

Some Background for PPA discussion

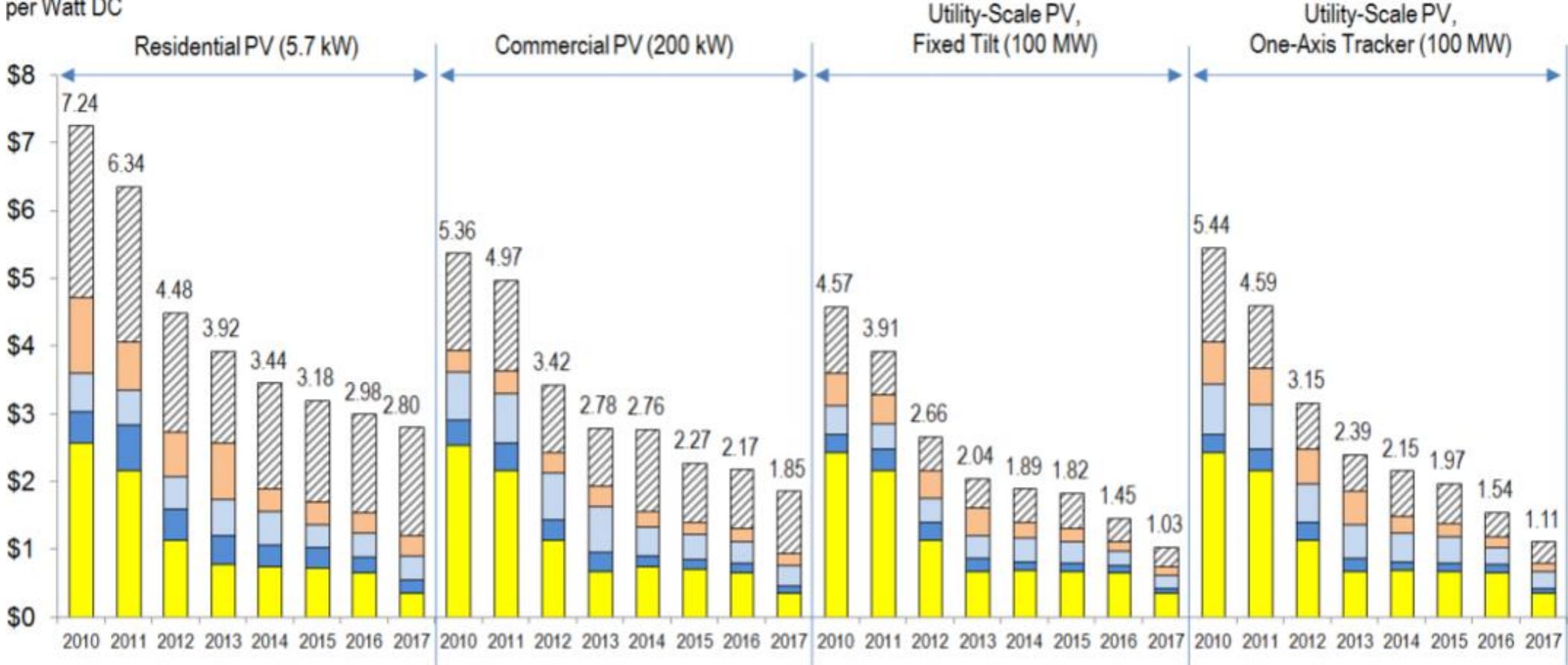
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Main points:

- Steep drop of solar and wind makes 10 year PPAs viable in 2017 and 2018 that were not viable in 2015
- In many states 10 year PPAs can provide cost savings, reduced risk and – for on site solar and wind – enhanced resilience for federal agencies
- Potential savings of hundreds of millions of dollars for federal agencies and enhanced resilience

NREL PV system cost benchmark 2017

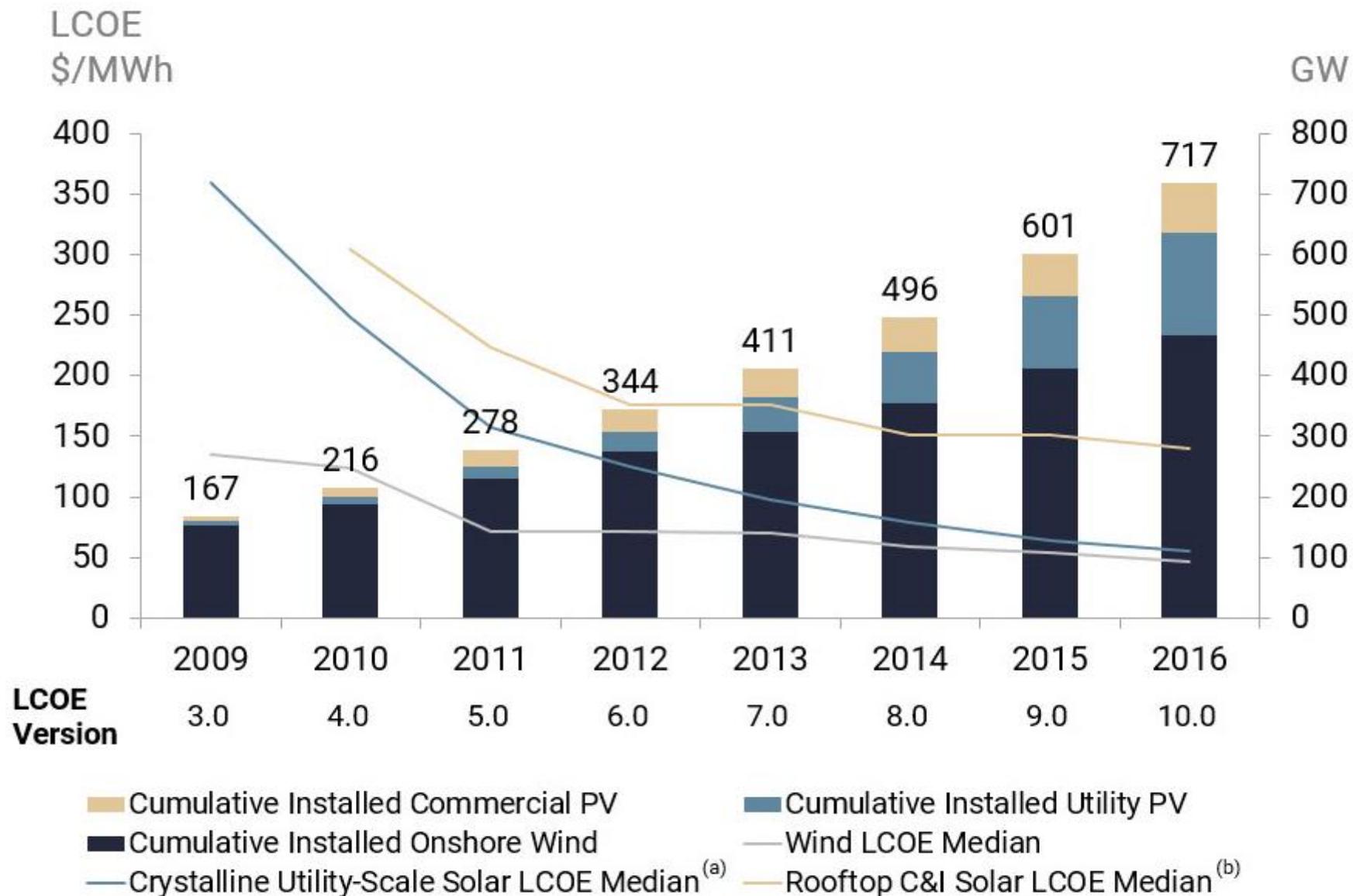
2017 USD
per Watt DC



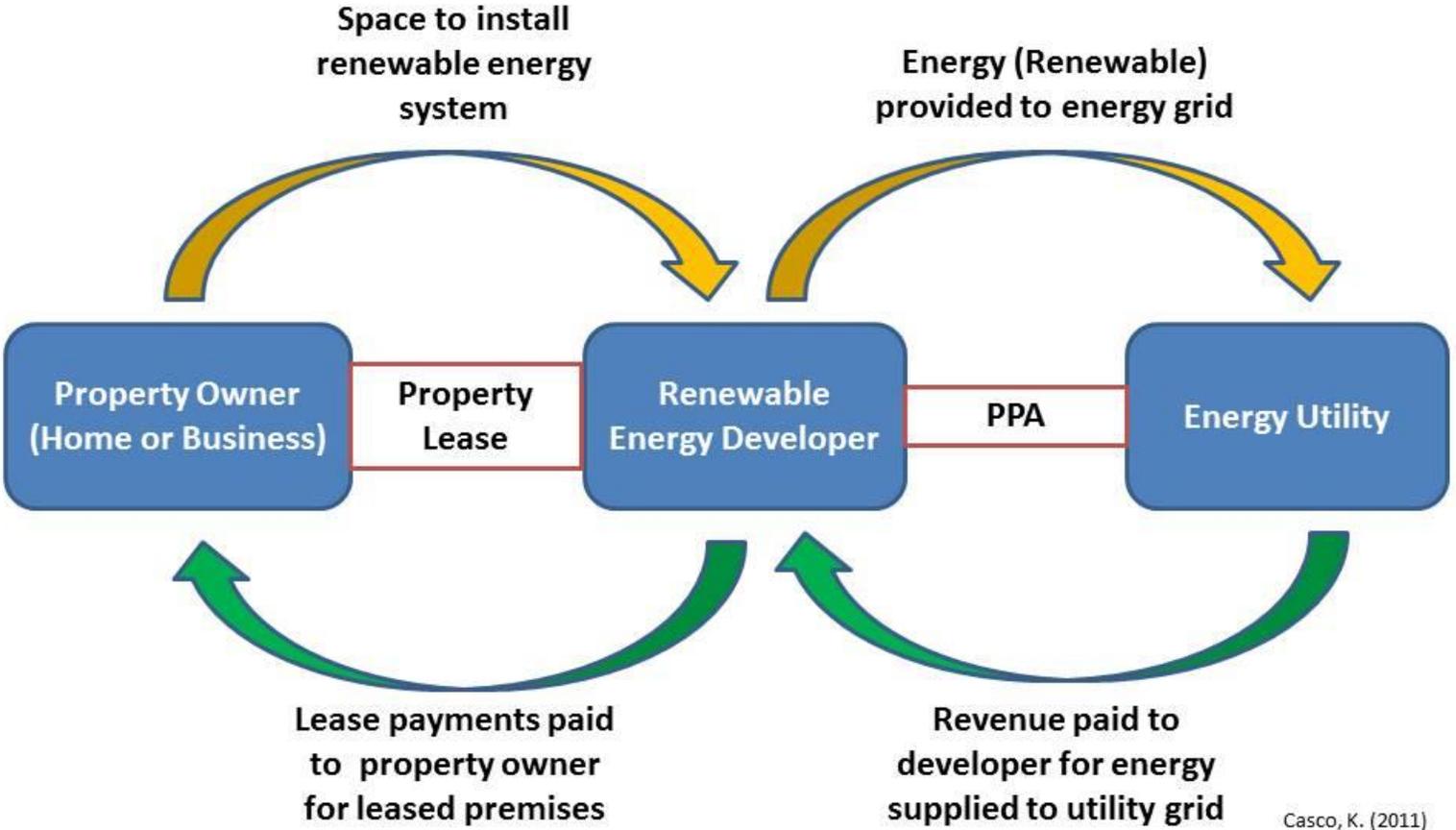
- ▨ Soft Costs - Others (PII, Land Acquisition, Sales Tax, Overhead, and Net Profit)
- ▤ Soft Costs - Install Labor
- ▥ Hardware BOS - Structural and Electrical Components
- Inverter
- Module

Unsubsidized Levelized Cost of Wind/Solar PV

Source: Lazard, BNEF 2017

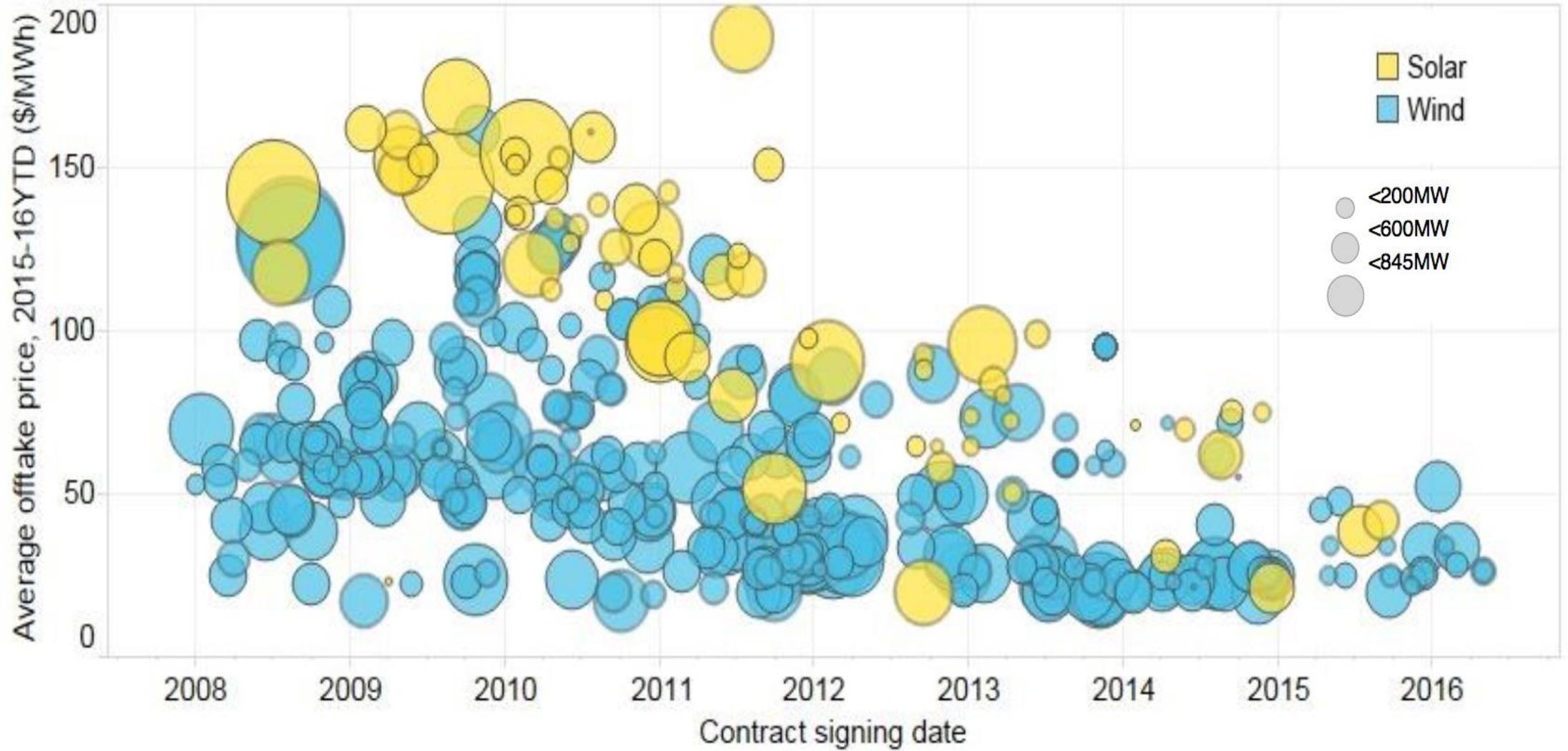


The PPA Model: Onsite



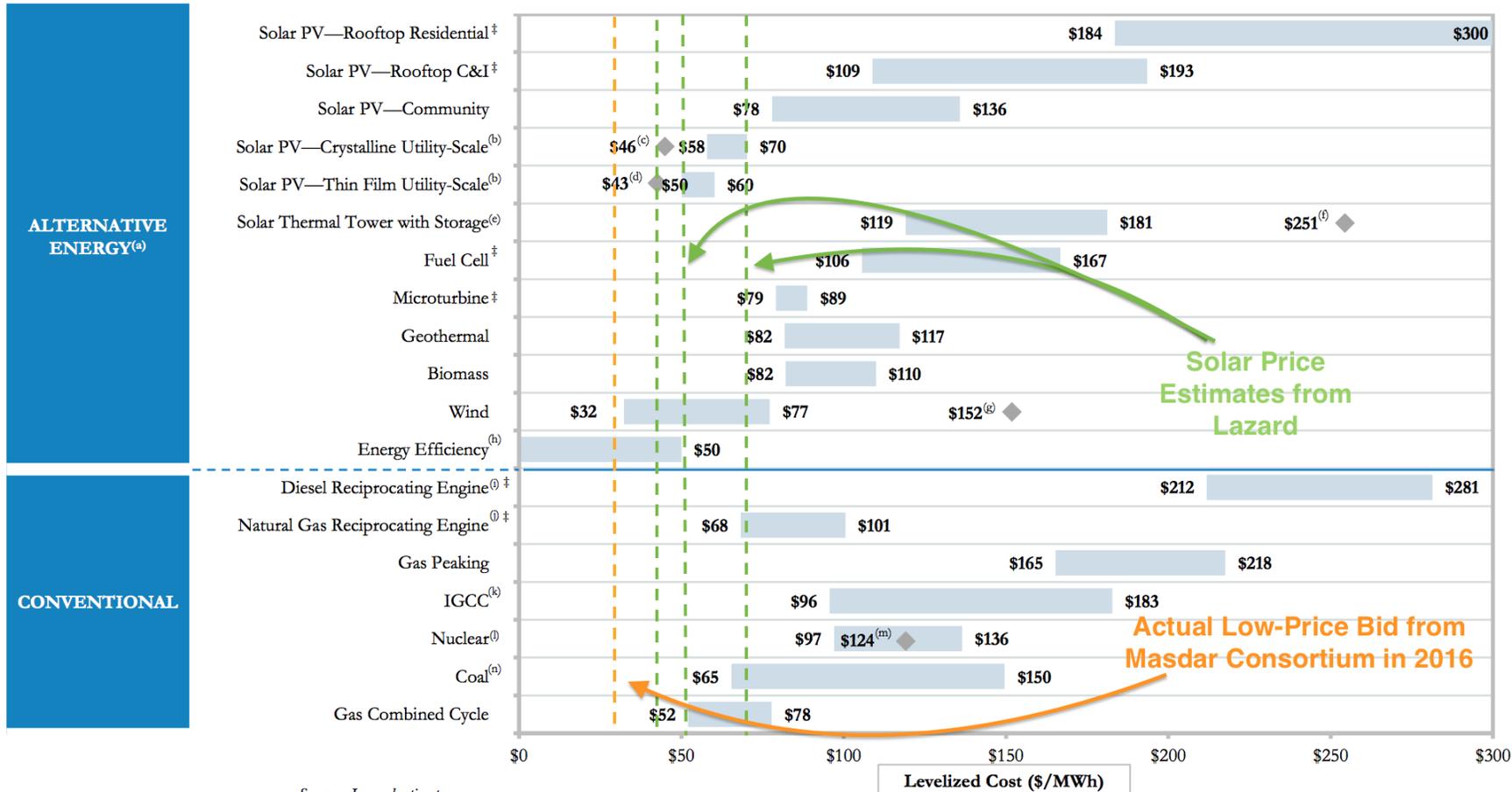
Casco, K. (2011)

Offtake prices for wind and solar PPAs (\$/MWh) Bloomberg 2017



Unsubsidized Levelized Cost of Energy Comparison

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.) or reliability-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy technologies)



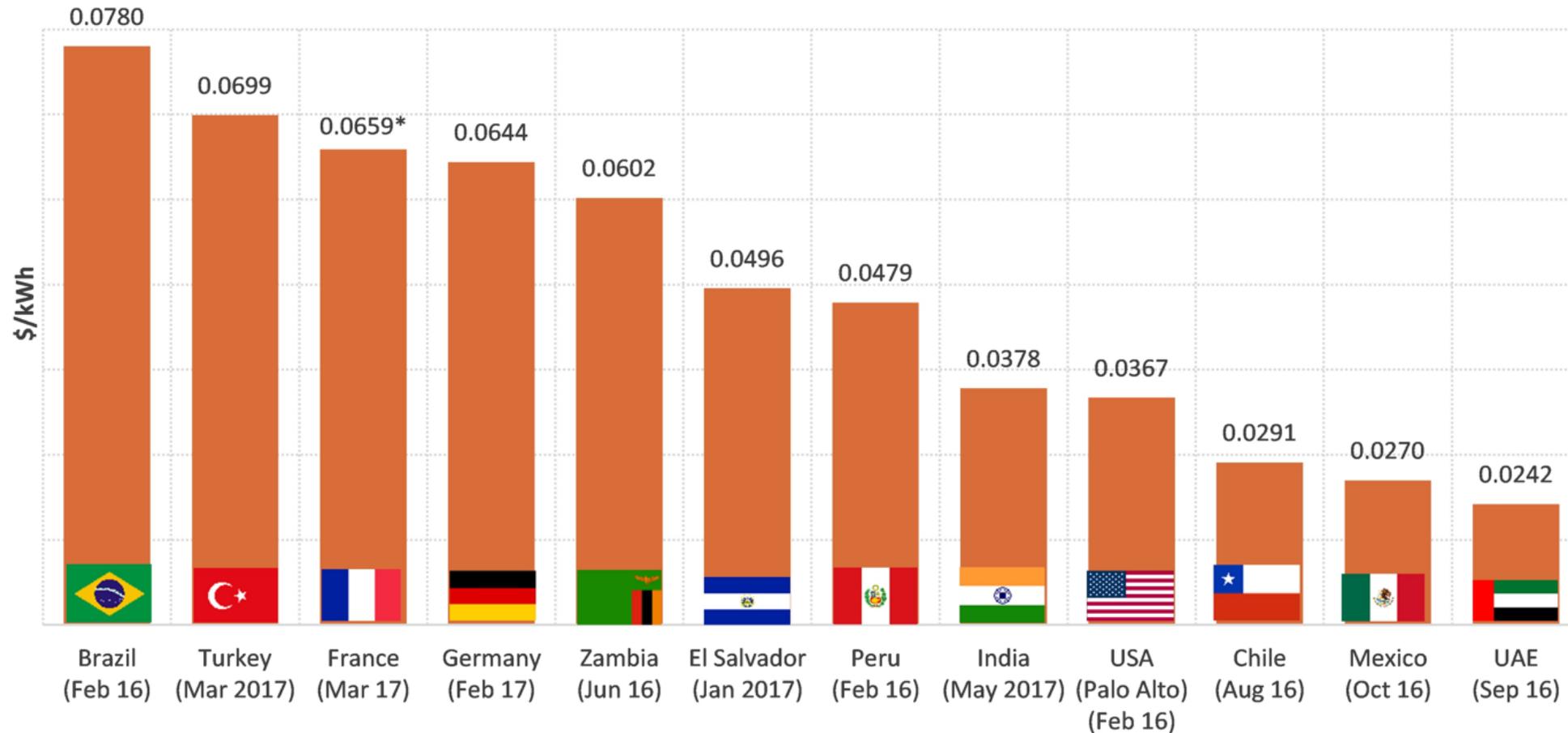
Source: Lazard estimates.

Note: Here and throughout this presentation, unless otherwise indicated, analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost for both conventional and Alternative Energy generation technologies. Assumes diesel price of ~\$2.50 per gallon, Northern Appalachian bituminous coal price of ~\$2.00 per MMBtu and a natural gas price of ~\$3.50 per MMBtu for all applicable technologies other than Natural Gas Reciprocating Engine, which assumes ~\$5.50 per MMBtu. Analysis does not reflect potential impact of evolving regulations/rules promulgated pursuant to the EPA's Clean Power Plan. See following page for footnotes.

‡ Denotes distributed generation technology.

Its Global

Solar Tariffs are Falling Globally Due to Proliferation of Auctions

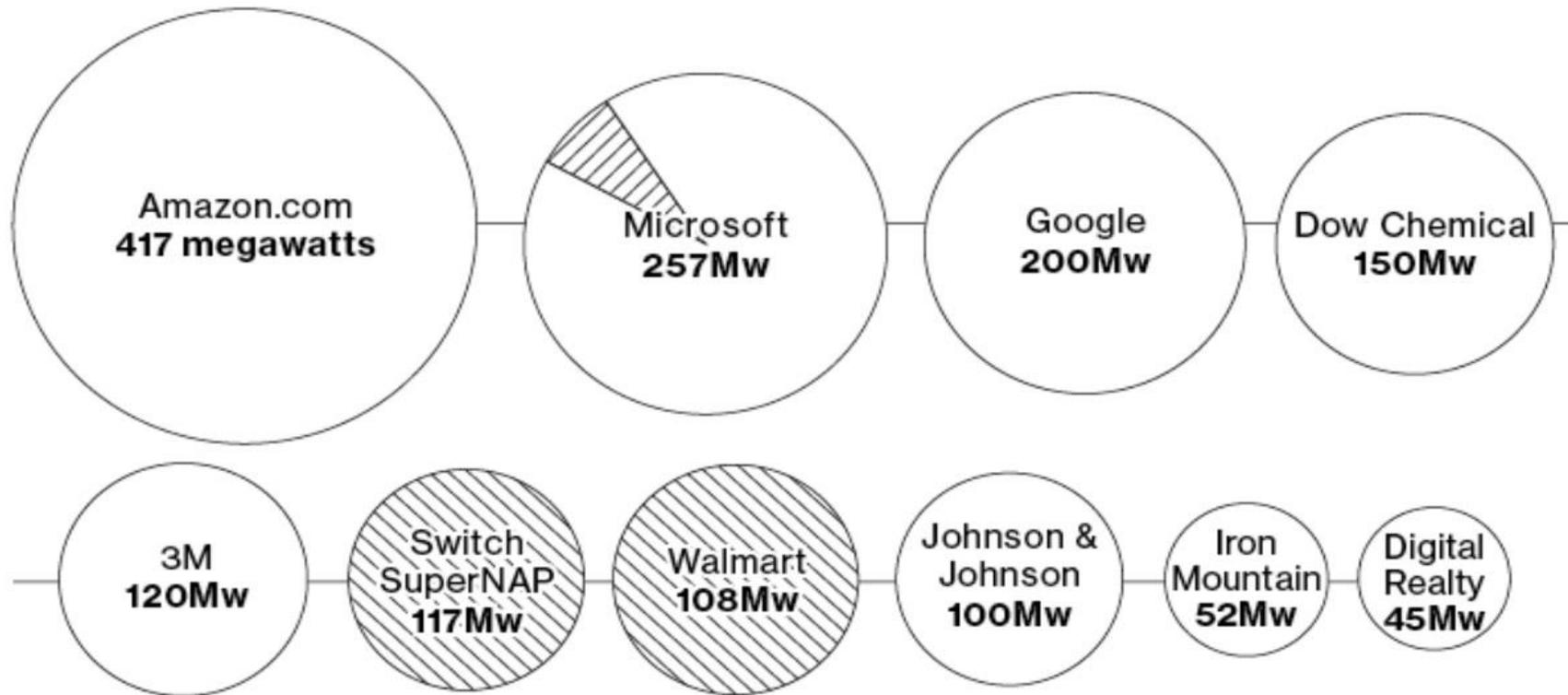


Mix of wind and solar (US deals)

Greener Companies

The 10 biggest signers of renewable-energy deals in 2016

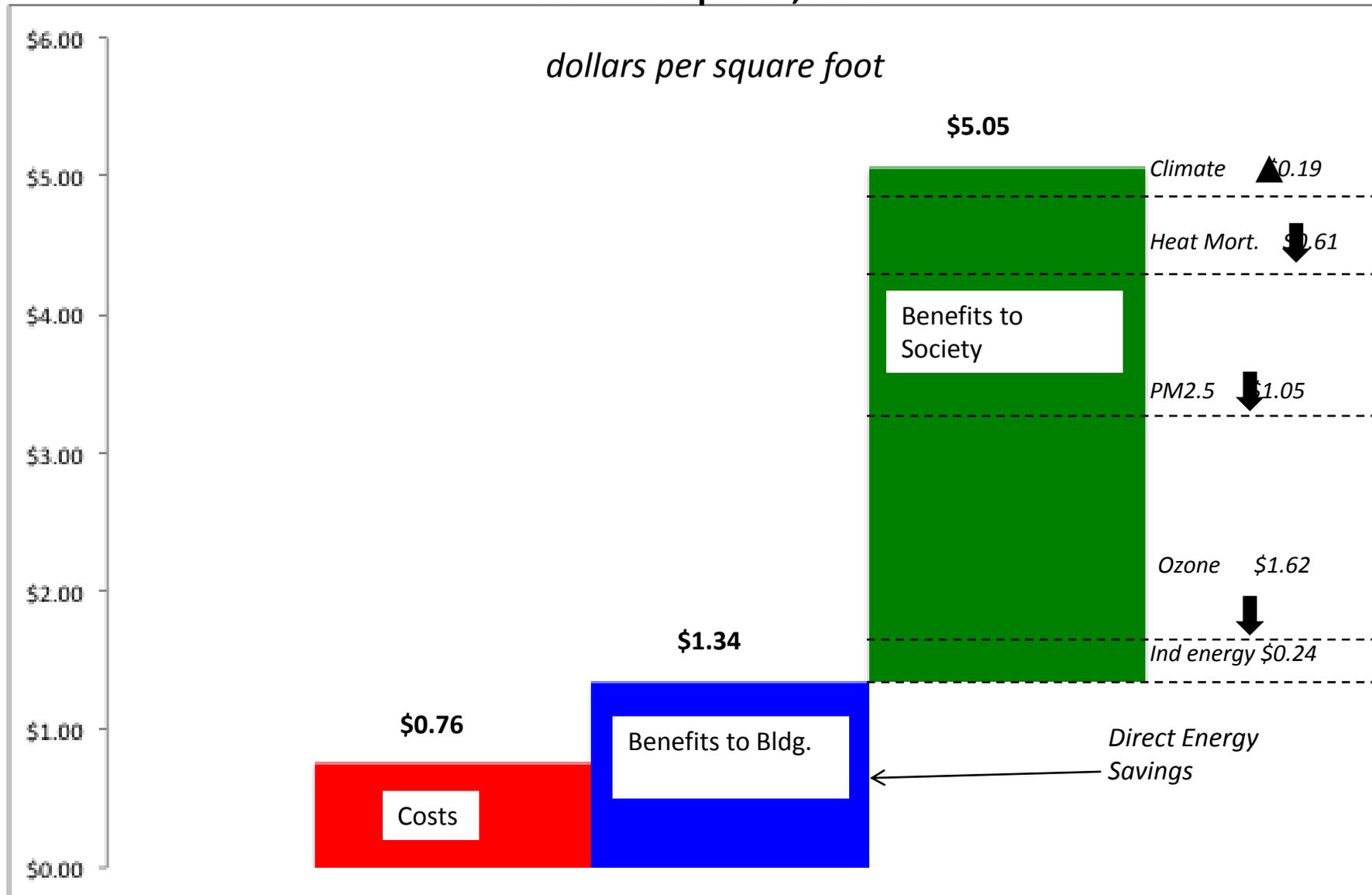
□ Wind ▨ Solar



GETTY IMAGES; ENERGY CONTRACT DATA THROUGH NOV. 14;
DATA: BLOOMBERG NEW ENERGY FINANCE; GRAPHIC BY BLOOMBERG BUSINESSWEEK

Reflective Roof Costs and Benefits

Source: Capital E, 2016



Increased renewables correlates with reduced rate increases: Annual Average Increases in Retail Electricity Prices, 2002-2013

