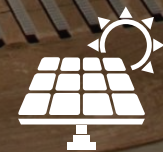


**STERLING & WILSON**



# MAKING SOLAR + STORAGE WORK BUSINESS MODELS EVOLUTION

Vikas Bansal  
Head, Business Development, International Solar

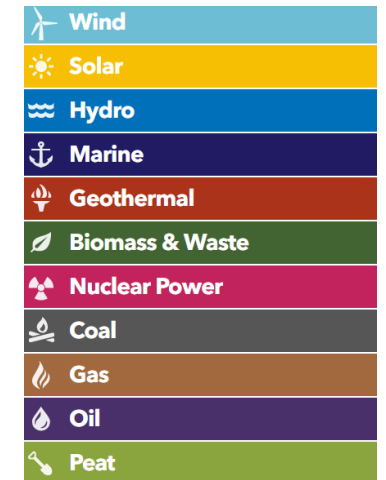
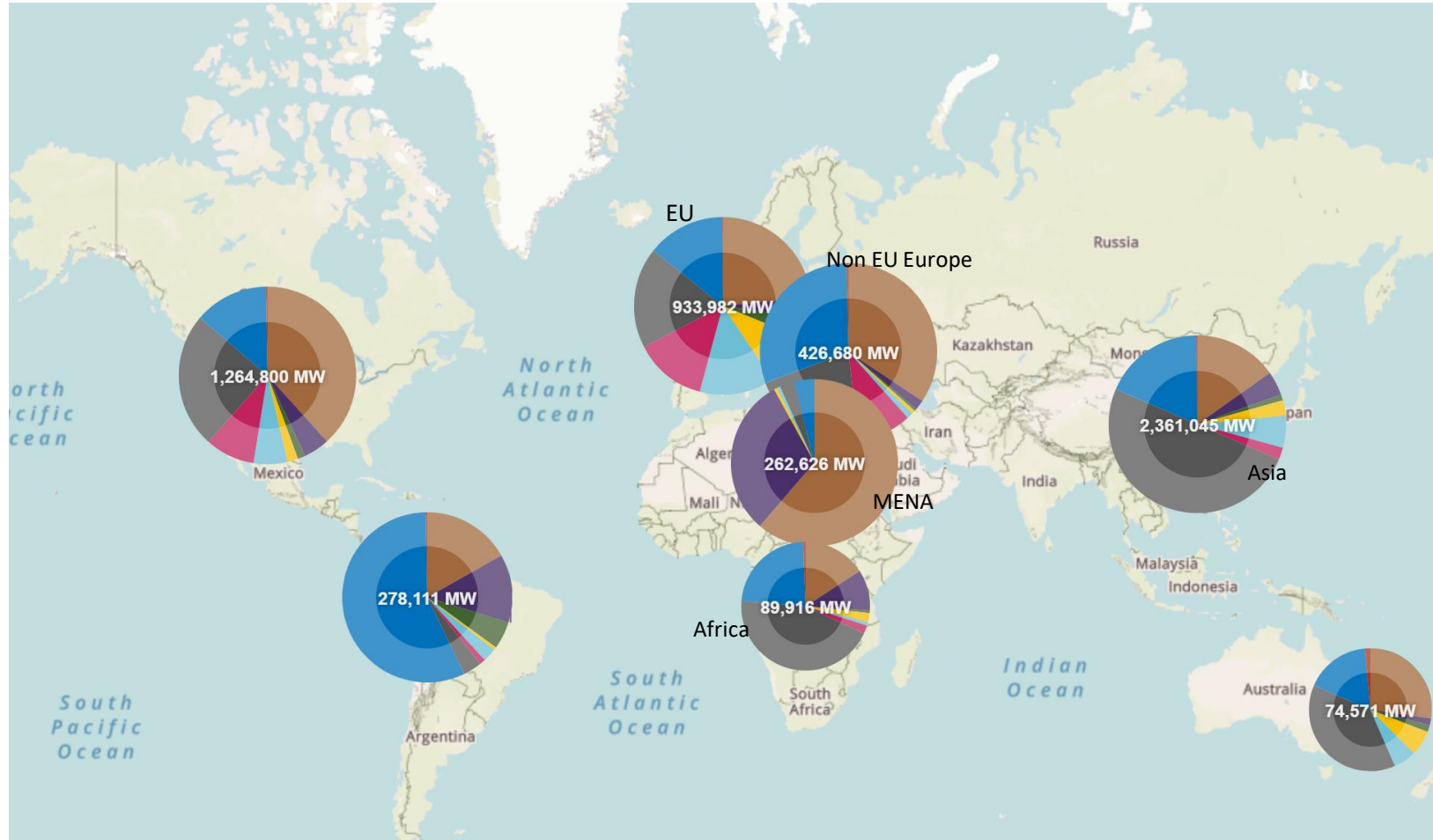


**RANKED WORLD'S #1  
SOLAR EPC COMPANY**

Outside China by IHS Markit



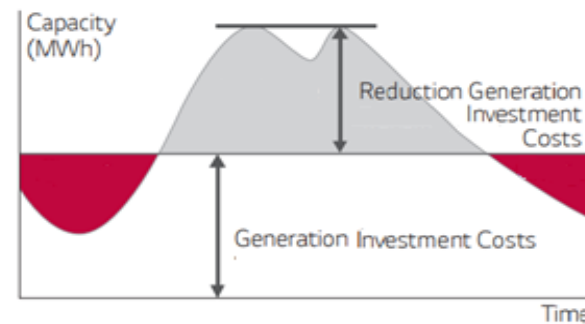
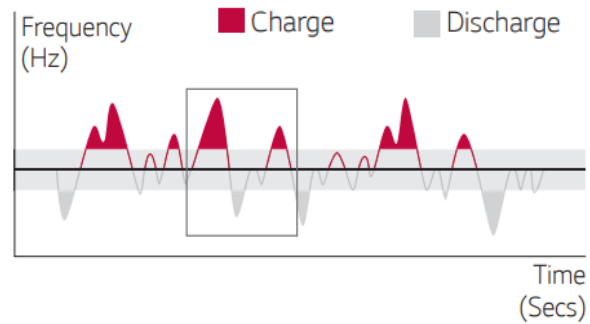
# WORLD'S INSTALLED POWER MIX



Source: BNEF, 2017

Total Installed Power Globally ~ 5700 GW  
Installed Solar Capacity < 500 GW

# APPLICATIONS OF ENERGY STORAGE



- |                          |                       |                         |
|--------------------------|-----------------------|-------------------------|
| • Voltage Regulation     | • Synchronous Reserve | • Renewable Integration |
| • Frequency Regulation   | • Black Start         | • Energy Trading        |
| • Transient Smoothing    | • UPS                 | • Peak Shaving          |
| • Reactive Power Control |                       | • Load Levelling        |

## Futuristic provision will mandating Renewable Energy Developer to build Energy Storage

Simply mandated to build ESS alongside their generation asset

May be required to provide more precise generation forecast

Operator may ask to export energy at given Time of Day citing grid stability

Integrating Energy Storage shall lead to overall reduction of Capex for Solar + Storage as a System

# PRESENT POLICIES

## South Korea is the leader in Energy Storage

PV project paired with ESS get benefited from a higher REC multiplier

C&I ESS get more than triple the level of discount on electricity retail rates

## The US will be the largest market by 2021 for Energy Storage

MACRS benefits depends on level of energy charged by PV relative to grid

ITC vary with fraction of electricity that is charged from co-located PV plant

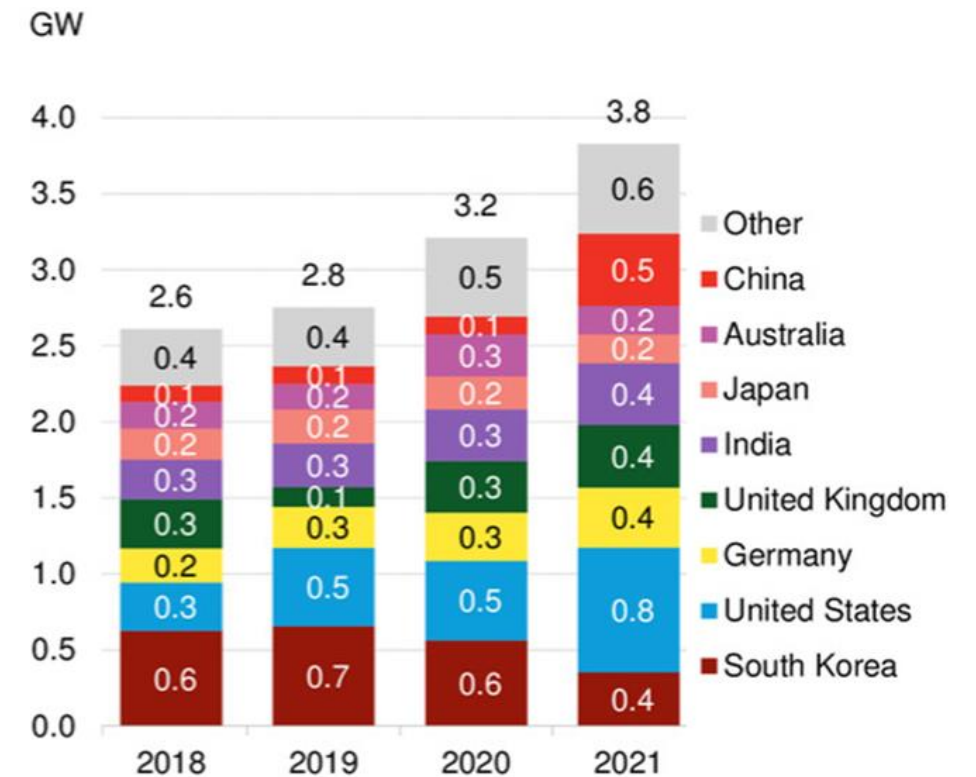
## India, Japan, Chile & Mexico are set to join the league

have begun requiring new RE plants to be co-located with ESS

## Modified Electricity Market rule in Australia boost investment in BESS

To align the physical dispatch and financial settlement of electricity at 5 minutes from 2021

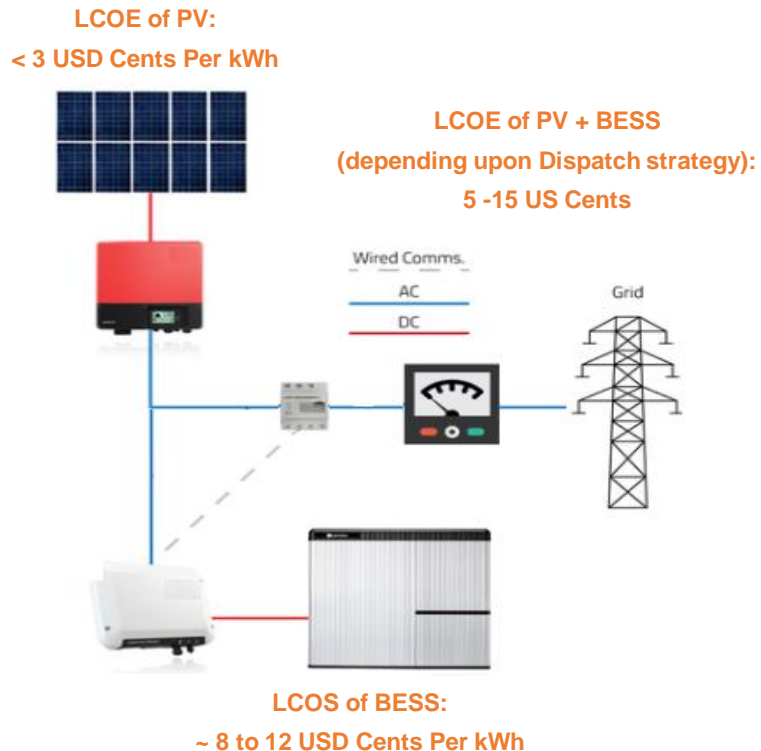
## DEPLOYMENT BY COUNTRY



Source: BNEF

# EVOLUTION OF BUSINESS MODELS ( TILL 2020 )

How to Monetize Energy Storage Co-located  
or Integrated with Solar Plants?



## Sale of Power

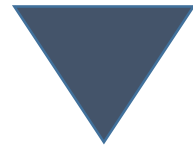
- Time of Day PPA : Higher Tariff for Peak Hours
- Energy Arbitrage
- Merchant Power Sale: Exploit Day ahead and Spot Energy Market

## Grid Ancillary Services

- Capacity PPA for Storage: If Grid Ancillary Services to be provided
- Preferential PPA for Grid Ancillary Services: Frequency/Voltage Regulation , Reactive Power Control, Transient Smoothing

# EVOLUTION OF FUTURE BUSINESS MODEL ( AFTER 2020 )

Expected LCOE for Solar + Storage expected be between 4/8 USD cents

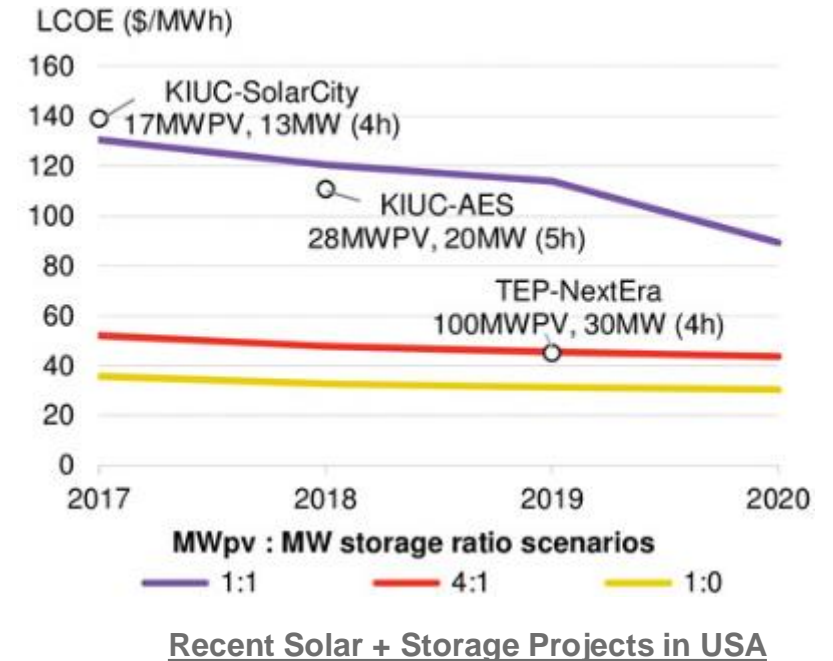


Solar + Storage shall compete with Base Load Generation plants like Coal/Gas

Coal/Gas will be used More as Backup Power ( Capacity Market )

Standalone Energy Storage will outcompete Gas Peaker Plants

Energy Storage As a Service





# Thank You

You can reach us at

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