



Towards a  
greener tomorrow

Presentation to investors

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# DISCUSSION OUTLINE



- 1 CONTEXT
- 2 TECHNOLOGY & SOLUTIONS
- 3 CASE STUDY
- 4 MARKET OPPORTUNITY
- 5 ABOUT OORJA ON MOVE



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**Context**

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# WHY WE NEED ELECTRICAL VEHICLES



EVs inherently more efficient at turning energy into miles driven; in fact 75% v/s 25% in ICE

EVs can be powered by Electricity produced from multiple sources

Greener than gasoline powered Cars.

Average driven range per day is 120 kms

Offer better driving experience



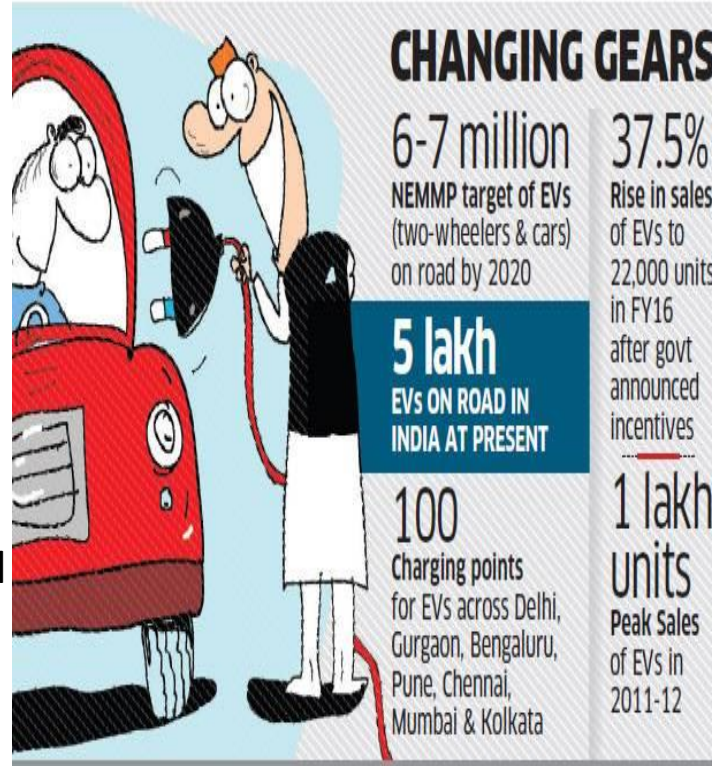
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# CHANGES ARE IMMINENT



- Courts ask Delhi Government to Create E-rickshaws Recharge Stations
- E-rickshaws stealing power worth Rs 216cr annually: Discoms
- Electric two-wheeler market picks up speed
- Mercedes-Benz to roll out Electric Cars and Plug-In Hybrid cars In India by 2018



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# CHANGES ARE IMMINENT

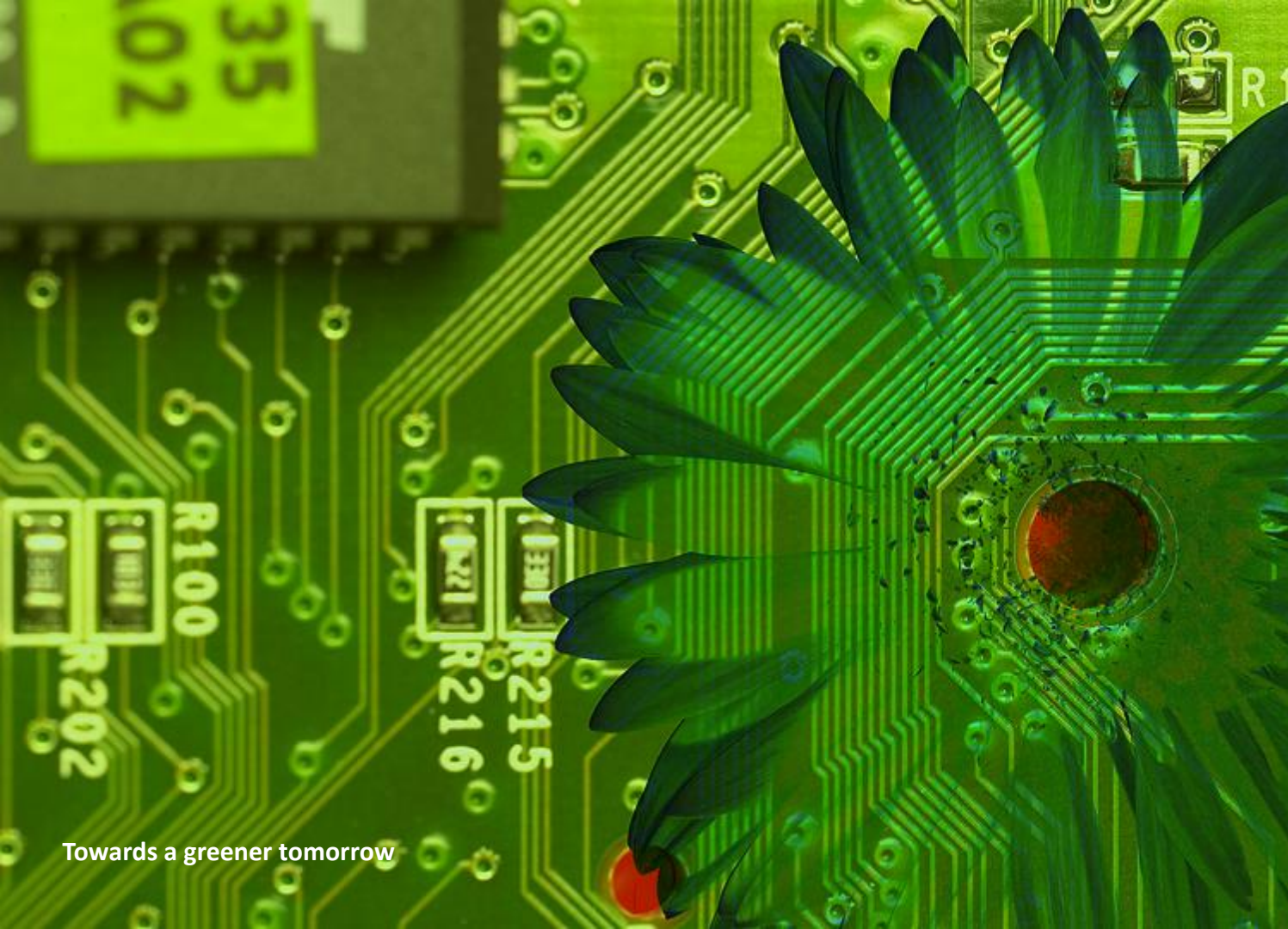


## THE ECONOMIC TIMES

ET Bureau New Delhi Nov 3, 2014 – Lithium-ion batteries to reduce cost and save energy for telecom tower companies. Telecom tower companies are **increasingly installing lithium-ion batteries for uninterrupted power supplies to their towers**, with Reliance Jio Infocomm a key adopter of this longer-lasting and cost-effective power storage technology that is also friendlier to the environment compared with other traditional options.

## Hindustan Times

Jan 13, 2012 – “TRAI mandates 50% of the towers in rural and 20% in urban areas to run on a mix of renewable energy and grid power by 2015. By 2020, the **telecom companies have to convert 75% of rural towers and 33% of urban towers to run on hybrid power.**”



# Green Technology & solutions

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# GREEN ALTERNATIVES

## FIT FOR POWERING EVs



	Solar	Li-Ion	Wind	Bio-Mass	Fuel Cell	Micro-hydro
RESOURCE POTENTIAL	High	High	Medium	Medium	Medium	Low / Slow / Poor
TECHNOLOGY AVAILABLE	High	High	Medium	Medium	Medium	Low / Slow / Poor
MARKET ACCEPTANCE & COMMERCIAL VIABILITY	Medium	High	Low / Slow / Poor	Low / Slow / Poor	Low / Slow / Poor	Low / Slow / Poor
SUPPLY CHAIN READINESS	High	High	Low / Slow / Poor	Low / Slow / Poor	Low / Slow / Poor	Low / Slow / Poor
ADOPTION POSSIBILITY	Medium	Medium	Low / Slow / Poor	Low / Slow / Poor	Medium	Low / Slow / Poor

High Medium Low / Slow / Poor



# SUN TO WHEEL

ALL ENERGY ON EARTH COMES FROM SUN



- 35Mn TerraWhr Solar energy strike earth yearly
- Energy bill **REDUCTION BY >50%**
- Long term **FIXED PRICE PPA** for EV charging stations
- Virtually **ELIMINATES DIESEL** usage
- Deflating prices will help increase the demand

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Case study

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# GREEN MOTORING HAS ARRIVED



	COST COMPONENTS	PETROL	DIESEL	EVs
1	Transportation spend	5000	5000	5000
2	Mileage km per ltr	20	20	121 km/24Kwh
3	Cost per ltr	80	60	5.75
4	Consumption in Ltr	63	83	870 KWh
5	Range/month	1260	1660	3509
6	Range/year	15120	19920	42108
7	Extra Coverage	-4800	-	22188
8	Savings in INR (diesel as base)	-19200	-	66564

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## 'Running buses on electricity will reduce fares by half'

Road transport and highways minister Nitin Gadkari has an ambitious plan to operate all state-run buses on electricity. He said the move will not only reduce pollution but also help cut fares by 50%. Excerpts of an interview with TOI:

**■ There are several issues linked to pollution caused by diesel vehicles. Is the government planning to discourage diesel use?**  
There are no two views that diesel vehicles cause more pollution. But when we talk our Bharat-VI, BS-VI emission norms in 2020, the fuel will be cleaner and it will make no difference whether a vehicle is using petrol or diesel.

**■ Do you have enough funds? We have no dearth of funds. Its 55,000 crore has been allocated to the budget. Over 10 completed highway projects can be sold to private parties for Rs 1.10 lakh crore. My revenue from toll collection is Rs 10,000 crore annually. I can securitise these and can raise Rs 1.50 lakh crore. Many foreign investors are interested in highway sector. But I have told them that I have enough money for the works that we have planned.**

**■ Is it due to corruption?**  
Not corruption, it's a habit. We love to delay things and need and avoid the. *File ke delay karne pe to pta karna se bh. jada hai karna jaye sitting over files more than living that side. A study will reveal what is wrong in system.*

**■ What is the plan for clean public transport?**  
We are going to produce lithium ion batteries commercially to run buses on electricity. While you pay Rs 60 a litre for petrol and Rs 50 for diesel, you need only Rs 8 per unit for electricity if you are willing to use electricity at night, some states are even willing to give you Rs 5 per unit.

**■ Selling completed projects and securitising future toll indicates we will have toll roads.**  
If you want good services, you have to pay. We have introduced Parking that will allow you to cross toll gates without stopping. Improvement of roads reduces travel time and saves fuel expenses as you travel at a higher speed. We don't have enough funds to build highways with government money. We don't have enough funds even to maintain existing roads. So, what do you do?

**■ What went wrong in the past 10 years in the highways sector?**  
Projects were awarded with availability of 30% land in many cases, and without shifting utilities. Forest and environment clearances were held up. You don't write about another subject, delaying the decision making. Those who get salary on first day of every month, they don't understand the pain that investors go through, who have taken loan from banks at high interest rates. I strongly feel that we will be able to meet the stiff.

**TOI INTERVIEW**

**■ Does this call for bureaucratic reform?**  
It does not matter how the horse is, but who rides it. We have problems everywhere. But there are people who convert problems into opportunities and there are others who convert opportunities into problems. We have taken 11 Cabinet decisions and introduced 20 reforms.

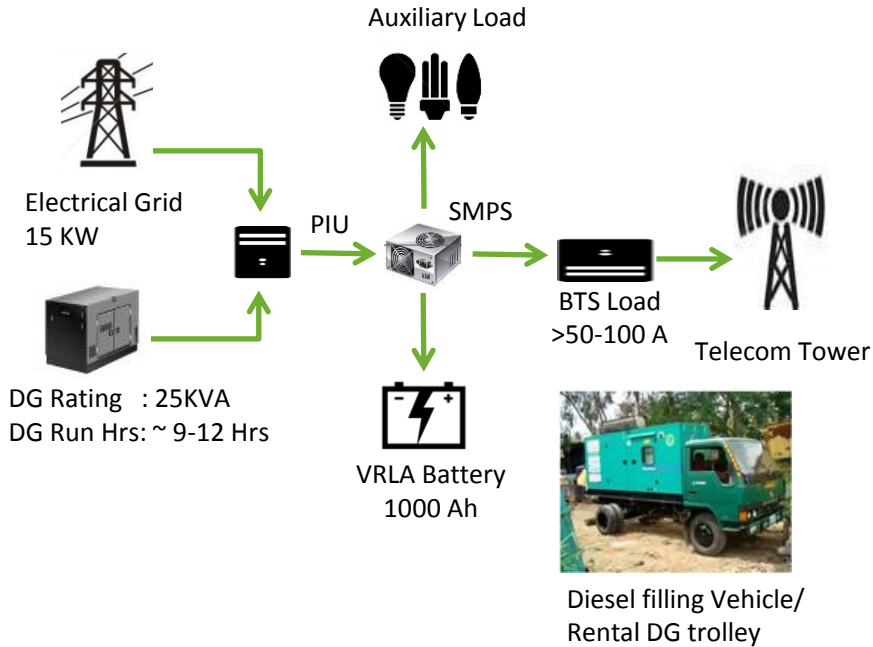
**■ So, will all these reforms and initiatives bring on the din good times?**  
Abhe din is an infinite concept. There is an end to expectations. Everyone wants more. Be it a politician, a common man or a journalist. But we will give a better life to people than what they had during Congress rule.

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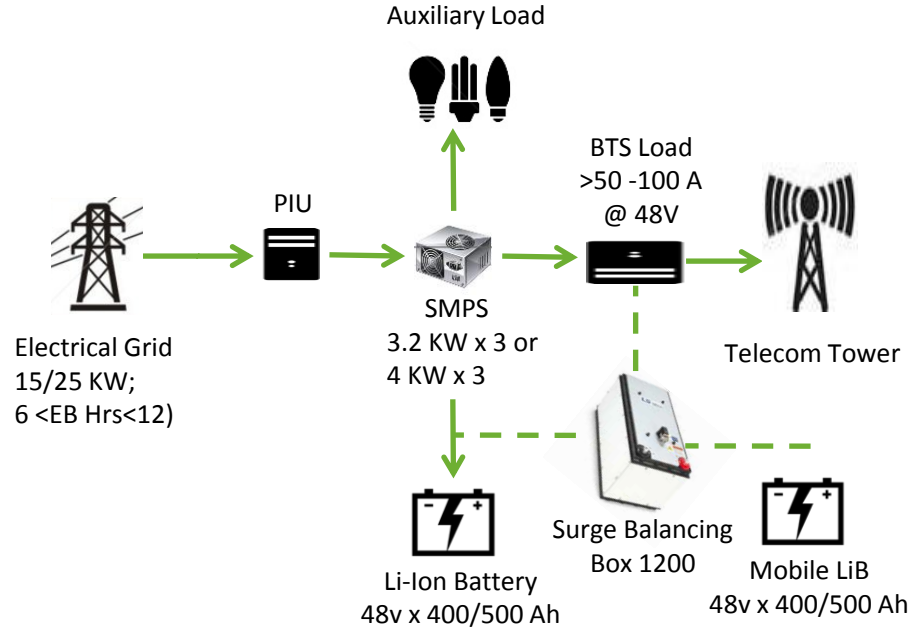
# POWER ON WHEELS



## CURRENT SCENARIO



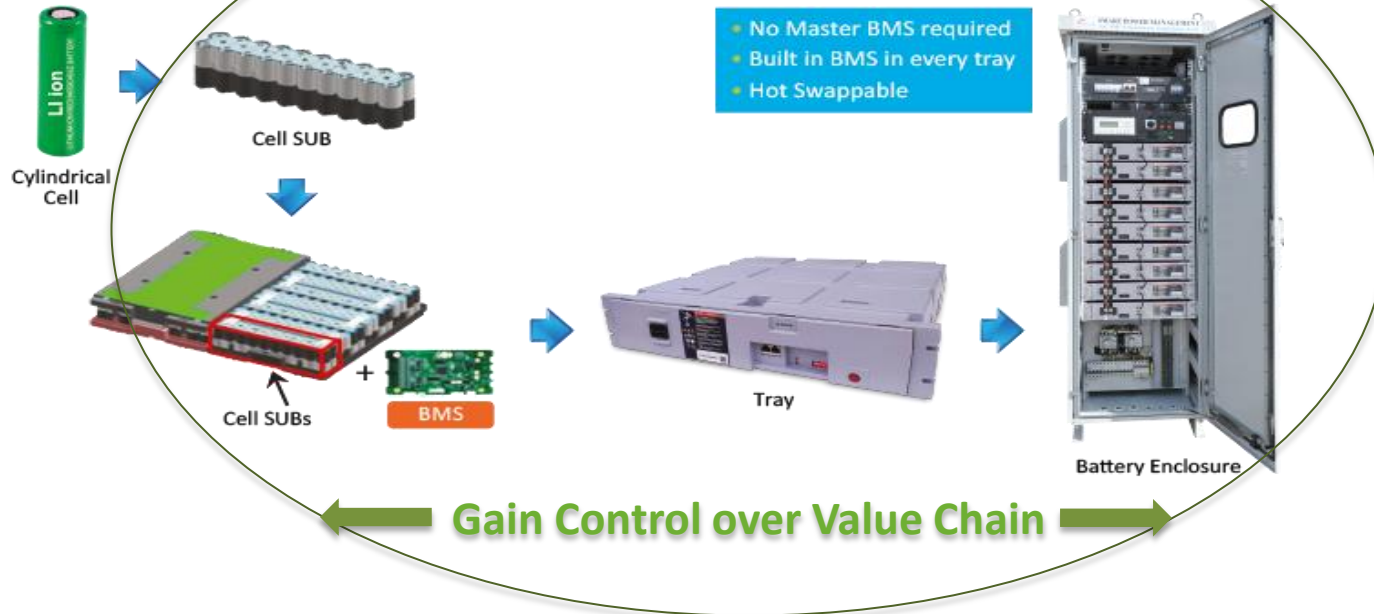
## OOM'S SOLUTION



# ESS VALUE CHAIN



From Li-ion Cylindrical Cell to Battery Enclosure

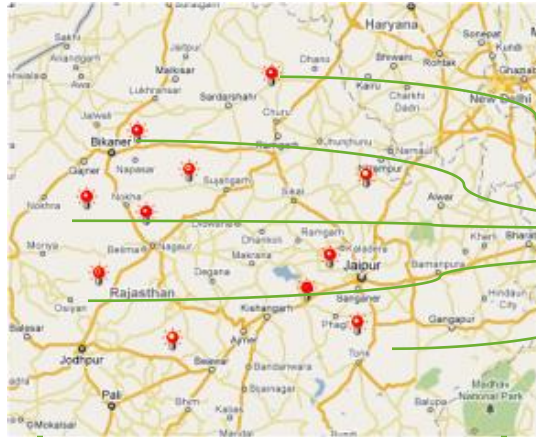


Value chain Optimization by Backward integration from Module to Sub-cell level

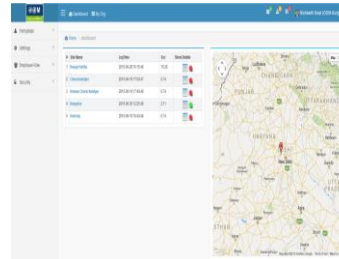
MAKE IN INDIA – OOM HAS EXPANSION PLANS TO SET UP MANUFACTURING IN 2017-18

# REMOTE MONITORING SYSTEM

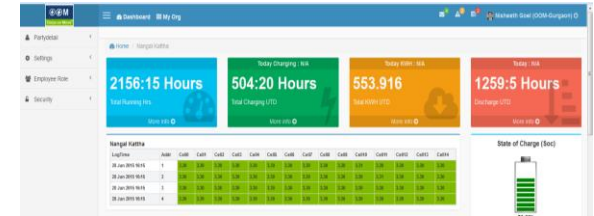
## FUNCTION



Central Server



System health and performance



LogTime	A/D	SOC	Current	Voltage	Cath1	Cath2	Cath3	Cath4	Cath5	Cath6	Cath7	Cath8	Cath9	Cath10	Cath11	Cath12	Cath13	Cath14	Temp1	Temp2	Temp3	Temp4	
28-Jan-2015 15:15	1	70.30	-4.40	45.51	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:16	1	70.00	-4.10	45.52	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:17	1	69.20	-3.77	45.53	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:18	1	67.80	-3.60	45.54	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:19	1	66.10	-3.30	45.55	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:20	1	65.04	-3.10	45.55	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:21	1	64.00	-2.90	45.55	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:22	1	63.00	-2.70	45.55	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:23	1	62.00	-2.50	45.55	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22
28-Jan-2015 15:24	1	61.20	-2.30	45.56	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	31.67	30.50	30.50	32.70	32.22

- Remote Monitoring
  - Monitor health & performance
  - Monitor generation & consumption
  - Control remotely
- Collect & aggregate data
  - Aggregate data by circle, operator, location
- Disseminate data
  - Access by circle, location, operator, specific site
  - Display and analyze daily, weekly, monthly data



FOR EACH SITE, SYSTEM HEALTH, PERFORMANCE, POWER GENERATION AND CONSUMPTION DATA IS COLLECTED AND SENT TO CENTRAL SERVER FOR AGGREGATION



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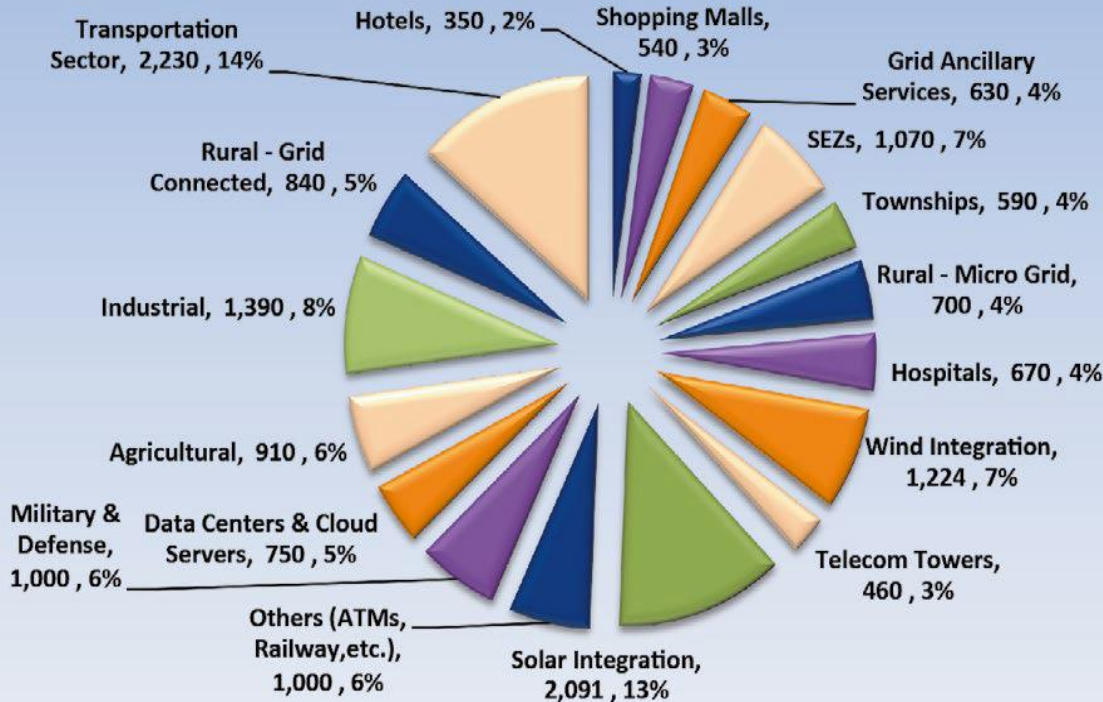
Market  
opportunity

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# MARKET DISTRIBUTION



ESS Estimated Market potential (16445 MW) through 2020



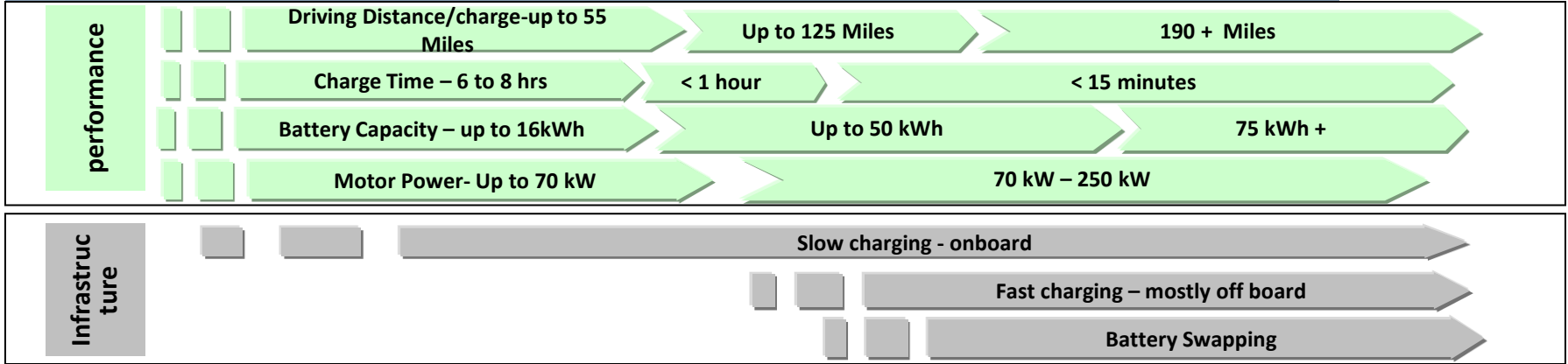
Energy Storage  
is all around us  
in our Modern  
lives



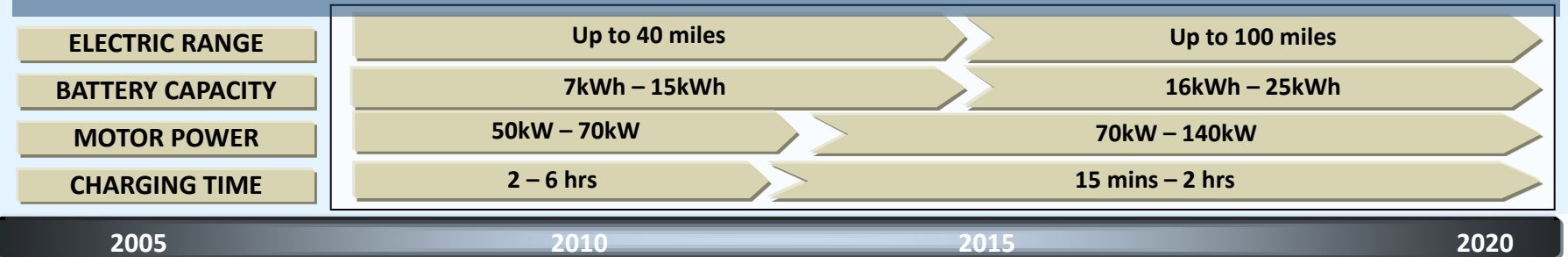
# EV & STORAGE TECHNOLOGY ROAD MAP



## Electric Vehicle Market: Technology and Product Roadmap for Electric Vehicles (Global), 2005-2015

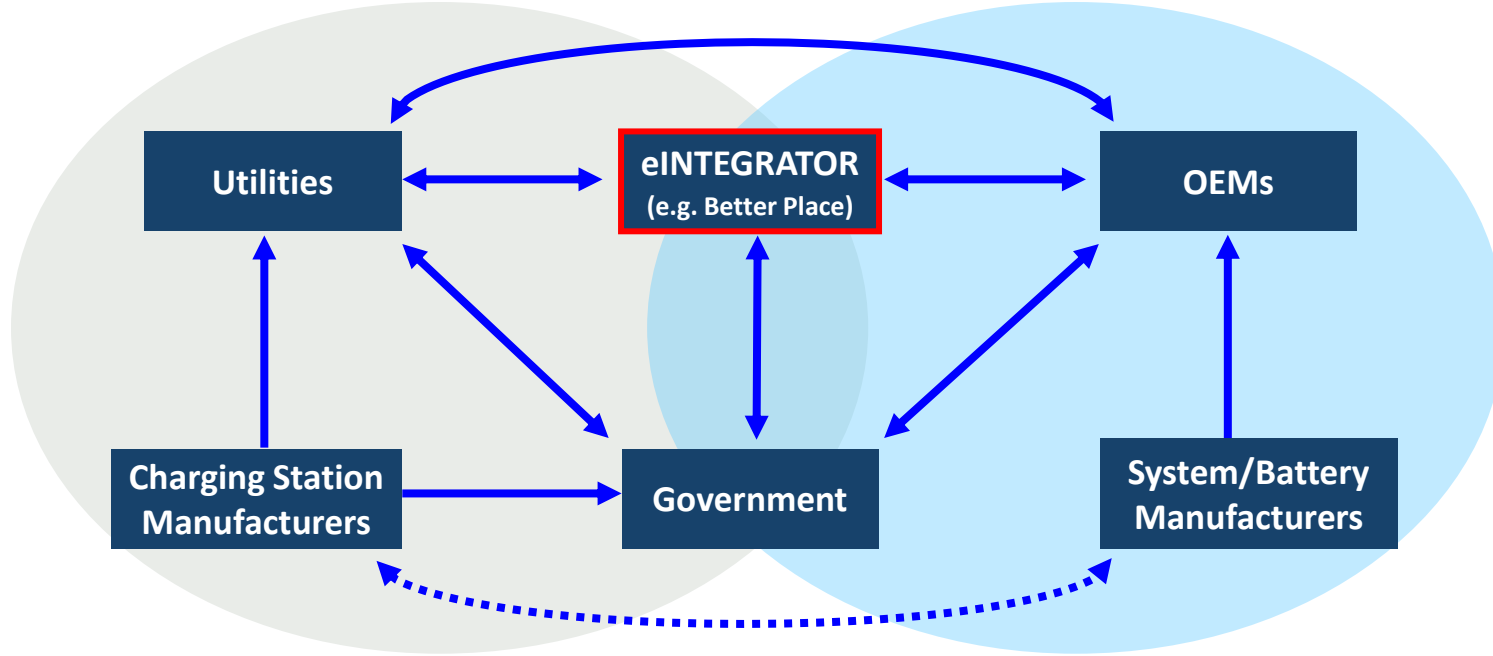


## Market for Extended-Range Electric Vehicles: Technology Roadmap for Plug in Hybrid Electric Vehicles



# EV INDUSTRY VALUE CHAIN

OPPORTUNITY TO ENTER NEW FIELDS



# PRODUCTS/SERVICES PORTFOLIO



Services  
Possible Revenue Streams

## Charging Stations



- Manufacturing & Sales
- Installation & Maintenance
- Charge Payment Program / Subscription based services
- Revenues from value added services
- Premium revenues via Renewable Energy Vs Non Renewable Energy
- Premium revenues via Peak Power Vs Off Peak Charging
- Level 1 Vs Level 2 Vs Level 3 Charging

## Batteries



- Battery Leasing Model
- Refurbishing
- Recycling
- Battery 2nd life
- Battery Swapping
- Extend to other E-mobility solutions
- Battery Integration

## E-Mobility Vehicles



- Energy Subscription Packages
- Extended E-mobility solution e.g. vehicle sharing
- Offering After-Sales services –
- Market green solutions such as Solar panels to E-Mobility client base
- Recycling and Refurbishing

## Electricity



- Subscription based Energy service Scheme
- Load Management
- investment in renewable energy such as wind farms and gain carbon credits
- Premium revenues via Peak Power Vs Off Peak Charging
- Premium revenues via Renewable Energy Vs Non Renewable Energy

## Telematics & other value added services



- Data Aggregator (working with other partners)
- Battery management services
- E-Mobility IT Platform
- V2V and V2G Communication
- Added value service (POIs, Diagnostics, etc)

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# About 'Oorja on Move'

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# SNAPSHOT



- 5 BUSINESS VERTICALS** focusing on Energy & Smart Grid Solutions, Battery Storage, EV Charging Infrastructure, Telecom Infrastructure, Infrastructure for Metals & Mining
- 8 OFFICES ACROSS INDIA** at Gurgaon (HQ), Delhi, Manipur, Lucknow, Ghaziabad Jaipur, Raipur, Pune
- 300+** **SOLAR INSTALLATIONS**  
Experience for Telecom BTS Sites have been completed
- 200+** **Green Energy Storage (GES) Solution**  
for Telecom BTS Sites are executed



“THANK YOU”

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