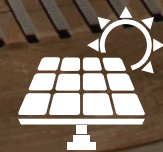


STERLING & WILSON



BUILDING A BANKABLE SOLAR + ENERGY STORAGE PROJECT

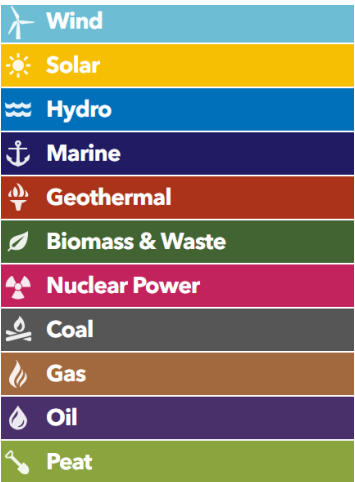
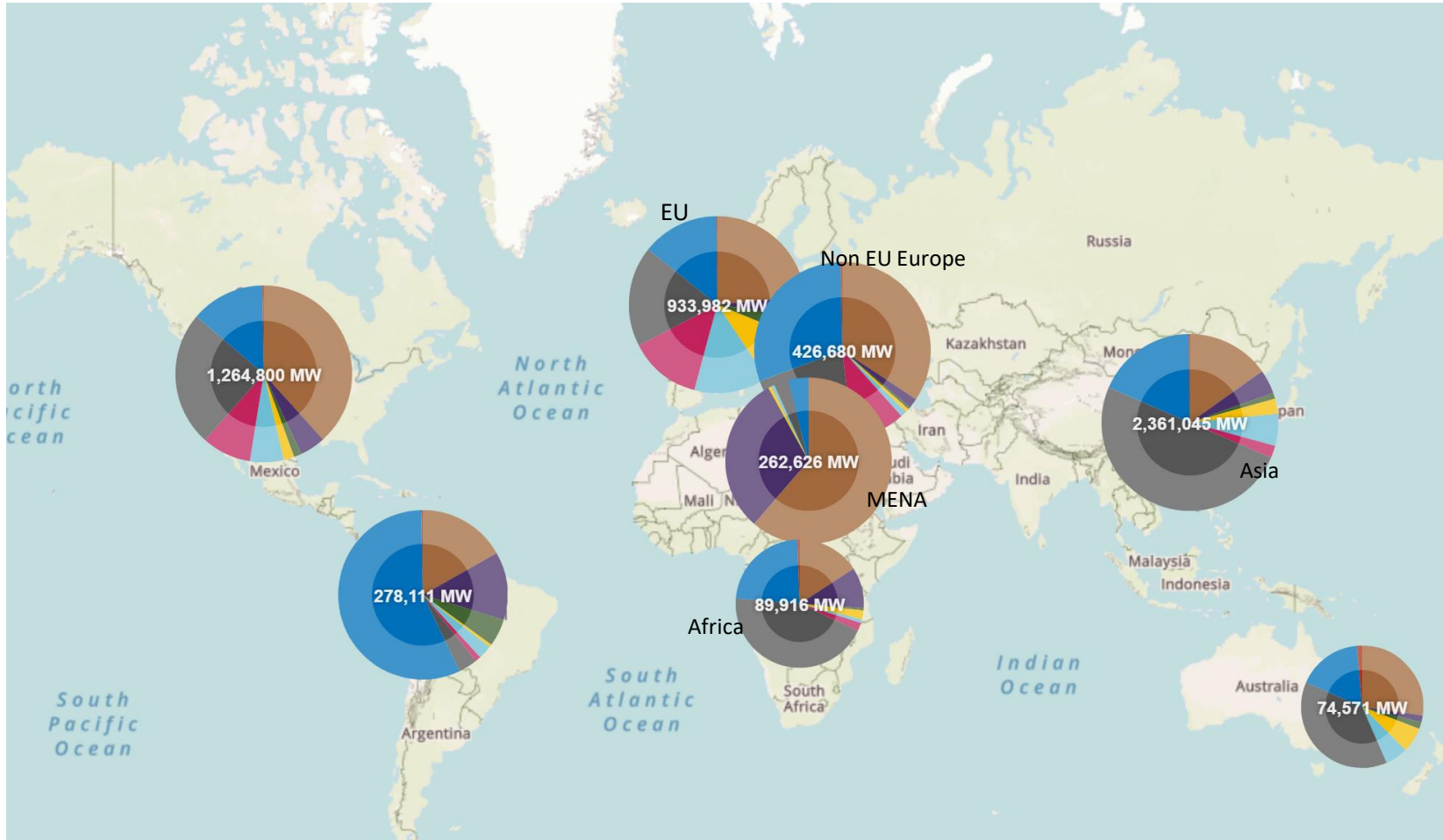
Vikas Bansal
Head, Business Development, International Solar



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

Outside China by IHS Markit

WORLD'S INSTALLED POWER MIX: OPPORTUNITY



Source: BNEF, 2017

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

SWOT ANALYSIS



STRENGTHS

- Huge Development and Financing Experience on Solar PV, which can be extended to Solar PV + ESS



WEAKNESS

- Limited Technical Expertise on ESS
- Limited Track Record of Project Financing for Solar + ESS



OPPORTUNITIES

- Capability to replacing coal/oil based power plant to serve base load
- Reduction in Cost on Solar PV + ESS, lowering LCOE every Year
- Favorable Government policy & incentives promoting clean energy
- Awareness to Decarbonizing the world & embrace clean energy



THREATS

- Unclear USE cases for ESS, together with finite life cycles of battery
- Relatively uncertain revenue stream makes project financing difficult
- Li-Ion ESS comes with poor OEM warranties with too many caveats
- Combined Cycle Gas plant, Bloom Cell & Hydrogen Cell technology

BANKABLE PV+ESS PROJECT

TECHNOLOGY RISK

Pass On the Risk

Full wrapped EPC Agreement deliver single point of responsibility, thus make the project bankable.

Avoid the Risk

EPCs Engineer the plant & ensure performance as envisaged in the business model for financing

Hedge the Risk

Insurance company underwrite Technology Risk, thus protect both the developer as well as the lender

REVENUE STREAM UNCERTAINTY

Realize through Energy Payment

Fuel cost + O&M costs + Variable Operational Payment
Measured through quantum of electricity delivered.

Realize through Capacity Payment

Compensation for fixed costs of Plant installation + ROI.
Predetermined amount, adjusted for plant availability.

Realize through Renewable Credits

Incentives to produce renewable energy.
To increase production of renewable energy.

REVENUE STREAMS

Energy PPA Model

Time-of-Day (TOD) PPA

TOD factor in PPA, means electricity produced during peak times is more valuable than electricity produced during off-peak time



Energy Arbitrage

Real Time & Day Ahead market options. And even leftover is sufficient for making business model viable with Real Time market

Market Participation Model

Capacity PPA

Entire capacity sold in exchange for fixed monthly capacity fee + reimbursement of other recurring expenses.

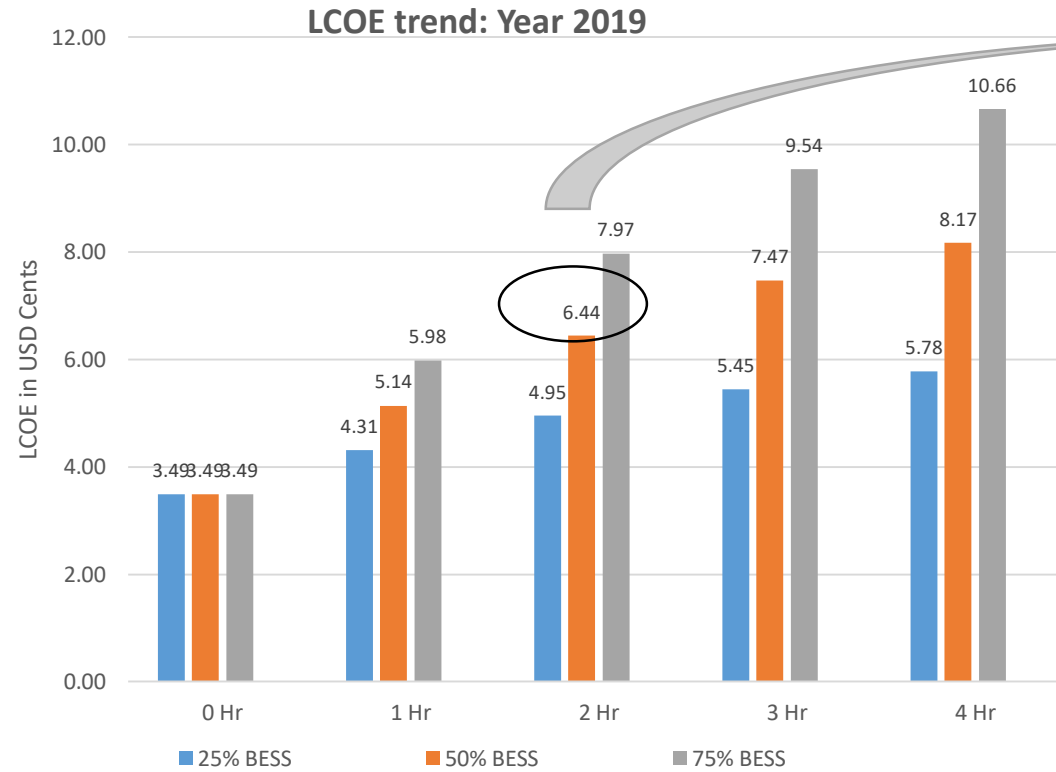
Ancillary Services

Reserve & Regulation market, with frequency/voltage Regulation, , Reactive Power Control, Transient Smoothing service

Policy Incentives

30% ITC in USA
RECs in S. Korea

LCOE: PV + ESS PROJECT

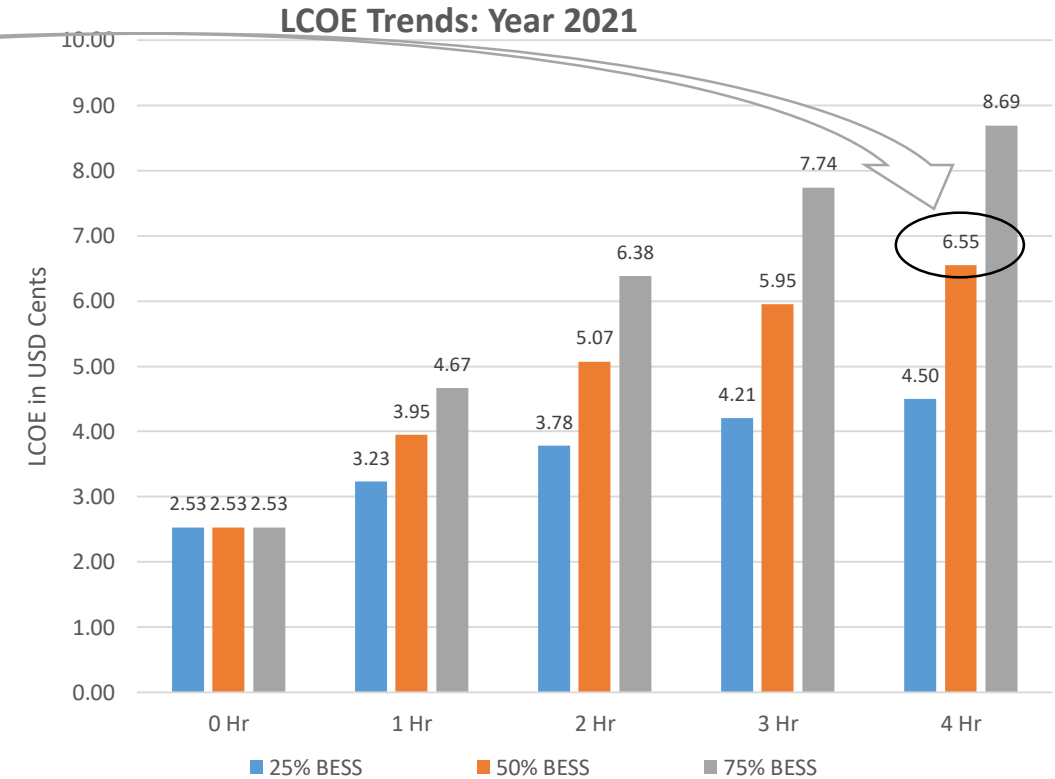


Cost of PV @ 65 USD cents per Wp

Cost of interest @ 6% PA, Loan term = 12 Yr, Project Life = 25 Yr

Cost of BESS (USD per kWh) is as below

1 Hr back-up	2 Hr back-up	3 Hr back-up	4 Hr back-up
USD 345	USD 305	USD 270	USD 235



Cost of PV @ 60 USD cents per Wp

Cost of interest @ 6% PA, Loan term = 12 Yr, Project Life = 25 Yr

Cost of BESS (USD per kWh) is as below

1 Hr back-up	2 Hr back-up	3 Hr back-up	4 Hr back-up
USD 298	USD 263	USD 233	USD 203



Thank You

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