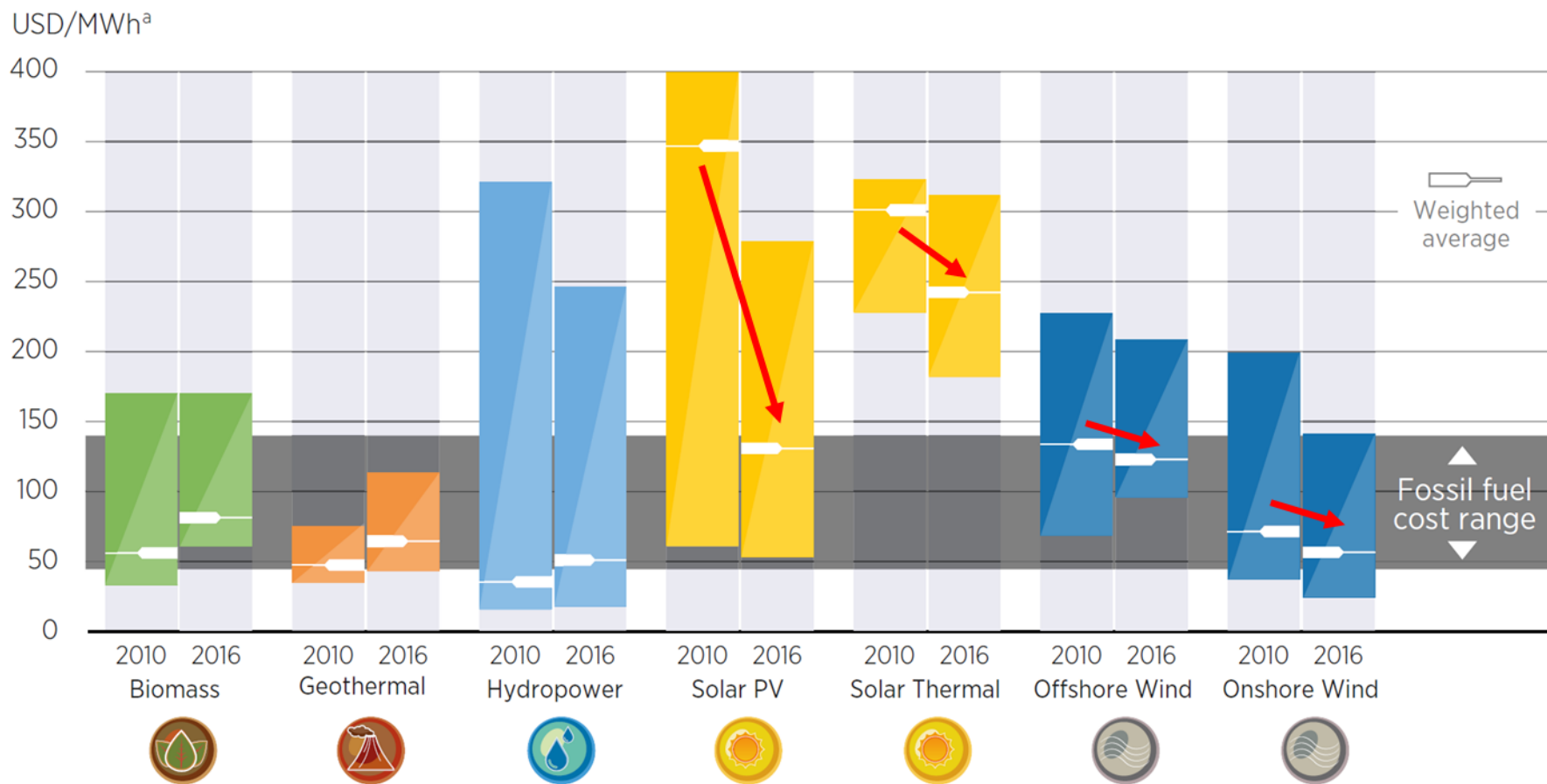


Renewable Energy and the Arab Region

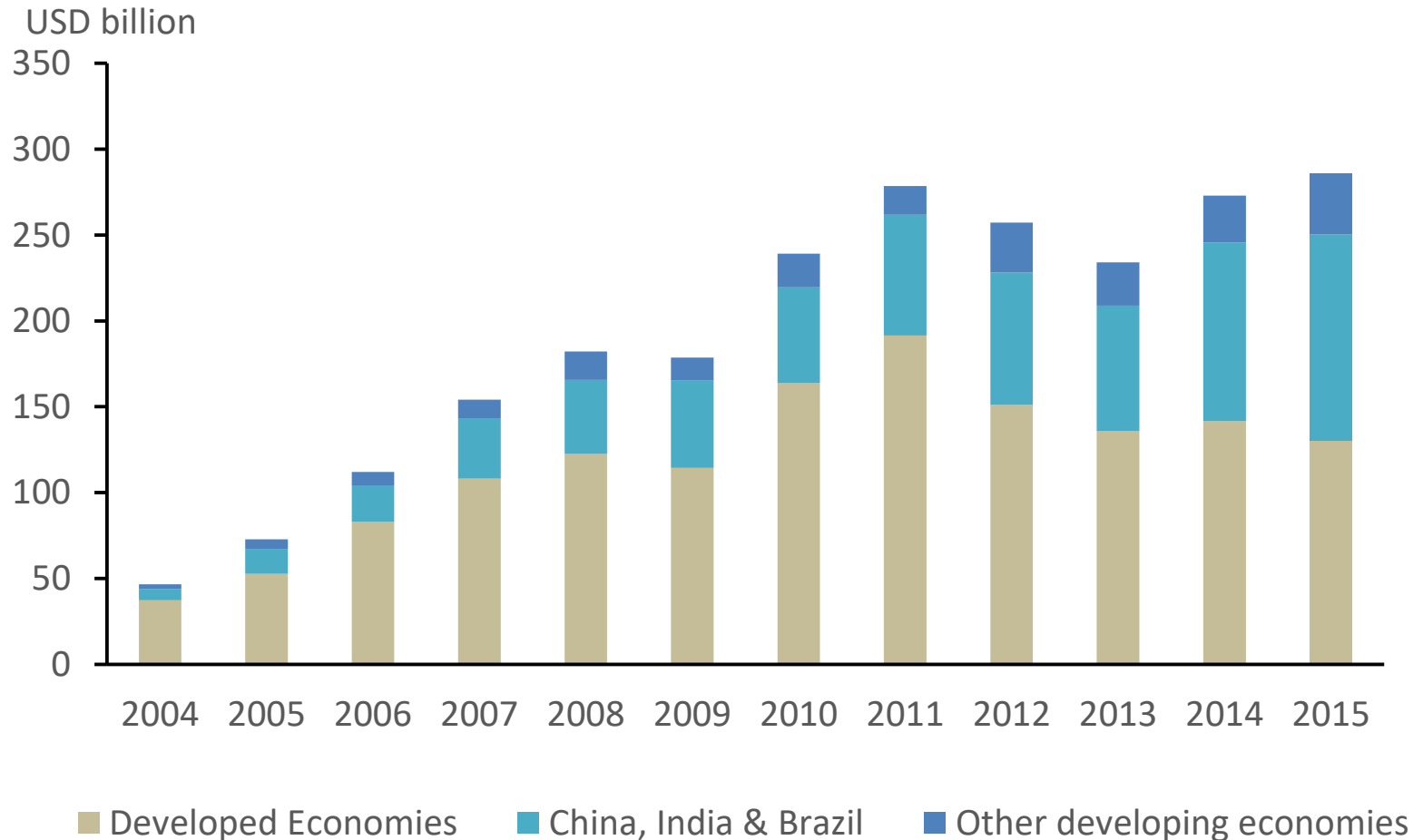


Expert Group Meeting
14-15 May 2017
Cairo, Egypt

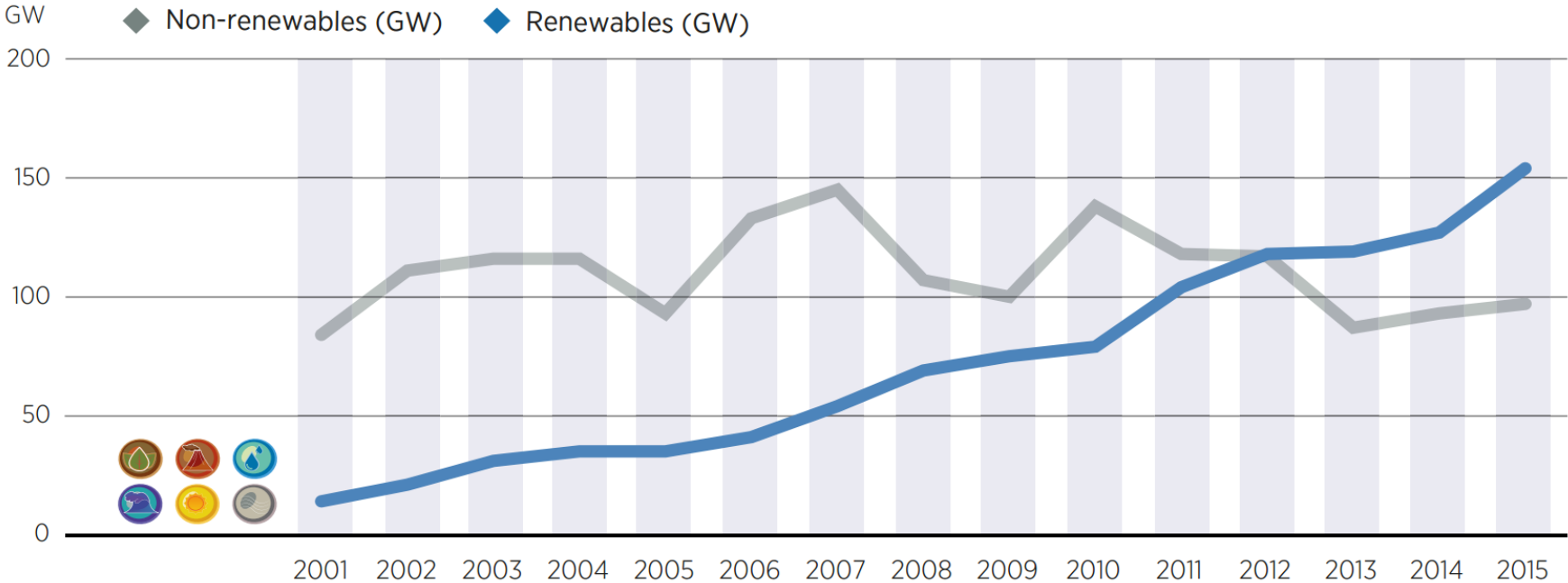
Electricity generation costs are falling



Investments are rising



New capacity additions surpassed fossil fuel



Renewables (GW)	14	21	31	35	35	41	54	69	75	79	104	118	119	127	154
Non-renewables (GW)	84	111	116	116	93	133	145	107	100	138	118	117	87	93	97

Source: IRENA

Renewable power capacity additions have exceeded non-renewables for the last 5 years (incl. 2016)

Benefits of an RE transition



GDP

Up 1.1%
by 2030



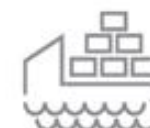
Jobs

24 million jobs
in renewables
by 2030



Welfare

Up 3%
by 2030



Trade

New markets,
new opportunities

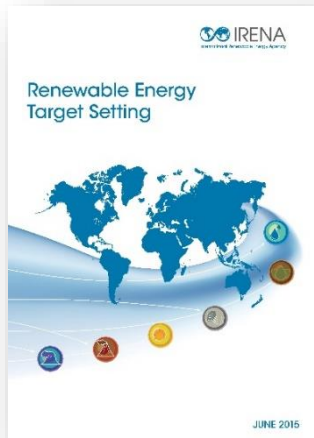
RE employed 8.1 million people around the world in 2015

→ additional 1.3 million for large hydropower

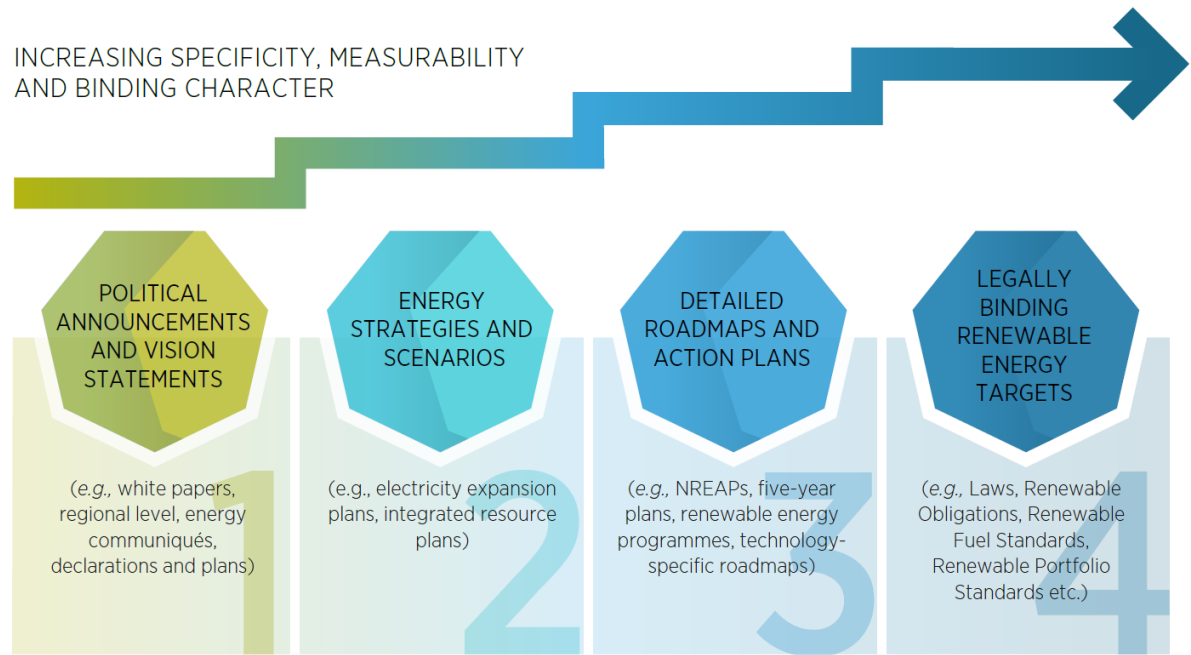
→ 5% increase from the previous year

Targets in the global RE landscape

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



INCREASING SPECIFICITY, MEASURABILITY AND BINDING CHARACTER

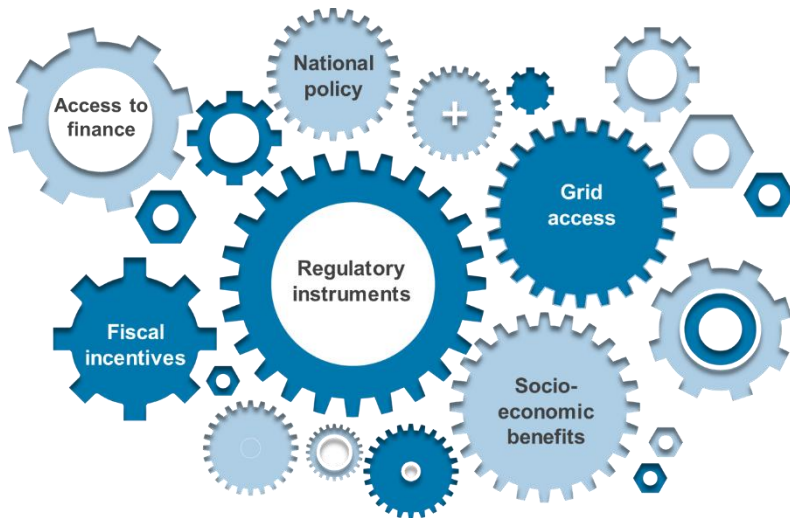


Note: NREAP: National Renewable Energy Actions Plans.

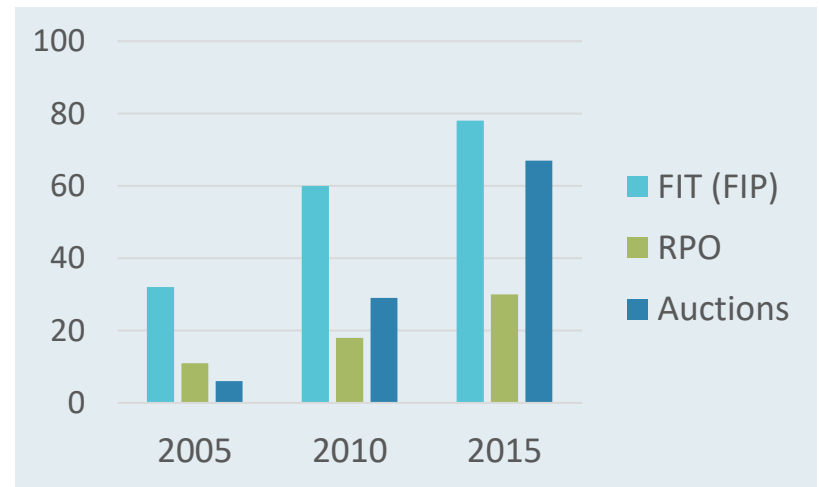


Source: IRENA (2015), Renewable energy target setting.

Trends in RE support policies



Number of countries with renewable energy policies, by type



Implemented auctions and a feed-in tariff simultaneously



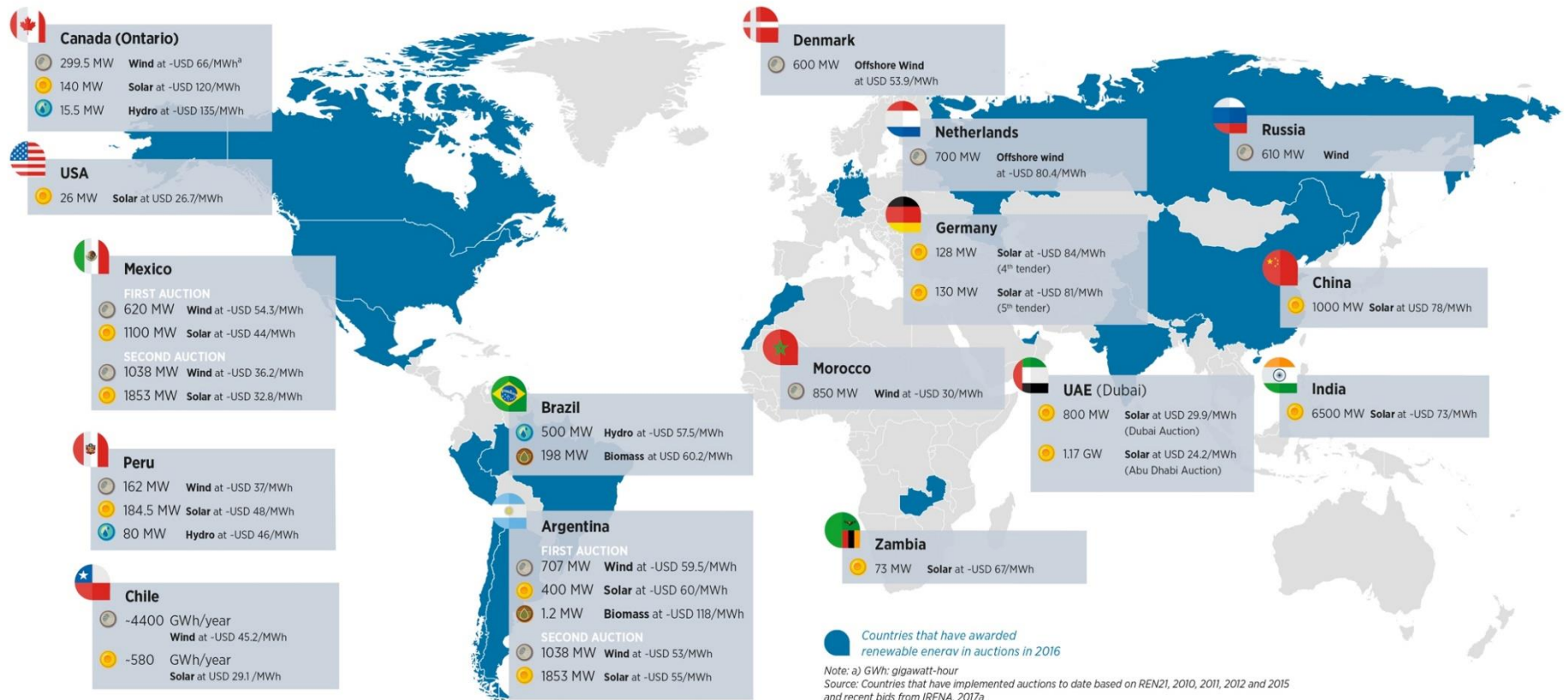
Used feed-in tariffs to set price cap for auctions



Used auctions to set feed-in tariffs

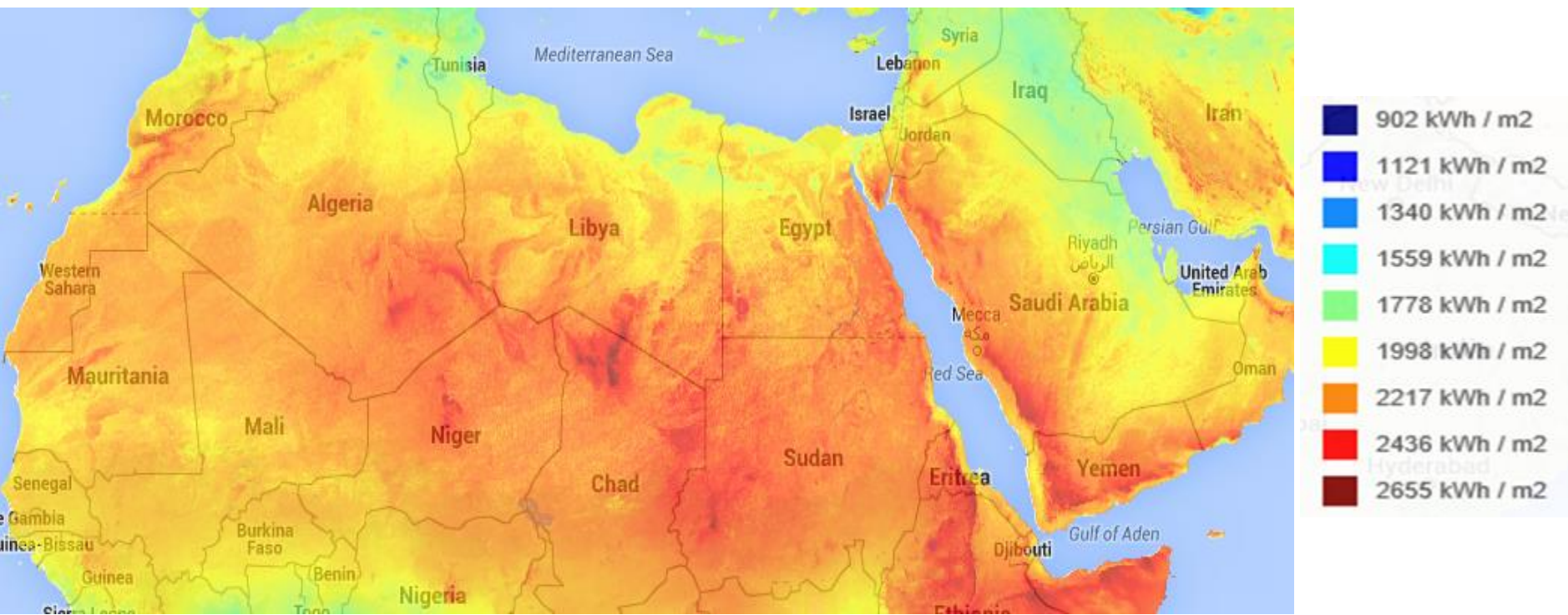
Renewable Energy Auctions

Recent highlights



RE Potential in the Arab World

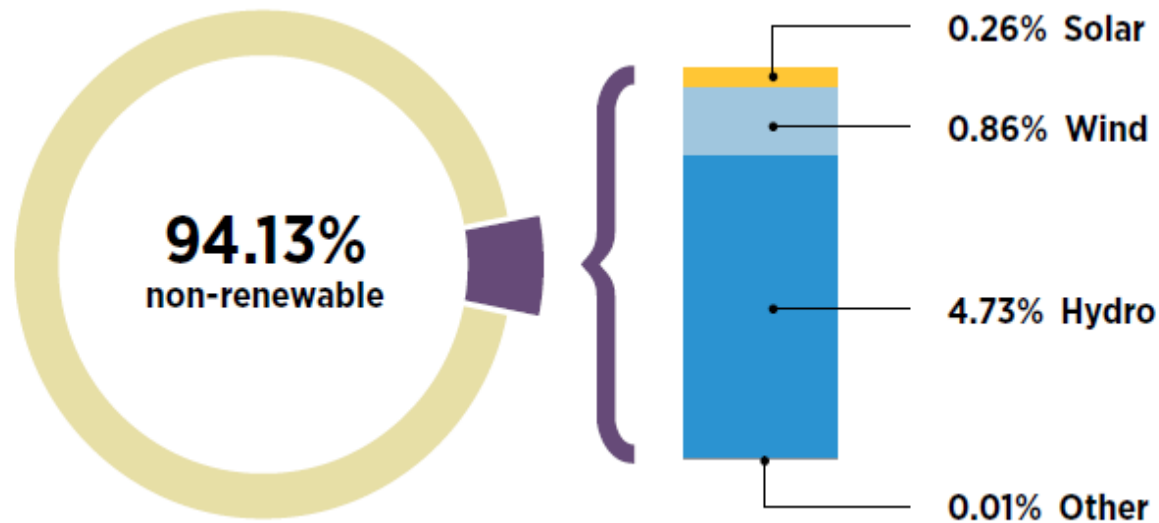
- Very high renewable energy potential, particularly in wind and solar
- Most Arab countries part of the solar belt with highest solar insolation levels in the world (6.5 kWh/m² per day)



Source: Mines ParisTech, retrieved from IRENA Global Atlas for Renewable Energy

Renewable Energy Installed Capacity

Despite tremendous potential, renewable energy penetration remains low.

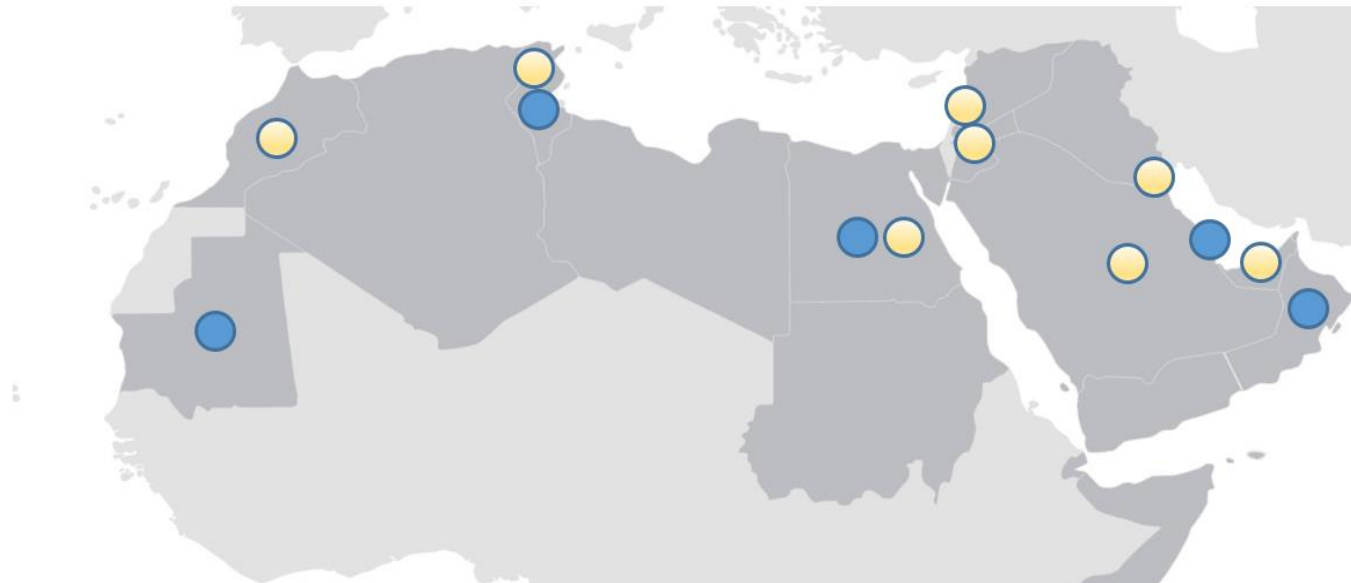


	Non-Renewable Installed Capacity	Renewable Energy Installed Capacity (2015)					Total Installed Capacity
		Solar	Wind	Hydro	Other	Total RE	
[MW]	218,726	616	2,000	11,000	36	13,652	232,378
[%]	94.13%	0.26%	0.86%	4.73%	0.01%	5.87%	100%

Sources: RCREEE (2016), IRENA (2016), Arab Union of Electricity (2015)

Yet, high commitment to drive RE deployment, with ambitious LT goals. 10

- In 2016, **USD 11 billion** were invested in renewables across the Arab region compared to USD 1.2 billion in 2008, a nine-fold increase in 8 years.
- In 2016, **5.8 GW** of renewables (excl. hydro) was operational or under construction, a five-fold growth since 2008.
- Targets to translate into a **combined 80 GW of renewable capacity** by 2030 based on national plans
- To achieve ambitions, **efforts needed** to enhance policy, regulatory, technical and economic frameworks enabling the scaled-up deployment of renewable.
- According to the World Bank, **only 6/22 countries** of the region scored more than 50 out 100 for the policies/laws/regulations of renewable energies.



Country Support

- RRA Oman (2015)
- RRA Mauritania (2015); post RRA
- RRA Tunisia (in progress)
- RRA/REmap Egypt (in progress)
- REmap AUE (2015)
- Qatar National Stakeholder Consultation (2017)

Regional Initiatives

- Pan-Arab Clean Energy initiative
- RE Market Analysis for GCC (2016)
- RE Manufacturing Potential for:
 - Egypt, Morocco and Tunisia (with EIB, 2015)
 - Jordan, Lebanon and the UAE (with UNESCWA, in progress)

Regional approach to promote the integration of greater shares of renewables into power systems

Resource assessment

Planning

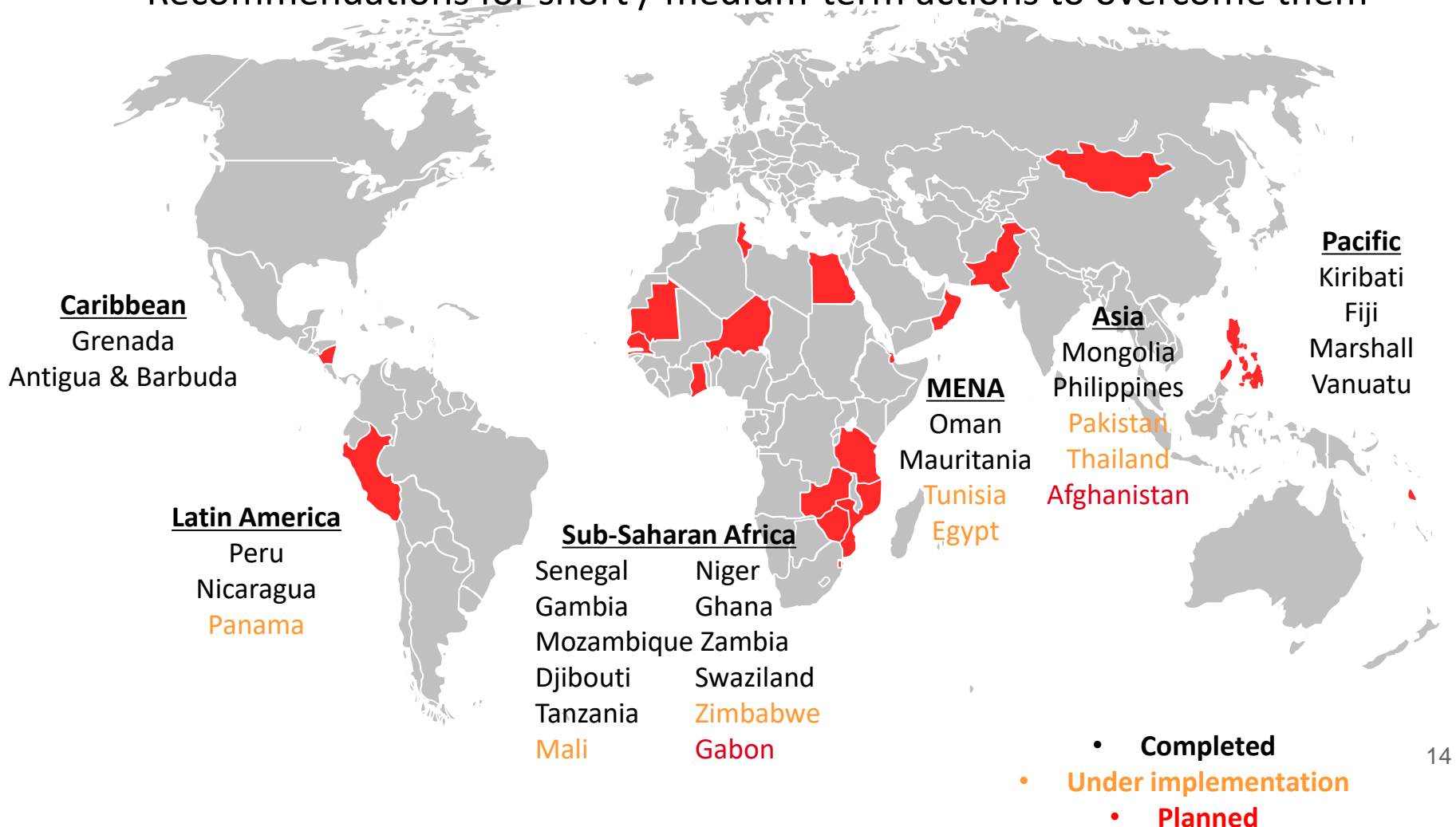
Enabling frameworks

Project facilitation support



Renewables Readiness Assessment

- ✓ Comprehensive assessment of the situation on the ground for RE deployment
 - ✓ Identification of obstacles hindering accelerated deployment
 - ✓ Recommendations for short / medium-term actions to overcome them



- A study assessing the capability to develop local RE manufacturing industries while exploiting interregional potential and linkages.



2015

Egypt, Morocco, Tunisia



UNITED NATIONS
الاستشقا
ESCWA

Forthcoming

Jordan, Lebanon, UAE

COMING SOON
Additional partners, countries



IRENA's Project Support

RESOURCE

YOUR SOURCE FOR RENEWABLE ENERGY INFORMATION

Success stories
Country profiles

Project
concept

Site characterization

GlobalAtlas
FOR RENEWABLE ENERGY

Deployment

Project pipelines
Corridors, SIDS
Lighthouse,
Readiness

Pre-
feasibility

IRENA ADFD
Supporting Energy Transition
**SUSTAINABLE
ENERGY MARKETPLACE**

Assistance to
financial closure
and debt facility

Bankable project
development guidelines

**IRENA
PROJECT
NAVIGATOR**

Investor
ready

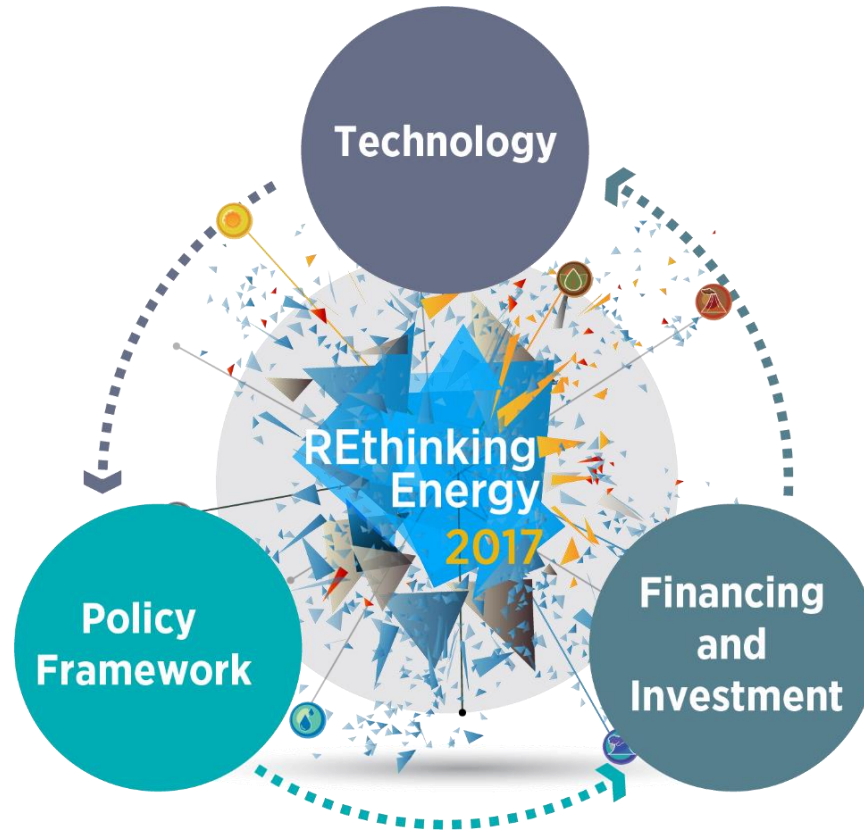
Feasibility

Evaluate, technical assistance

**SUSTAINABLE
ENERGY MARKETPLACE**

Thank you for your attention





Renewable energy policies have been central to this growth

NATIONAL POLICY	REGULATORY INSTRUMENTS	FISCAL INCENTIVES	GRID ACCESS	ACCESS TO FINANCE ^a	SOCIO-ECONOMIC BENEFITS ^b
<ul style="list-style-type: none"> ◆ Renewable energy target ◆ Renewable energy law/strategy ◆ Technology-specific law/programme 	<ul style="list-style-type: none"> ◆ Feed-in tariff ◆ Feed-in premium ◆ Auction ◆ Quota ◆ Certificate system ◆ Net metering ◆ Mandate (e.g., blending mandate) ◆ Registry 	<ul style="list-style-type: none"> ◆ VAT/ fuel tax/ income tax exemption ◆ Import/export fiscal benefit ◆ National exemption of local taxes ◆ Carbon tax ◆ Accelerated depreciation ◆ Other fiscal benefits 	<ul style="list-style-type: none"> ◆ Transmission discount/exemption ◆ Priority/dedicated transmission ◆ Grid access ◆ Preferential dispatch ◆ Other grid benefits 	<ul style="list-style-type: none"> ◆ Currency hedging ◆ Dedicated fund ◆ Eligible fund ◆ Guarantees ◆ Pre-investment support ◆ Direct funding 	<ul style="list-style-type: none"> ◆ Renewable energy in rural access/cook stove programmes ◆ Local content requirements ◆ Special environmental regulations ◆ Food and water nexus policy ◆ Social requirements

FITs Strengths and weaknesses - Keeping pace with rapidly decreasing costs

FITs

Strengths

Limits the risks for investors also in emerging technologies

Facilitates the entry of new players in the market

Often funded by consumers and not exposed to public budget cuts

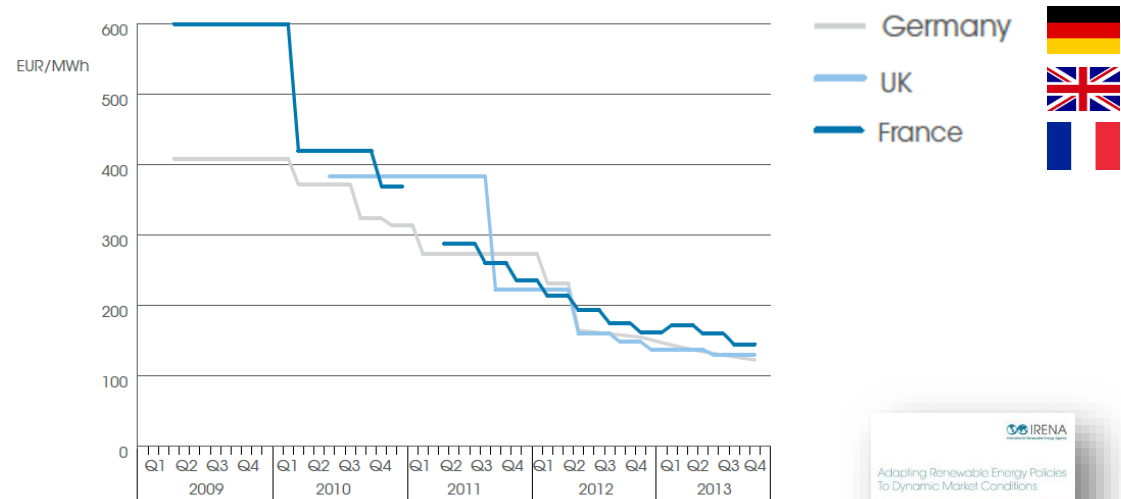
Long term security drives technological development

Weaknesses

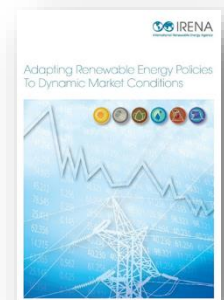
Costly with high deployment rates and Generation is not exposed to electricity market prices

Tariff setting and tariff adjustment process is challenging and complex

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



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



FIPs Strengths and weaknesses - Keeping pace with rapidly decreasing costs

FIPs

Strengths

Fixed premiums encourage generators to react to market signals

Sliding premiums or capped fixed premiums minimise the support cost

Limit risk for investors, especially premiums with floor

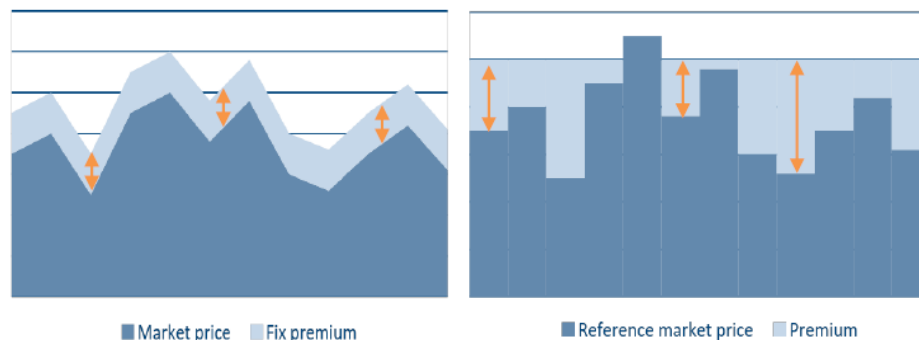
Flexible designs and well suited for liberalised electricity markets

Weaknesses

Fixed premiums without floor create risk for investors

Premium setting and adjustment process is challenging and complex

Fixed or floating premium



Auctions Strengths and weaknesses - Keeping pace with rapidly decreasing costs

Auctions

Strengths

Flexibility in the design according to conditions and objectives

Permit real price discovery

Provide greater certainty regarding prices and quantities

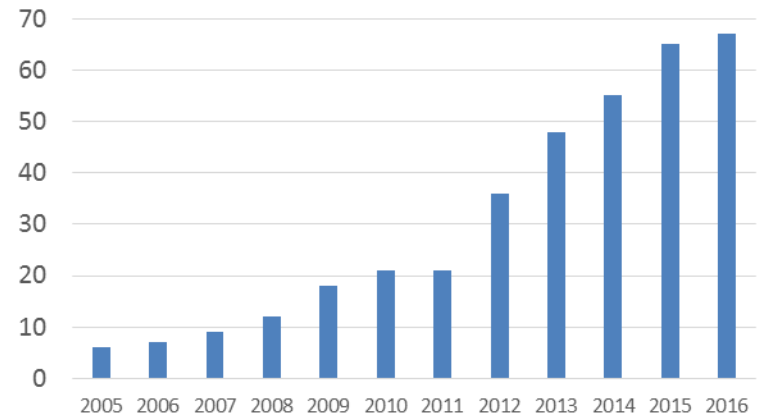
Enable commitments and transparency

Weaknesses

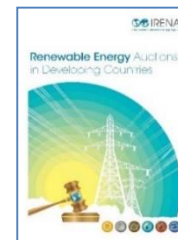
Are associated with relatively high transaction costs for both developer and auctioneer

Risk of underbidding and delays

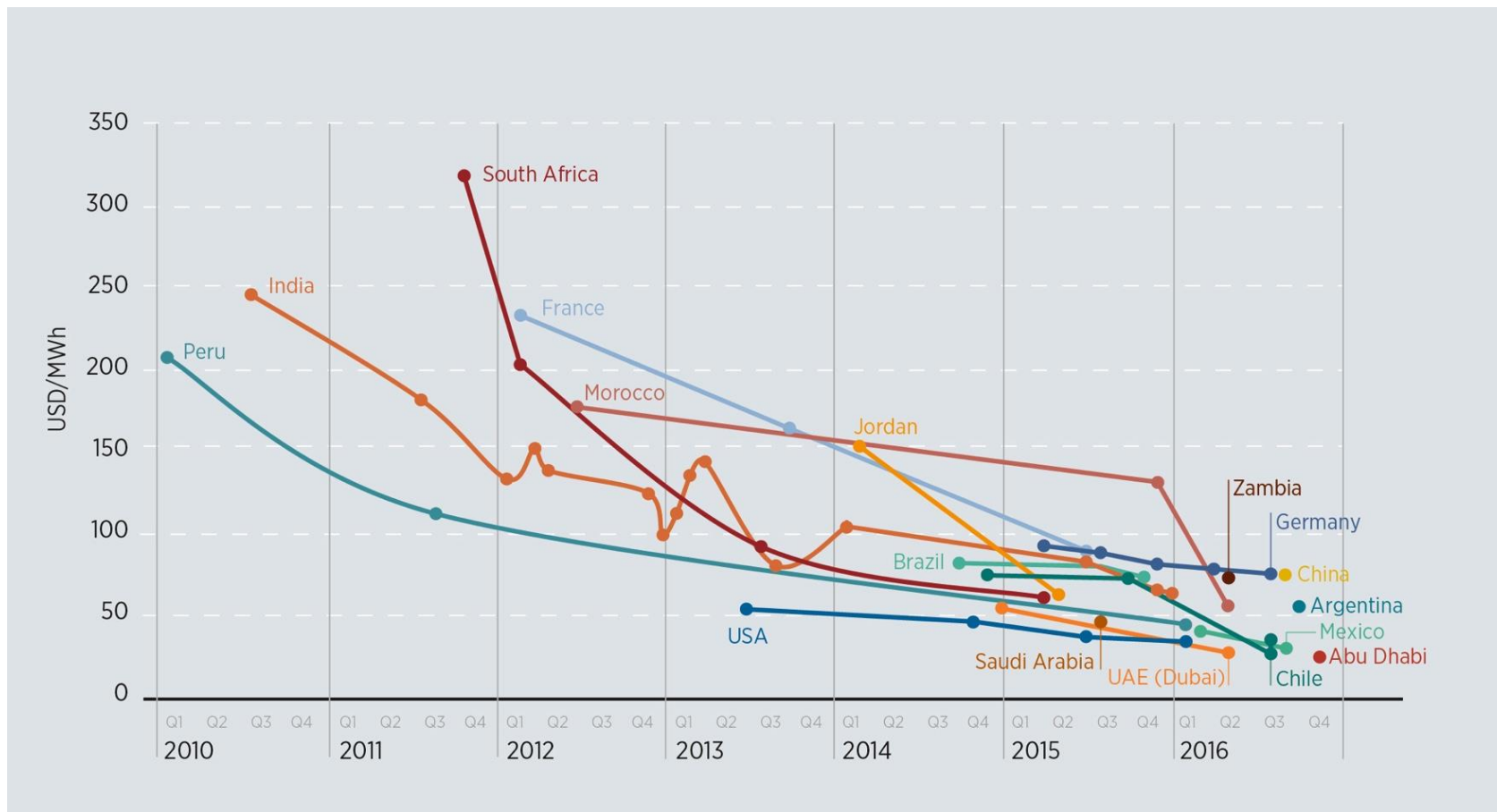
Number of countries that have adopted auctions



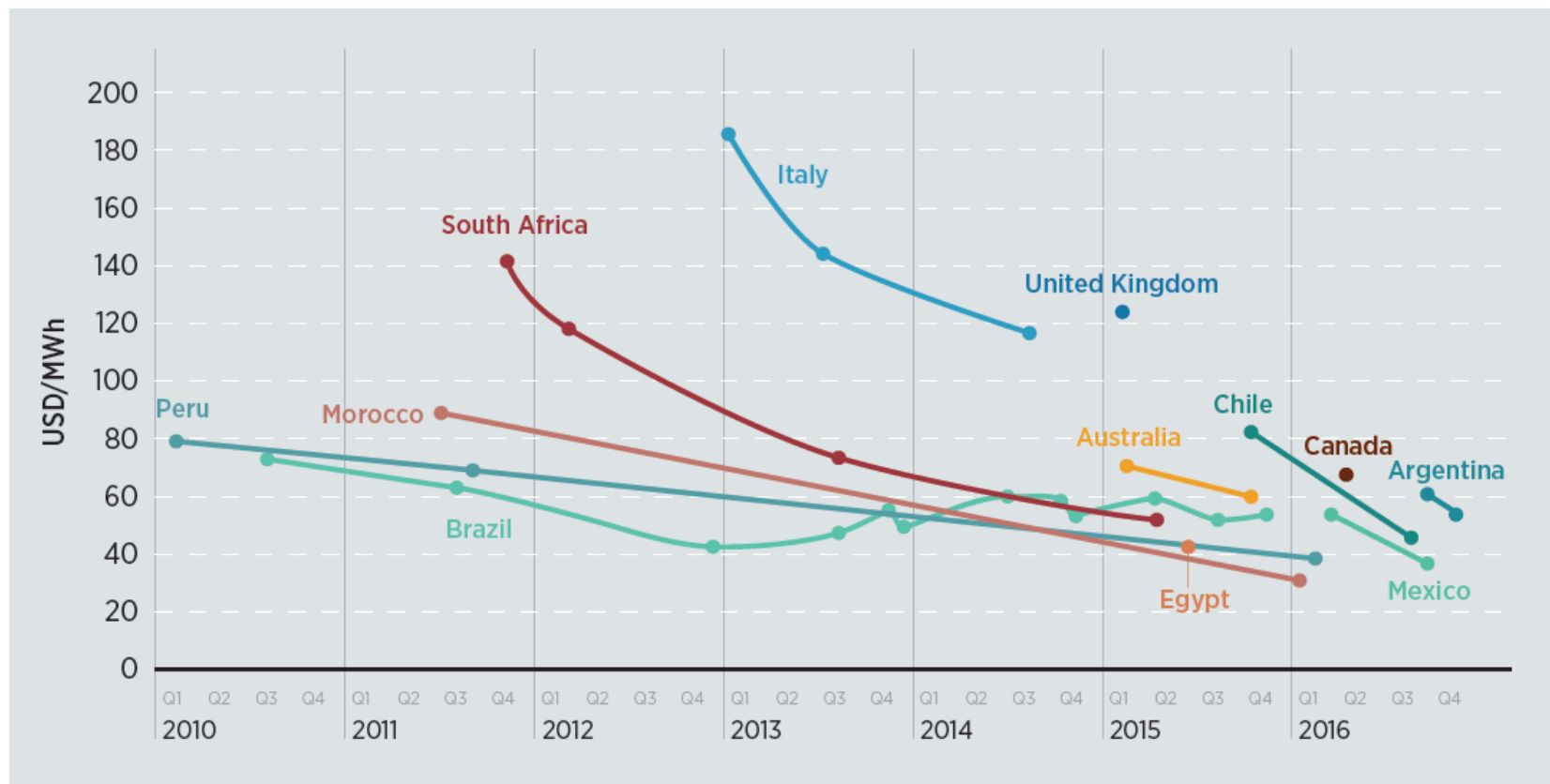
Based on REN21 Global Status Report (2005 to 2016)



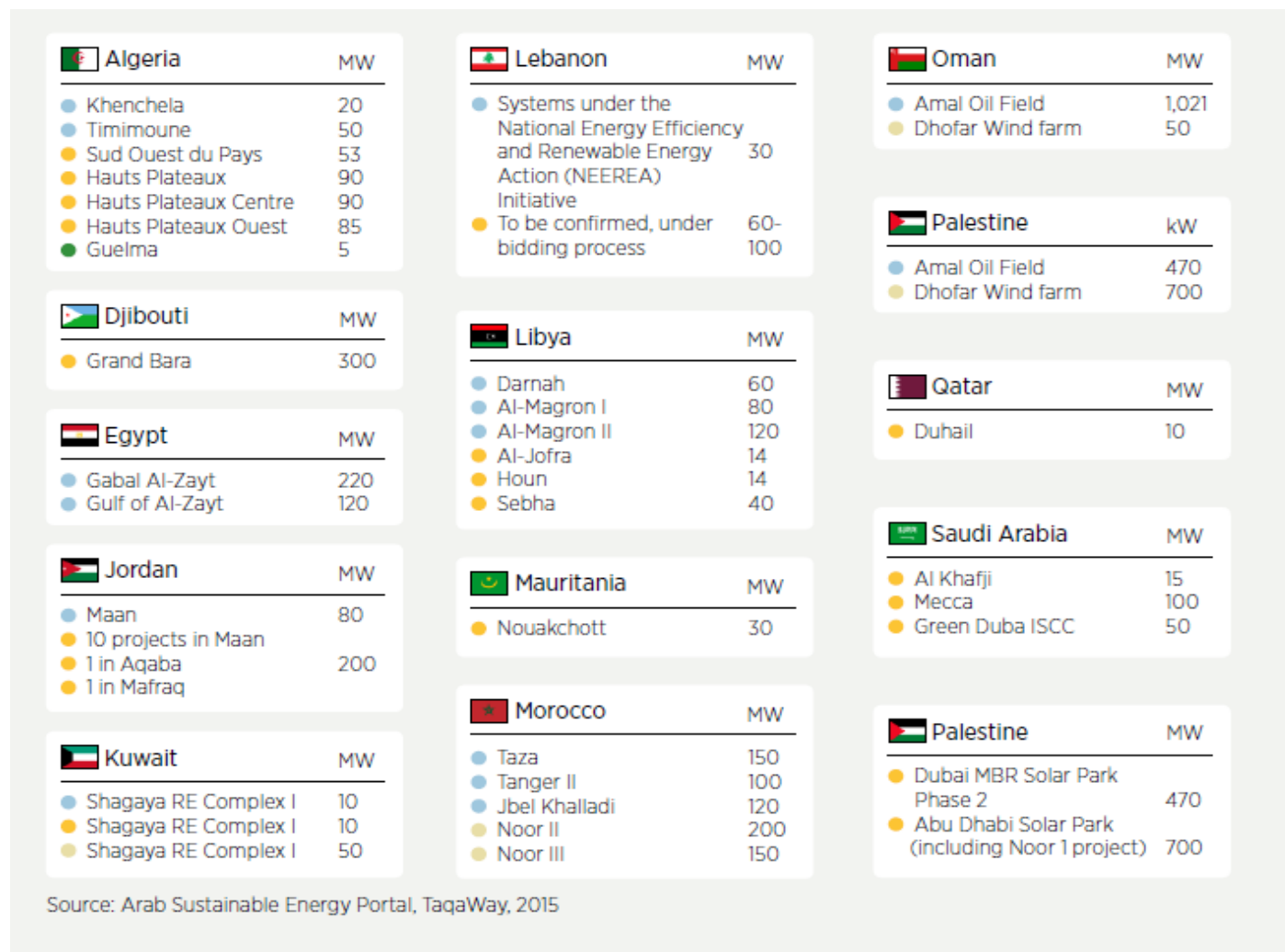
Price trends: solar PV auctions



Price trends: onshore wind auctions



...and many projects underway.



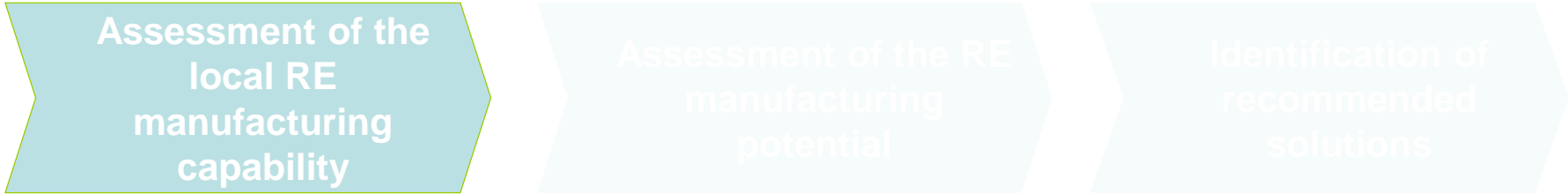


- Backbone of IRENA's country level engagement
- Comprehensive assessment of the situation on the ground for RE deployment; identification of obstacles hindering accelerated deployment; recommending short / medium-term actions to overcome them
- Country-initiated, country-led process
- Inclusive and multi-stakeholder process promoting consensus
- Process establishing a basis for future collaboration
- IRENA as facilitator

- » IRENA's **Global Renewable Energy Roadmap**
- » Shows feasible, cost-effective ways to **increase renewable energy deployment** in world's energy mix
- » **Support the G20** in determining pathways for operationalising Paris Agreement with decarbonisation scenarios analysis to 2050, report released in March, 2017
- » **New global REmap report** in 2018, previous global reports in 2014, 2016
- » Identifies concrete **technology options** for countries and sectors
- » Assesses policy and investment **implications**
- » Outlines **benefits** (economic, social, environmental)
- » In cooperation with 70 countries
- » 30 publications to date and datasets including country reports and sector studies



Objectives of the study



- ▶ **Identification of actors involved in the value chain**
- ▶ **Assessment of local manufacturing assets**
- ▶ **Conclusion on current local manufacturing capacity**

Value Chain	Materials		Components			Construction	
	Raw materials	Wafer production	Solar cell production	Module assembly	Electronics and cable	Steel support structure	EPC
Companies	Not identified	Not identified	Not identified	Egyptian Army (state owned)	El-Sewedy	Not identified	PIRECO EPPM
	Orascom Al-Ezz Steel Sinai Cement	Egyptian Army (state owned)	Egyptian Army (state owned)	Not identified	Not identified	DSD-Ferrosteel Orascom	SOTEE SOMATRA-GET EGMS
	Rio Glass Saint Gobain etc.	Not identified	Not identified	Not identified	Leoni	International comp. active in the steel sector	M+W Sunenergy Abengoa
	Local companies active in the sector	Local companies potentially active in the sector	International companies locally involved				

Ex: Solar PV Value Chain in Egypt

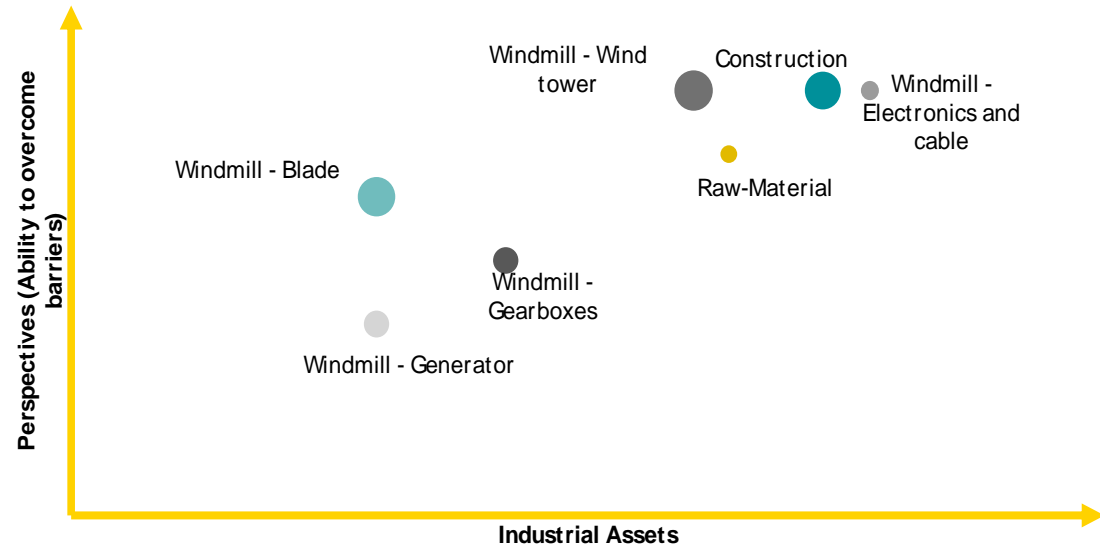
Objectives of the study

Assessment of the local RE manufacturing capability

Assessment of the RE manufacturing potential

Identification of recommended solutions

- ▶ **Analysis of the barriers for future local manufacturing**
- ▶ **Interviews with >30 stakeholders**
- ▶ **Conclusion on future local manufacturing capacity**



Ex: Perspectives in the wind value chain in Tunisia

Objectives of the study

Assessment of the local RE manufacturing capability

Assessment of the RE manufacturing potential

Identification of recommended solutions

- **Identification of the key success factors to achieve the potential for local integration**
- **Formulation of recommendations to enable environment for RE industry growth**

Key measures	State assessment / Priority level					
	Solar PV		Solar CSP		Wind onshore	
	Current state	Priority	Current state	Priority	Current state	Priority
Provide information on market size and opportunities of production adjustments		High		High		High
Assess the feasibility of production line upgrades		Medium		Medium		High
Foster business linkages in particular through JV with international companies		High		Medium		High
Support awareness-raising initiatives		-		Medium		High
Support the structuring of the sector		-		-		High

Ex: Recommendations on the development of a local RE industry in Morocco