



APRICUM

THE CLEANTECH ADVISORY.

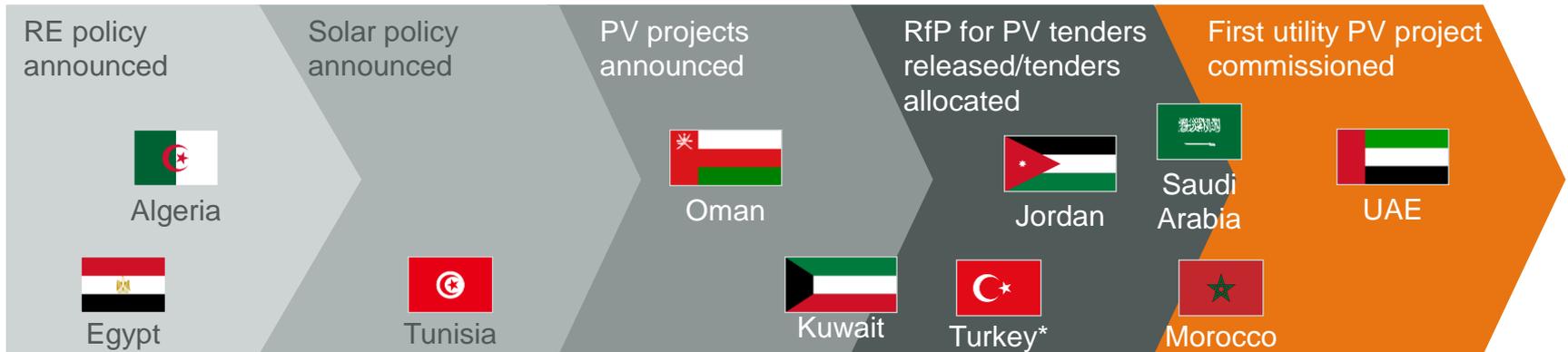
How to Prepare for K.A.CARE's Localization Requirements

ESIA – Doing Solar Business in Saudi Arabia

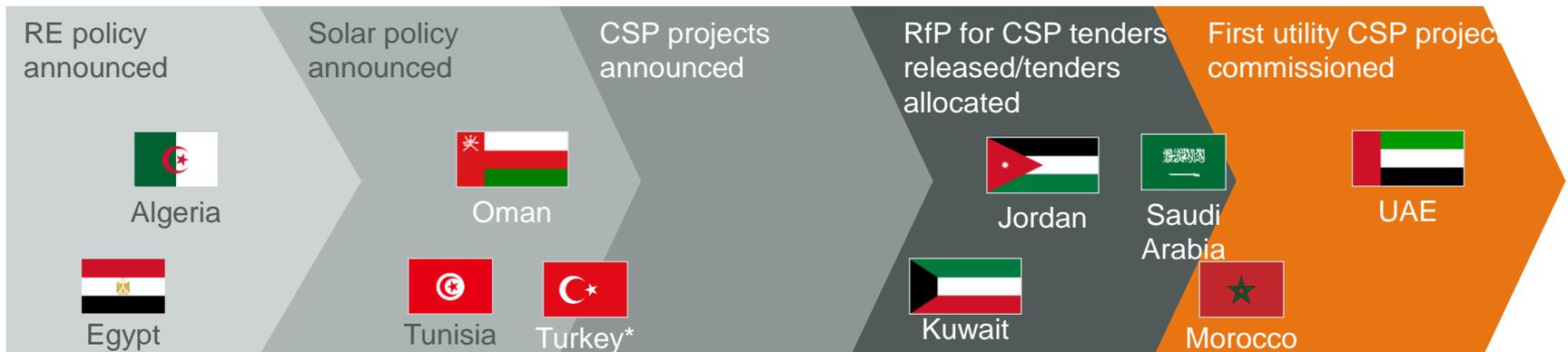
April 30, 2013

While UAE has commissioned the first utility-scale solar plants in MENA, Saudi Arabia will quickly catch up by 2014.

Selected MENA countries and expected stage of utility PV project development (Q1/2014)



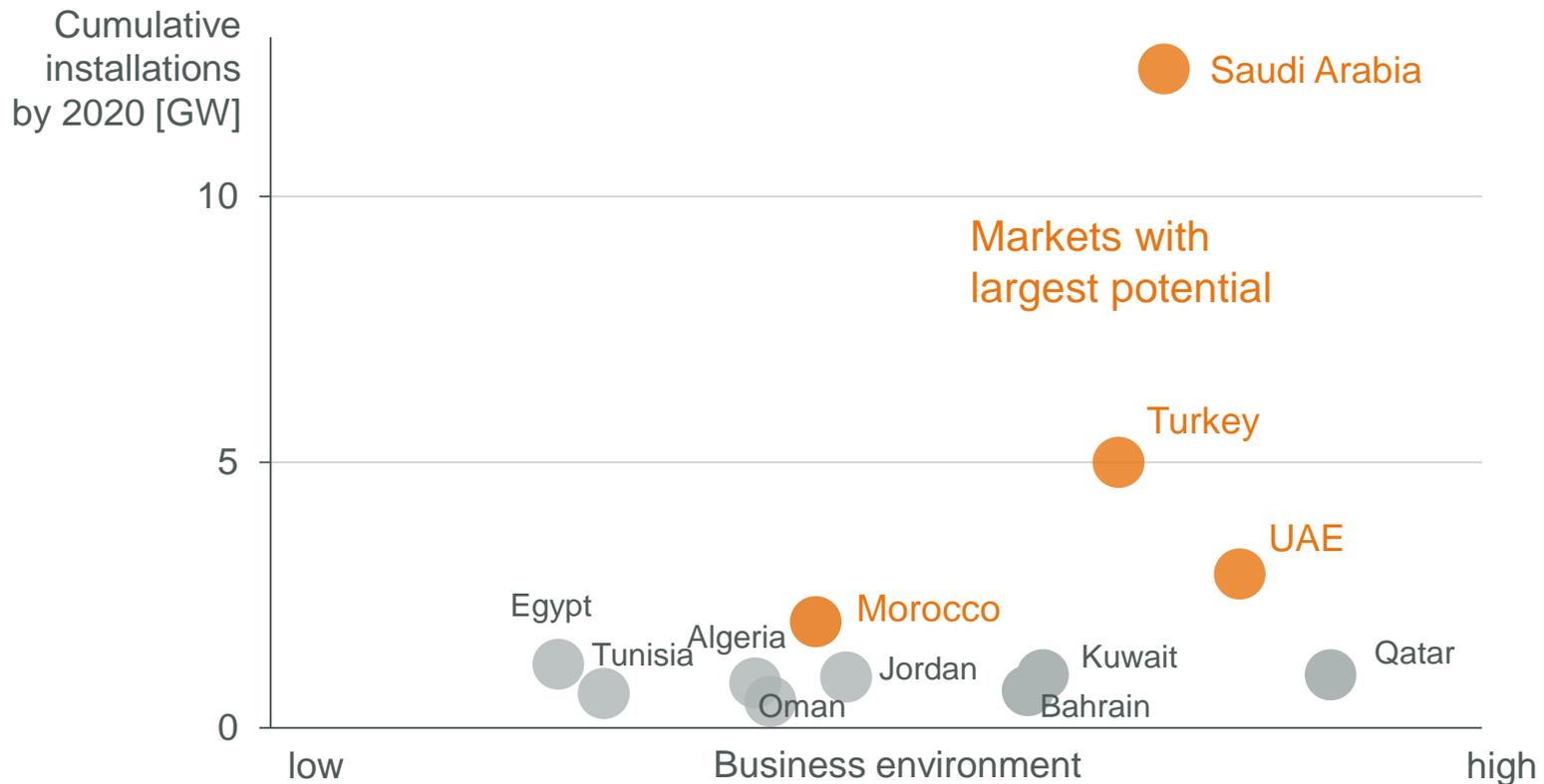
Selected MENA countries and expected stage of utility CSP project development (Q1/2014)



*: Not a tender market – will move slowly in this time horizon because of solar measurement requirements; Source: 1. Apricum estimates

Famous for oil and gas, KSA has emerged as MENA's most promising solar market thanks to the K.A.CARE program.

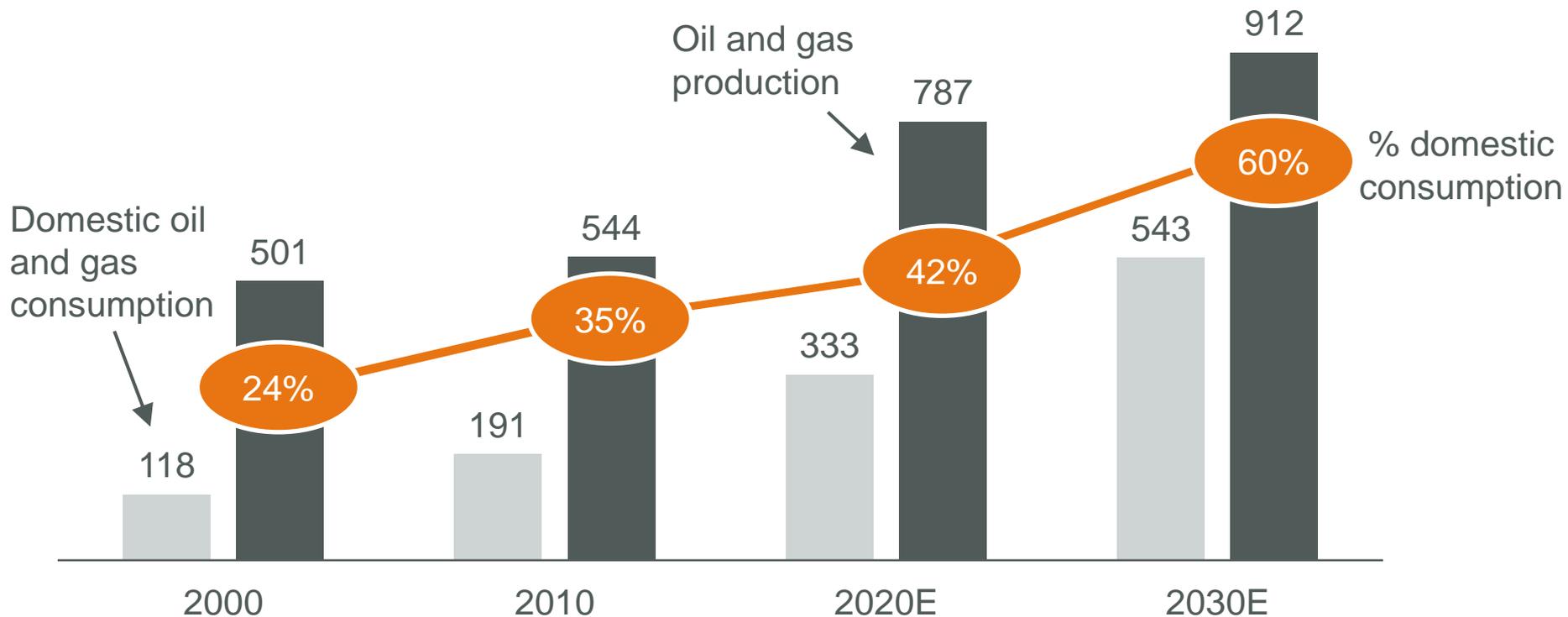
Solar market potential matrix for MENA countries



Source: Apricum market model Q1/2013, center case. Includes PV and CSP. Business environment is defined using metrics on ease of doing business (World Bank), political stability (Bloomberg combustibility index) and corruption perception index (Transparency International)

Saudi Arabia's oil and gas production and consumption trends are not sustainable.

Energy production and consumption (oil and gas) in Saudi Arabia [mtoe]

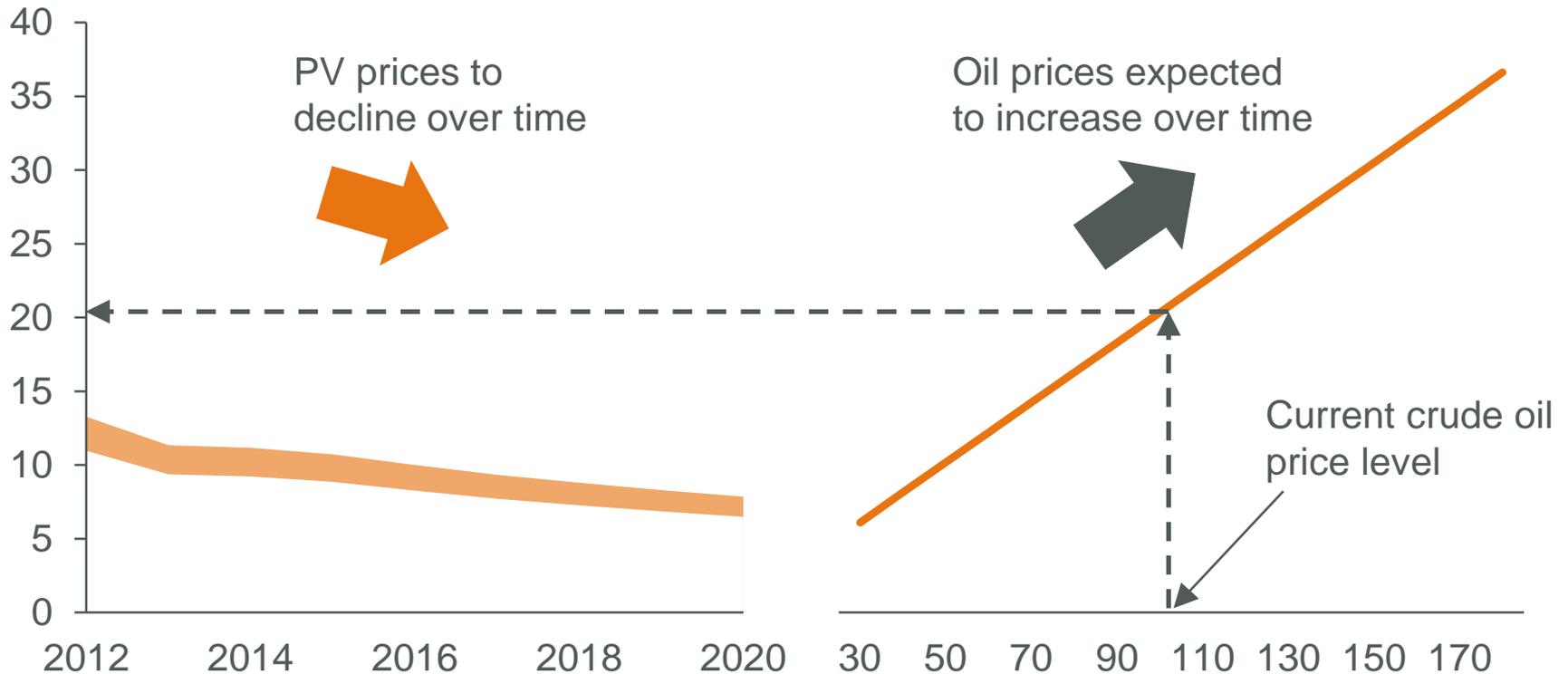


Source: BP statistical review of world energy 2011, Economist Intelligence Unit 2012, IEA 2011, Apricum forecast

Given market prices for oil at the end of 2012, PV is easily economical compared to crude oil power generation.

LCOE of utility-scale PV power generation in KSA [USD ¢/kWh]

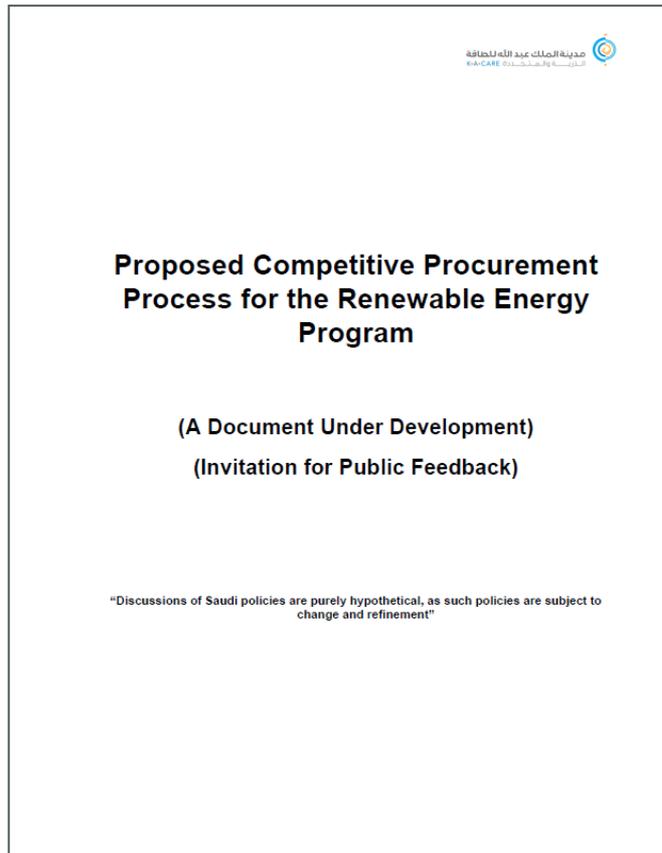
Variable cost of power generation from crude oil [USD ¢/kWh] vs. crude oil prices



Source: Apricum PV price model Q4/2012. Other key assumptions: discount rate: 6% (real), yield east coast: 1572 kWh/a, west coast: 1900 kWh/a, O&M: 1.25% of CAPEX, degradation: 0.8% p.a.

The Saudi government will address its energy challenge through a massive renewable energy procurement program.

K.A.CARE white paper defining RE procurement program



K.A.CARE (King Abdullah City for Atomic and Renewable Energy) released a white paper with details about Saudi Arabia's renewable energy program on February 21, 2013:

- ▶ Plan to develop 16 GW of PV capacity and to become the world's largest CSP market with target capacity of 25 GW until 2032
- ▶ Introductory round of 500–800 MW

K.A.CARE aims to release solar IPP tenders for more than 6 GW until 2016.

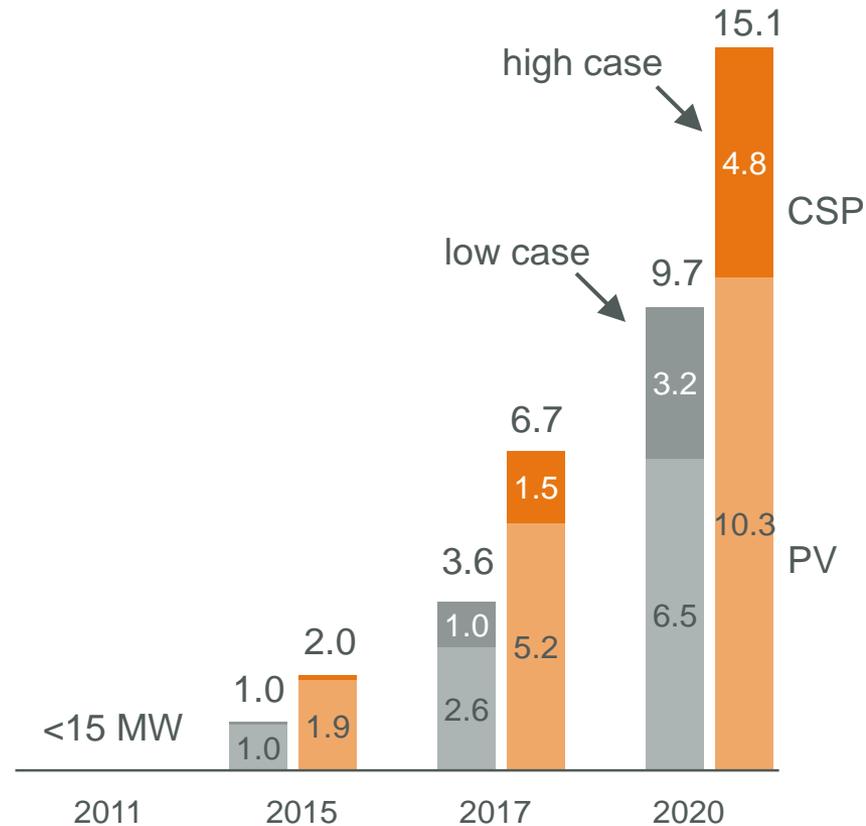
Indicative size of procurement rounds for renewable-energy projects in KSA

	Introductory round (RfP release expected in Q2/2013)		First tender round (RfP release expected in Q2/2014)		Second tender round (RfP release expected in Q3–Q4/2015)	
	Capacity [MW]	App. no. of projects	Capacity [MW]	App. no. of projects	Capacity [MW]	App. no. of projects
Solar PV	500–800 ¹	≥6	1,100	11–55	1,300	15–65
Solar CSP			900	5–25	1,200	7–30
Wind			≥1	650	10–30	1,050
Geothermal + waste to energy	–	–	50–350	5–10	50–350	5–15
All renewable	500–800	5–7	2,700–3,000	31–120	3,600–3,900	42–160

1) Split between technologies has to be defined; Source: K.A.CARE 2012, 2013

Apricum expects the Saudi solar market to grow to as much as 15 GW cumulatively by 2020.

Forecast installed solar capacity in Saudi Arabia [cumulative, GW]



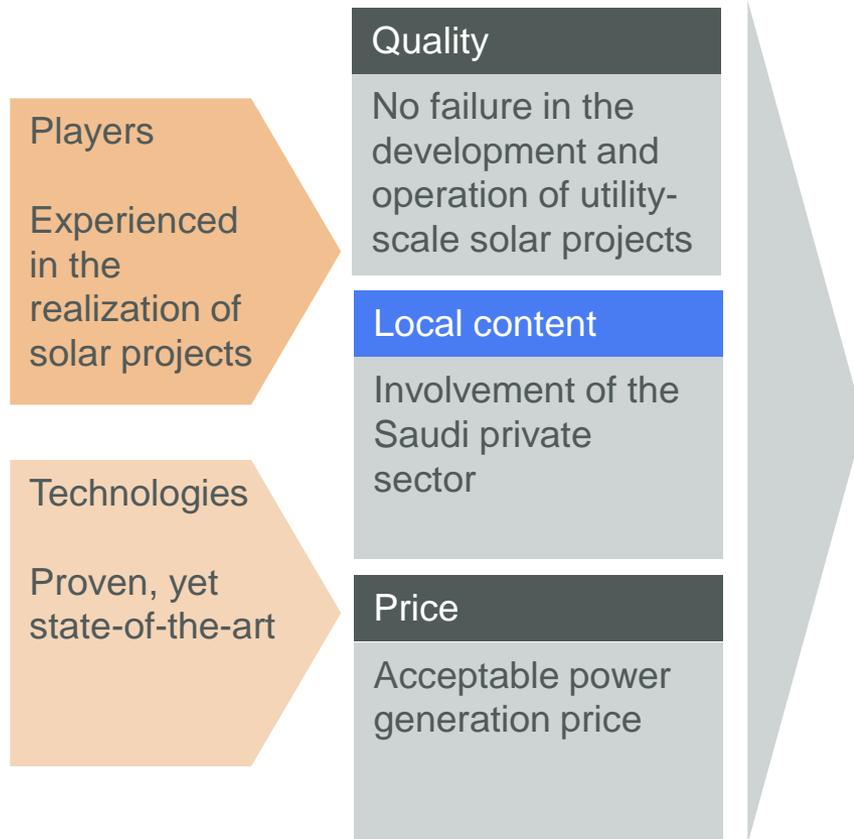
Solar market opportunity

- ▶ Large K.A.CARE program
- ▶ Utility-scale projects
- ▶ Additional projects (e.g, Saudi Aramco)
- ▶ High solar irradiation
- ▶ Replacing oil and diesel-fired capacity
- ▶ Local investors are eager to develop solar business activities

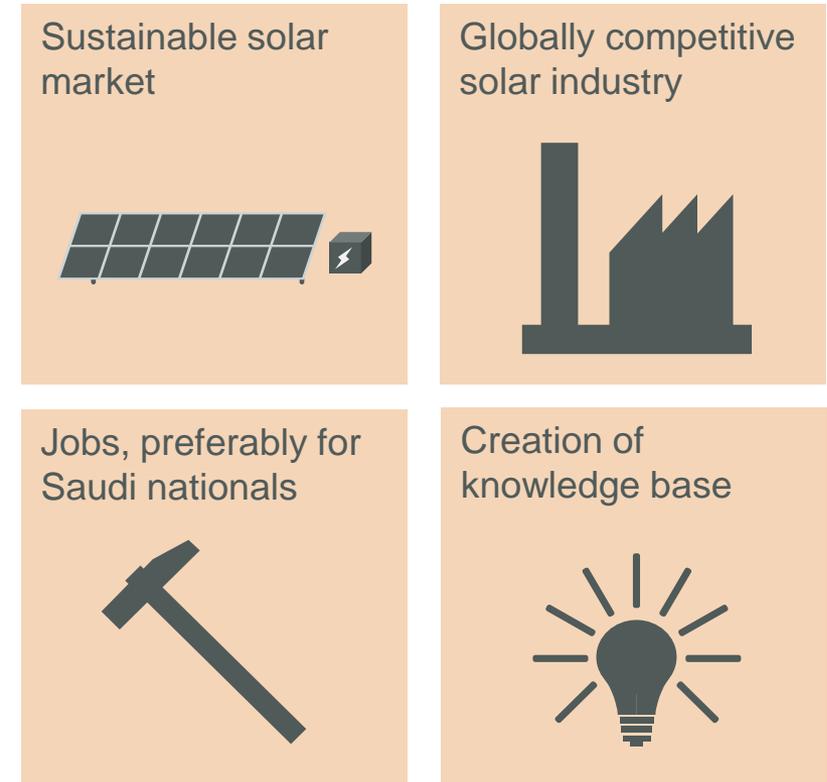
Source: Apricum market model Q1/2013

Local content needs to be demonstrated in projects, so that K.A.CARE can fulfill economic goals.

K.A.CARE's aspirations on solar project level

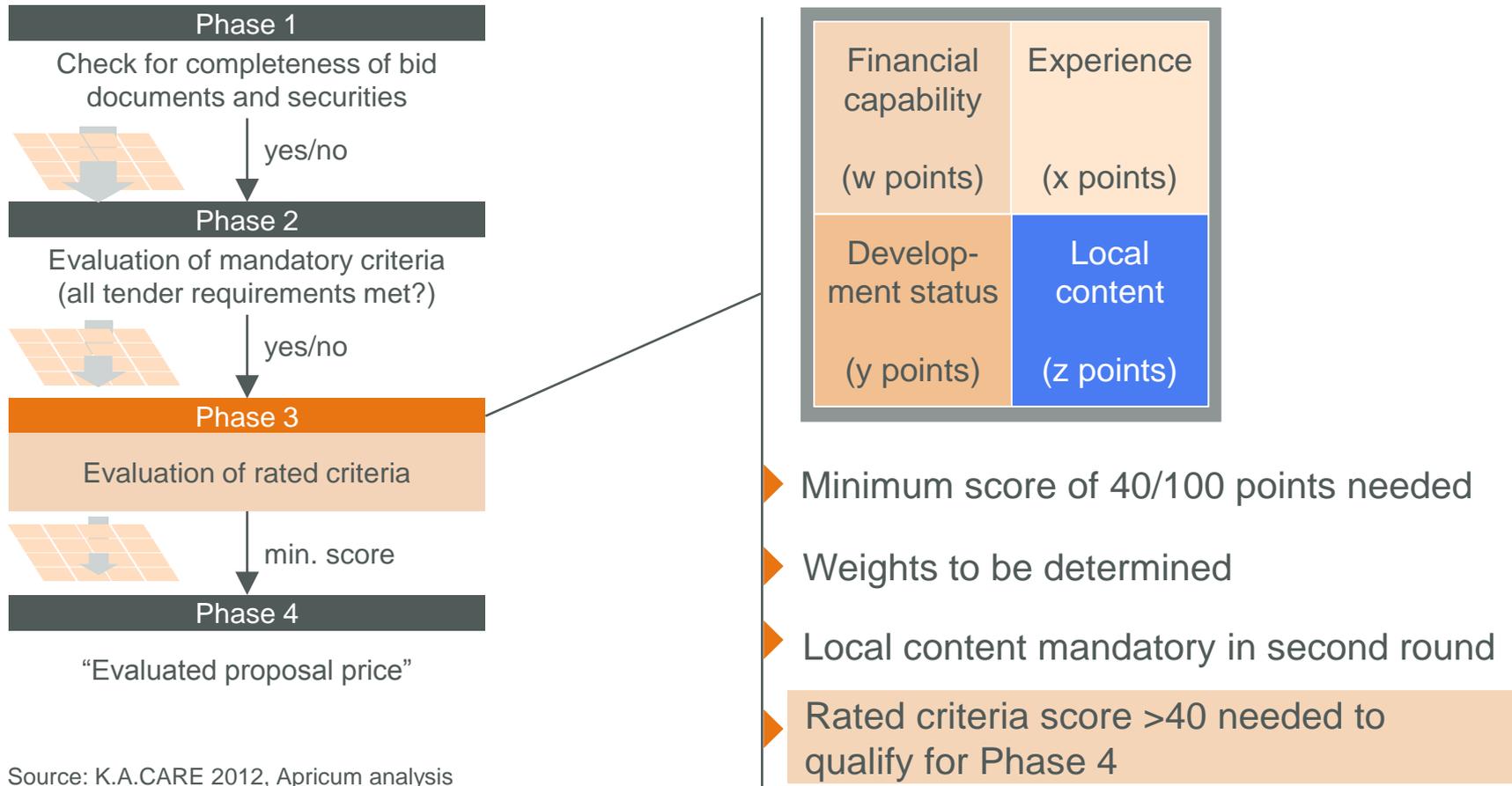


K.A.CARE's aspirations on economic level



Consequently, local content plays a key role in bid evaluation.

K.A.CARE's bid evaluation scheme in competitive procurement process



Source: K.A.CARE 2012, Apricum analysis

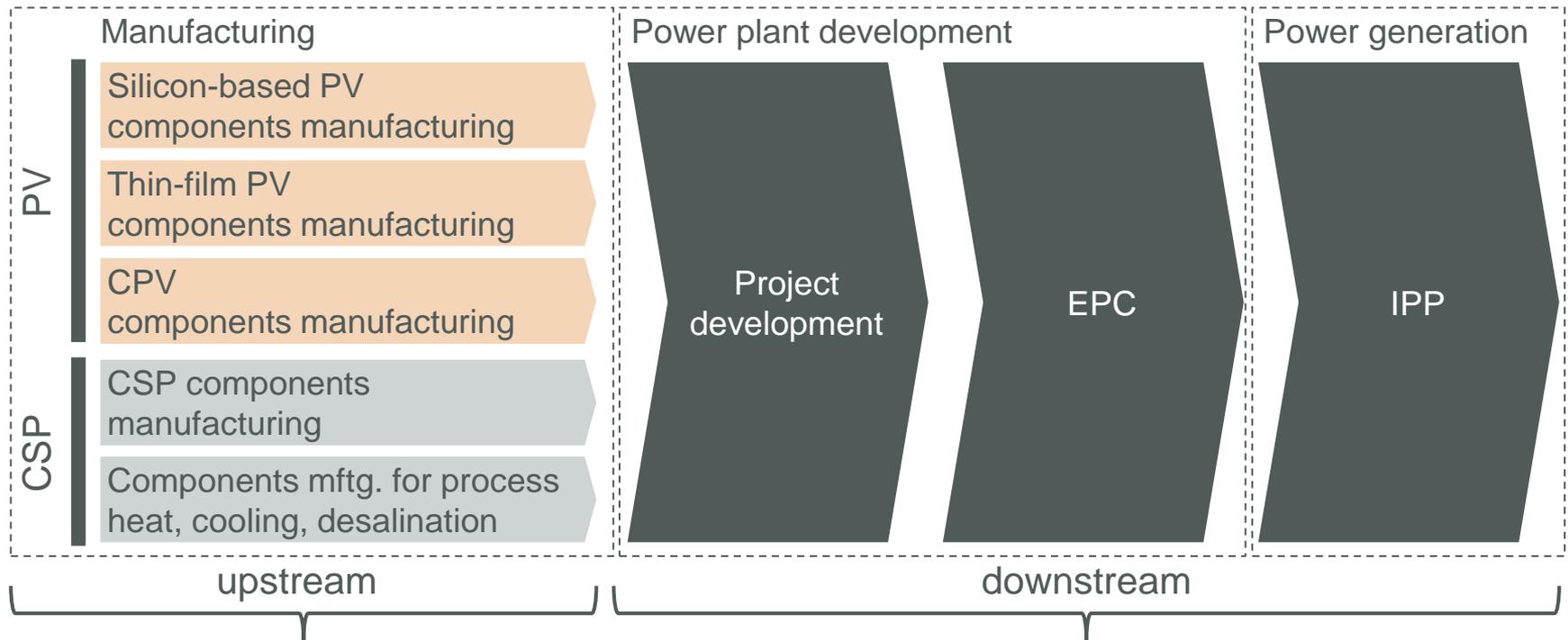
Local content is a complex topic, on the intersection of the local industry, global industry and government.

Many questions need to be answered and filtered to derive the best local content strategy



Dilemma: Whereas K.A.CARE seeks to boost manufacturing; Saudi firms are mainly interested in downstream activities.

Solar energy value chain overview

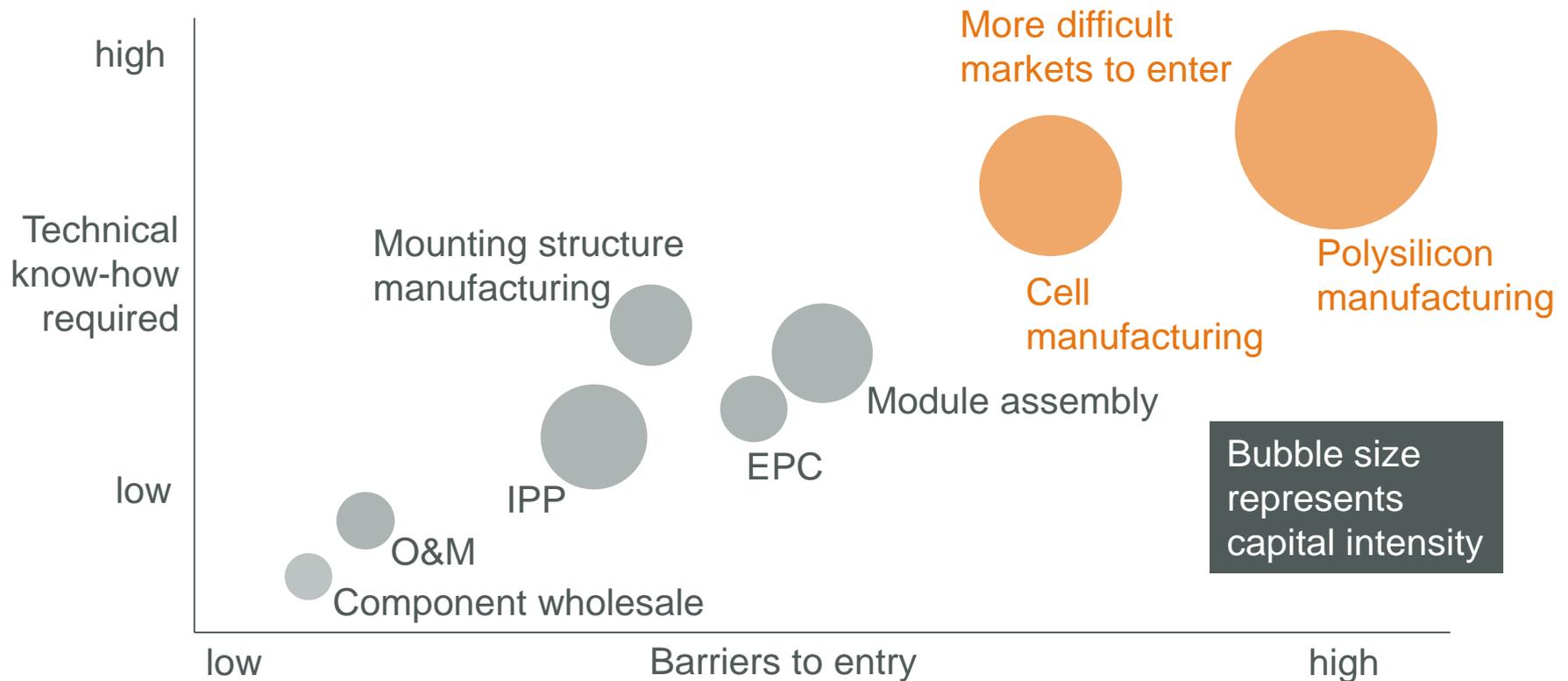


Primary interest of K.A.CARE due to perceived higher potential for job creation

Primary interest of Saudi companies due to perceived lower risk and lower entry barriers (e.g., CAPEX, IP)

Likely high competition in the downstream arena will require strong business models and partnerships.

Market entry considerations for different links in the PV value chain

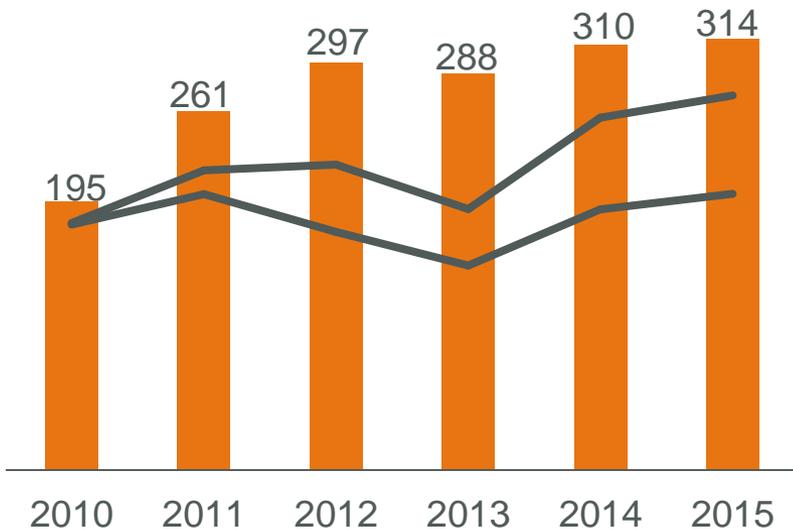


Source: Apricum analysis

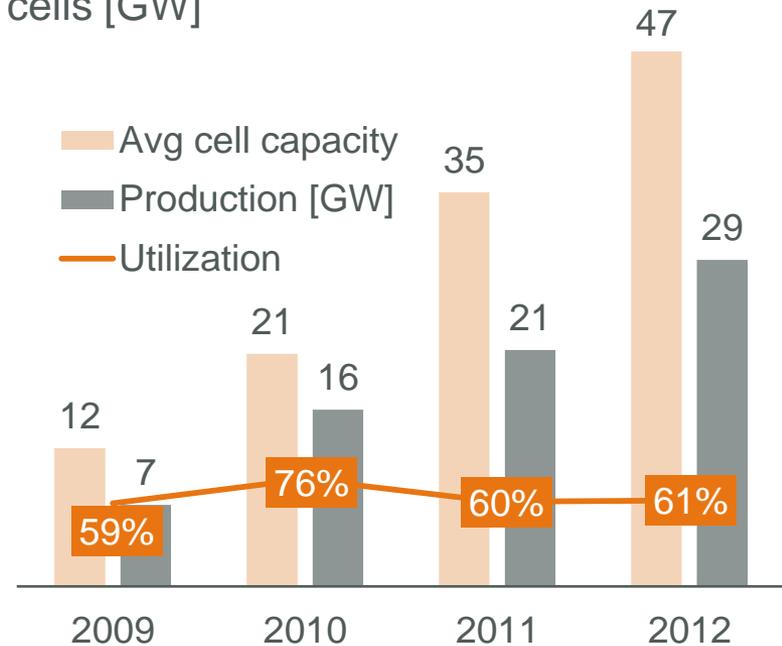
Global oversupply situation for many solar components requires new entrants to have a strong competitive position.

Globally available polysilicon production capacity 2010–2015 [kt p.a.]

— PV demand forecast high/low [kt polysilicon]



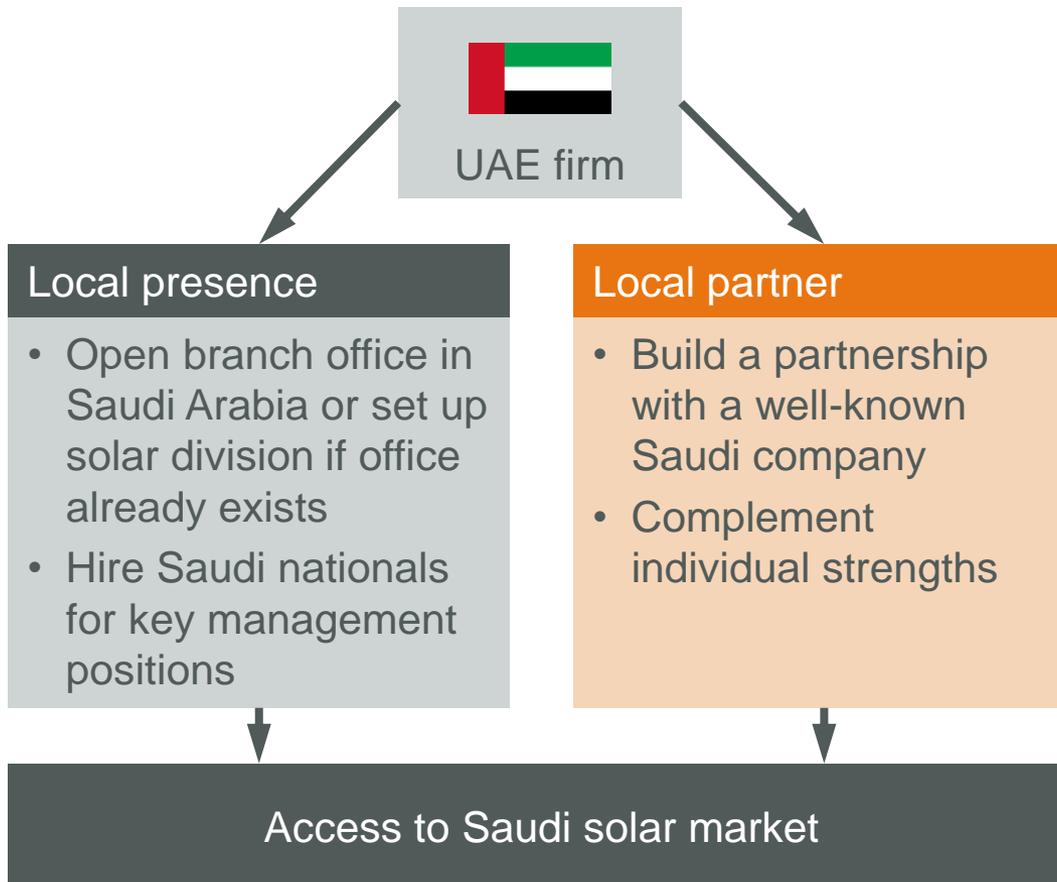
Global Supply-demand situation for PV cells [GW]



With massive global oversupply in PV manufacturing value chain (shown for polysilicon and cells), it is critical that new entrants have a competitive advantage. This can be, e.g., through very low electricity prices (e.g., for polysilicon) or strict local content rules.

How can UAE companies address the Saudi solar market? Bring a Saudi flavor to your business.

Options for successful Saudi market entry



Saudi companies seek:

1. Access to technology and execution know-how
 2. Track record and experience from abroad
 3. Differentiation of offerings
- ▶ Success in KSA depends on relationships and long-standing reputations
 - ▶ A Saudi footprint is critical for successful participation in the Kingdom's solar program

Apricum – expertise in Cleantech and solar energy in particular.

Apricum at a glance

Business	Strategy consulting and transaction advisory services
Industry focus	Cleantech
Team	>40 Cleantech experts with decade-long industry experience
Clients	Companies, investors and public institutions
Services (selected)	<ul style="list-style-type: none"> • Strategy development (e.g., value chain, go-to-market, marketing) • Feasibility analysis, business plan design • Partner search (MOU, JV) • Investor/target search • Due diligence (comm., technical)
Locations	<ul style="list-style-type: none"> • HQ in Berlin, Germany • Representative offices in Brazil, China, India, Indonesia, Japan, Saudi Arabia, Turkey, UK and USA



Apricum is a trusted partner for strategy development in the solar industry – around the globe and in Saudi Arabia.

Selected recent references

Global players

AsahiKASEI

NRI
未来創発
Dream up the future.

CENTRO SOLAR

VIESSMANN

AEG
POWER SOLUTIONS

Soitec

CONERGY

Montagu
private equity

sovello

mounting
systems

Agfa

EVONIK
INDUSTRIES

JNC

Silicor
MATERIALS

SOLVAY

Saudi companies/public institutions

شركة مساهمة الامتار القابضة
CPC
CONSTRUCTION PRODUCTS HOLDING COMPANY

سابك
سابك

دله البركة
Dallah Albaraka

إرامكو السعودية
Saudi Aramco



عبد اللطيف جميل
Abdul Latif Jameel

التركيا
ALTURKI



King Abdullah City for Atomic
and Renewable Energy (KA-CARE)

KAUST
King Abdullah University of
Science and Technology

المملكة العربية السعودية
وزارة التجارة والصناعة
البرنامج الوطني لتطوير التجمعات الصناعية
National Industrial Clusters Development Program

التجمعات الصناعية



APRICUM

THE CLEANTECH ADVISORY.

Apricum GmbH
Spittelmarkt 12 | 10117 Berlin | Germany

T. +49.30.308 77 62 - 0 | F. +49.30.308 77 62 - 25
info@apricum-group.com

www.apricum-group.com