

Opportunities & Challenges for small scale storage for renewable off grid solutions

Dr. Rahul Walawalkar
Executive Director,
India Energy Storage Alliance

India Energy Storage Alliance

- IESA was launched in 2012 to help technology and system integration companies involved in energy storage and microgrids to understand and capture opportunities in thro growing market
- In 2013 launched IESA-Knowledge Partner Network with a goal of addressing energy storage applications in over 10 key sectors
- IESA membership is divers comprising of

- Technology providers
- System integrators
- User community
- Consultants
- Research & Development

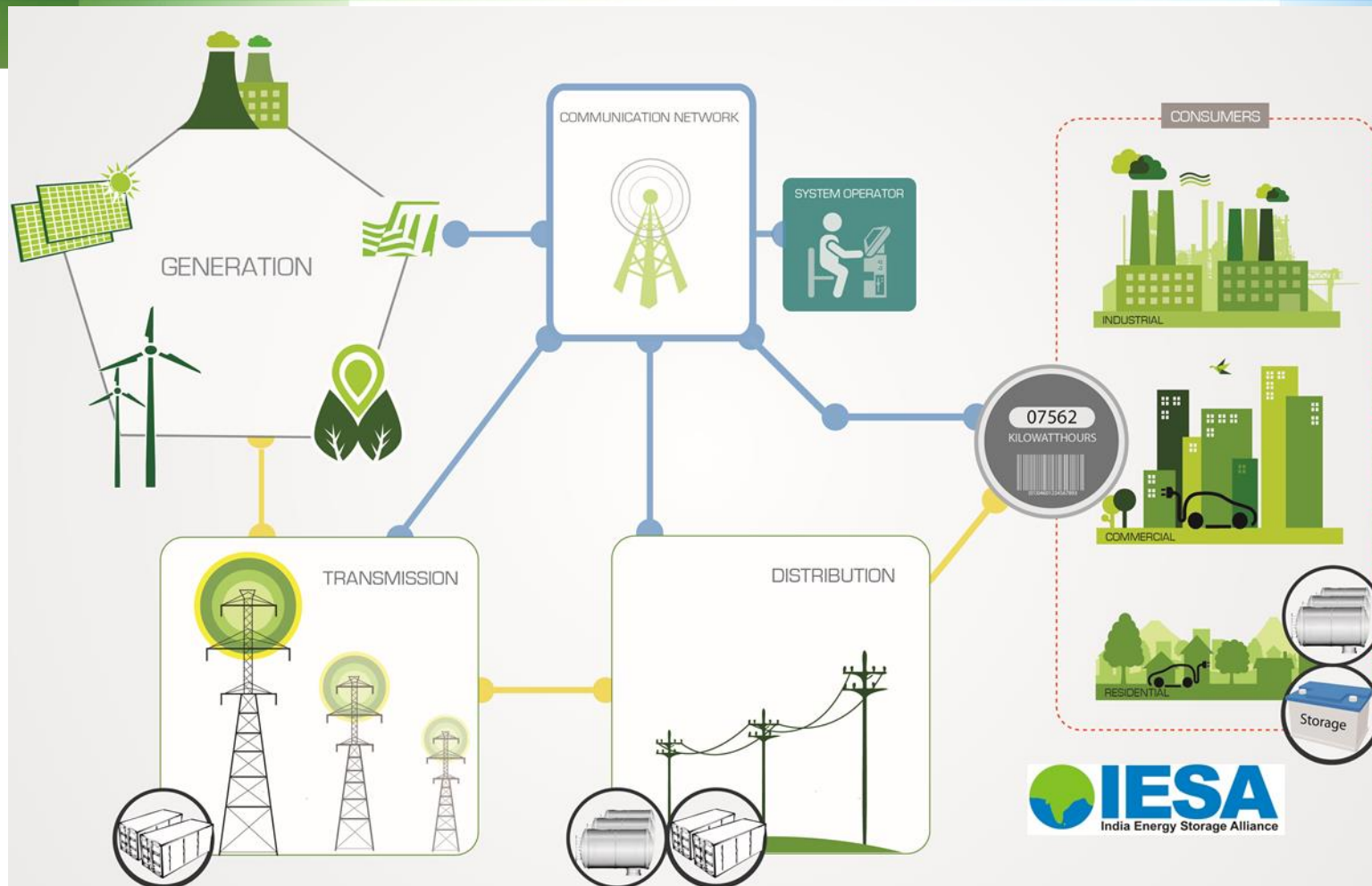
- For more details visit www.indiaesa.info



Helping drive policy framework for storage

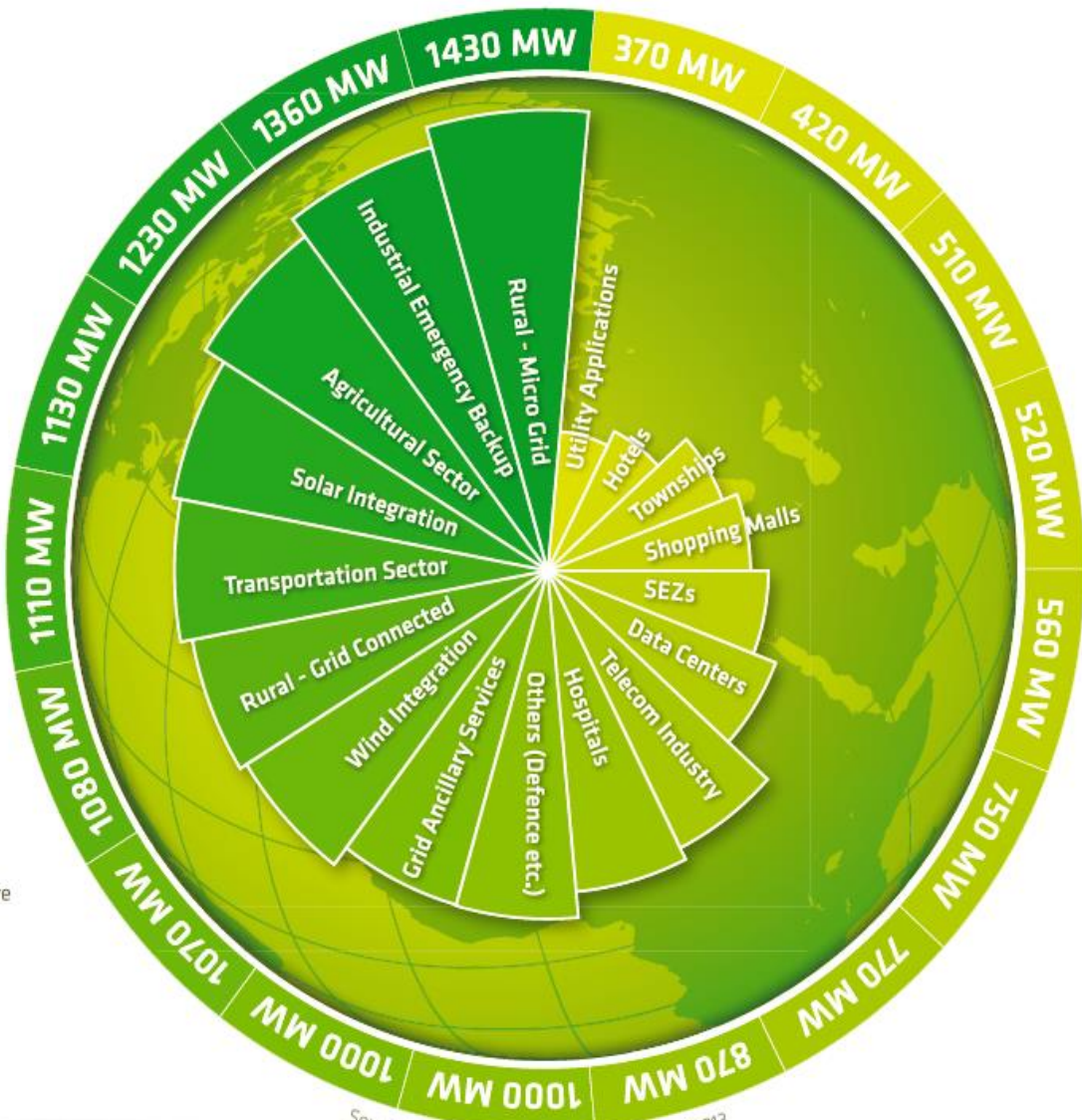
- Member of National Taskforce on Renewable Integration for Central Electricity Authority (CEA) & Ministry of Power (MOP)
- Member of Standing Committee on Energy Storage and Hybrid Systems for Ministry of new and Renewable Energy (MNRE)
- Chairperson of working group on energy storage, microgrids and renewable integration as part of Smart Grid Co-ordination Committee for Maharashtra Electricity Regulatory Commission (MERC)
- Special collaborations with various trade groups including InWEA, IWTMA, AEEE, Indian Electronic & Semiconductor Association etc.
- Have developed special report on role of energy storage in introduction of ancillary services in India that could pave way for launch of ancillary service procurement in India in next 2-3 years.
- Providing inputs for launch of demonstration projects for ancillary services, renewable integration and C&I applications

Role of Energy Storage in Indian Grid



Energy storage could play a key enabling role in every aspect of modern grid including Generation, Transmission, Distribution and at Customer Premise (including electric vehicles)

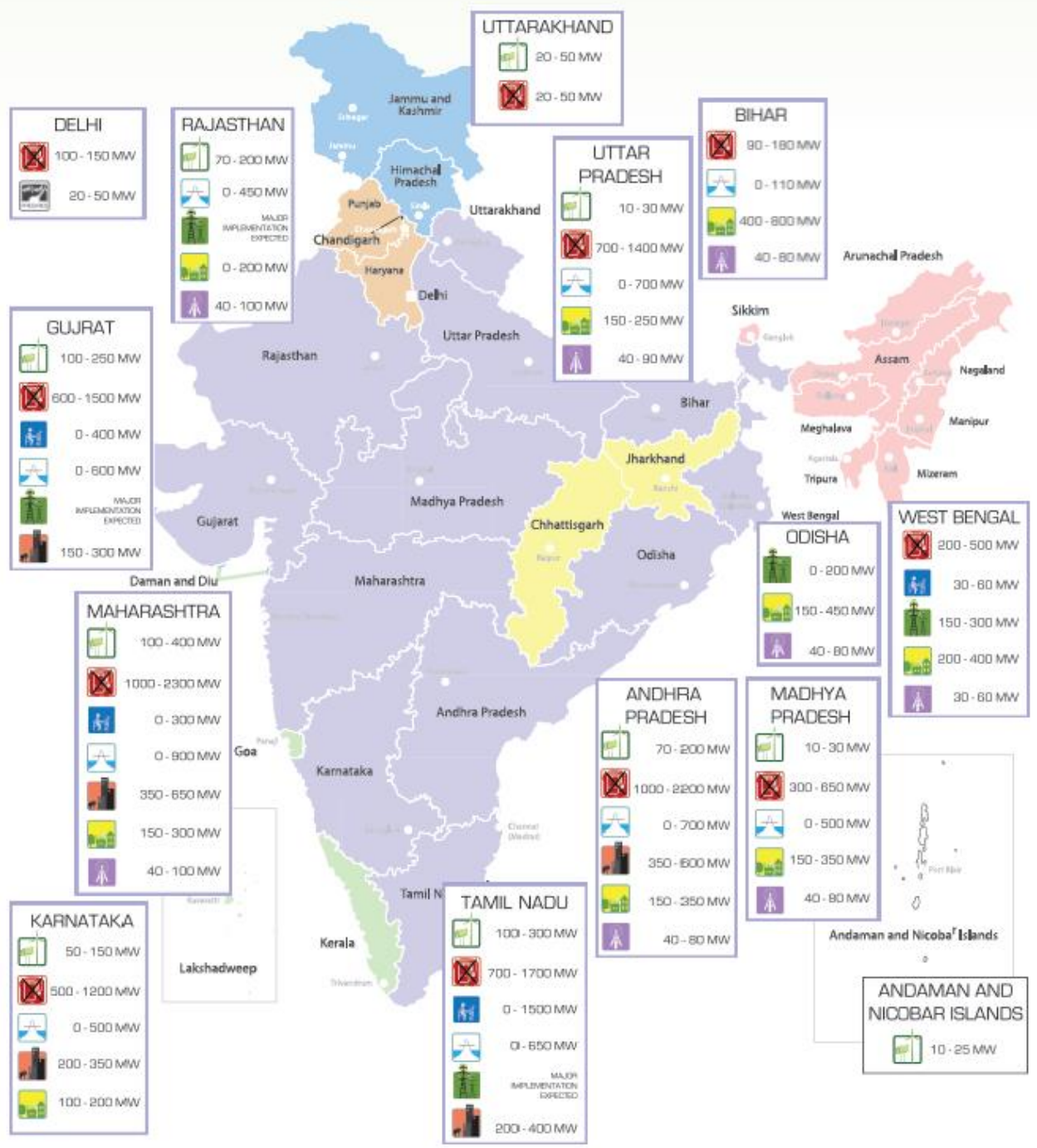
Indian Market Opportunities



Source: IESA India Market Overview Report 2013

- We anticipate the energy storage market in India to grow to 15-20 GW by 2020 driven by
 - Energy Access
 - Renewable integration
 - Solar PV
 - Ancillary Services
 - C&I customer demand
 - Telecom sector
 - Agricultural applications

India Energy Storage Market Potential Map



Challenges for distributed storage

- Lack of clear policy framework
 - Net metering, demand response, grid reliability standards etc.
 - Generation based incentives vs hybrid solutions
 - Need to consider energy efficiency policies at equipment level vs efficiency at systemic level
- Distortion of price signals due to subsidies or lack of real time pricing signals for consumers
- Need for considering life cycle costs vs capital costs for selection of government funded projects
- Lack of awareness about technologies
- Cost of technology role of localization and system integration
- Need for innovative business models
- Need for financing mechanisms



Energy Storage Landscape 2014

IPPs / Project Developers



PCS / Inverter Supplier



Sodium Based



Compressed Air



Flywheel



Lead Acid



Li-Ion Batteries

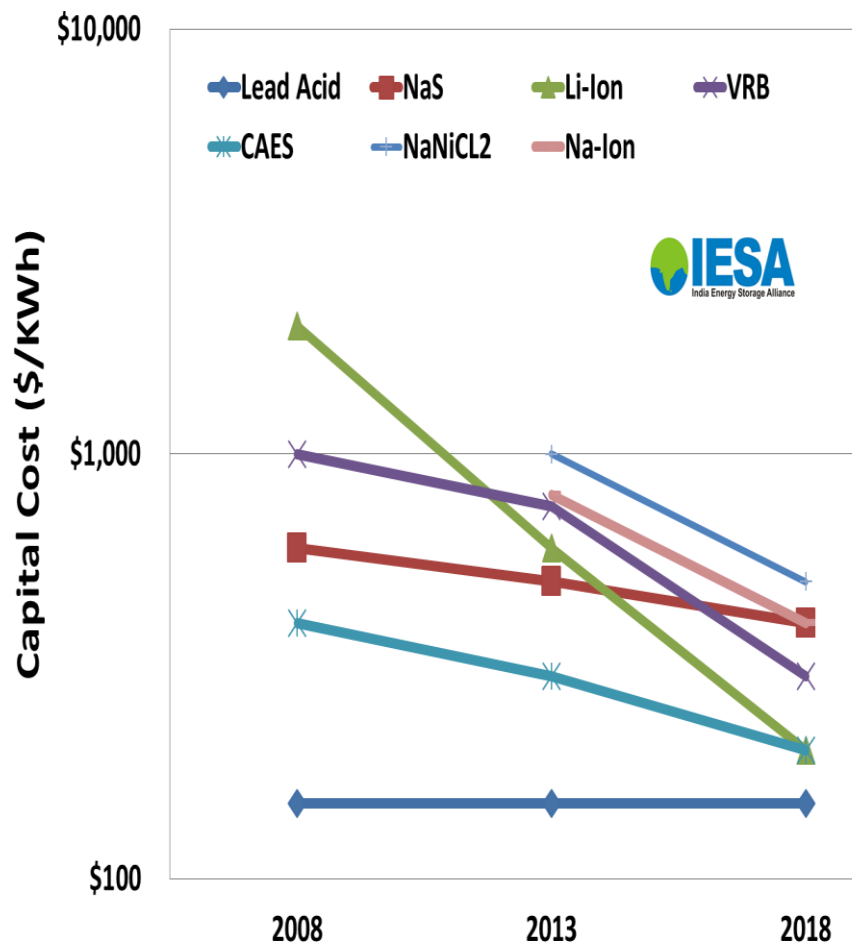


Flow Batteries

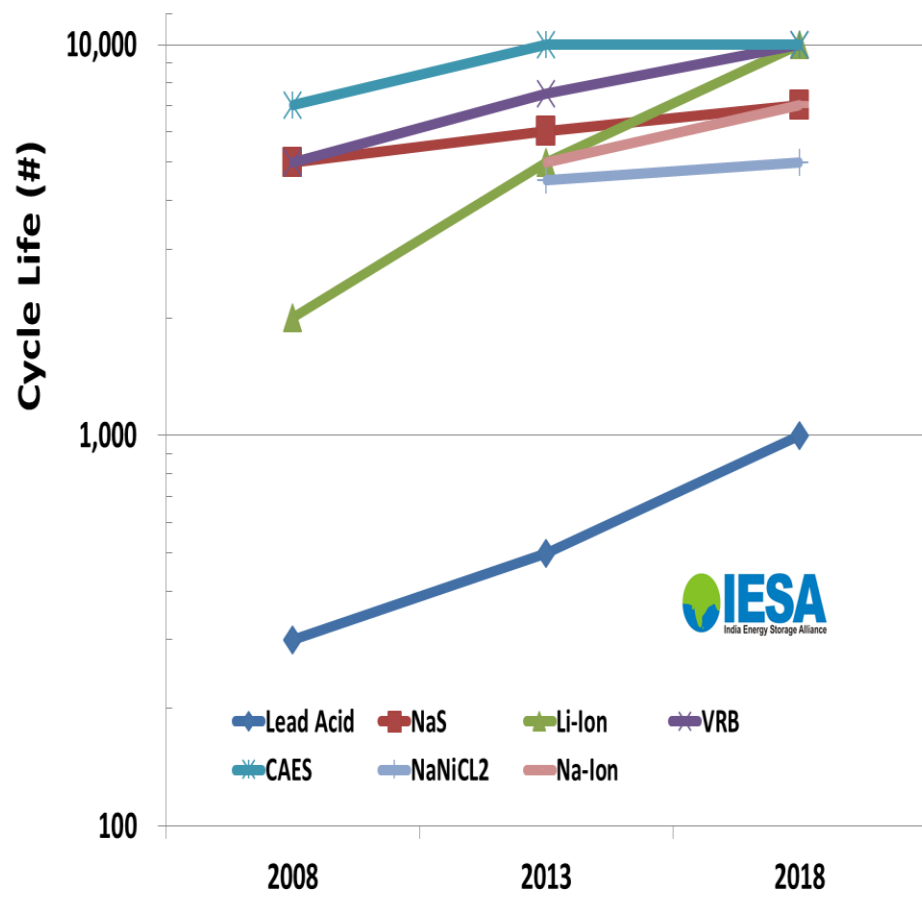


Key Trends in Energy Storage

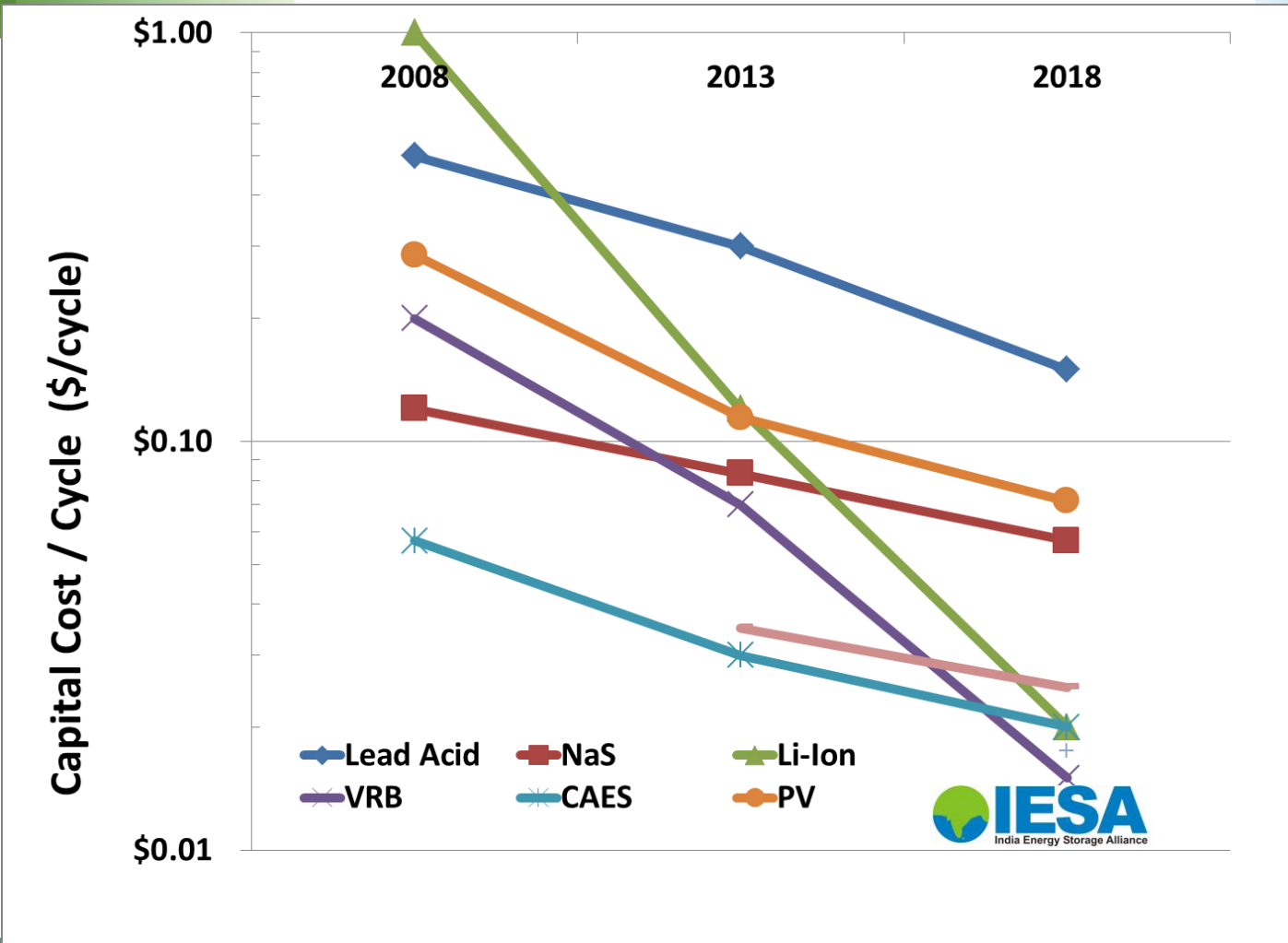
Capital Cost Trends



Cycle Life Trends



Capital cost / cycle



Contact US



Customized Energy Solutions Ltd.

1528 Walnut Street, 22nd Floor
Philadelphia, PA 19102 USA

Phone: +1-215-875-9440
Fax: +1-215-875-9490
info@ces-ltd.com

Dr. Rahul Walawalkar

Executive Director,
India Energy Storage Alliance
rahul@ces-ltd.com
US Cell: +1-516-639-5391
India Cell: +950-303-1765

Customized Energy Solutions India Pvt. Ltd.

A 501, GO Square
Aundh - Hinjewadi Link Rd, Wakad
Pune, Maharashtra 411057 India

Phone: 91-20-32407682
info@ces-ltd.com