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India Energy Storage Alliance




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**India SMART GRID Week 2015**

02 - 06 March, 2015  
Bangaluru International Exhibition Centre  
Bangaluru, India  
[www.isgw.in](http://www.isgw.in)



International Conference and Exhibition on Smart Grids and Smart Cities

# ISGAN Workshop – Microgrids


## Role of Energy Storage in Smart Microgrids

**Dr. Rahul Walawalkar**  
Executive Director, IESA &  
VP, Emerging Tech, Customized Energy Solutions


**2<sup>nd</sup> March 2015**

3/3/2015

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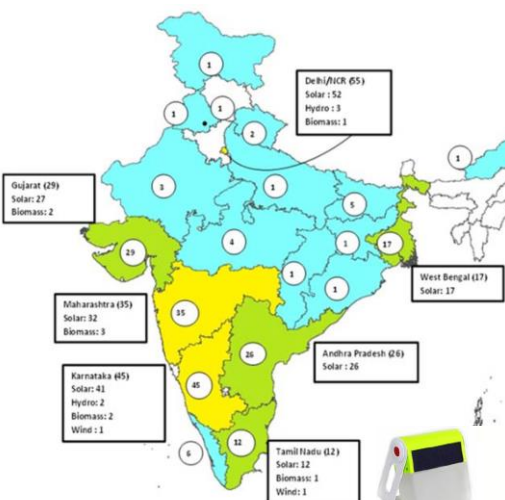


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## India: Fast growing market for off grid systems




State	Solar	Hydro	Biomass	Wind
Delhi/NCR (65)	52	3	1	
Gujarat (29)	27		2	
Madhya Pradesh (35)	32		3	
Karnataka (45)	41	2	1	
Andhra Pradesh (26)	26			
Tamil Nadu (12)	12		1	1
West Bengal (17)	17			

According to a recent survey by USAID / CEEW, there are currently over 250 companies working on providing off grid solutions to consumers in India.



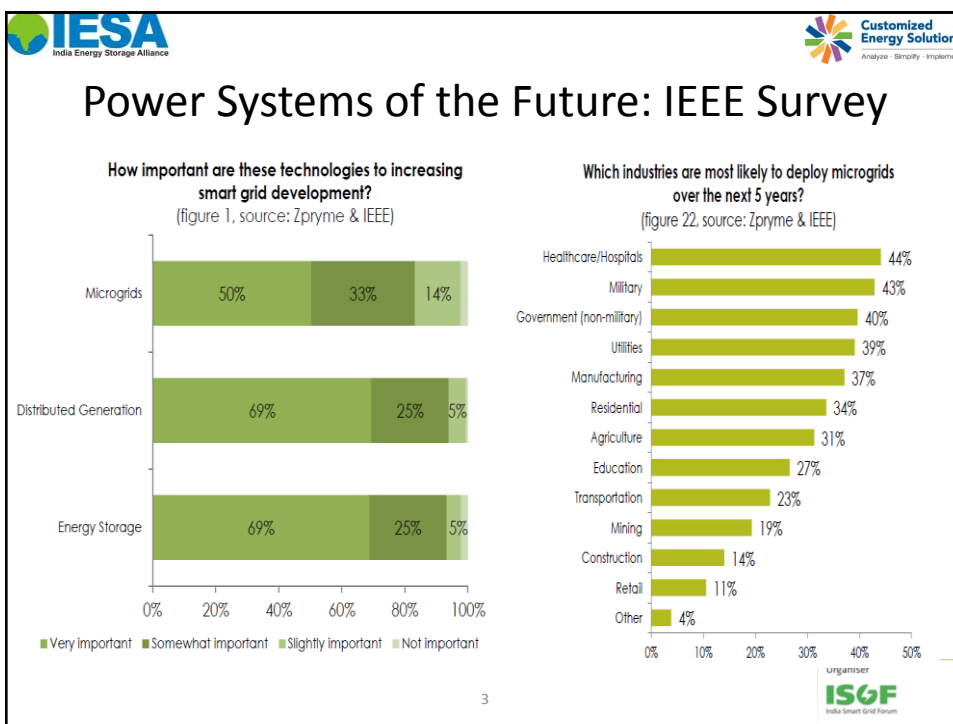


INR 4500  
USD 72



INR 1550  
USD 25

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## Classification of Microgrids


- **Commercial or campus or industrial grids:** catering to a specific industrial community or campus.
- **Community grids:** Optimize and utilize the specific regional renewable resources to give cost effective power supply.
- **Remote grids:** are necessary due to geographical features, such as islands.
- **Military and security grids:** are grids necessary to maintain data and security of critical assets.

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## Microgrids for improving Grid Resiliency

**2012: Hurricane Sandy**



**2013: Cyclone Phailin**



**PHAILIN STRENGTHENING THIS WEEK**  
ALL-TIME LOCAL











Photo: Iwan Baan/New York Magazine


<b>Robustness</b> 	Gas insulated switchgear Flood proofing and water proofing Undergrounding Hydrophobic coatings Fuse saving technologies Voltage/VAR controls
<b>Redundancy</b> 	Battery storage Vehicle-to-grid Demand reduction and energy efficiency
<b>Diversity and flexibility</b> 	Distributed generation Intelligent feeders and relays Automated switches Battery storage Vehicle-to-grid
<b>Responsiveness</b> 	Advanced Metering Infrastructure (AMI) Automated Demand Management Intelligent feeders and relays Automated switches
<b>Coordination</b> 	Advanced Metering Infrastructure (AMI) Geographic Information Systems (GIS)


 Smart Grid Forum 5

Source: NY Case Study by Arup, RPA and Siemens




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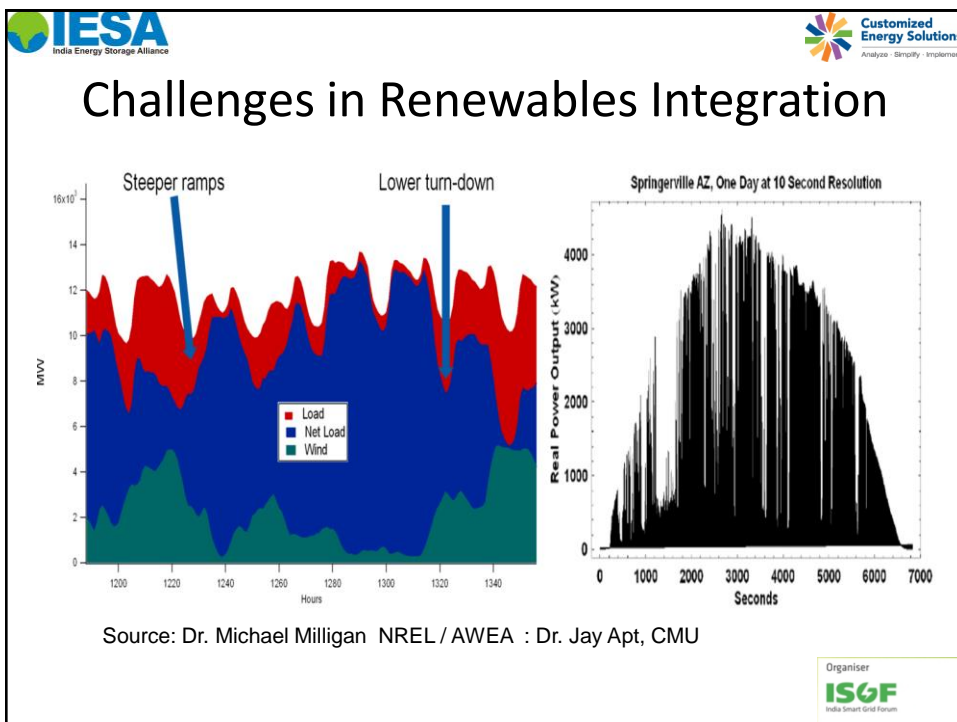
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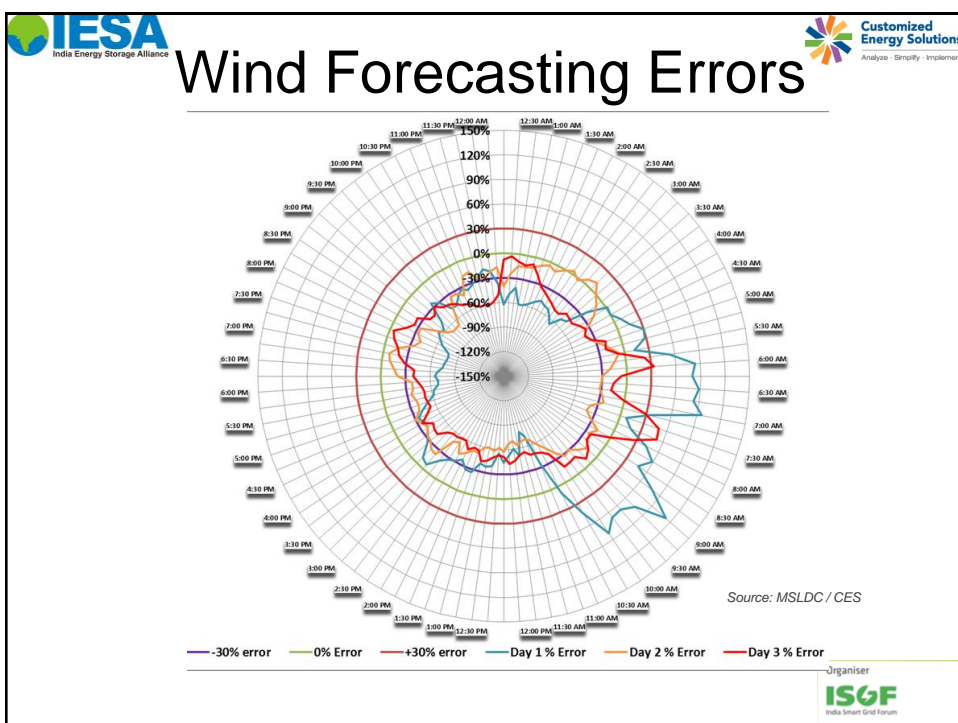
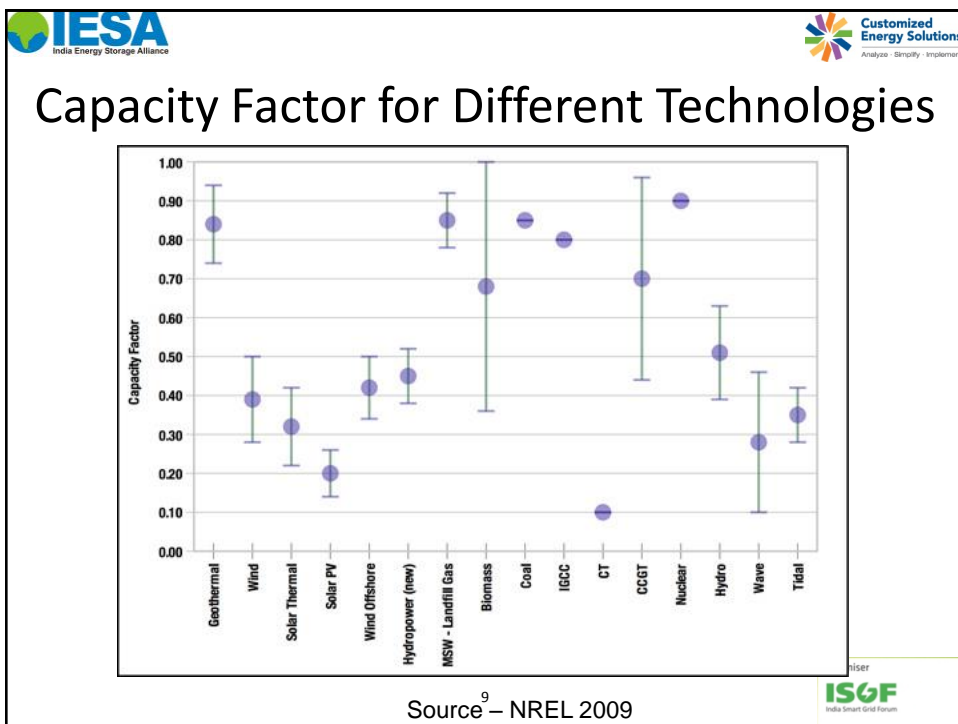
## Smart Cities & Townships

- India plans to build 100 smart cities.
- In addition, over 300 of UltraModern Townships could drive microgrids and storage deployment in India.

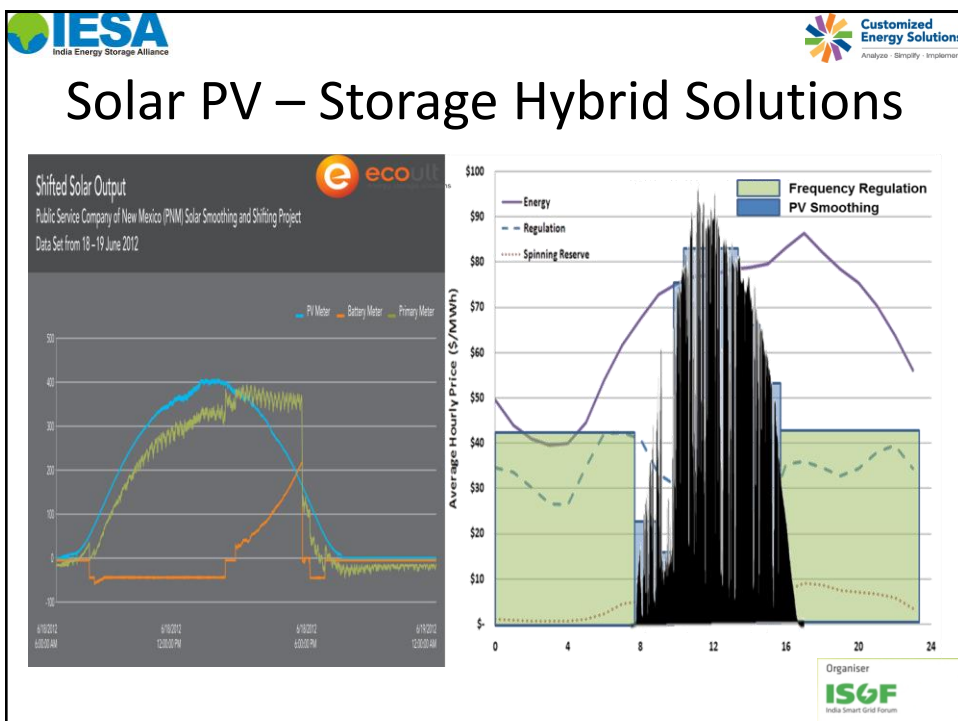
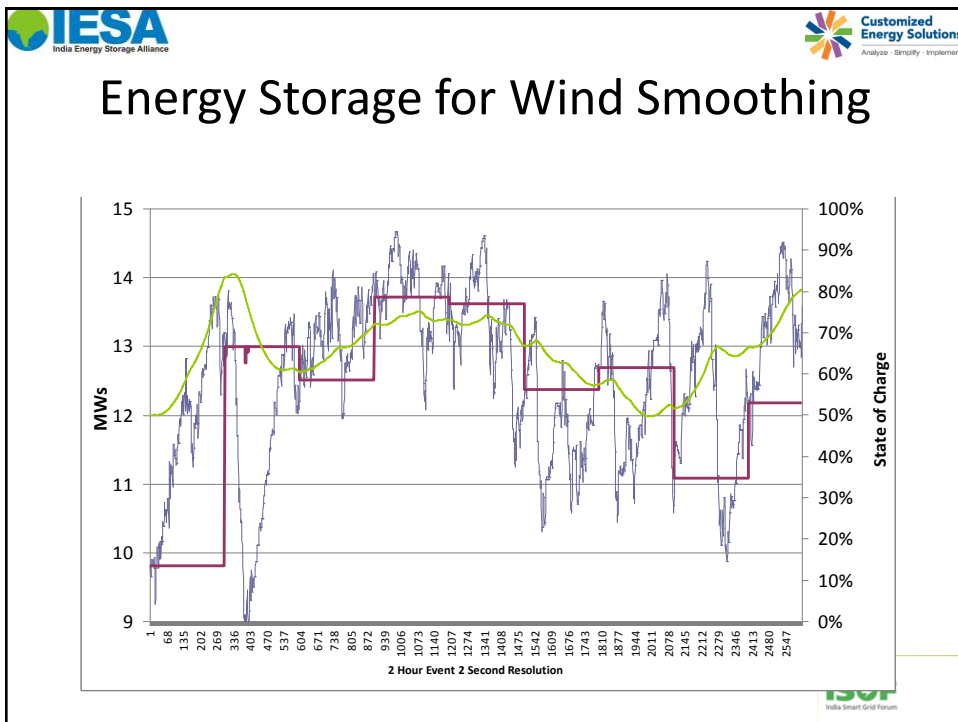


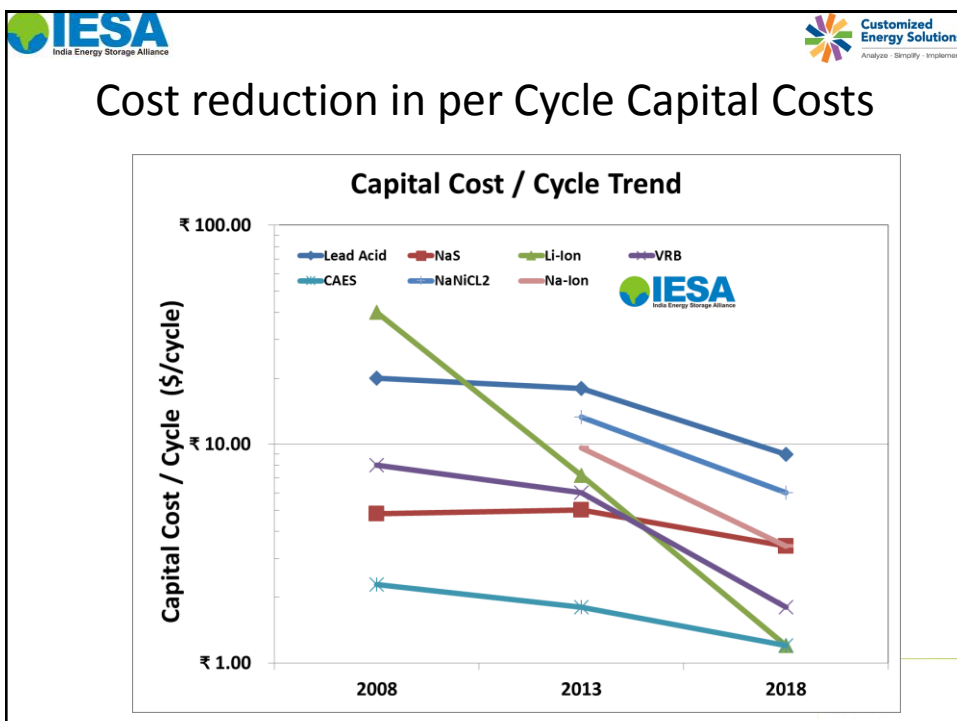
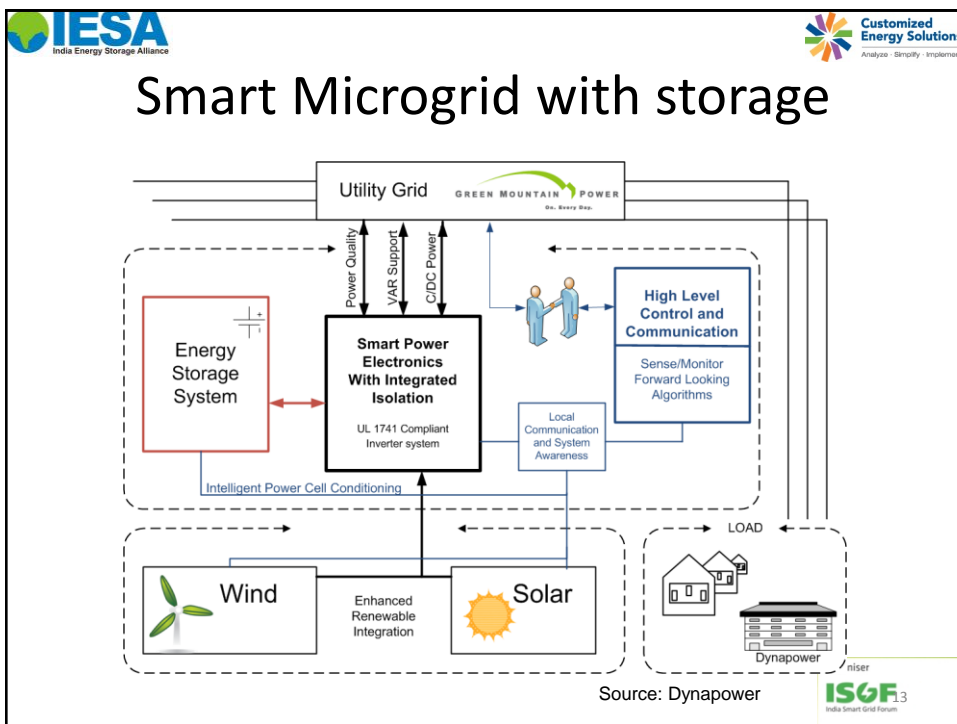
**Map Labels:** Main Gate, SEZ Entrance, SEZ Security Cabin, SEZ, Cafeteria, Reading Room, Multipurpose hall, Gymnasium, Convenience Store, Tennis, Soccer, Cricket, Fountain, Swimming Pool, Water Body, Ring Soccer, Club House, Banks, Swimming Pool, Studio Apartments, Theme Square, Boom Barrier/ Security Check, Professional Security System, Gymnasium, Club House, Professional Security System, Ring Soccer, Club House, Banks, Swimming Pool, Studio Apartments, Theme Square, Boom Barrier/ Security Check, Professional Security System, Gymnasium, Club House, Professional Security System.




















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# Energy Storage Landscape 2014

**IPPs / Project Developers**




















**PCS / Inverter Supplier**














**Sodium Based**






**Compressed Air**














**Flywheel**












**Lead Acid**













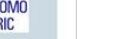


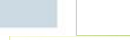
**Li-Ion Batteries**











**Flow Batteries**

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## Join IESA to get actively involved in development of energy storage and microgrids in India



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Role of Energy Storage in Modern Electric Grid



India - Energy Storage Market Potential Map



India opens the door for series of Energy Storage Projects



IESA Energy storage Seminar Series

India Energy Storage Project Opportunities

IESA Student Competition

**IESA Knowledge Partner Network**

During past year IESA has tremendous response from various stakeholders and has a growing list of members that have joined IESA- Knowledge partner Network. The IESA membership is diverse and includes manufacturers, academic institutions, technology and materials developers, start-ups, engineering firms, systems integrators, and end-users. Know more...








**KPN Members**
























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## Conclusion

- Microgrids present a growing opportunity for developing the electricity infrastructure while optimizing the infrastructure spending and providing a balance of reliability and power quality for regions where centralized grid is not feasible
- Recent environmental disasters have highlighted the potential of microgrids also for improving resiliency of centralized grids
- Significant growth potential exist even in India through SEZs / townships / industrial microgrids as well as rural microgrids
- Energy Storage technologies can help in optimizing the microgrids and provide the flexibility essential for smooth and economical operations of microgrids.
- IESA is working on a major initiative to bring together various stakeholders in microgrid area to address barriers that are preventing scaling up of microgrids in India

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## Contact US



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