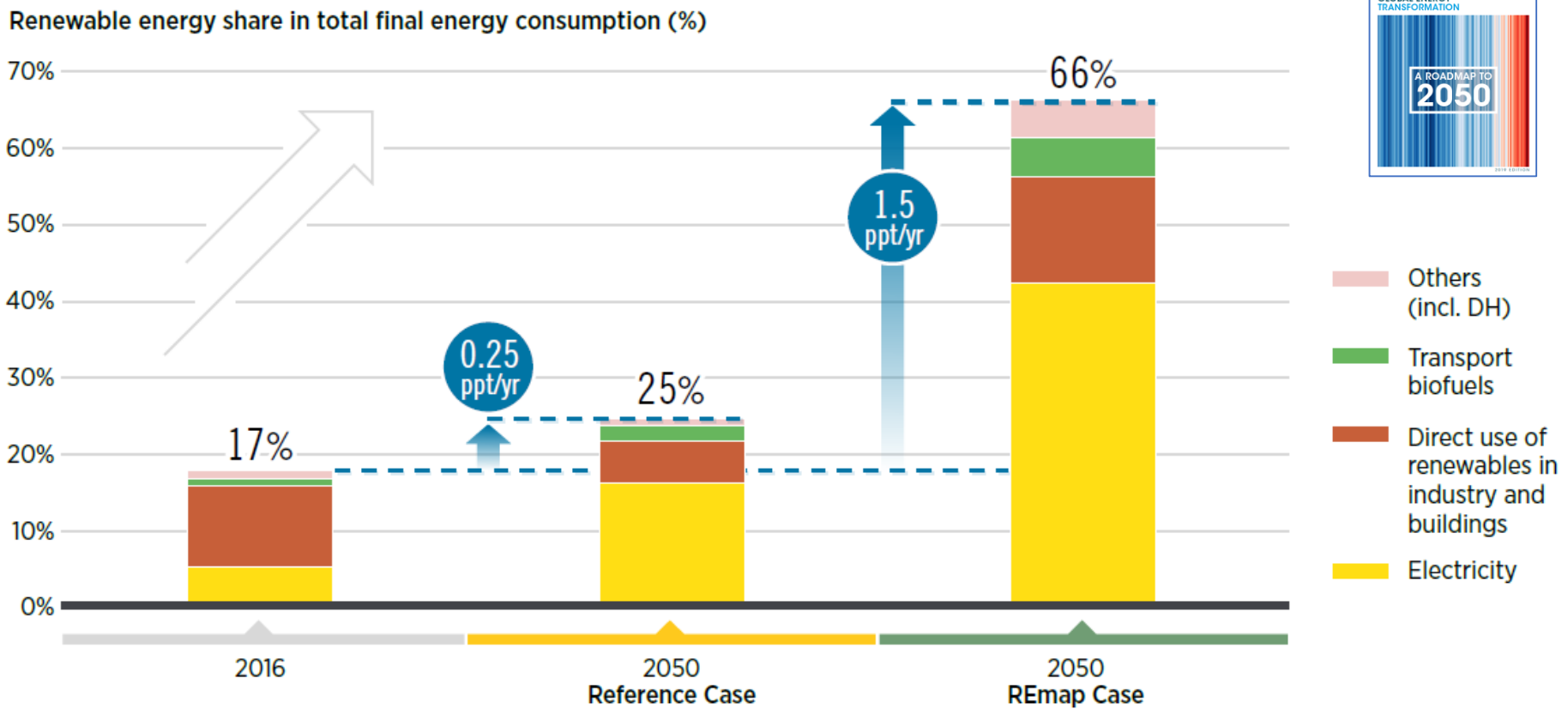
Policy and regulatory design to promote renewable energy investment

Regional Workshop on Accelerating Renewable Energy Investments in Latin America
Bogota, September 2019

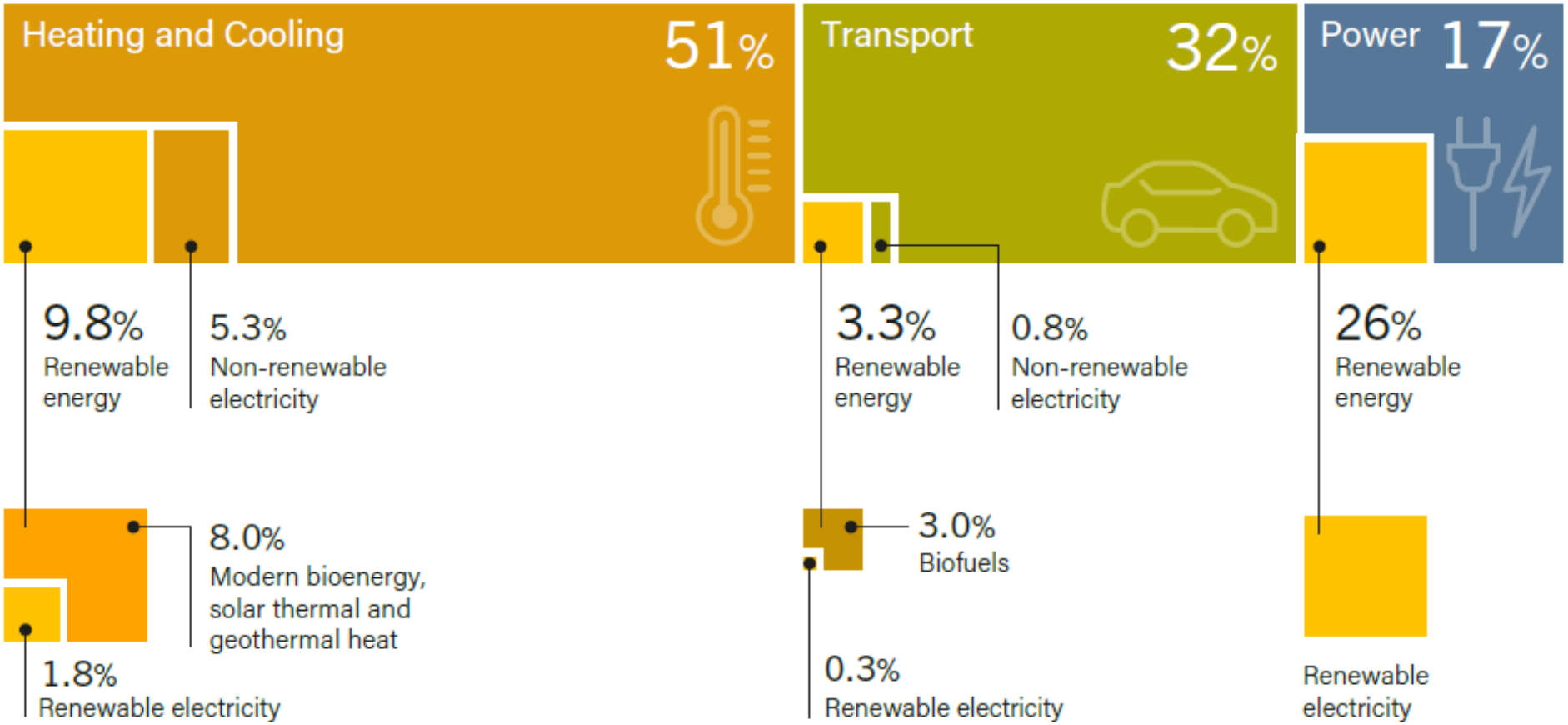
Renewables share in total final end-use consumption needs to accelerate six-fold compared to current levels for the world to start to meet the goals set out in the Paris Agreement



Note: DH refers to district heat and ppt refers to percentage points per year

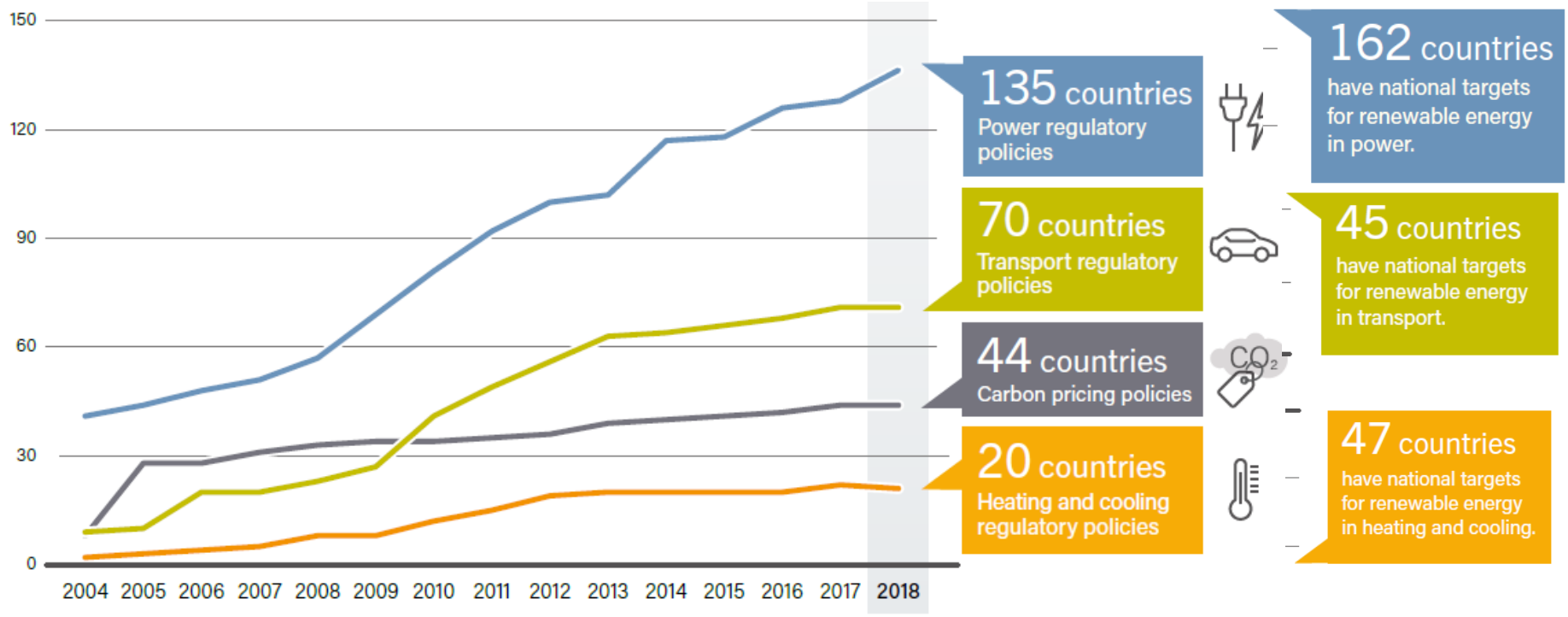
Source: IRENA, Global Energy Transformation: A Roadmap to 2050, 2019 (2019 edition)

Where are we today? Renewable Energy in Total Final Energy Consumption, by Sector, 2016



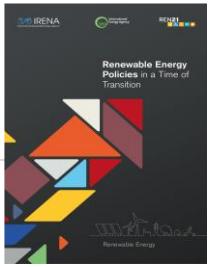
Source: REN21, Global Status Report 2019, Based on OECD/IEA

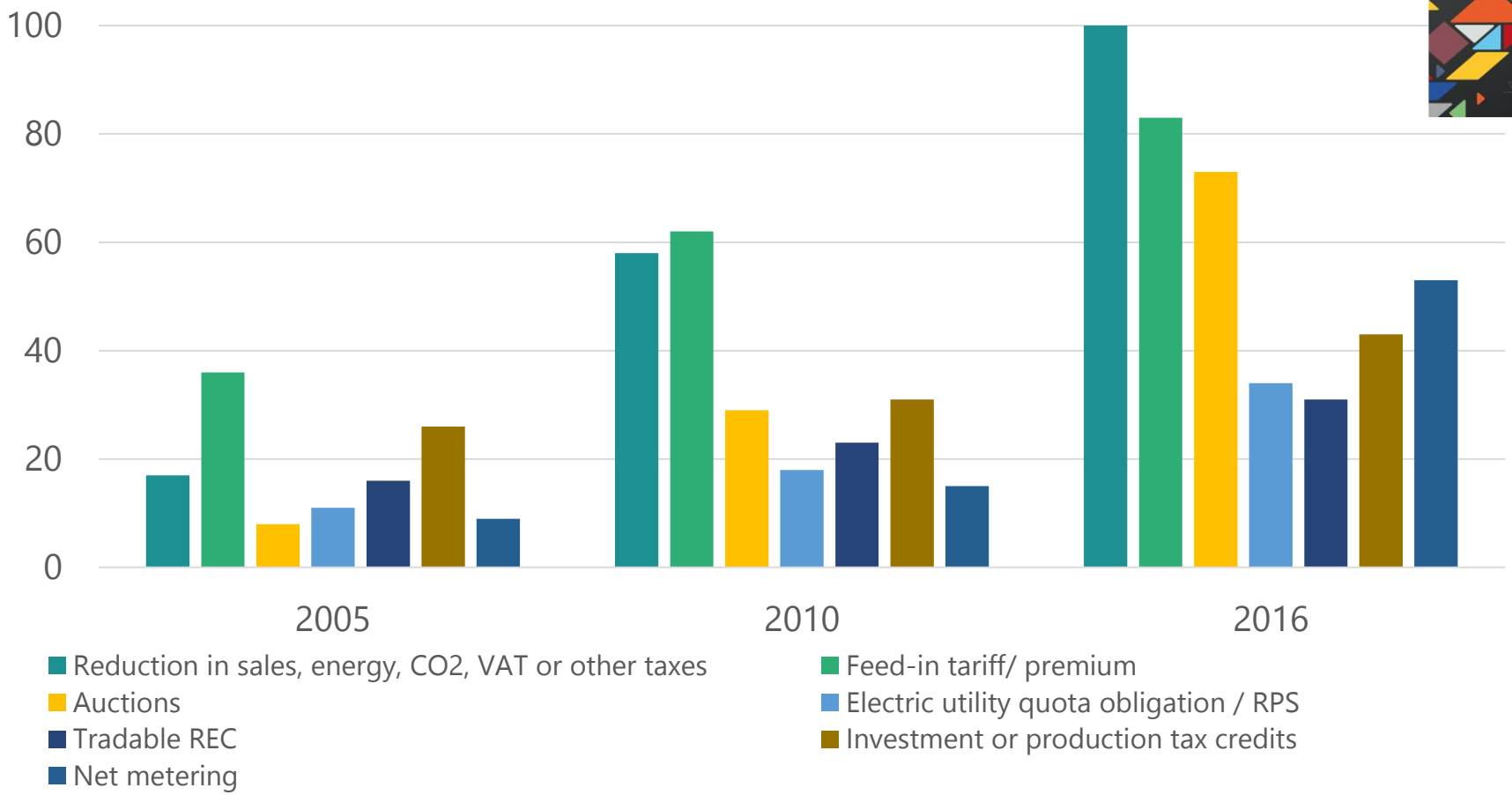
Where are we today? Number of Countries with Renewable Energy Targets and Regulatory Policies and Carbon Pricing Policies, 2004-2018



Source: REN21, Global Status Report 2019

Trends in deployment policies

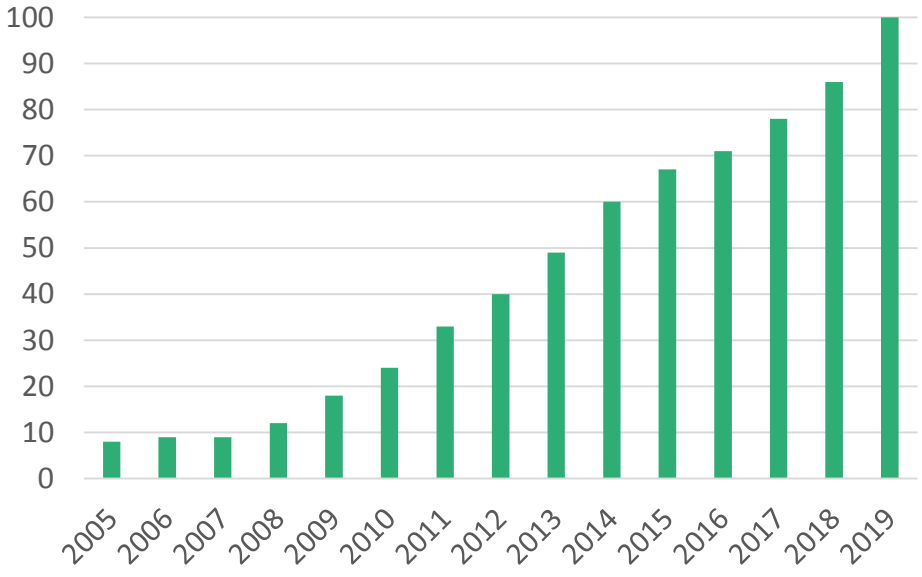




Source: IRENA/IEA/REN21, Renewable Energy Policies in a Time of Transition, 2018

Auctions trends, weaknesses and strengths

Number of countries that have adopted auctions



Based on REN21 Global Status Report (2005 to 2019)

Weaknesses

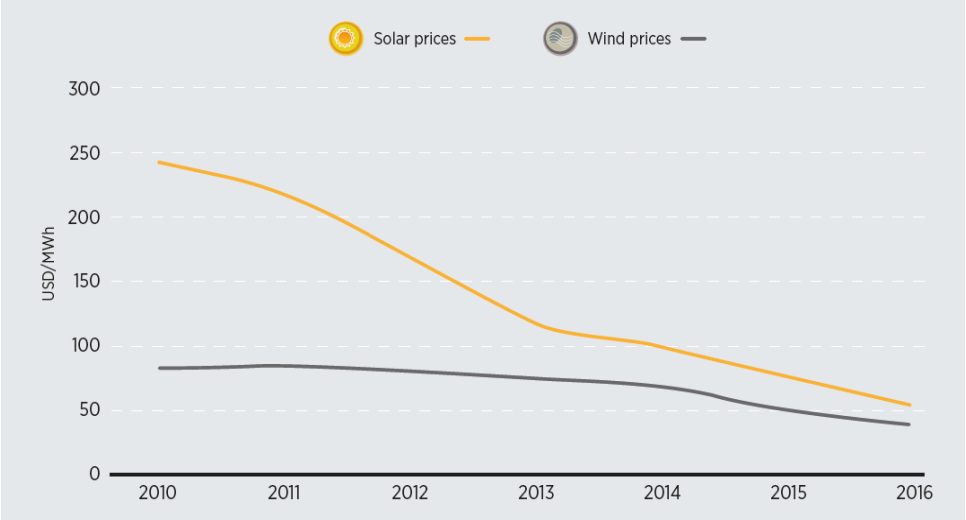
- Associated with relatively high transaction costs for both developer and auctioneer
- Risk of underbuilding and delays

Strengths

- Flexibility in the design according to conditions and objectives
- Enable commitments and transparency
- Provide greater certainty regarding prices and quantities
- Permit real price discovery

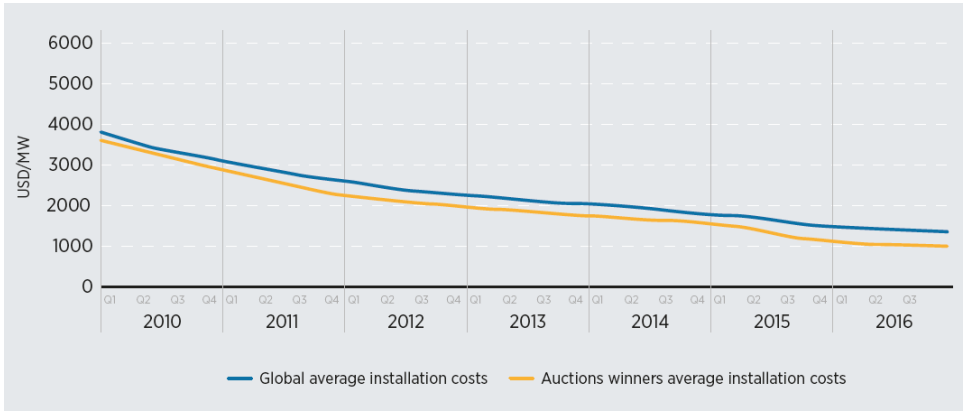
Auctions potential for real price discovery

Average prices resulting from auctions, 2010-2016



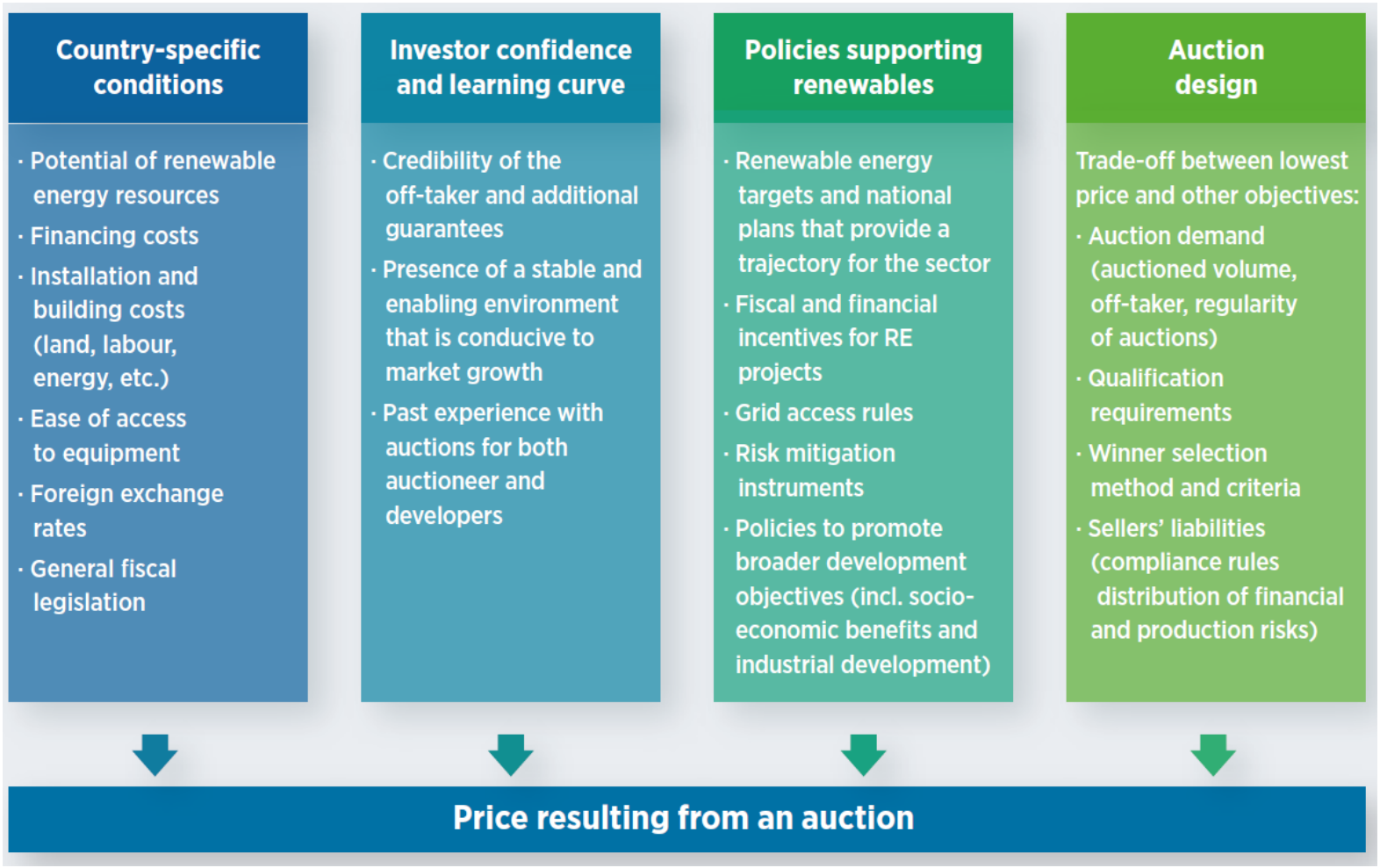
- Solar energy was contracted at a global average price of almost USD 250/MWh in 2010, compared with the average price of USD 50/MWh in 2016.
- Wind average prices have also fallen from USD 80/MWh in 2010 down to USD 40/MWh in 2016.

Estimated installation costs of utility-scale PV projects: global versus auction winners, 2010-2016



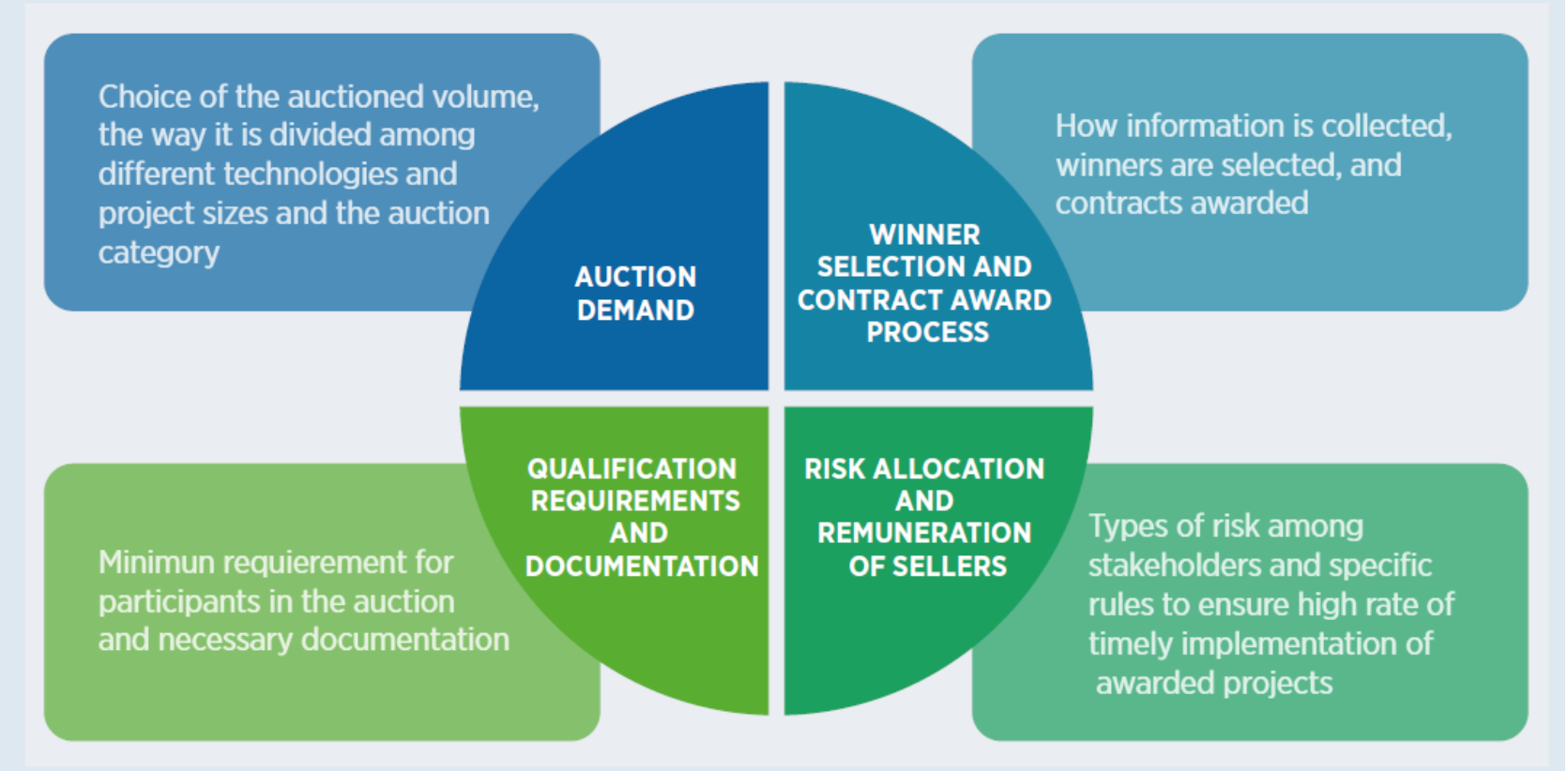
- The average installation costs of projects awarded from auctions are consistently lower than global average installation costs.

Factors that impact the price



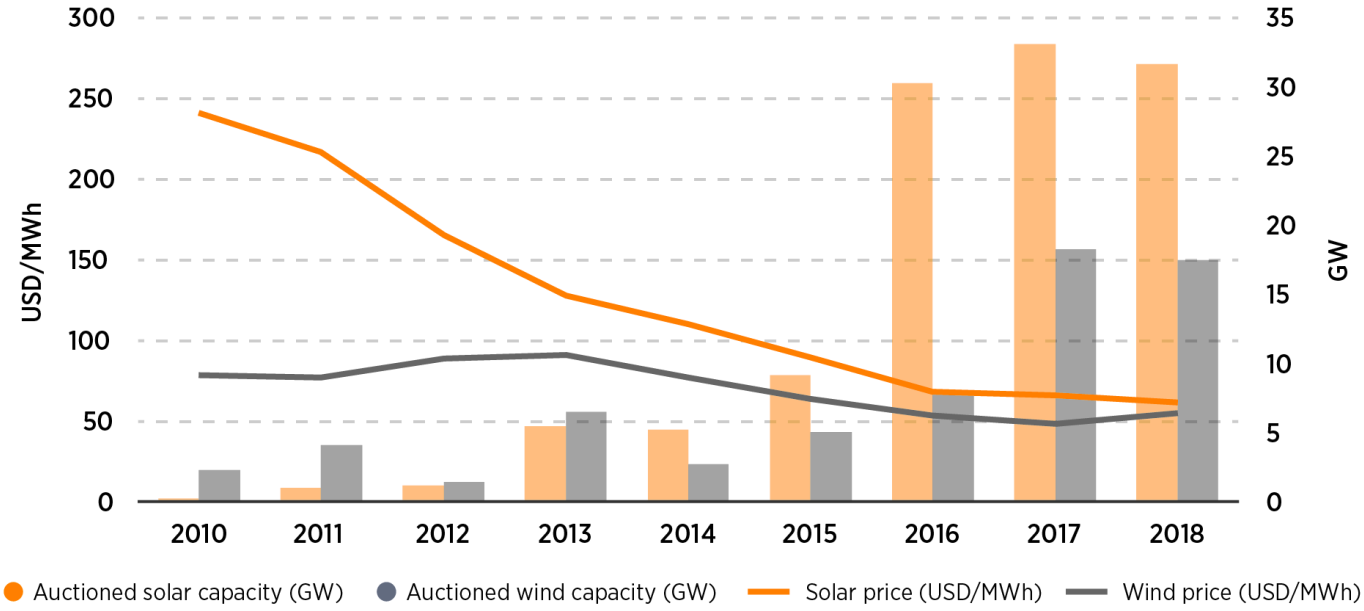
Adapted from IRENA, 2017. Renewable Energy Auctions: Analysing 2016

Factors that impact the price



Adapted from IRENA, 2015. Renewable Energy Auctions: A Guide to Design

What are the latest trends in price?

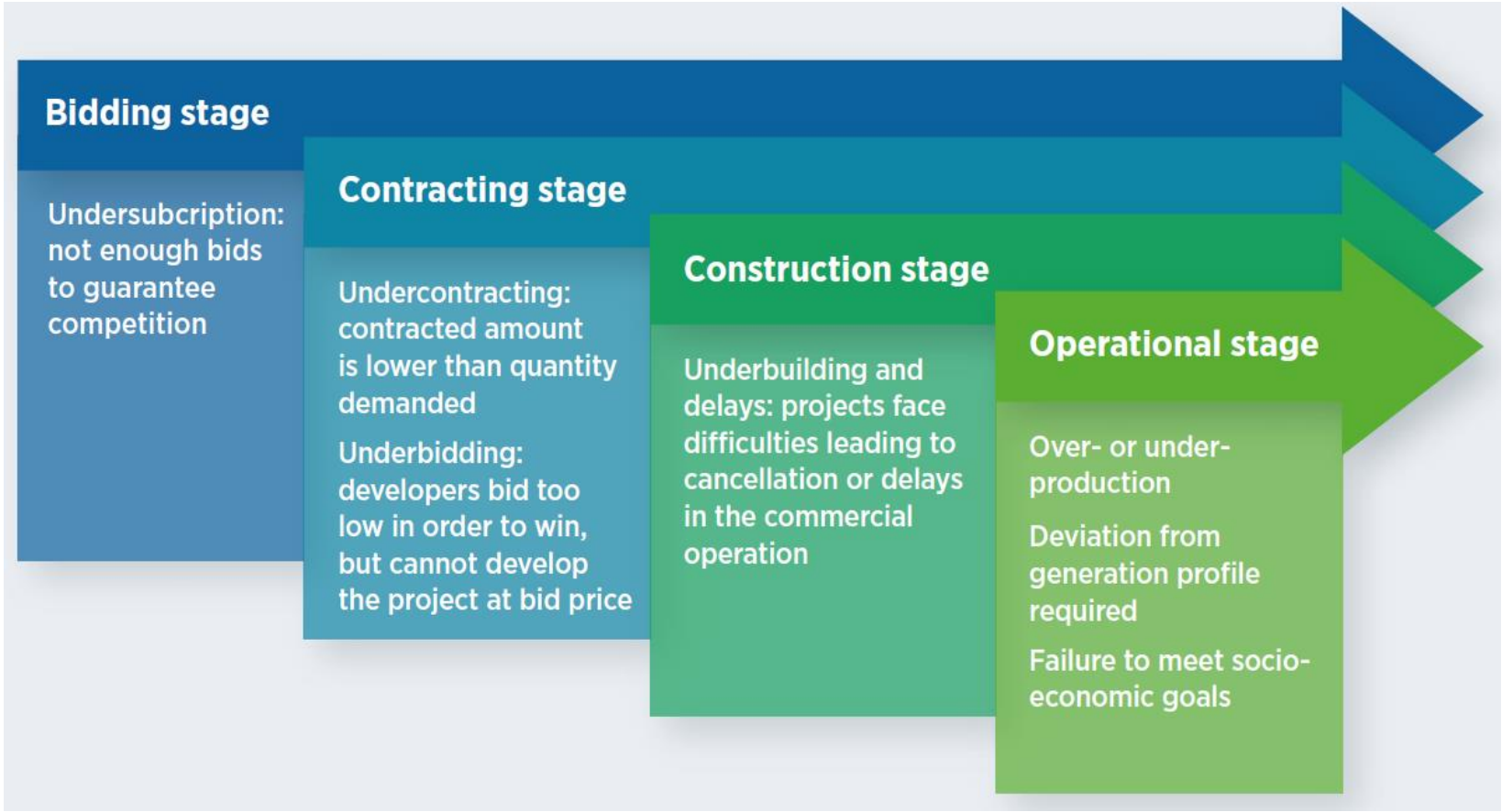


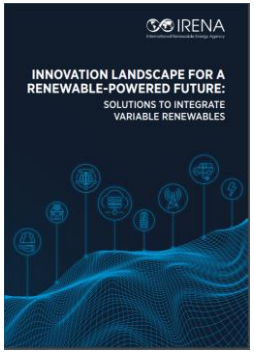
- Solar prices continues to fall, albeit at a slower rate, as PV auctions expand to newcomers
- Wind edged out, due to higher prices in countries with majority of volume auctioned

Objectives beyond price

- Ensure winning projects are completed on time and deliver as per the bid
- As more projects get completed and as the share of VRE increases, support integration into the system
- Make sure the projects align with the strategy to achieve a just and inclusive energy transition

Ensuring project timely completion





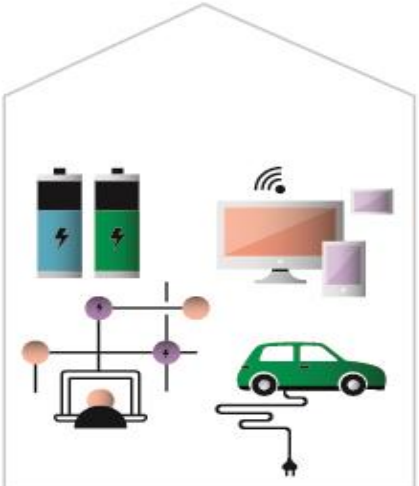
IRENA
International Renewable Energy Agency

Innovative solutions are needed to integrate high shares of variable renewable energy

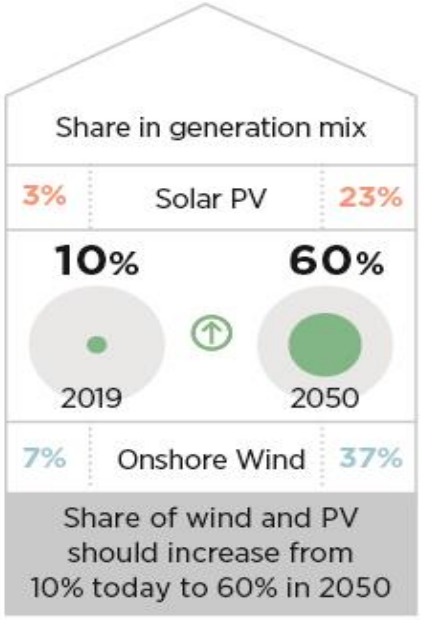
Main challenge is to integrate high share of variable VRE

Power sector is leading the transition

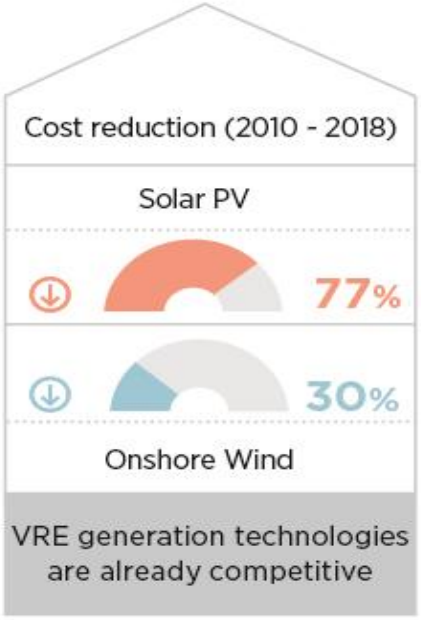
INNOVATIONS TO INCREASE POWER SYSTEM FLEXIBILITY → **FLEXIBLE POWER SYSTEM TO INTEGRATE VRE** → **RENEWABLE-POWERED SYSTEM** → **LOW CARBON, RELIABLE, AFFORDABLE & SECURE ENEGY SYSTEM**



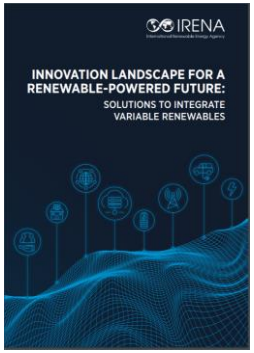
Abundance of innovations in the power sector



Share of wind and PV should increase from 10% today to 60% in 2050



VRE generation technologies are already competitive



IRENA
International Renewable Energy Agency

Proposed solutions to increase system flexibility

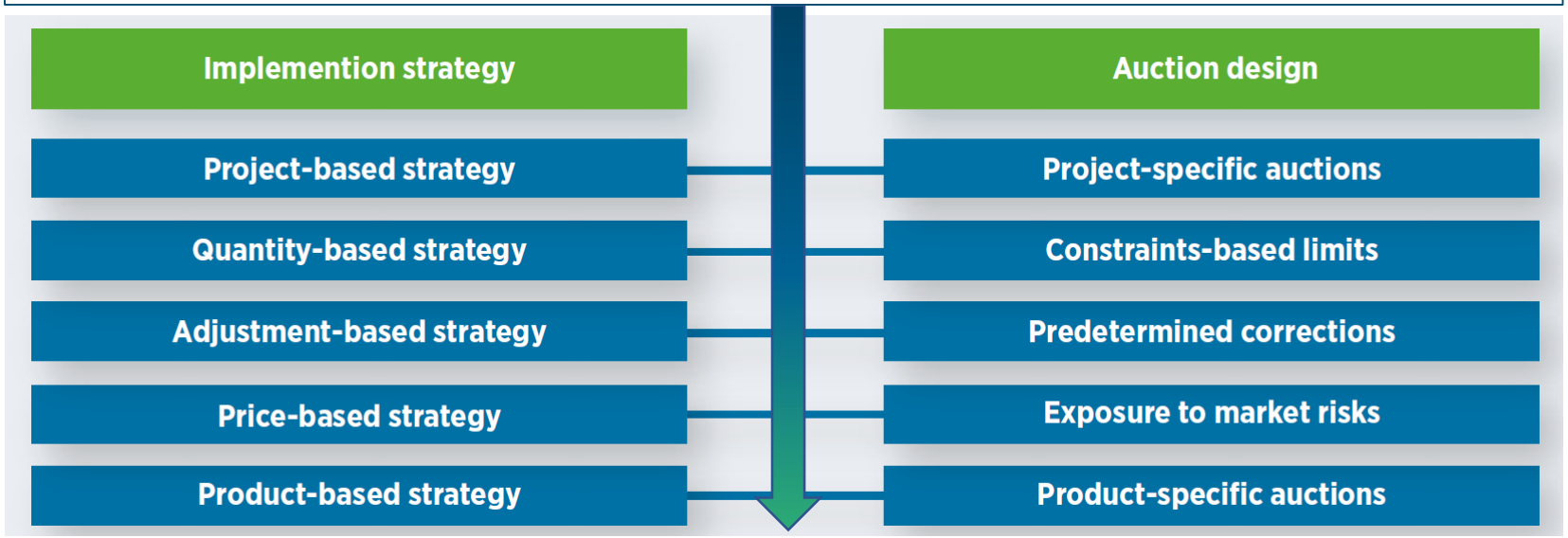
11 Solutions

FLEXIBILITY — SOLUTIONS

SUPPLY-SIDE FLEXIBILITY SOLUTIONS		GRID FLEXIBILITY SOLUTIONS		DEMAND-SIDE FLEXIBILITY SOLUTIONS		SYSTEM-WIDE STORAGE FLEXIBILITY SOLUTIONS	
I	Decreasing VRE generation uncertainty with advanced generation forecasting	III	Interconnections and regional markets as flexibility providers	VI	Aggregating distributed energy resources for grid services	X	Utility-scale battery solutions
II	Flexible generation to accommodate variability	IV	Matching RE generation and demand over large distances with Supergrids	VII	Demand-side management	XI	Power-to-X solutions
		V	Large-scale storage and new grid operation to defer grid reinforcements investments	VIII	RE mini-grids providing services to the main grid		
				IX	Optimising distribution system operation with with distributed energy resources		

Integrating high shares of VRE

Highest degree of central planning required, with centralization of roles and responsibilities



Highest degree of flexibility to the developers, along with the risks and responsibilities

Ensuring just and inclusive transition

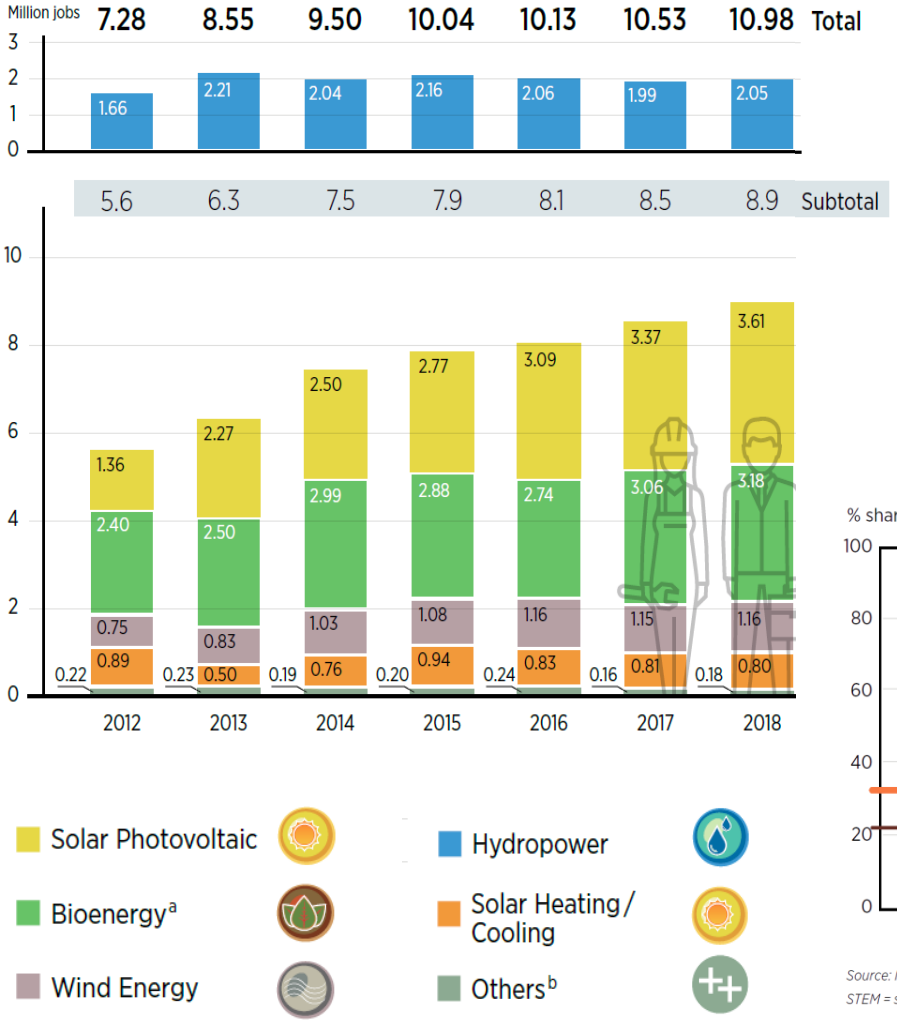
Inclusion of small and new players

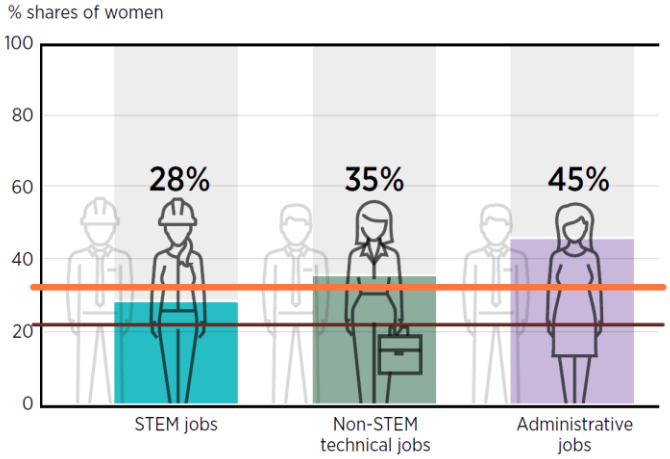
Subnational development and community benefits

Local job creation

Development of local industries

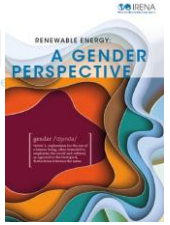
Jobs in renewable energy today





32% average share in renewable energy

22% average share in oil and gas

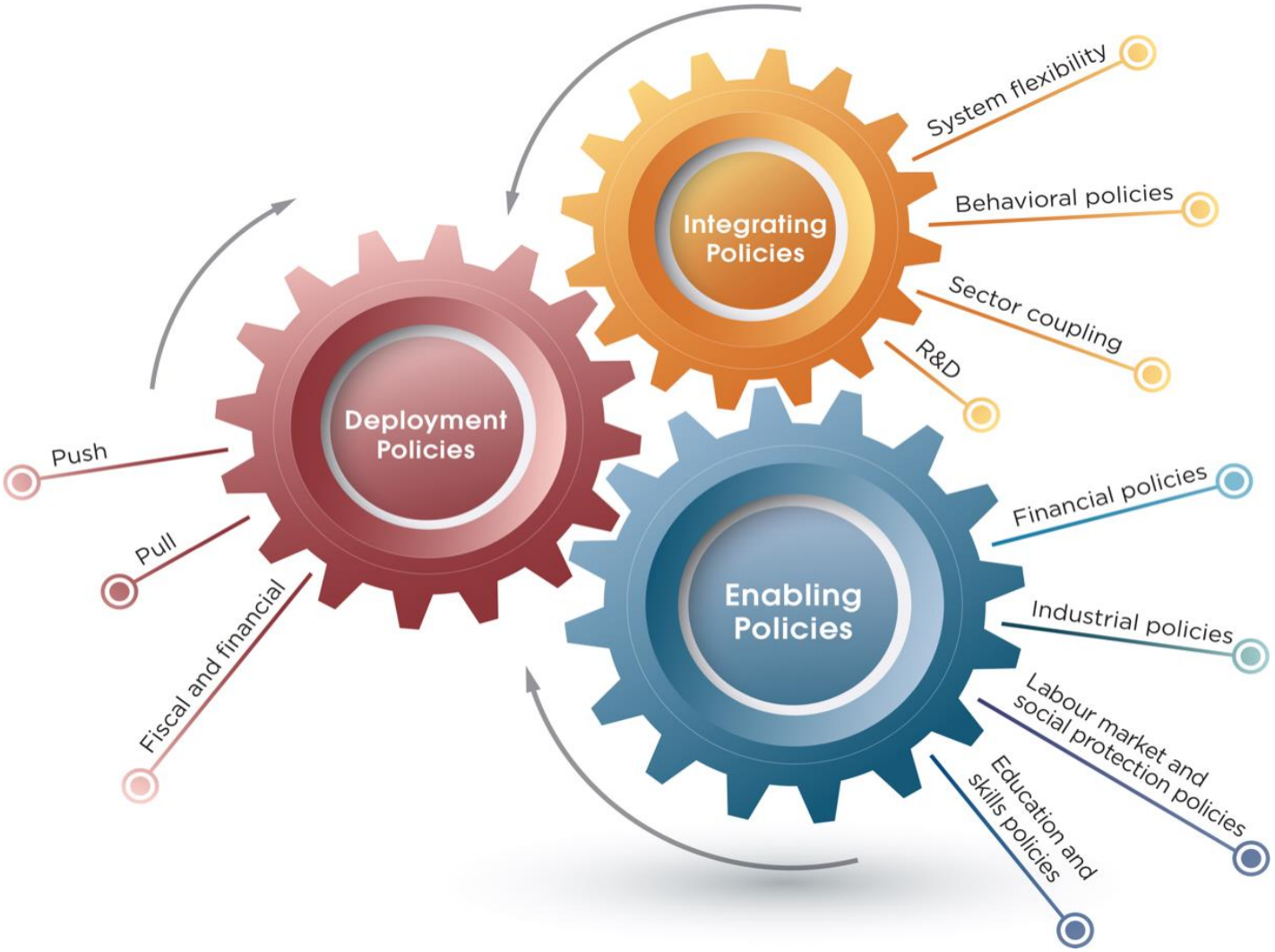


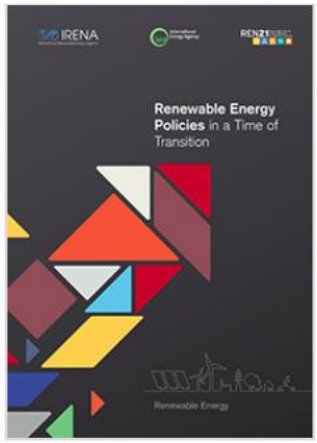
Source: IRENA, 2019b.

STEM = science, technology, engineering and mathematics.

IRENA
International Renewable Energy Agency

Policy framework for a just transition





IRENA

International Renewable Energy Agency

Thank you!