Dusit Thani Hotel, Dubai, 3 May 2016

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PROJECT FINANCING CLEAN ENERGY IN MENA

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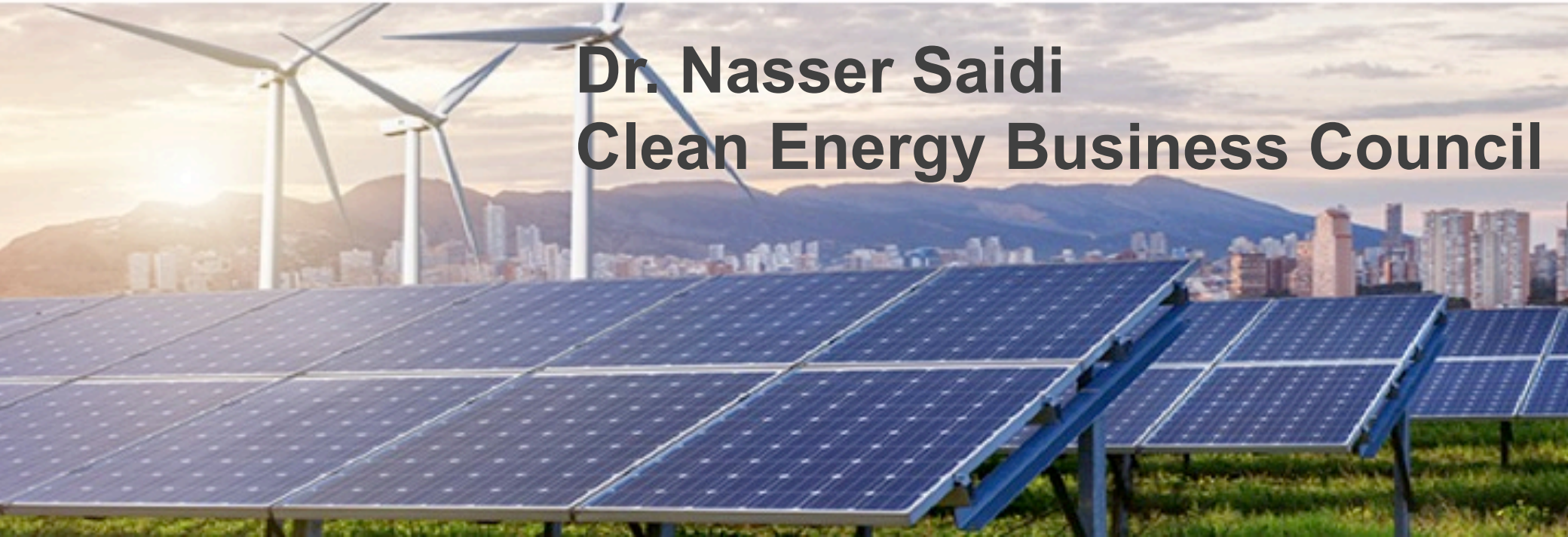
مجلس صناعات الطاقة النظيفة
Middle East & North Africa

New Oil Normal and the Impact on Renewables: Global Lessons Learned



Dr. Nasser Saidi
Clean Energy Business Council

Agenda

- **New Oil Normal & Impact on Renewables**
- Global Technology Distortions
- Financial Road to Decarbonisation

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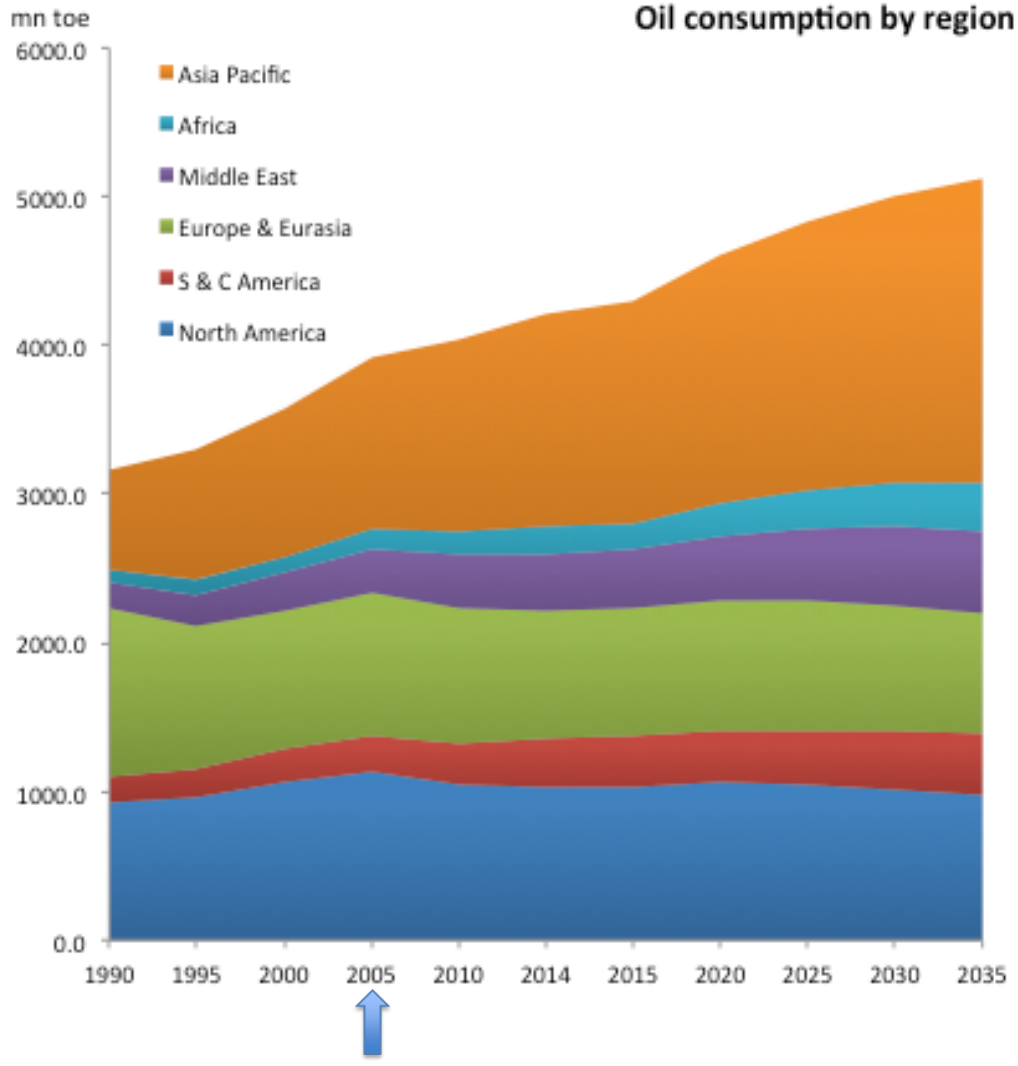
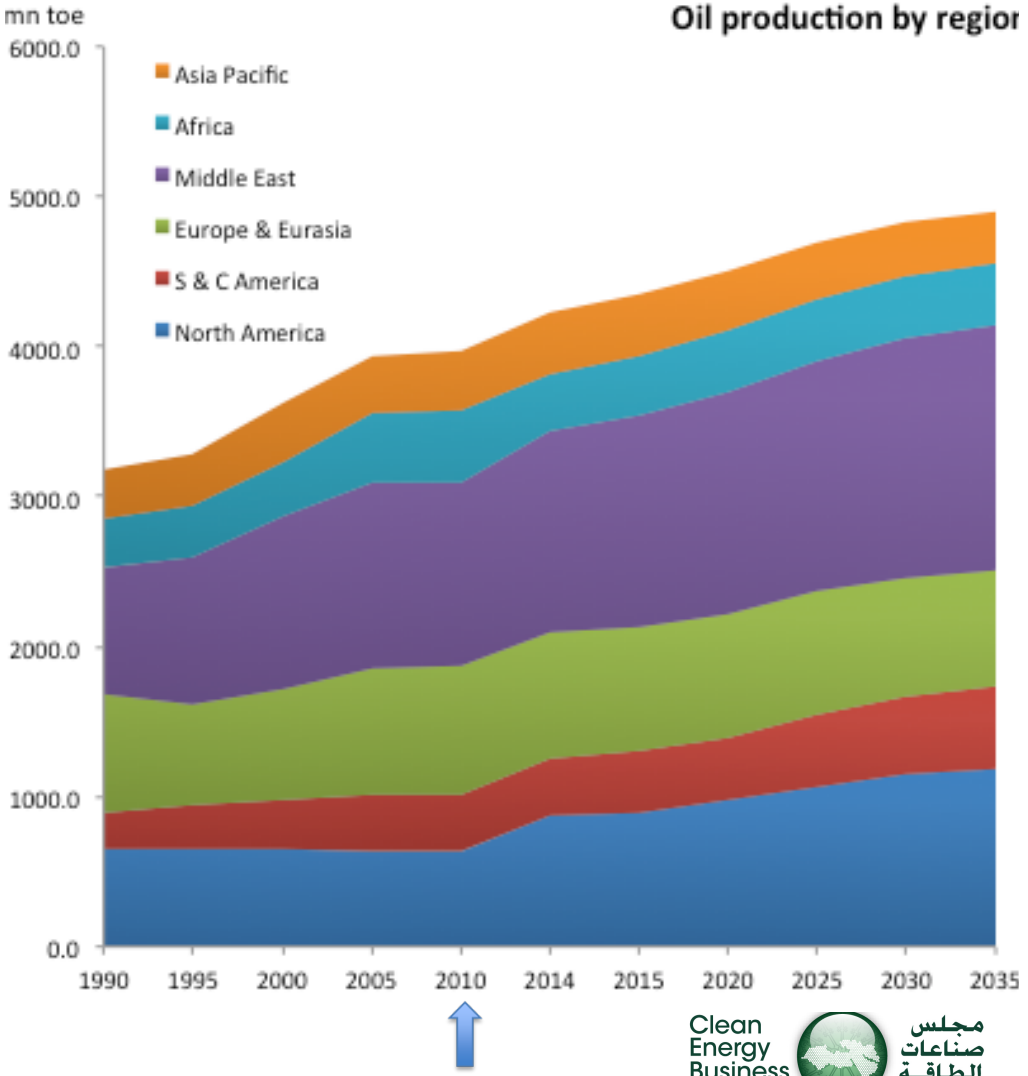
“New Oil Normal”: demand dynamics dominated by EMEs; new energy sources





Source: Energy Outlook 2035, BP (Feb 2016)

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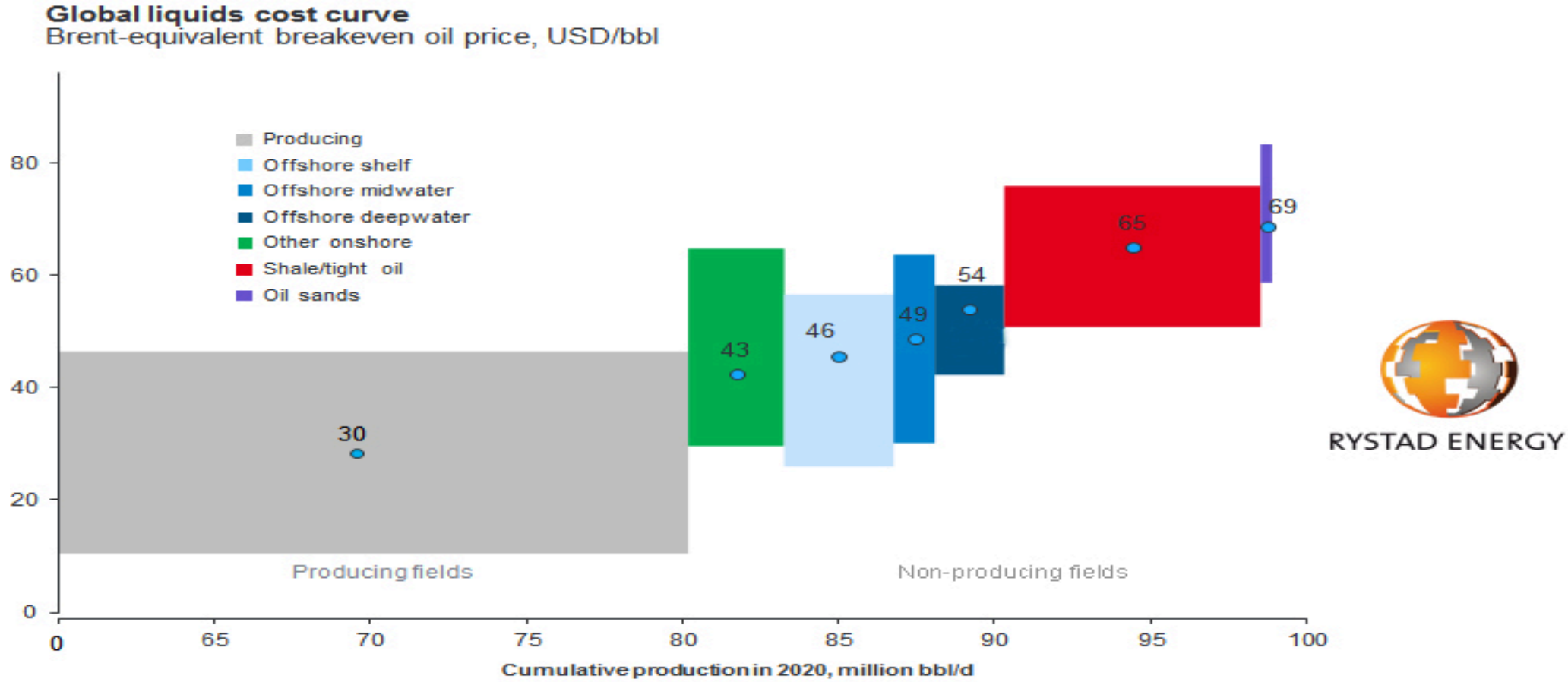
“New Oil Normal”: OPEC aims to drive out competition. Disruptive tech driving costs down for shale, renewables



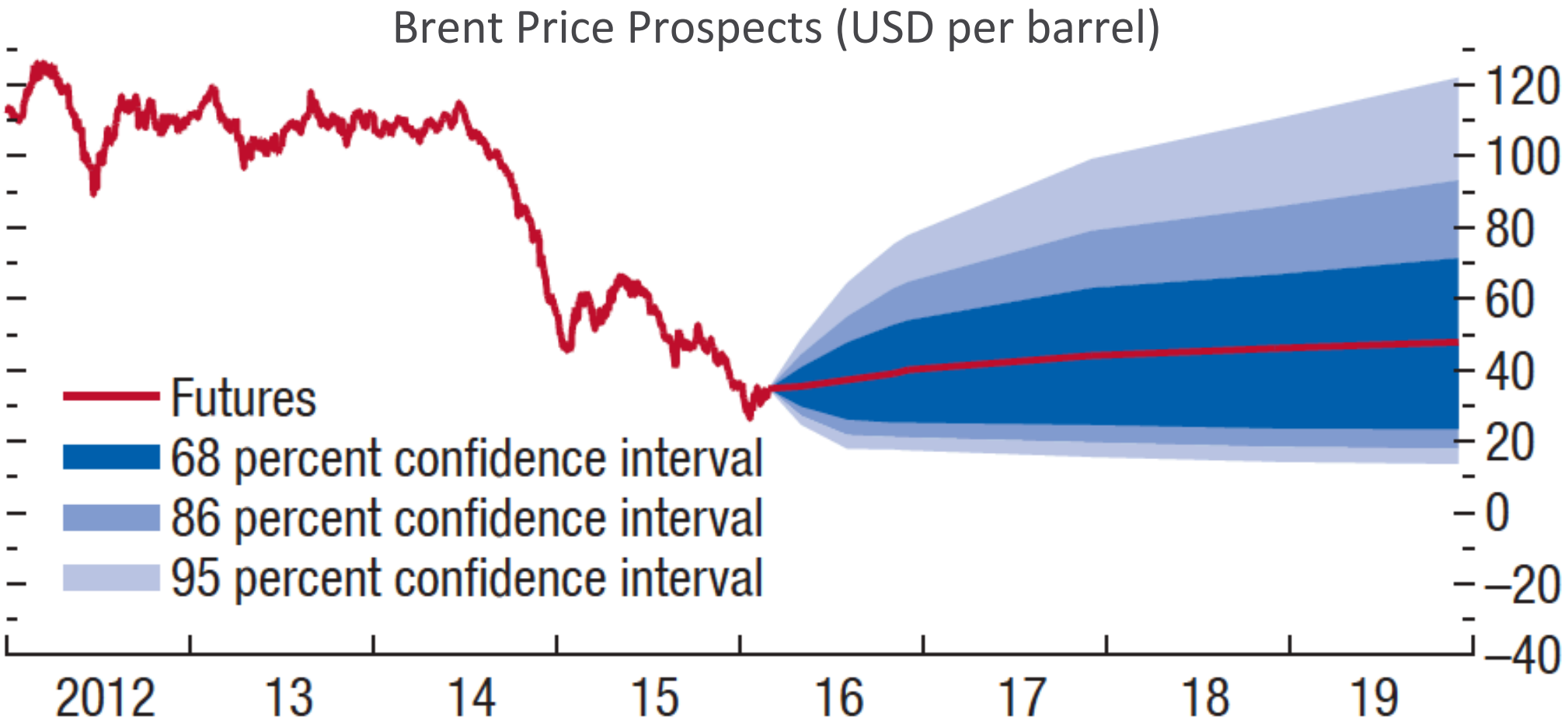
RYSTAD ENERGY

Producing fields are the cheapest supply source, as opposed to the most expensive – non producing oil sands – with 69 USD/bbl. The producing fields' low breakeven price is due to past capex that we consider as sunk, cheap Middle East and shale production. Non-producing shale and oil sands are the marginal sources of supply in 2020, with high drilling/completion costs for the former and high capex/opex for the latter.

Rystad Energy's liquids cost curve is made up of nearly 20,000 unique assets by considering each asset's breakeven oil price and potential production in 2020. The breakeven price is the Brent oil price at which NPV equals zero, considering all future cash flows using a real discount rate of 7.5%.

Source: Rystad Energy research and analysis; UCube March 2016

Oil price weakness likely to persist: demand & supply factors weighing on market



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Source: IMF World Economic Outlook Apr 2016.

“New Oil Normal”: downside risk for oil prices & resources I

- **Demand side**: **cyclical, structural & tech factors imply downward trend in oil demand relative to activity**
  - Slowdown in EMEs, China
  - Greater Energy Efficiency Trend: falling (E/GDP) ratios imply a growing disconnect between economic growth & energy.
  - 1990-2015: half of increased energy demand has been met through gains in energy efficiency. EE improvements averaged 0.9% p.a. across sectors in advanced economies.
  - Climate Change & COP21 commitments; changing energy mix
  - Tech innovation: energy storage, e-cars, 4th Industrial Revolution

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“New Oil Normal”: downside risk for oil prices & resources II

- **Supply side: technological innovation is making RE, CE, shale more competitive**
  - Shale: technology & exploitable resources widely available
  - Renewable & Clean Energy increasingly competitive
  - Return of Iran, Libya, Iraq

- ***Both demand & supply side factors increase downside risk for oil resources and prices***

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- **Global Technology Distortions**
- Financial Road to Decarbonisation

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Global disruptive technologies => encouraging move to Renewable Energy

- Oil to Gas Switching
- Falling cost of solar energy
- Energy Storage
- Electric Vehicles
- 3-D & 4-D printing

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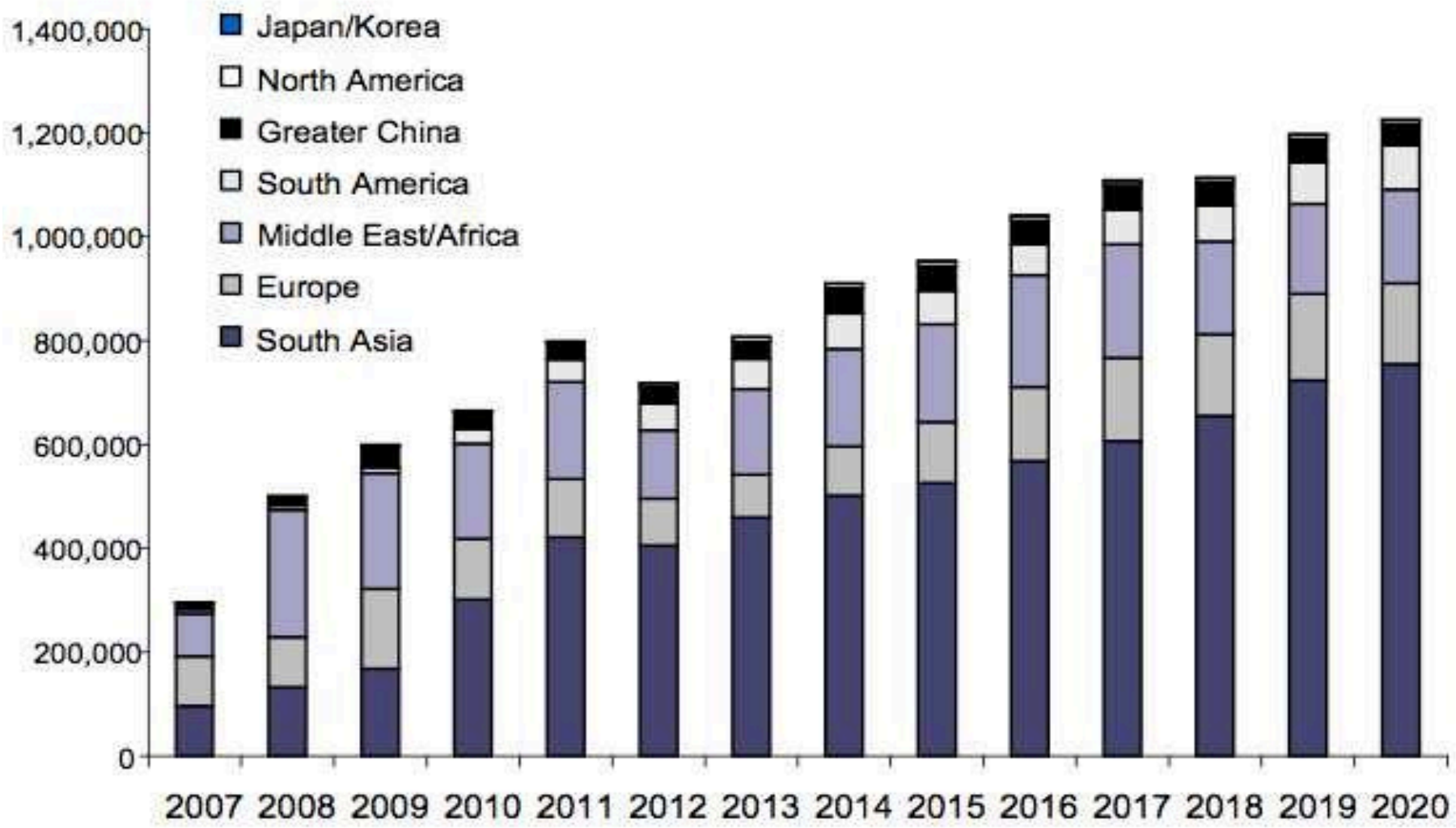
Oil to Gas switching: Global Compressed Natural Gas vehicle outlook



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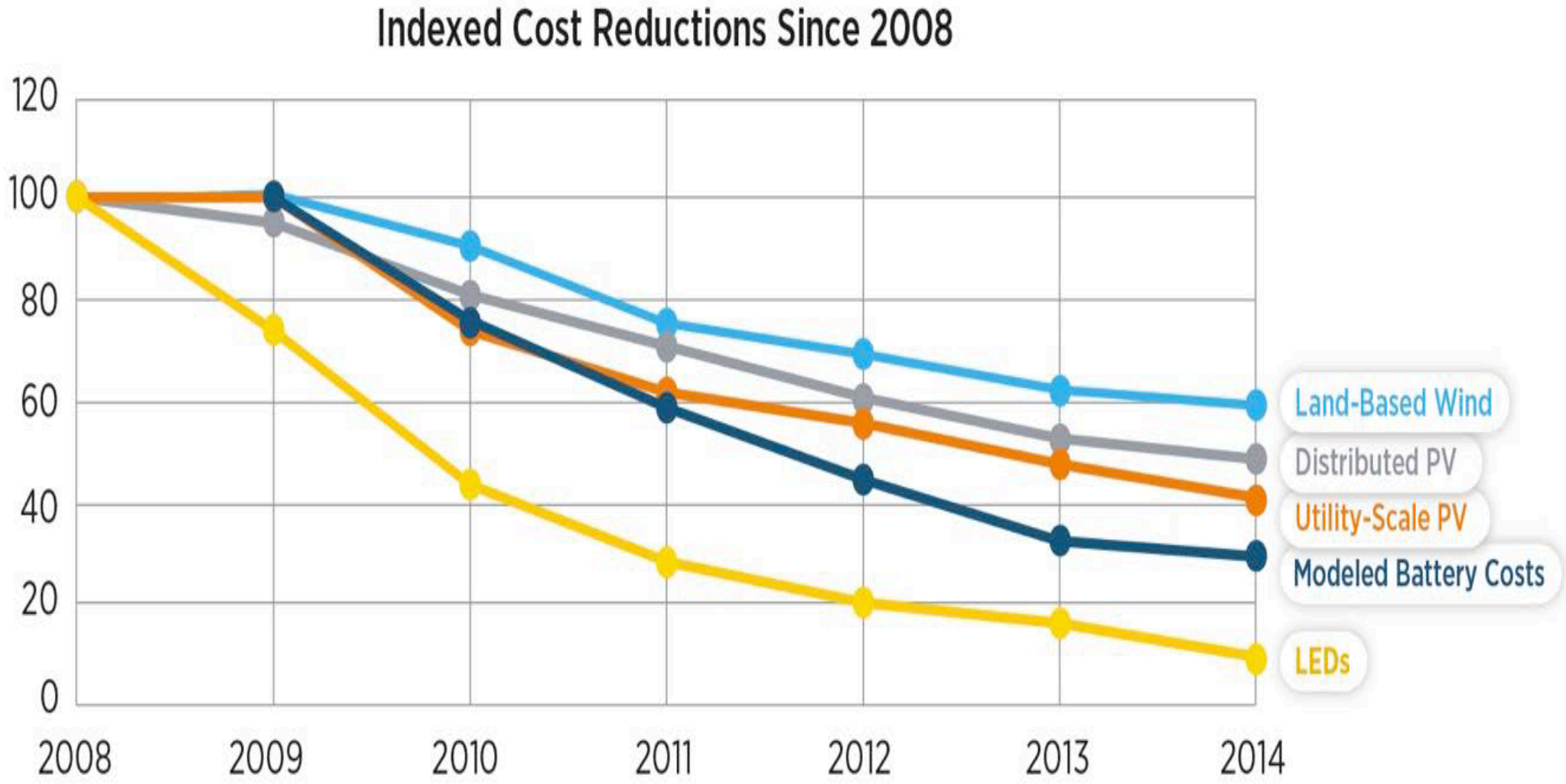
Source: Citi Research

Innovation is driving costs down



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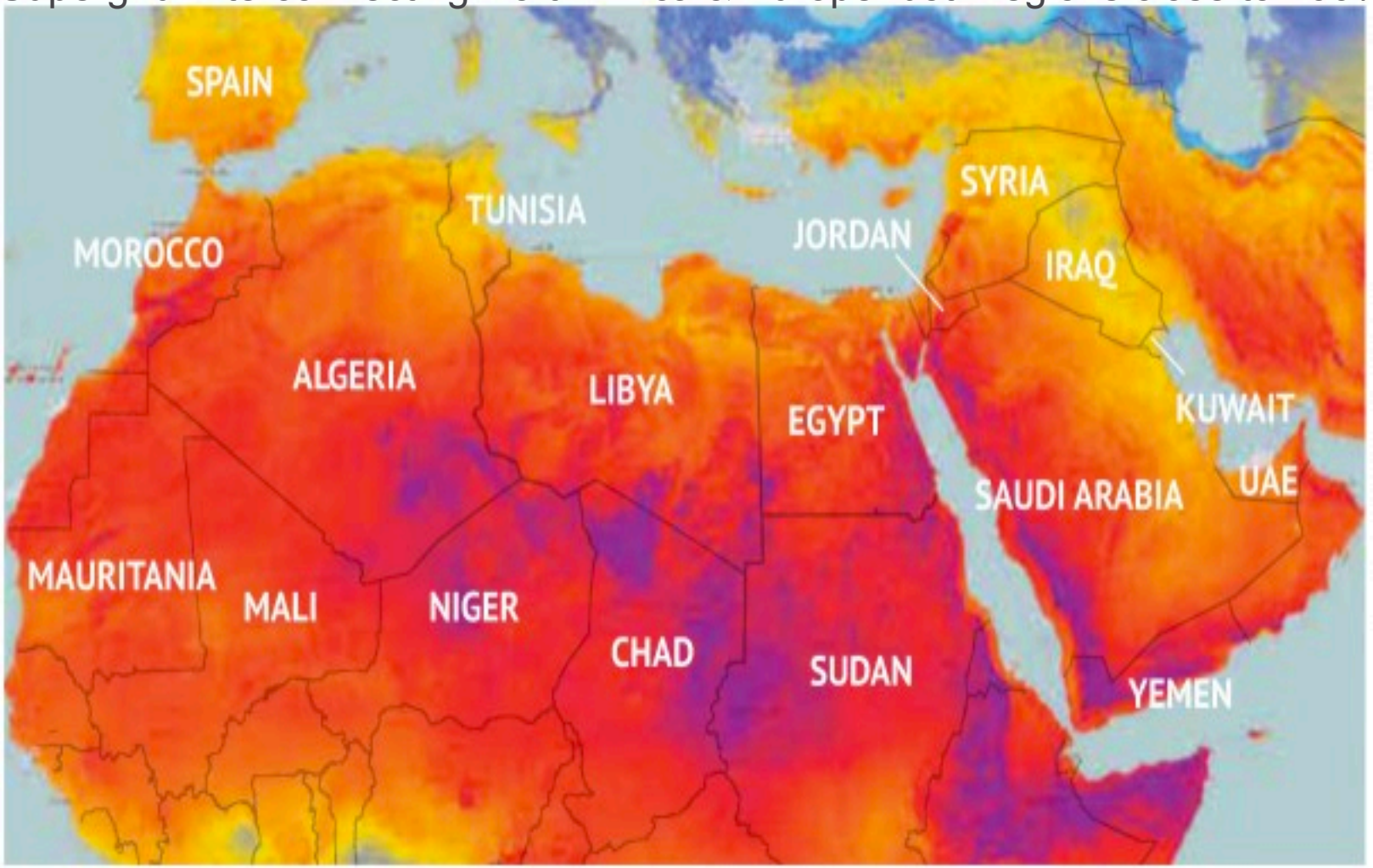
Source: Ernest Moniz, US Secretary of Energy, IEA Ministerial, 18 November 2015

Global Sunbelt: more energy falls on the world's deserts in six hours than the world consumes in a year

‘Supergrid’ interconnecting North Africa & Europe: both regions close to 100% RE by 2050



Source: MINES ParisTECH/ ARMINES/ Transvalor-HC3V5-Dec. 2015

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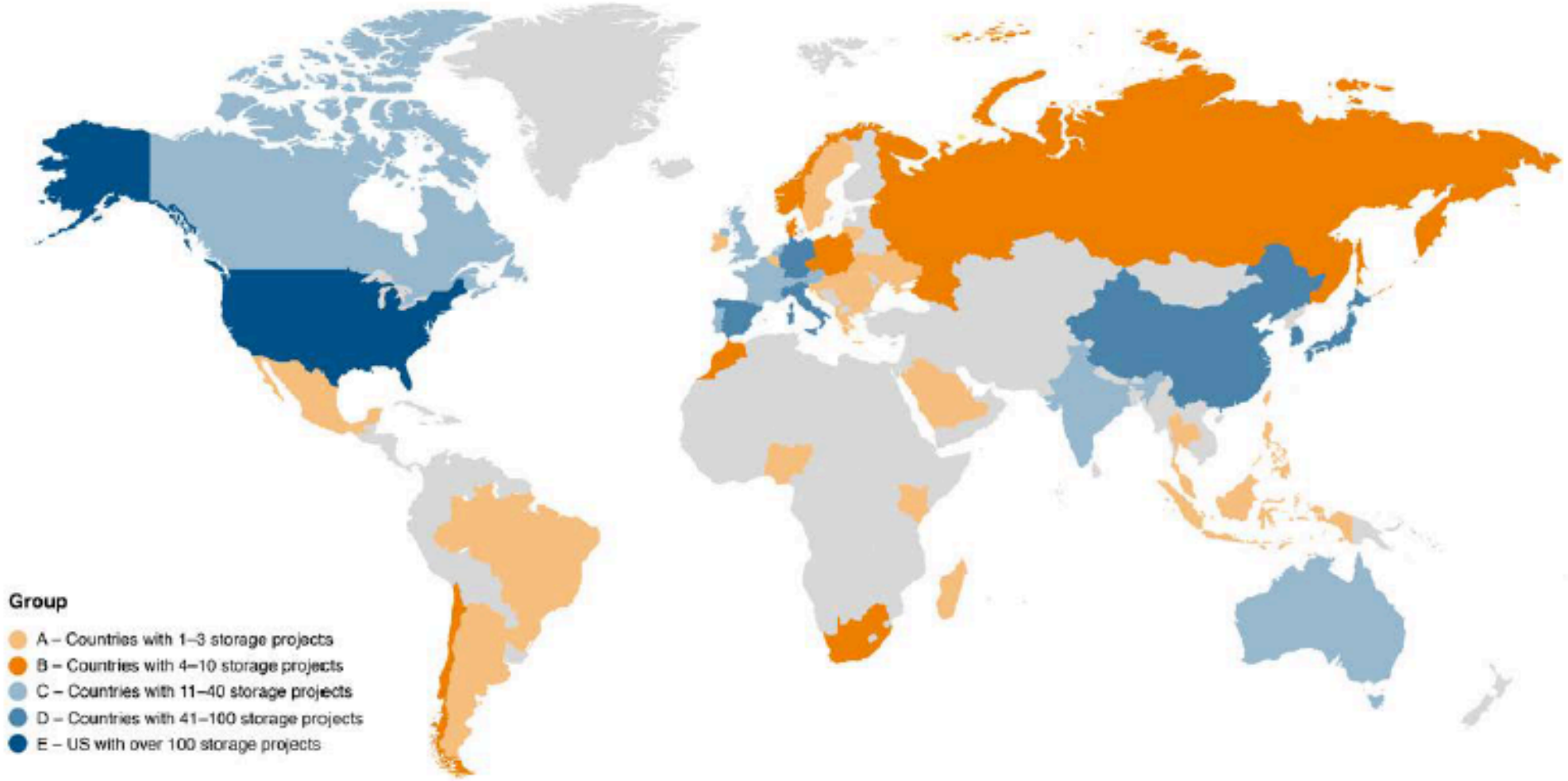
Falling cost of solar energy: domestic socket parity has already been achieved in many countries

Lithium-ion batteries constitute about one-third of all installations in the world



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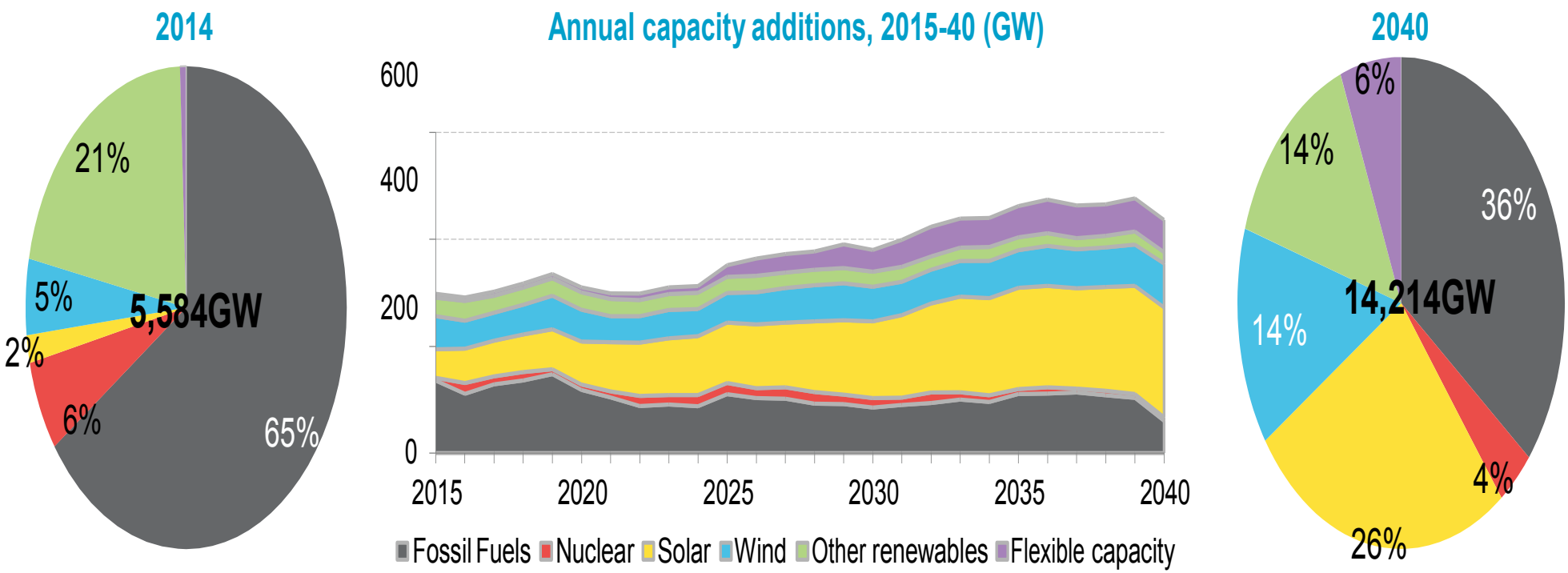
Source: World Energy Council 2016

Renewables share to double to 46% of world electricity output by 2040; Wind & Solar accounting for 30% of generation, up from 5%

Global installed capacity in 2014 and 2040 and projected capacity additions, by technology (GW)



Solar will boom worldwide, accounting for 35% (3,429GW) of capacity additions and nearly a third ($3.7 trillion) of global investment, split evenly between small- and utility-scale installations.

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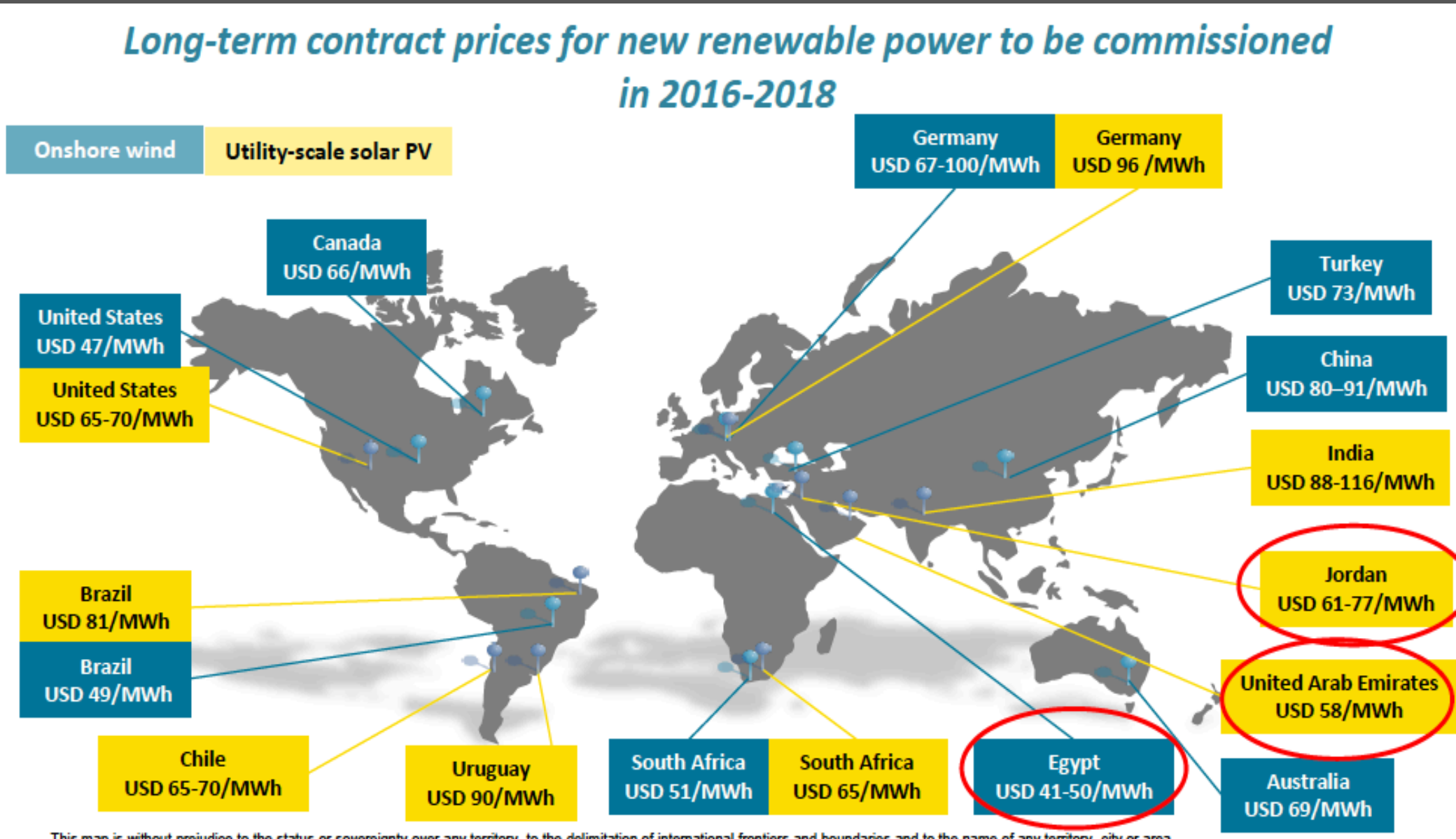
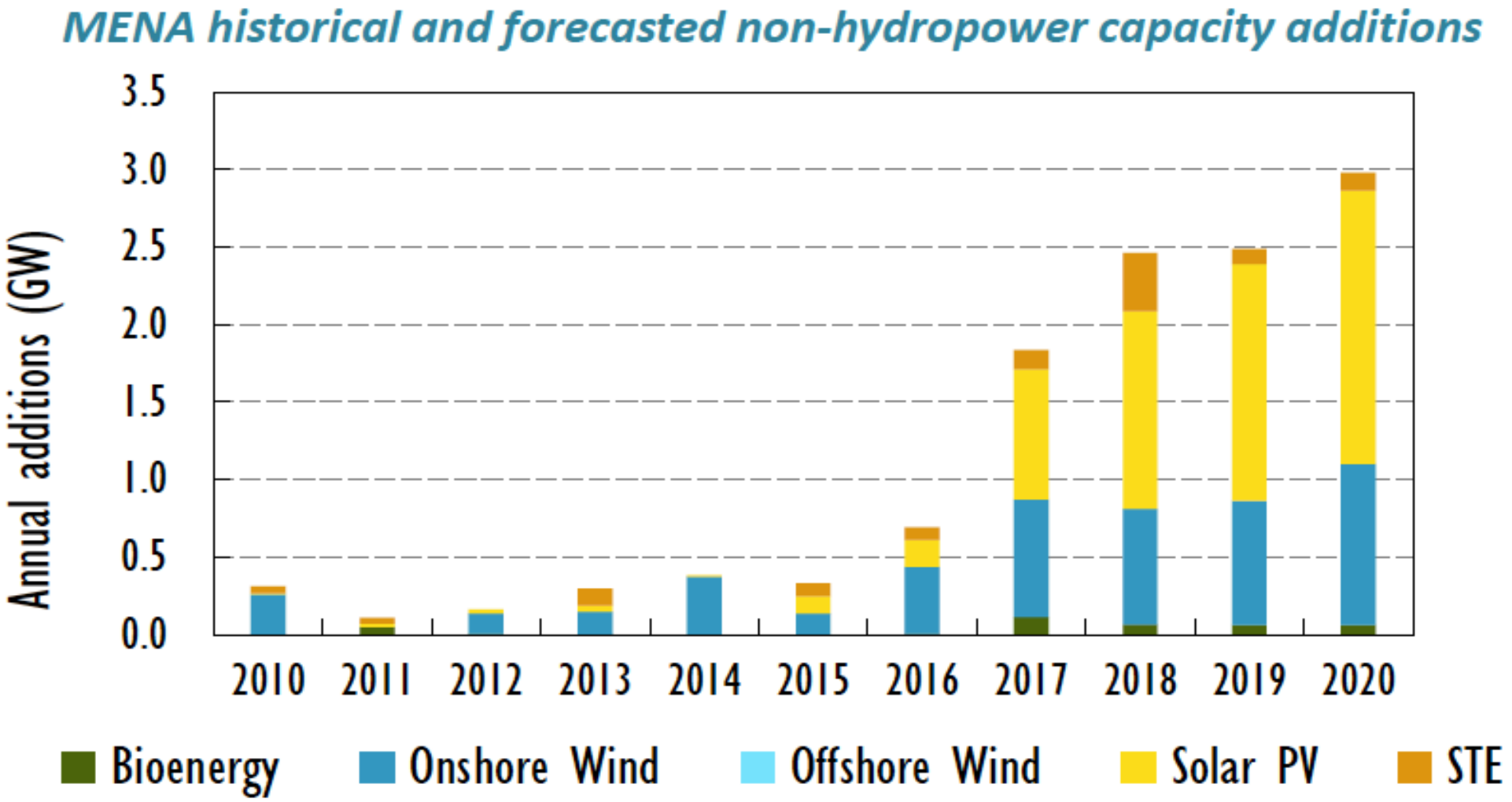
Source: Bloomberg New Energy Finance

Lowest wind and PV prices now found in MENA



Source: Cédric Philibert, IEA, 5 December 2015

Increasing momentum for Solar & Wind



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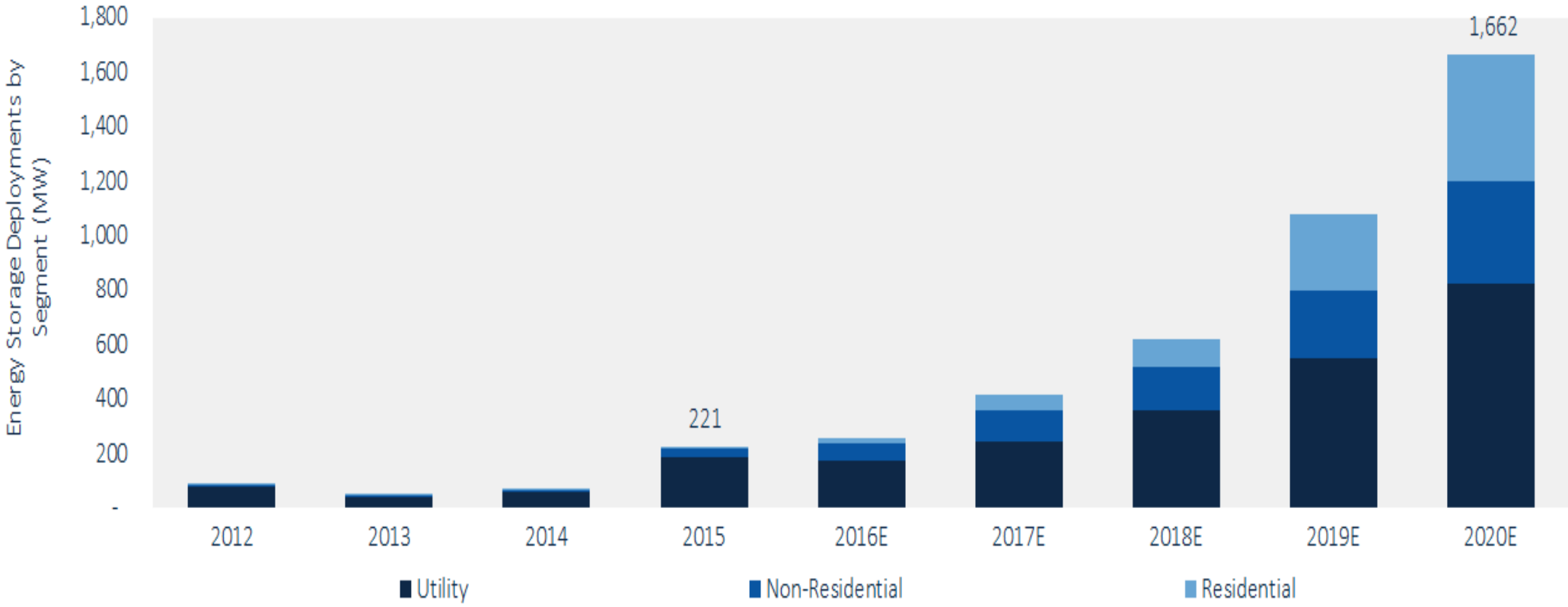
Source: Cédric Philibert, IEA, 5 December 2015

US Energy Storage Market Grew 243% in 2015: Largest Year on Record



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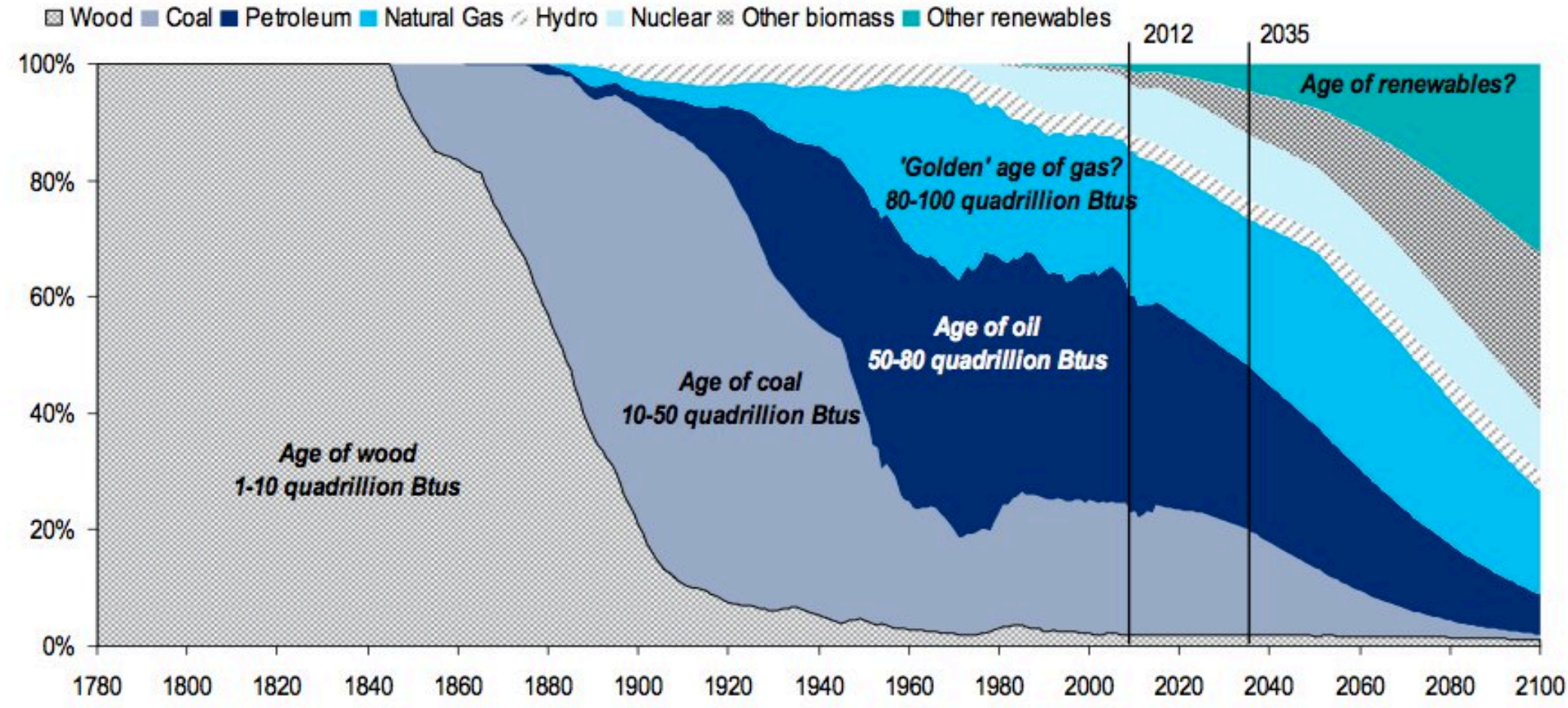
Source: GTM Research

Age of Renewables has only just begun

Share of US primary energy demand from 1780-2100 demonstrates the substitutional nature of shifts in the generation mix



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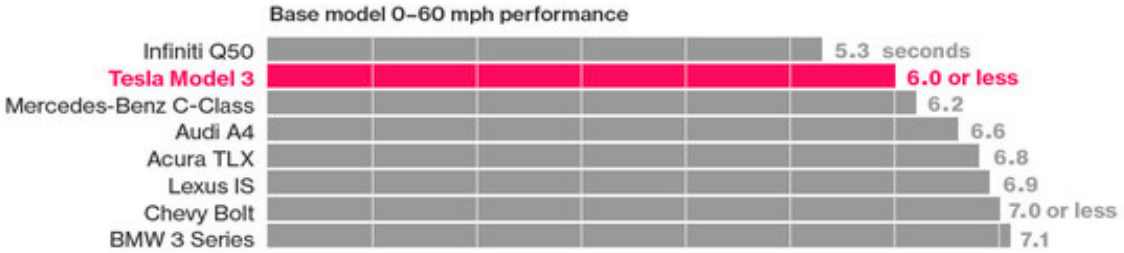
Source: Citi Research

Electric vehicles: Tesla 3 coming soon

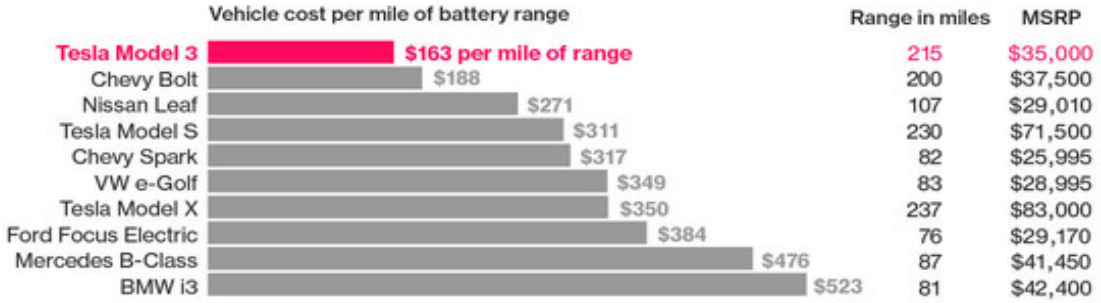
Tesla Has Its iPhone Moment

There's only been one other car with numbers like these: the 1955 Citroen DS

Fastest Cars in the Class

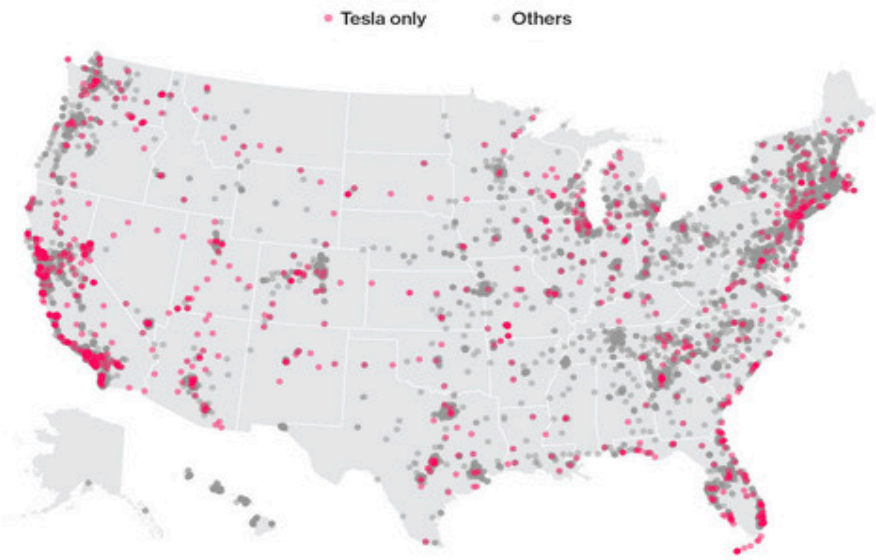


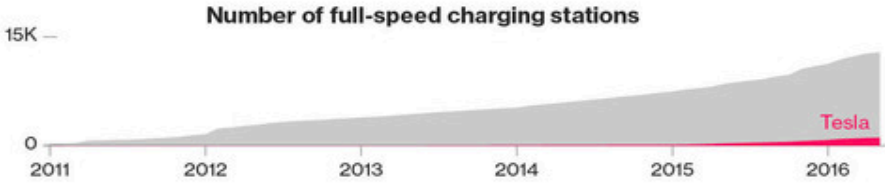
Cheapest Battery Range Available



The Expansion of U.S. Charging Stations

Most people power up at home, but public charging stations are popping up everywhere.





Source: Alternative Fuels Data Center, U.S. Department of Energy

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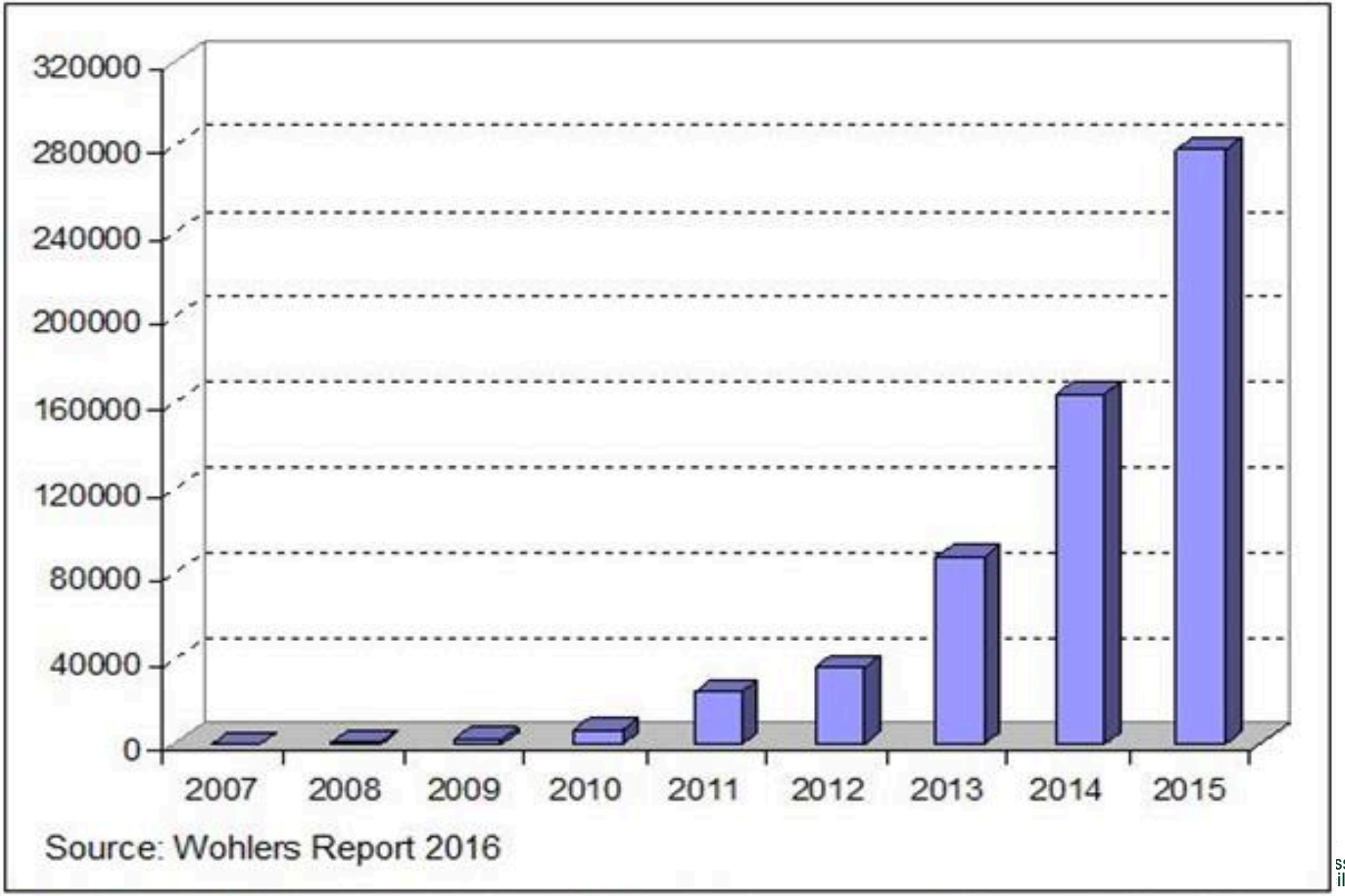
3D printing industry surpassed $5.1bn n 2015
4D printing is gaining speed…



More than 278,000 desktop (under $5,000) 3D printers were sold worldwide last year

Zaki Yamani: "*The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil.*" (2002)

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MENA Financial Road to Decarbonisation

I. Removal of Fossil Fuel Subsidies

II. Energy Efficiency Investments

III. Carbon Tax

IV. New Energy Financing:

    I. Risk Capital; VCPE

    II. Green Bonds & Sukuk

    III. Green Climate Funds

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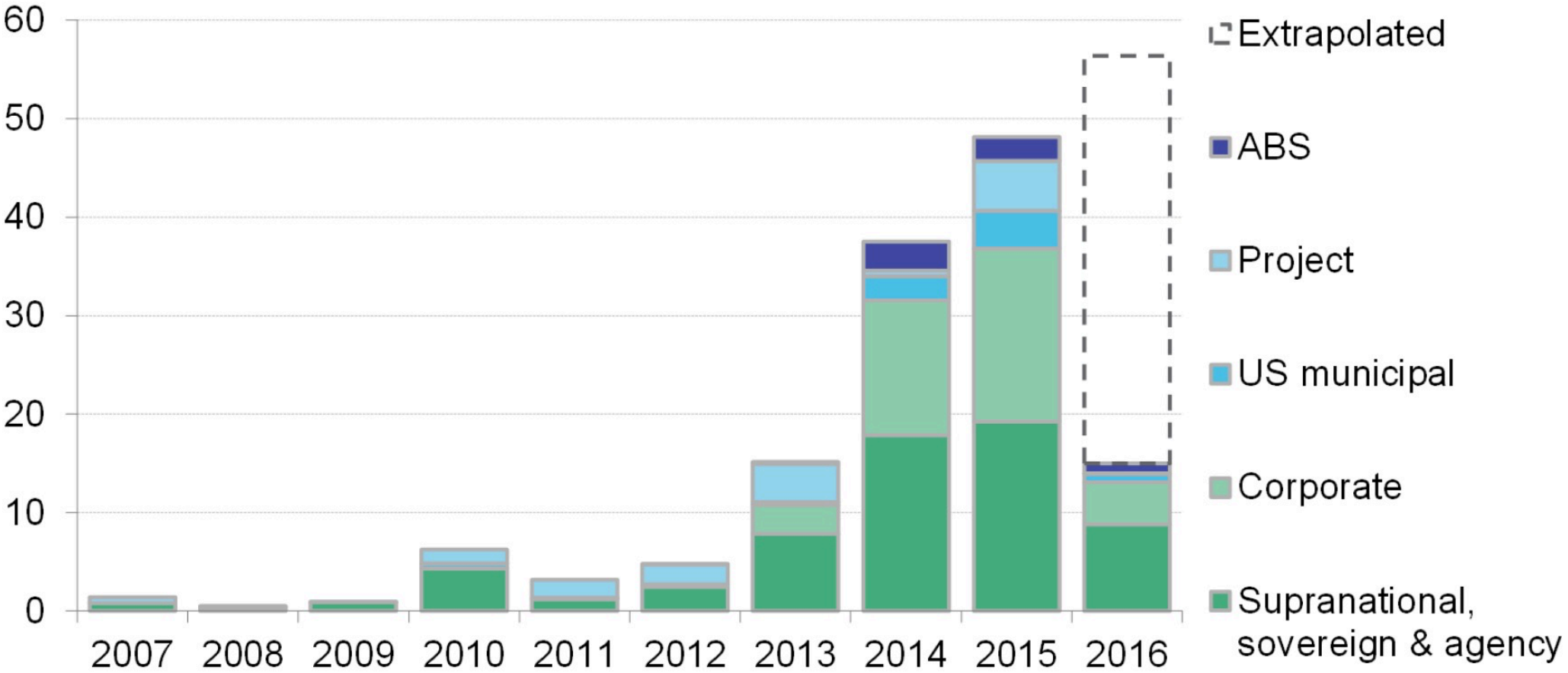
Annual historical Green Bond issuance



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Source: Bloomberg New Energy Finance, Apr 2016

Establishing a Green Climate Fund

GCC should set-up Green Climate Funds to decarbonise + for urban transformation => paradigm shift towards low-emissions & climate-resilient development

Proceeds from a carbon tax => Climate Fund

Carbon tax on Gasoline ($ per litre)					
	Carbon	Local air pollution	Congestion	Accidents	**Total**
Bahrain	0.08	0.01	0.15	0.07	**0.31**
Kuwait	0.08	0.05	0.42	0.11	**0.67**
Oman	0.08	0.02	0.05	0.38	**0.53**
Qatar	0.08	0.04	#N/A	#N/A	#N/A
Saudi Arabia	0.08	0.03	0.14	0.28	**0.52**
UAE	0.08	0.02	#N/A	#N/A	#N/A

Source: "Getting Energy Prices Right", IMF

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Key Takeaways

- **New Oil Normal implies downside risks for oil resources & prices**
- **Economics – rather than policy – will increasingly drive the uptake of renewable technologies**
- **Global Technology Disruptions will facilitate Decarbonisation**
- **New Energy financing will be increasingly reliant on non-bank financing**
- **GCC decarbonisation should move from removal of fossil fuel subsidies to energy efficiency investments, imposing carbon taxes and establishing Green Climate Funds**

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