IRENA
International Renewable Energy Agency

Policies to Unlock a Solar Future

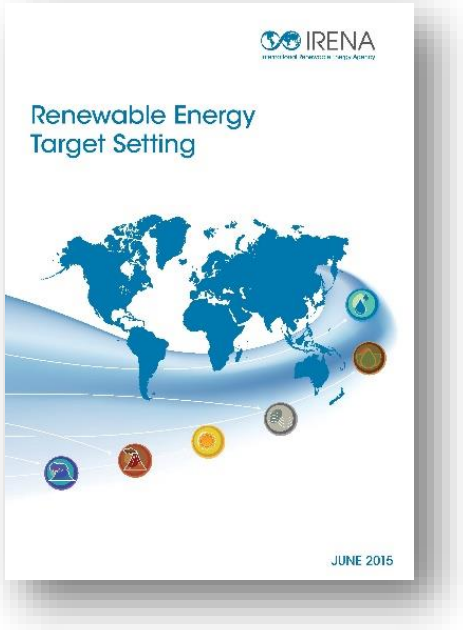
Letting in the Light: Unlocking the Potential of Solar Energy

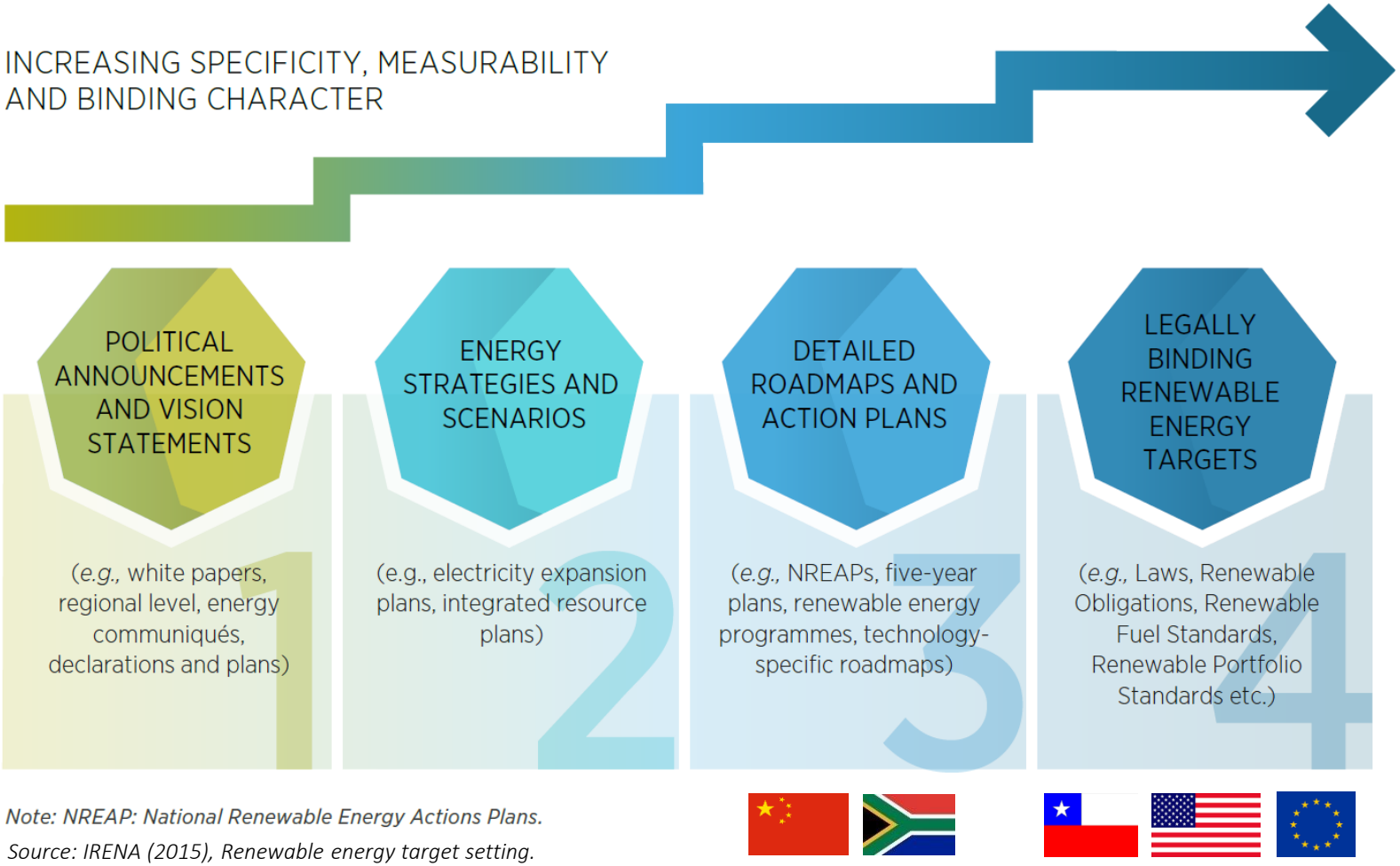
World Future Energy Summit

Abu Dhabi, 17 January 2017

Targets in the global renewable energy landscape

173 countries have at least one type of renewable energy target **– up from 43** in **2005**





Note: NREAP: National Renewable Energy Actions Plans.

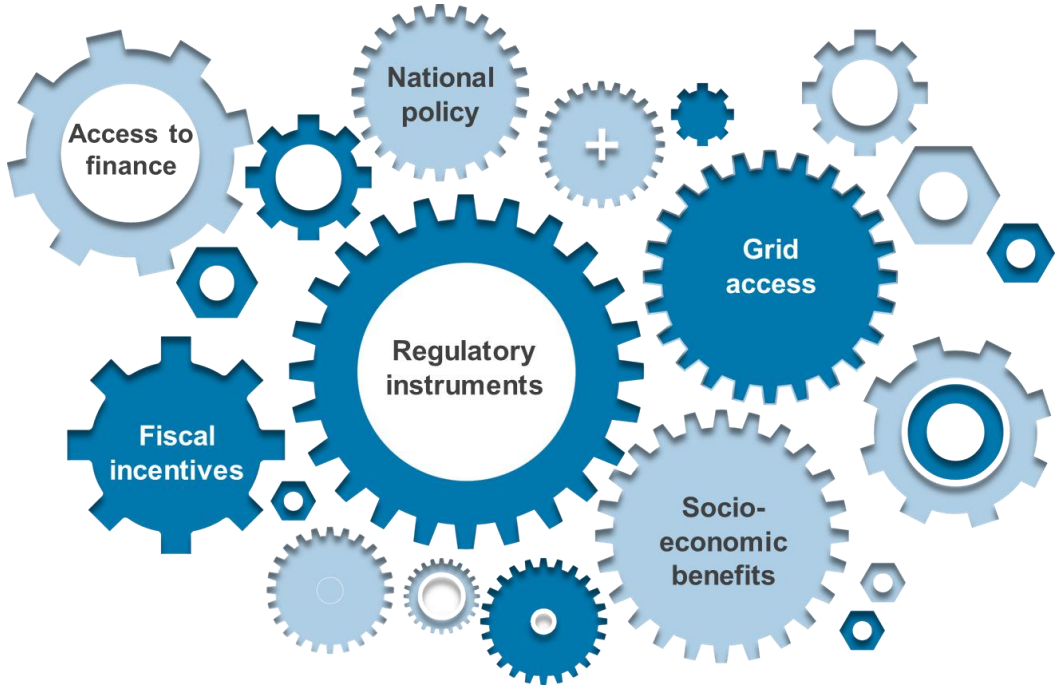
Source: IRENA (2015), Renewable energy target setting.

Types of renewable energy policies and measures

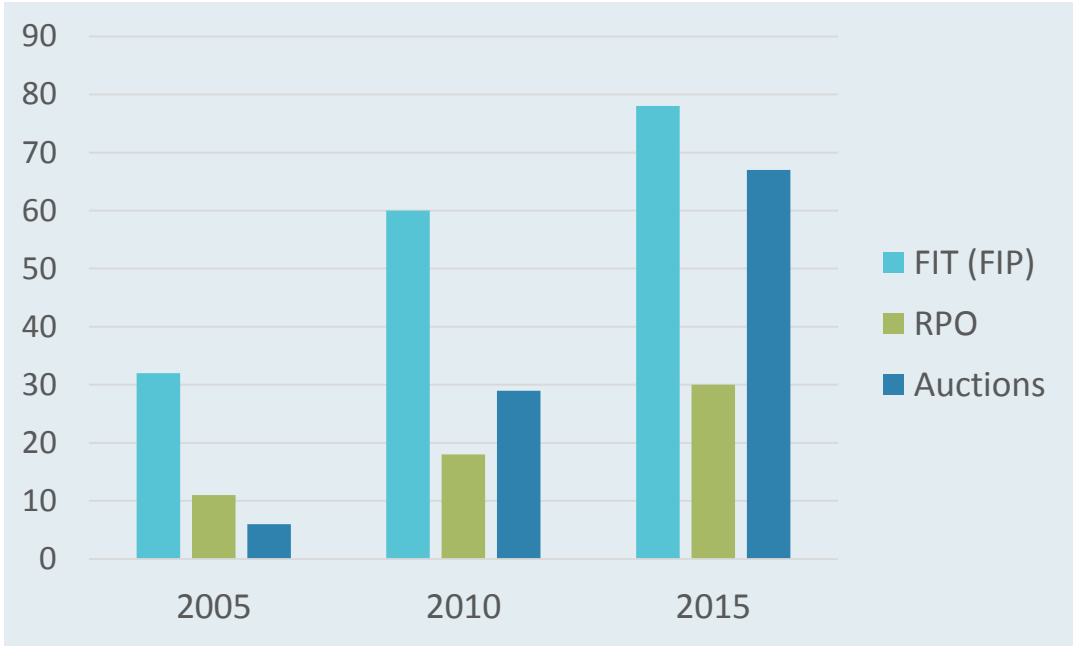
NATIONAL POLICY	REGULATORY INSTRUMENTS	FISCAL INCENTIVES	GRID ACCESS	ACCESS TO FINANCE[a]	SOCIO-ECONOMIC BENEFITS[b]
◆ Renewable energy target	◆ Feed-in tariff	◆ VAT/ fuel tax/ income tax exemption	◆ Transmission discount/ exemption	◆ Currency hedging	◆ Renewable energy in rural access/cook stove programmes
◆ Renewable energy law/ strategy	◆ Feed-in premium	◆ Import/export fiscal benefit	◆ Priority/ dedicated transmission	◆ Dedicated fund	◆ Local content requirements
◆ Technology-specific law/ programme	◆ Auction	◆ National exemption of local taxes	◆ Grid access	◆ Eligible fund	◆ Special environmental regulations
	◆ Quota	◆ Carbon tax	◆ Preferential dispatch	◆ Guarantees	◆ Food and water nexus policy
	◆ Certificate system	◆ Accelerated depreciation	◆ Other grid benefits	◆ Pre-investment support	◆ Social requirements
	◆ Net metering	◆ Other fiscal benefits		◆ Direct funding	
	◆ Mandate (*e.g.*, blending mandate)				
	◆ Registry				

Source: IRENA (2017), REthinking Energy 2017: Accelerating the global energy transition

Trends in renewable energy support policies



Number of countries with renewable energy policies, by type



Implemented auctions and a feed-in tariff simultaneously

Used feed-in tariffs to set price cap for auctions

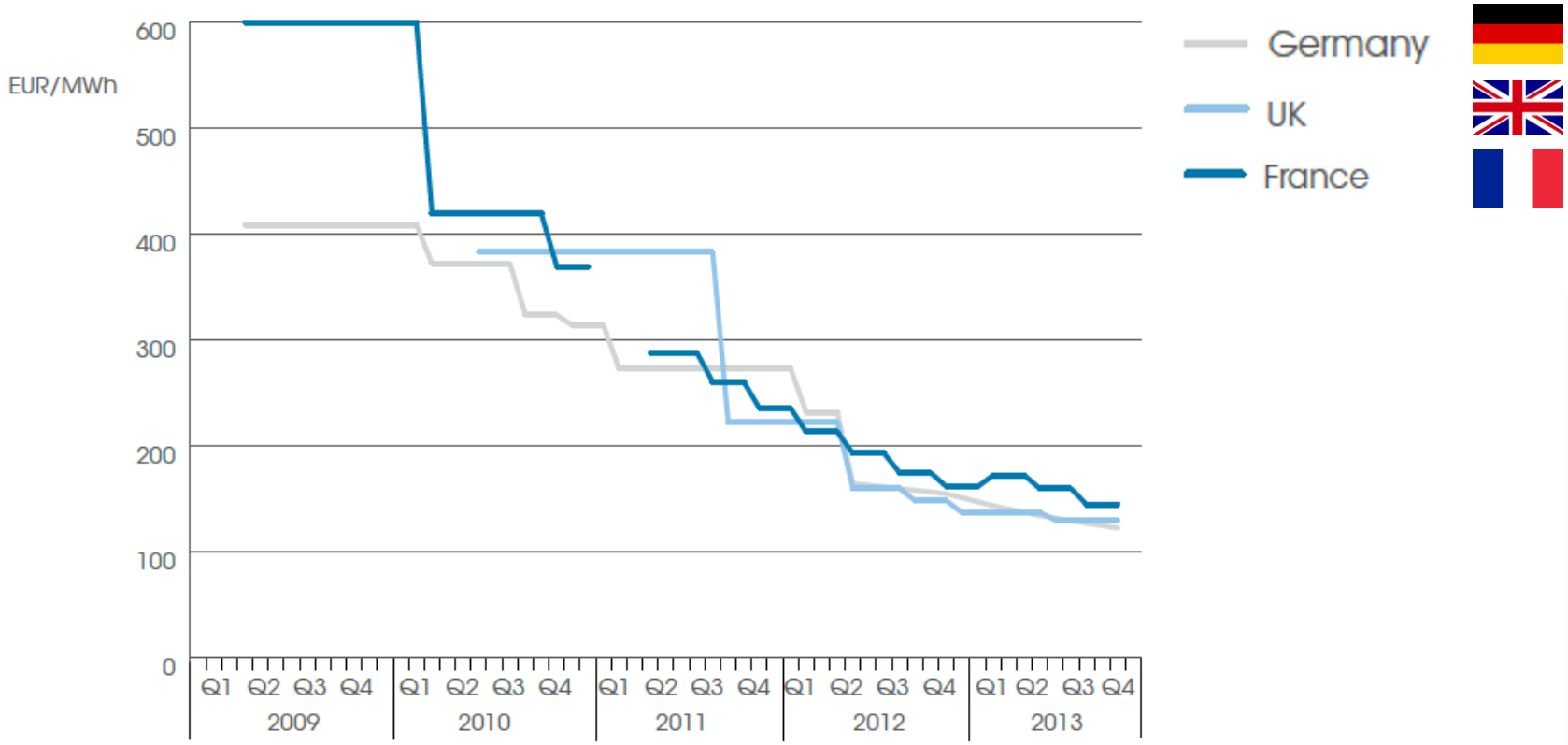
Used auctions to set feed-in tariffs

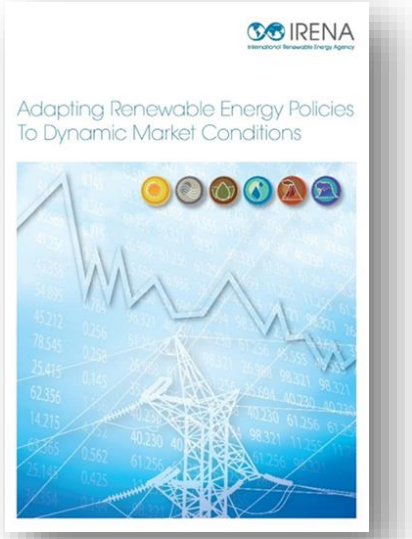
Strengths and weaknesses of FITs, FIPs and Auctions

	FITs	FIPs	Auctions
Strengths	Limits the risks for investors also in emerging technologies	Fixed premiums encourage generators to react to market signals	Flexibility in the design according to conditions and objectives
	Facilitates the entry of new players in the market	Sliding premiums or capped fixed premiums minimise the support cost	Permit real price discovery
	Often funded by consumers and not exposed to public budget cuts	Limit risk for investors, especially premiums with floor	Provide greater certainty regarding prices and quantities
	Long term security drives technological development	Flexible designs and well suited for liberalised electricity markets	Enable commitments and transparency
Weaknesses	Costly with high deployment rates and Generation is not exposed to electricity market prices	Fixed premiums without floor create risk for investors	Are associated with relatively high transaction costs for both developer and auctioneer
	Tariff setting and tariff adjustment process is challenging and complex	Premium setting and adjustment process is challenging and complex	Risk of underbuilding and delays

Keeping pace with rapidly decreasing costs - FITs

PV FIT degression mechanism in Germany, the U.K. and France





Source: IRENA (2014), Adapting renewable energy policies to dynamic market conditions

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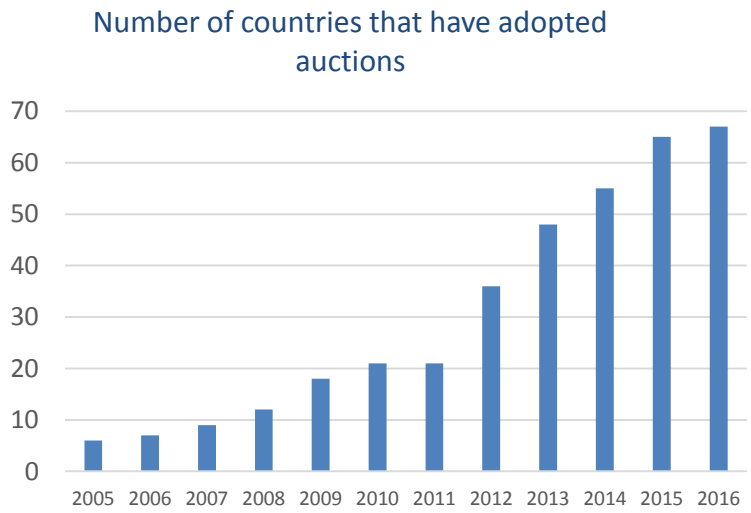
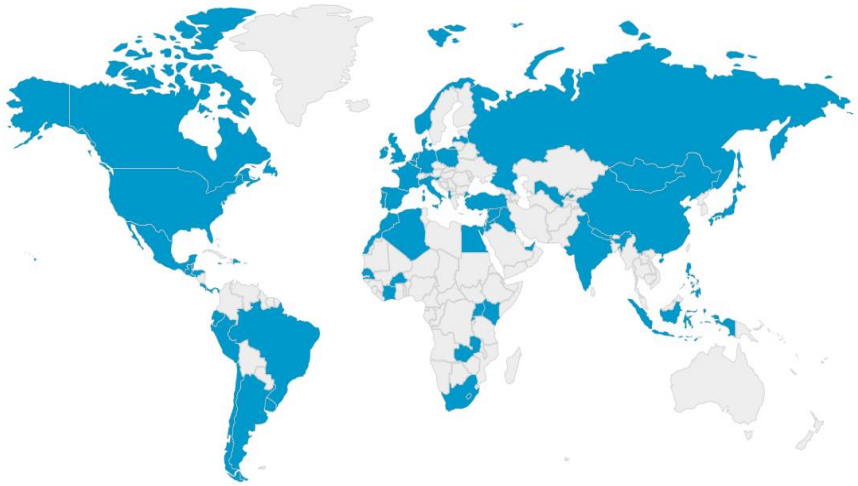
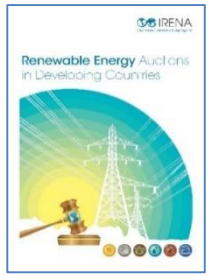
Renewable Energy Auctions

Auctions have increasingly been adopted to support renewable energy deployment

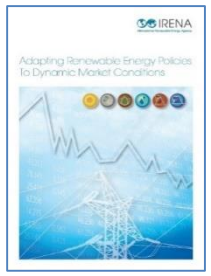




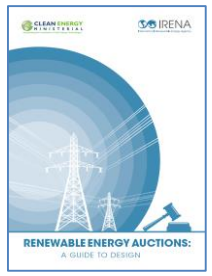
Based on REN21 Global Status Report (2005 to 2016)



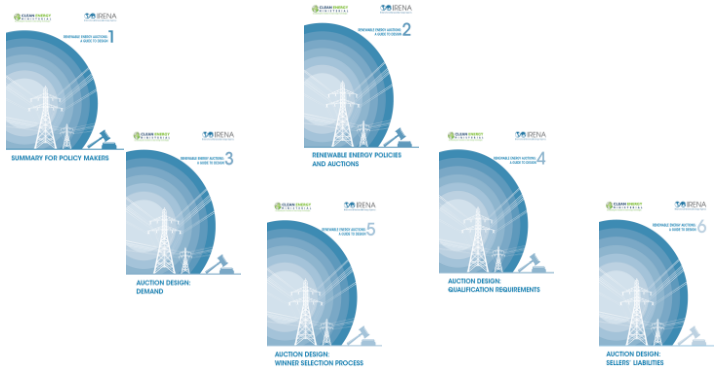
2013

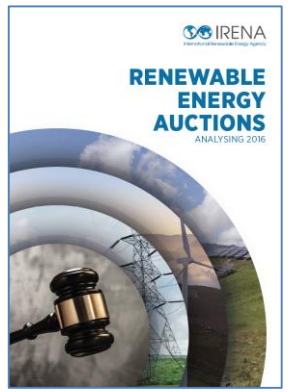


2014



2015





2017

Renewable Energy Auctions

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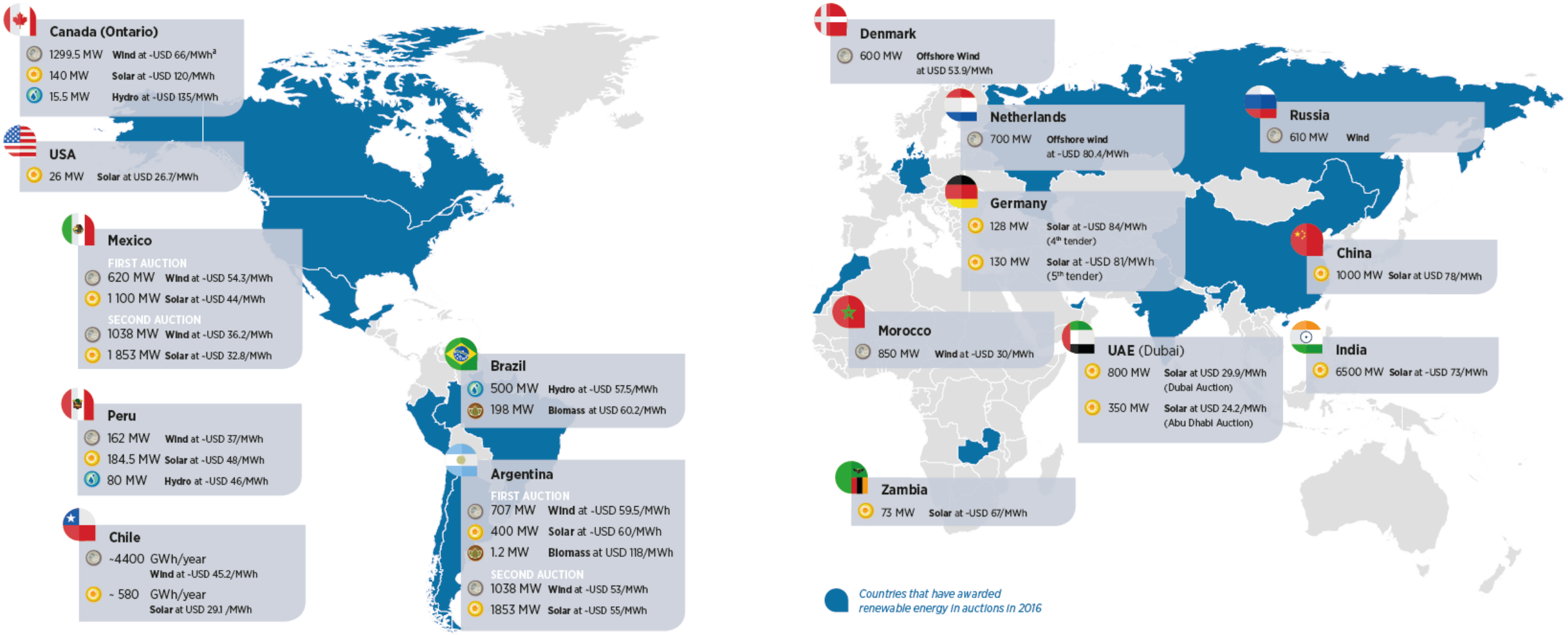
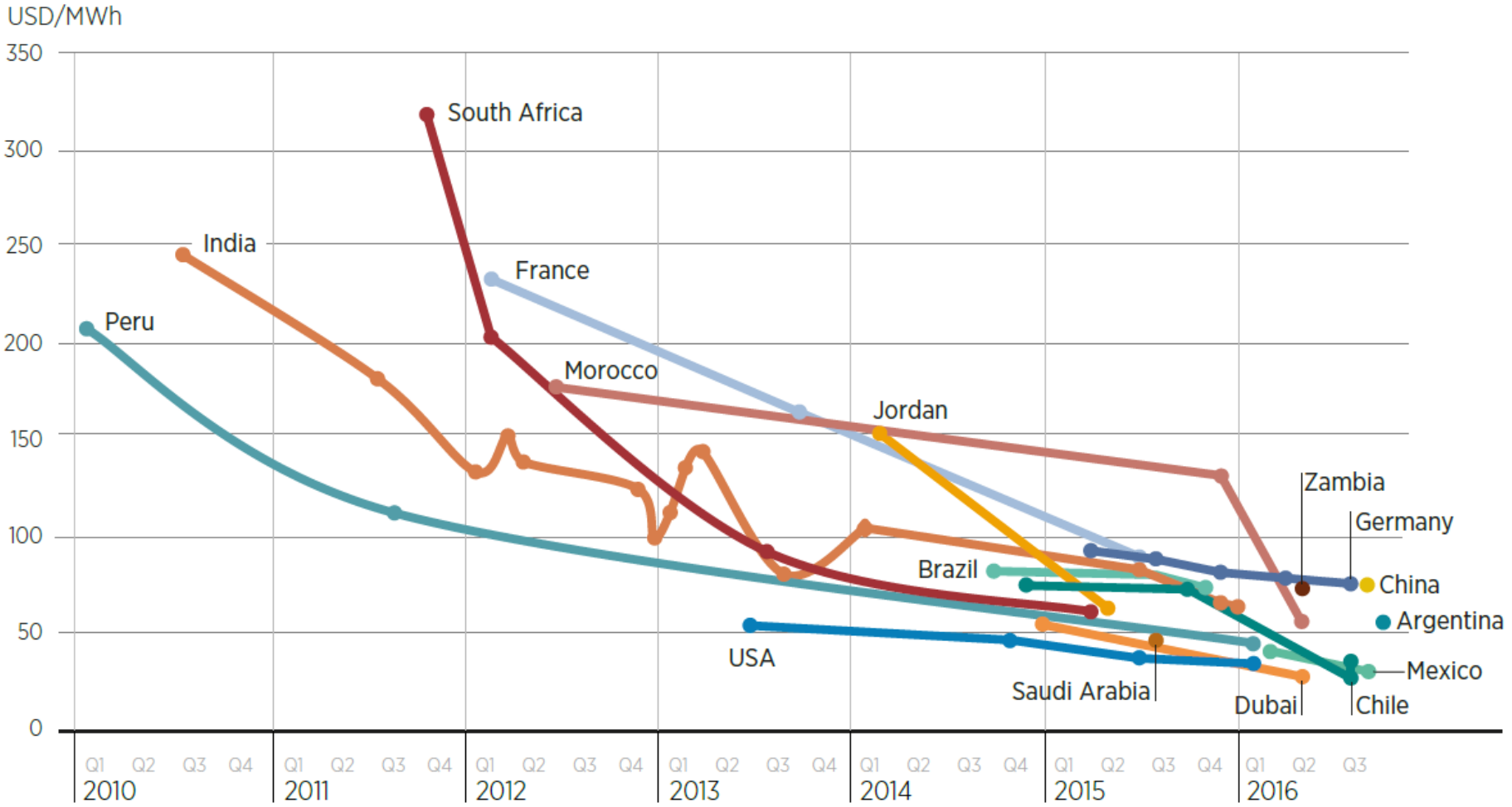
Recent highlights



Source: IRENA (2017) Renewable Energy Auctions: Analysing 2016

Price trends: solar PV auctions



Source: IRENA (2017) Renewable energy auctions: Analysing 2016

Factors that impact the price

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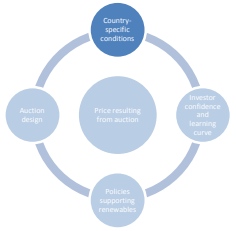
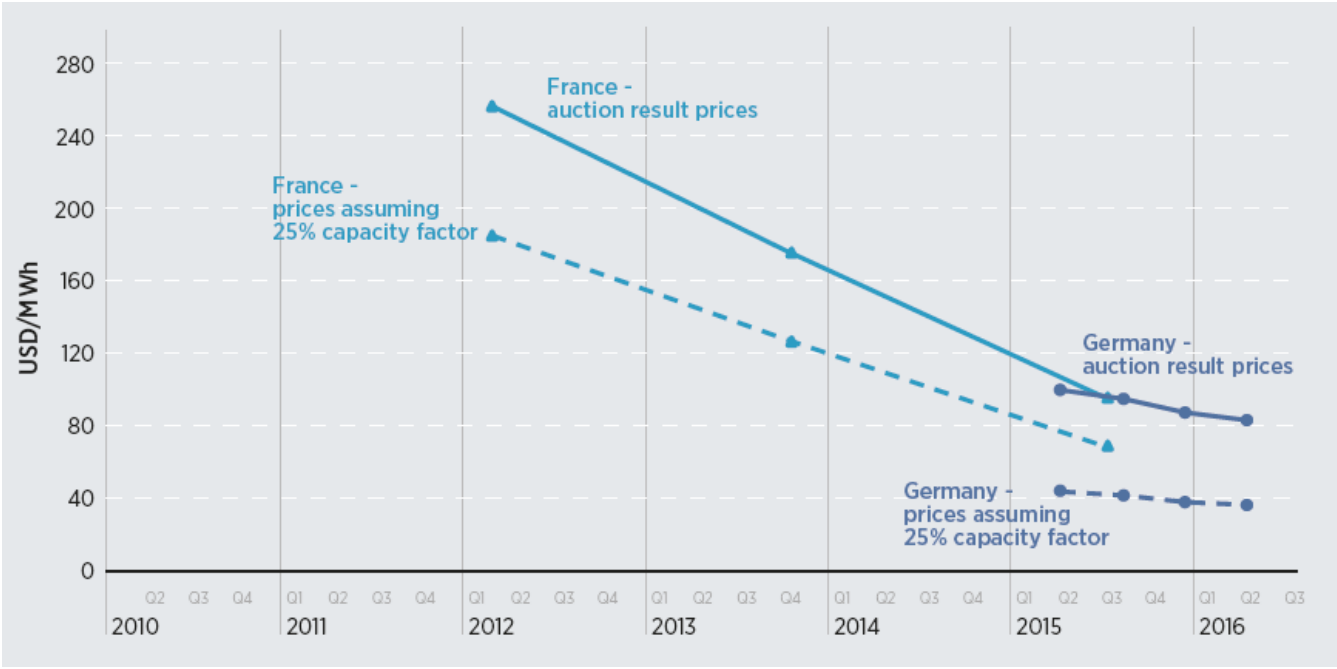


Country-specific conditions:

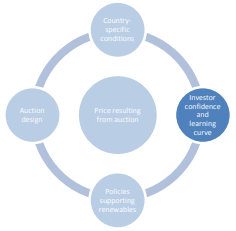
- Cost of finance (access to finance, ease of doing business, etc.)
- Cost of labor, cost of land, etc.
- Renewable energy resource availability.

Solar prices in France and Germany: actual results vs. adjusted result assuming a benchmark capacity factor of 25%, February 2010-August 2016



Source: based on data from BNEF, 2016.

Factors that impact the price



Investor confidence and learning curve:

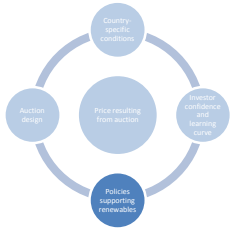
- Credibility of off-taker.
- Periodicity of auctions (as part of a long-term plan).
- Confidence from past auctions.
- Lessons learnt from past auctions (auctioneer and bidders).
- Reuse of documents/studies from past rounds.

Systematic auctions and the learning curve impact

Country	Renewable energy technology	First iteration	Second iteration	Learning curve impact
South Africa	Various	2011: 53% bids qualified	2012: 64.5% bids qualified	+11% increase in bid qualification rate
India	Solar PV	2010: 12.16 INR/ kWh	2011: 8.77 INR/kWh	28% decrease in contracted price
California (USA)	Various	2011: 92 bids received	2012: 142 bids received	+54% of bids received

Source: IRENA and CEM, 2015.

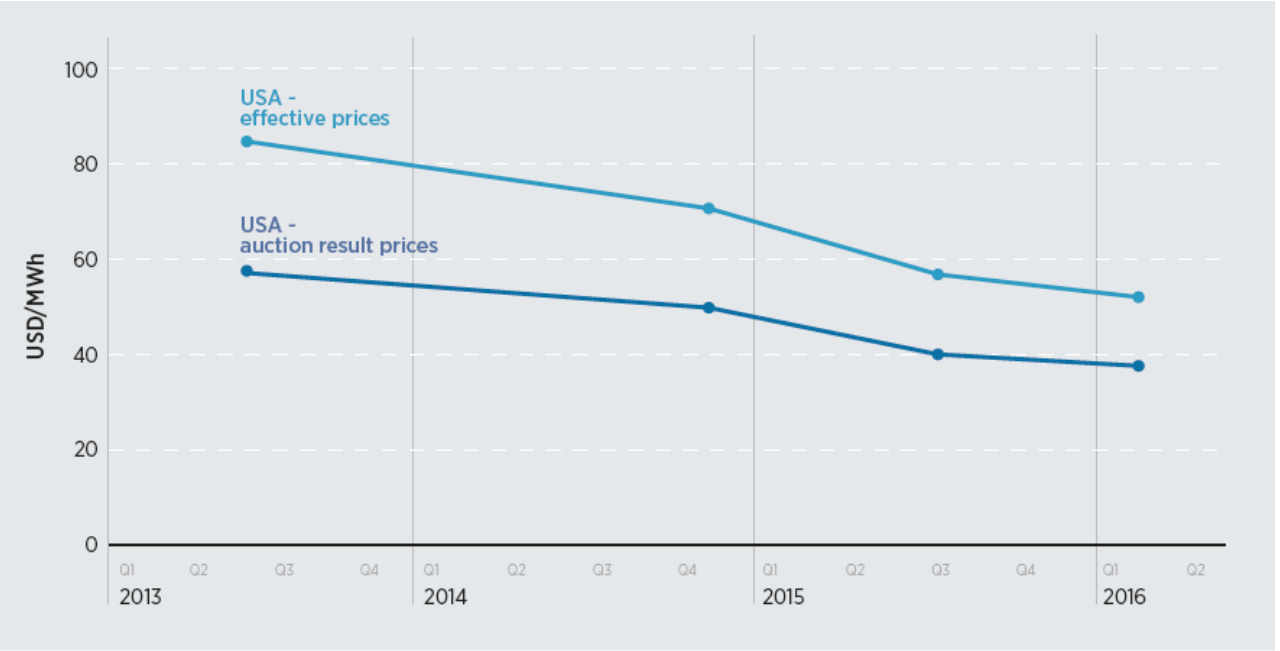
Factors that impact the price



Policies and measures supporting renewable energy development

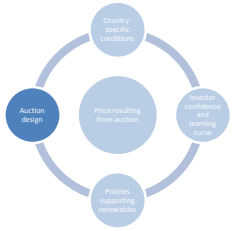
- National plans and targets.
- Fiscal incentives (tax credits, exemptions, accelerated depreciation, etc.)
- Grid access and priority dispatch.
- Socio-economic benefits.

US solar prices: actual vs. estimated effective prices, February 2013-May 2016



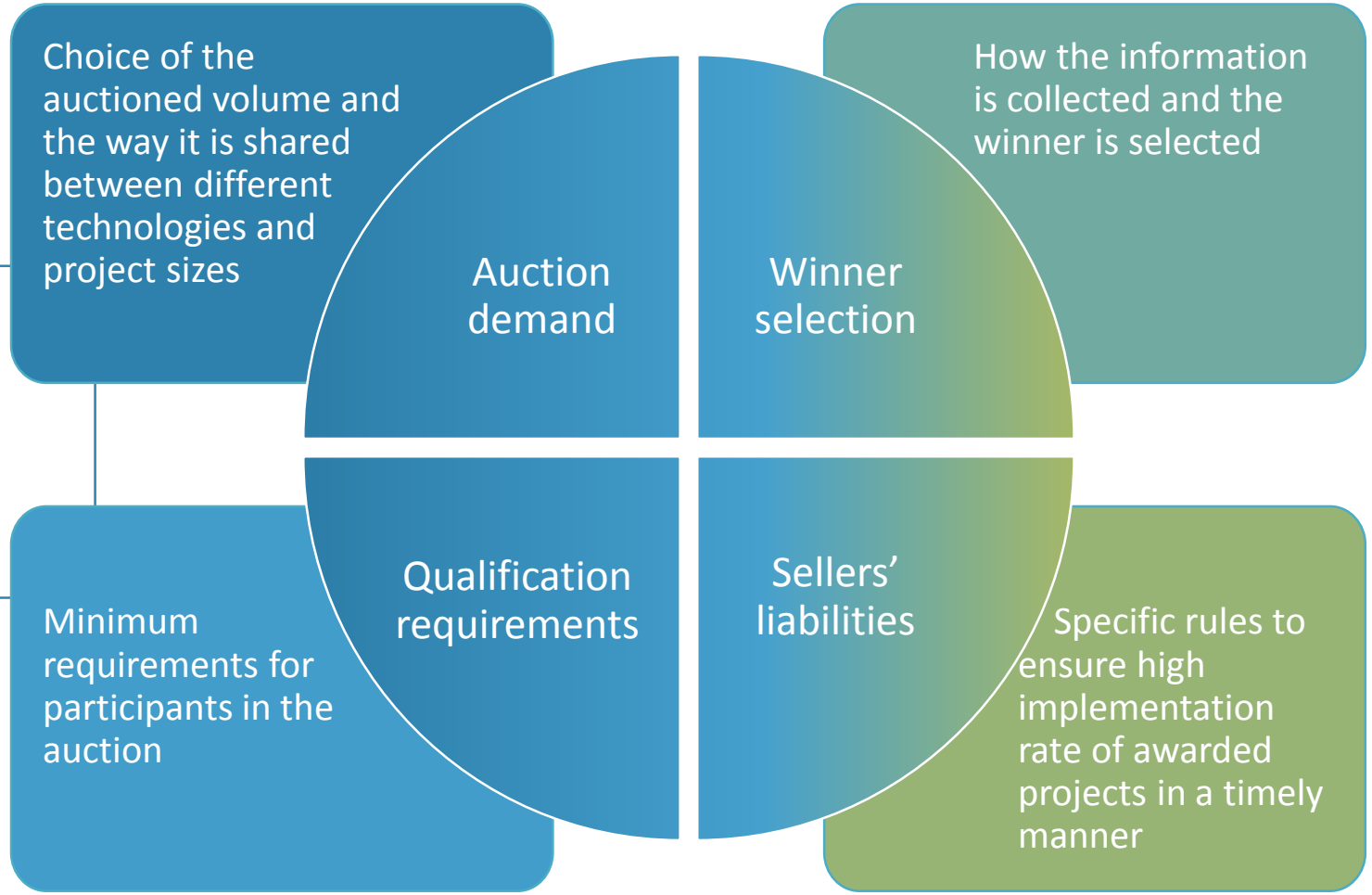
Source: based on data from Shahan, 2016.

Factors that impact the price



The design of the auction considering trade-offs:

- Ensuring project delivery and price.
- Fulfilling development goals and price.
- Encouraging small/new players and price.



IRENA and CEM, 2015

Key messages

Policy makers may want to consider the following:

- Different policy options are not mutually exclusive and each type can be used to address different technologies, capacities, markets and objectives.
- Auctions play an important role in the new generation of policies and they have become increasingly sophisticated in their design
  - Account for the trade-offs between different design elements
  - Tailor the design of auctions to the specific context and objectives
- Mobilising the scale of investment necessary requires an environment that is built on an enabling policy and regulatory framework that can catalyse private investments into the energy sector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