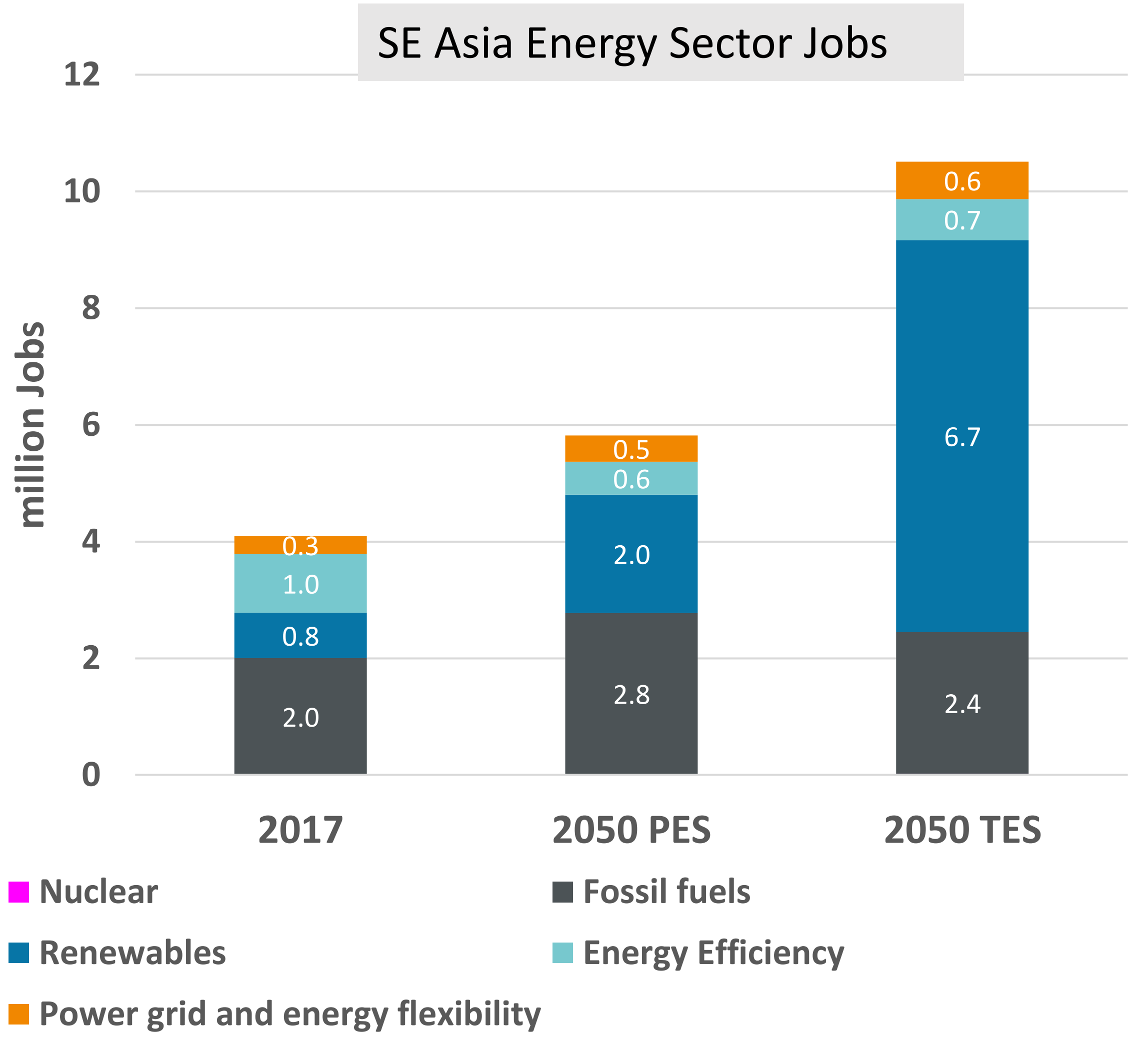
Source: IRENA analysis

- The energy sector will employ almost 100 million people by 2050.
- Of these, 42 million jobs will be created in renewables, 21 in energy efficiency and 15 million in power grids and energy flexibility.

All regions see gains in energy sector jobs, including Southeast Asia



Source: IRENA analysis



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Policy measures needed to support a just transition

AMBITION

Scale-up targets under NDCs and accelerate energy transition-related plans

PUBLIC INTERVENTION

Launch public investment plans, provide strategic guidance

INVESTMENT

Scale up transition-related investment in power, heating & cooling, and transport

LOCALIZATION OF INDUSTRY

Develop local supply chains for energy transition-related technologies

EMPLOYMENT & LIVELIHOODS

Create jobs, offer labour market measures, provide social protection

SKILLS and EDUCATION

Expand education and vocational training to avoid skill gaps, reskill fossil fuel workers

ACCESS

Continue efforts to ensure universal energy access and support productive use

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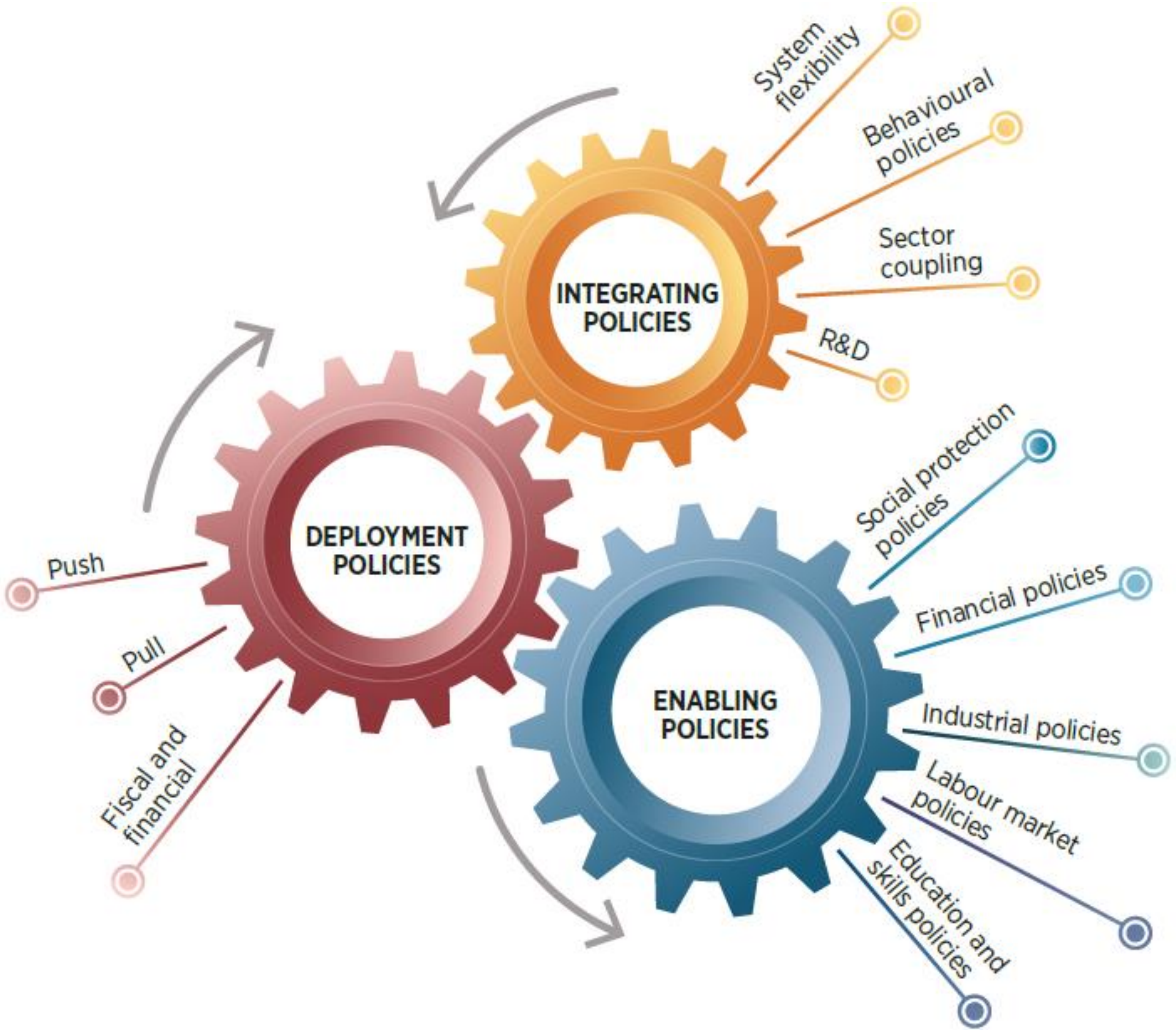
A comprehensive policy package can support the energy transformation



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