

STERLING & WILSON



Designing PV Systems with Energy Storage

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Solar EPC and Energy Storage



**RANKED WORLD'S #2
SOLAR EPC COMPANY**

by IHS Markit

S&W GROUP OVERVIEW



Established

In 1927



Commissioned > 8.5 GW Power Projects

2.5 GWp Solar PV*, 1.8 GW
Gas & 4 GW Diesel based



Strong Presence

in ME, Africa, Asia
Europe, USA, Australia
and Latin America



Ranked World's #2

Solar EPC Company**



Largest Corporate

House providing Electrical
Solutions in India



Leading

MEP contracting Company
In India

* - As on 31th March, 2018

** - As per EPC and O&M provider tracker – Q1 2018 by IHS Markit

SOLAR AND ENERGY STORAGE SOLUTIONS



24x7 Power Reliable

Economical

Fast Response

Intermittent Support

5000 plus cycles

25 year Plant Life



Renewable Integration

- Frequency Regulation
- Voltage Regulation
- Peak Shifting
- Ramp Rate Management
- Renewable Firming
- Power Quality



Dispatch on Demand

- Improving Generation efficiency
- Defined Power output
- No Intermittency
- Fast Response time
- Load Matching
- Cover lead-in times
- Base Load generation
- Merit order dispatch



Dependable Technology

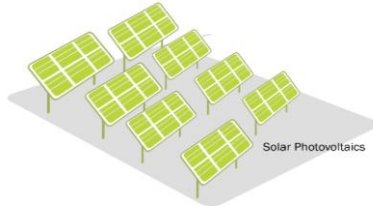
- Longer Life
- High Efficiency
- Certified Cells
- Technology Agnostic Design
- Customized Storage Solution
- Least complicated, fastest deployment



SWPL Advantage

- Concept to Commissioning
- Engineering & Detailed Design
- Yield Assessment
- Project Planning & Management
- Supply Installation, Testing & Commissioning
- Lifecycle O&M
- BESS End Of Life Replacement Support
- System Performance Guarantee

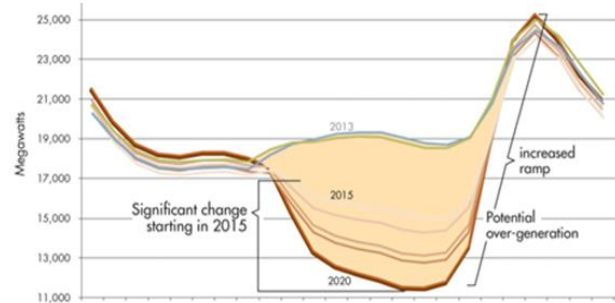
WHY DOES SOLAR NEED ENERGY STORAGE



Cheap Solar Power



**Infinite
2005 to 2017**



**Duck Curve
2018**

In order to be bankable in this new scenario with grid constraints, ES is needed to add Firmness/Dispatchability to Solar.

At the minimum Solar Plants shall have the ability to shift Peaks and control rate of injecting power to grid.

BALANCE OF SYSTEM



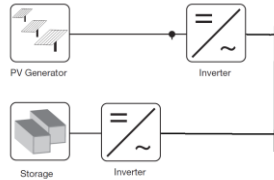
- Controls Solar Inverters
- Controls Charging/Discharging & Dispatch Strategy for ES
- Ensure Compliance on Technical Requirement of Grid

DESIGN STRATEGIES: DC VS AC COUPLING

AC SIDE COUPLING



- Lower Cost of Equipment
- Higher Flexibility on Design / Use cases
- Higher Reliability

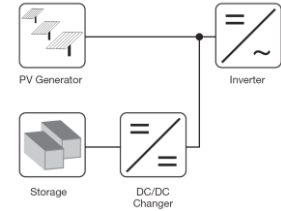


- Higher Losses to extra DC-AC Conversion cycle

DC SIDE COUPLING



- 5-7% reduction in losses
- High DC loading possible, Lower Balance of System Cost



- Very High Cost of DC-DC Hybrid Inverter
- Less Flexibility on Design/Use cases

DESIGN STRATEGIES

Peak Power Clipping Management

PV Plant degrades by more than 5% in first 5-7 Years, there is clipping of 0.5% to 1% during these years. To have optimized design (Min LCOE) meeting grid requirement, this clipping loss could be managed by putting Energy Storage.

Hybrid Inverter

Hybrid Inverter can be utilized for Reactive Power Compensation to meet grid requirement, thereby reducing numbers of Solar PV Inverters/Capacitor Bank

HV Transformer: AC Side Coupling

Same Transformer could accommodate Power output from Solar & ESS, eliminating need for new Transformer for ES

OFF-GRID CAPTIVE HYBRID POWER PROJECTS



5 MWp (3 PROJECTS) SOLAR - DG BATTERY - HYBRID PROJECT

NIGERIA: UNIVERSITY PROJECT



Customer

Universities



Scope of Work

Turnkey EPC and O&M for 10 years



COD

Q4 2018



Objective

24*7 Reliable Power



Unique Feature

1 + 1 Day Autonomy



Thank You

You can reach us at

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