



TATA POWER-DDL

TATA POWER DELHI DISTRIBUTION LIMITED

A Tata Power and Delhi Government Joint Venture

***Breaking Boundaries for Energy and
Transportation Innovation:
Indian Perspectives***

NASEO 2018 Annual Meeting

25th September 2018, Westin Book Cadillac, Detroit

with you *Non-Stop*

About TATA Power - DDL



*“To be the most **trusted** and **admired** provider of **reliable, competitive and sustainable power** and **services**, using **technology and innovative solutions** and **be the utility of choice for all stakeholders**”*

License Area: North and North West Delhi (510 sq. km)

TATA POWER – DDL IS CERTIFIED WITH				
ISO 9001:2008	ISO 14001:2004	OHSAS 18001:2007	ISO 27001:2005	SA 8000 : 2008



51:49 Joint Venture
of The Tata Power Company Limited
(Tata Power)
and
the Government of Delhi
Formed on 1st July 2002
in



with you *Non-Stop*

About Clean Energy International Incubation Centre

Tata Trusts' Foundation for Innovation and Social Entrepreneurship (FISE) is setting up the Clean Energy International Incubation Centre (CEIC) with support from Tata Trusts, Government of India, Tata Power and Tata Power-DDL for promoting innovations in the energy space.

CEIC is designed to offer complete “lab to market” incubation support to clean tech enterprises which can bring about profound social and environmental impact. The incubation centre will also support the incubatees by providing last-mile connectivity and end-use deployment of successful research outputs.



Foundation for Innovation and Social Entrepreneurship is also a Technology Business Incubator, approved and supported by the Department of Science and Technology, Government of India. This is achieved through a unique three-tier ecosystem architecture stack called Social Alpha.



Tata Power Delhi Distribution (TPDDL), previously North Delhi Power Limited, is Limited a joint venture between the Government of the National Capital Territory of Delhi and Tata Power Co. Ltd., which holds a 51% majority stake in the venture. The experts, research teams and labs of these institutions and companies will form a part of the CEIC ecosystems as well.



Tata Power, formerly known as Tata Electric, pioneered the generation of electricity in India more than 100 years ago. Today, the Company together with its subsidiaries and jointly controlled entities has an installed gross generation capacity of 10857 MW and a presence in all the segments of the power sector viz. Fuel Security and Logistics, Generation (thermal, hydro, solar and wind), Transmission, Distribution and Trading.

It is also lending its support to CEIC in various capacity viz expertise sharing, providing repositories and lab facilities, and pilot support.

Consumers are Transforming...

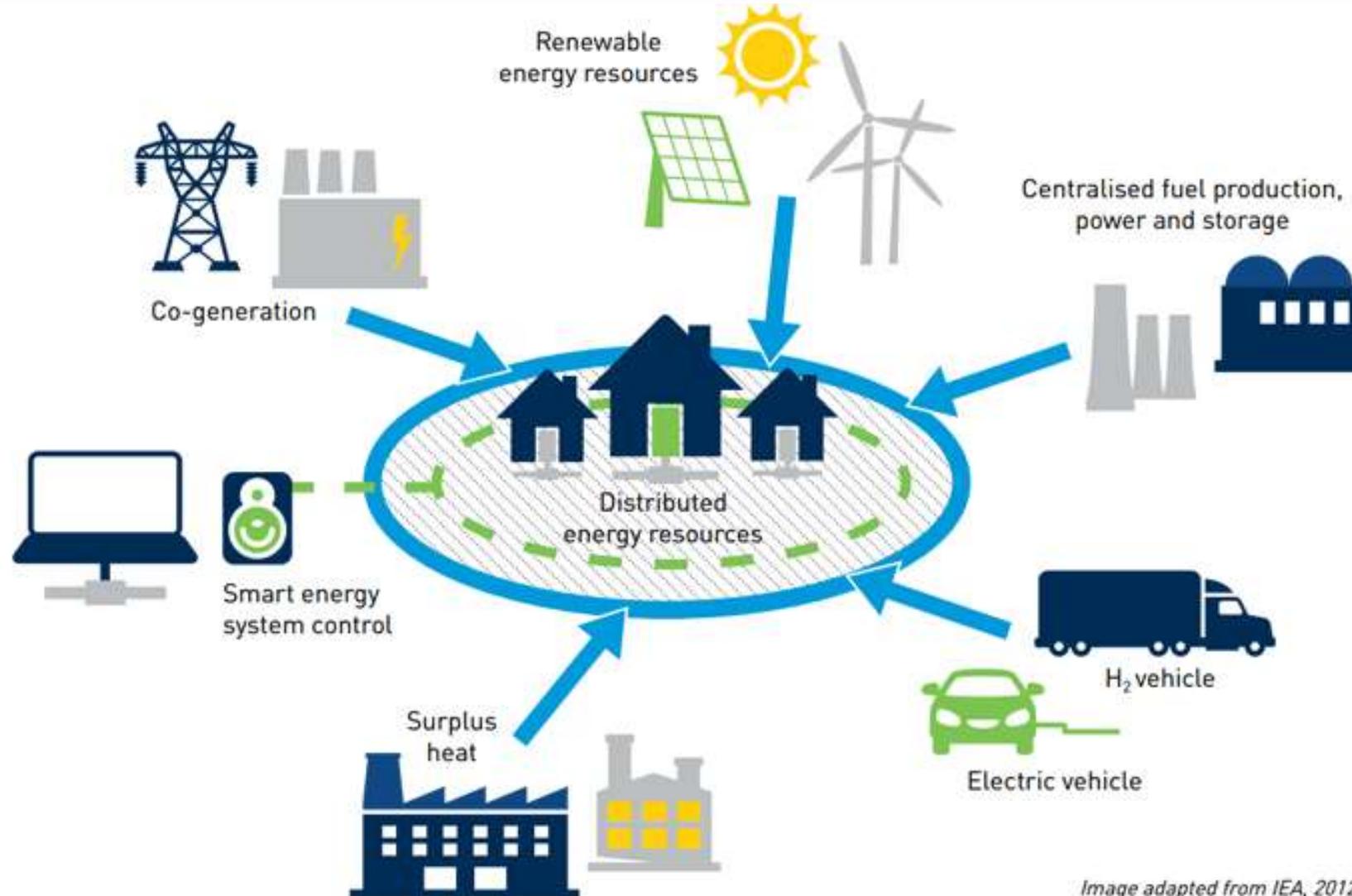
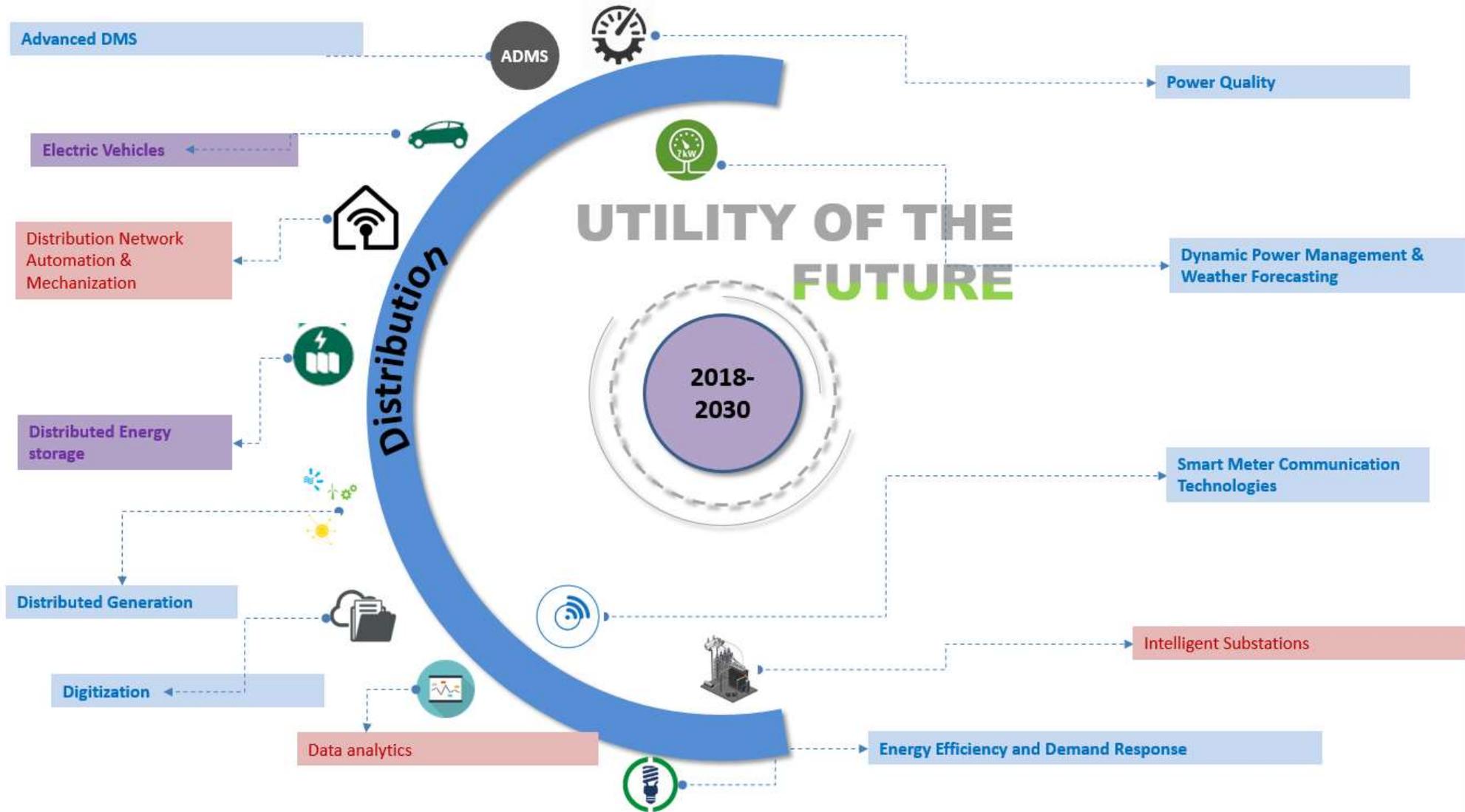


Image adapted from IEA, 2012

...And so is the Utility



Challenges of Indian Power Sector

Short duration of peak load experienced by the electric utility and the vast difference of load in summers and winters

Increasing penetration of electric vehicles and renewables, making power distribution extremely dynamic in nature

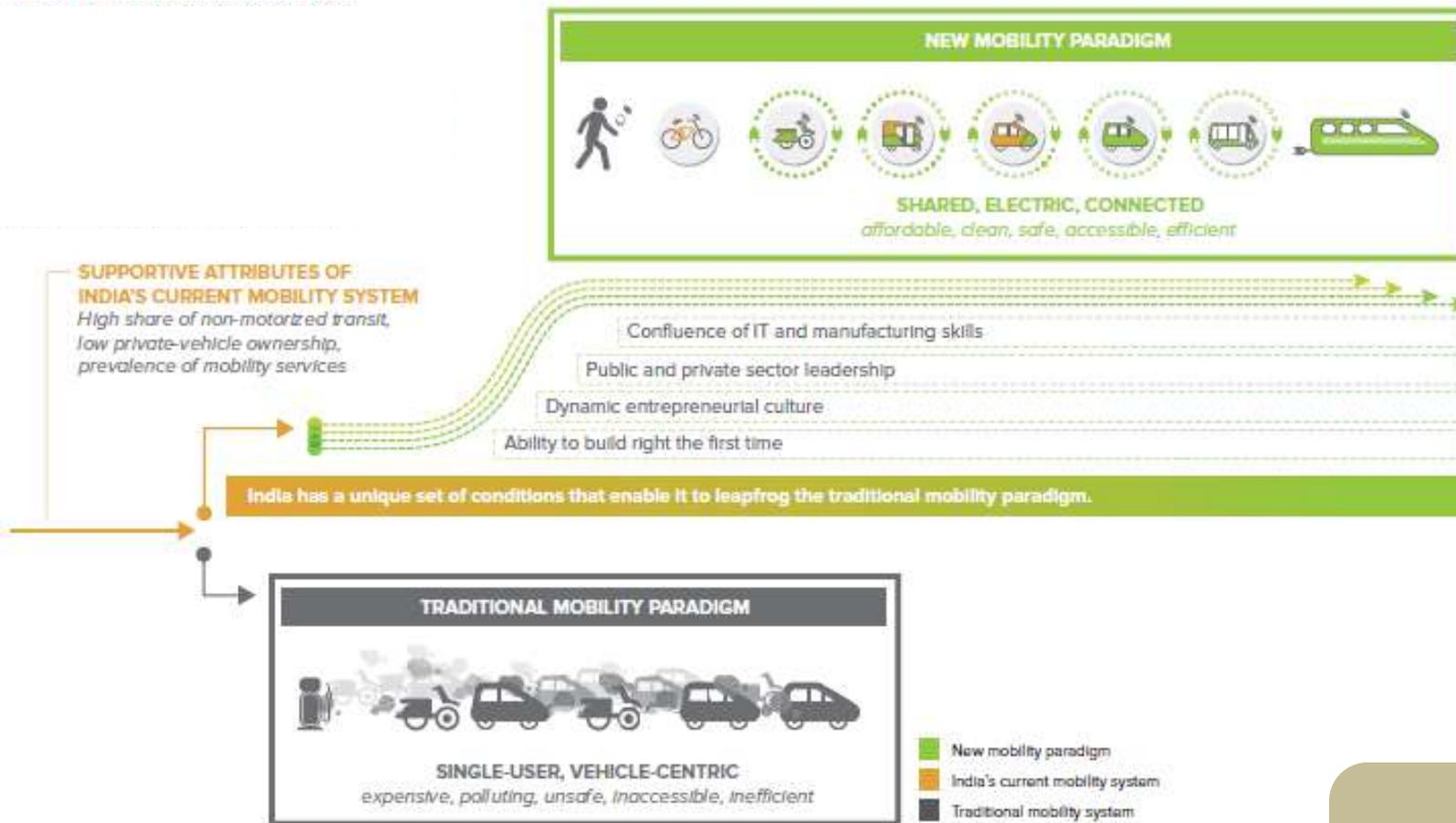
Increasing congestion in cities due to both horizontal and vertical growth, leading to difficulty in laying of network.

High Technical and Commercial losses, cross subsidies and regulatory overhang

Space constraint for the development of new assets such as substation and grids.

Power Quality issues with the increase of power electronics and electronics in the system

India is Gearing Up for E – Mobility



Source: Rocky Mountain Institute

Charting a New Journey

Drive started with the **NITI Aayog policy on EVs**, defining a 15-year roadmap to attain complete electrification

Ola, Uber, and Zoom began tapping into the **EV portfolio** of Mahindra

BS Protocol for Charging was formed to build the framework for future **charging stations**

New Delhi ordered **10,000** vehicles worth **₹2,000 cr**

M&M-Ford, Renault-Nissan, Honda Motor, Mercedes Benz, BMW, Volvo and JLR have EVs planned for **India**

Penetration of EVs globally is less than **1%**

India has issues related to charging infrastructure, range anxiety and actual vehicle cost

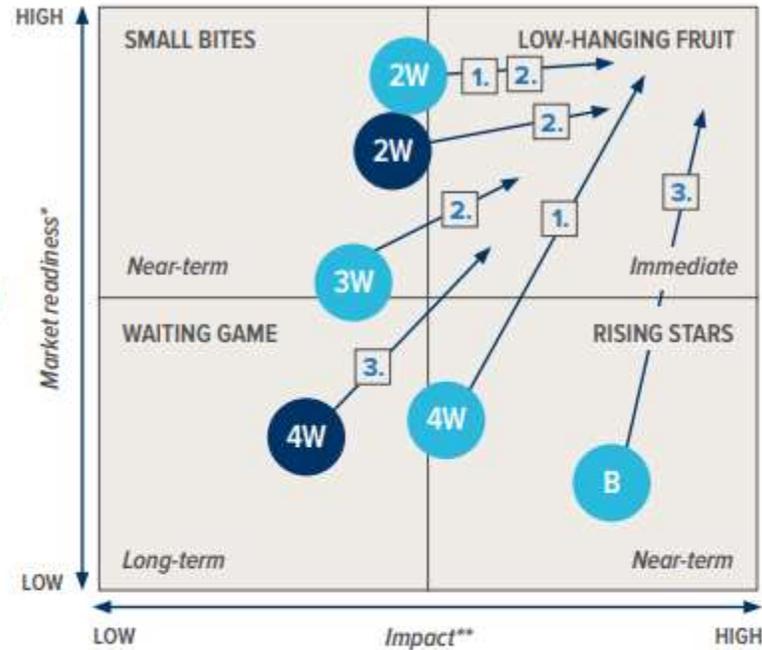
Slam has proposed incentives, including tax reduction on electric vehicles to **5% from 12%**

Source: Times of India

A similar leapfrog is expected from India as it had done in the mobile market

Target Matrix

ELECTRIC VEHICLE MARKET SEGMENT	PRIVATE VS. FLEET ¹
2-wheelers	Private
	Fleet ²
3-wheelers	Fleet
4-wheelers	Private
	Fleet
Buses	Fleet



■ PRIVATE
■ FLEET

REPRESENTATIVE DIAGRAM PLOTTING EV MARKET SEGMENTS BASED ON THEIR CURRENT MARKET READINESS (Y-AXIS) AND IMPACT ON CO₂ EMISSIONS AND PARTICULATE MATTER REDUCTION (X-AXIS)

Several strategies can improve each segment's market readiness and impact:

1. Service strategy: High-mileage electric service vehicles' lower operating costs can offset capital cost premiums
2. Technology strategy: Smart, standardized and swappable batteries could reduce capital cost for electric 2- and 3-wheelers
3. Manufacturing strategy: Private 4-wheelers and commercial buses can become economic as battery prices decline further

2017

PHASE 1

2019

Harvest low-hanging fruit + Enhance small bites + Support rising stars

Source: Rocky Mountain Institute

Storage is Increasing Flexibility

Community energy storage entails utility deployment of modular, distributed energy storage systems (DESS) at or near points in the utility distribution system that are close to residential and business end users.

02 Generation

Serve as a robust, fast-responding and flexible alternative to generation

04 Investment Deferral

Reduce the need for transmission and distribution (T&D) capacity as less equipment is needed to serve the local "peak demand".

06 Islanding

CES functions autonomously to provide "back-up" power in case of emergencies

01 Price Deferral

Store low priced energy and use that energy when the price is high

03 Unit Diversity

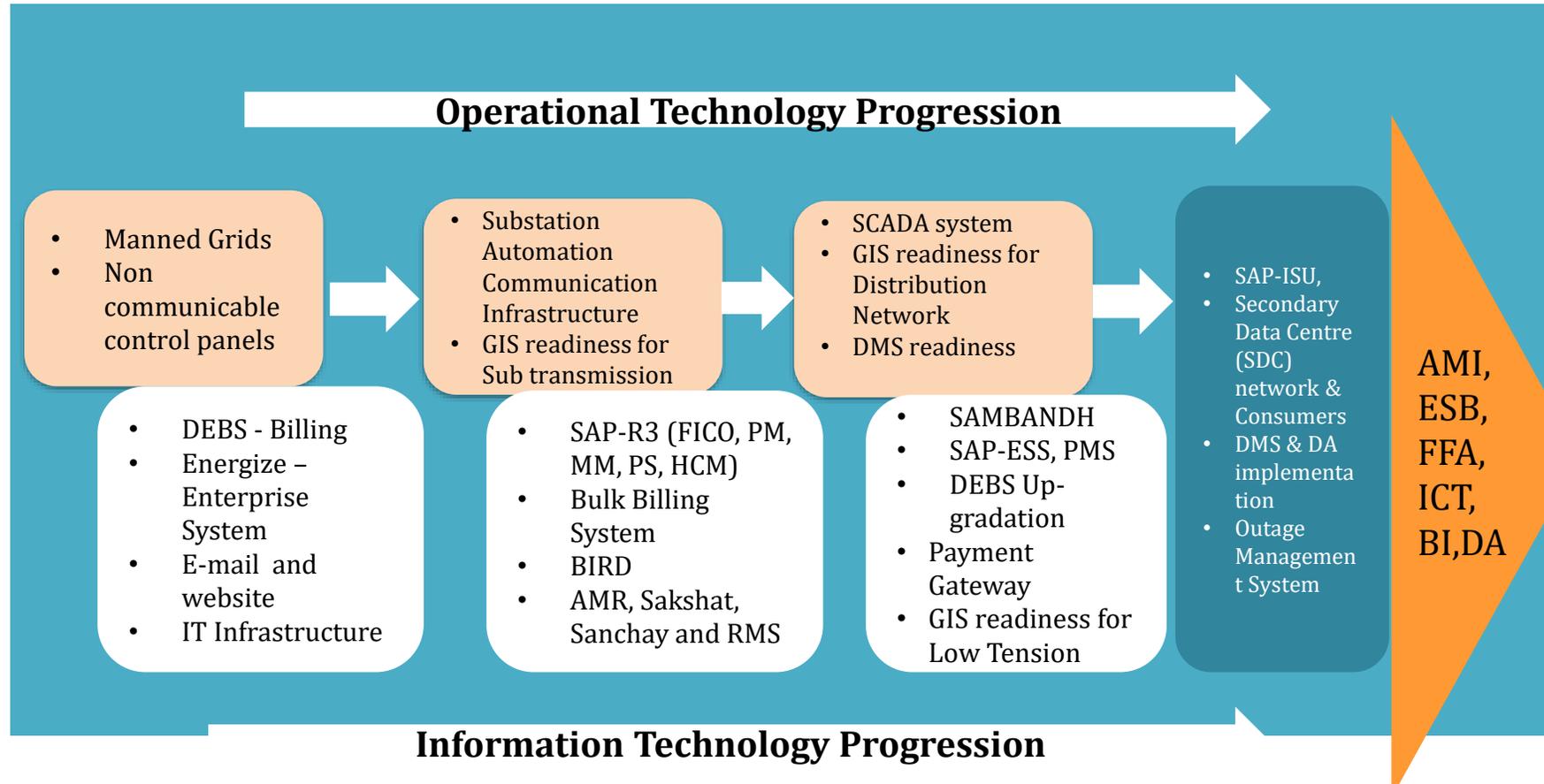
Unlikely that a substantial amount of CES power will be out-of-service at any time, thus improving reliability

05 Localised Integration

Integration to technologies such as rooftop solar, electric vehicles etc. at a grassroots level

IT – OT Integration is Critical

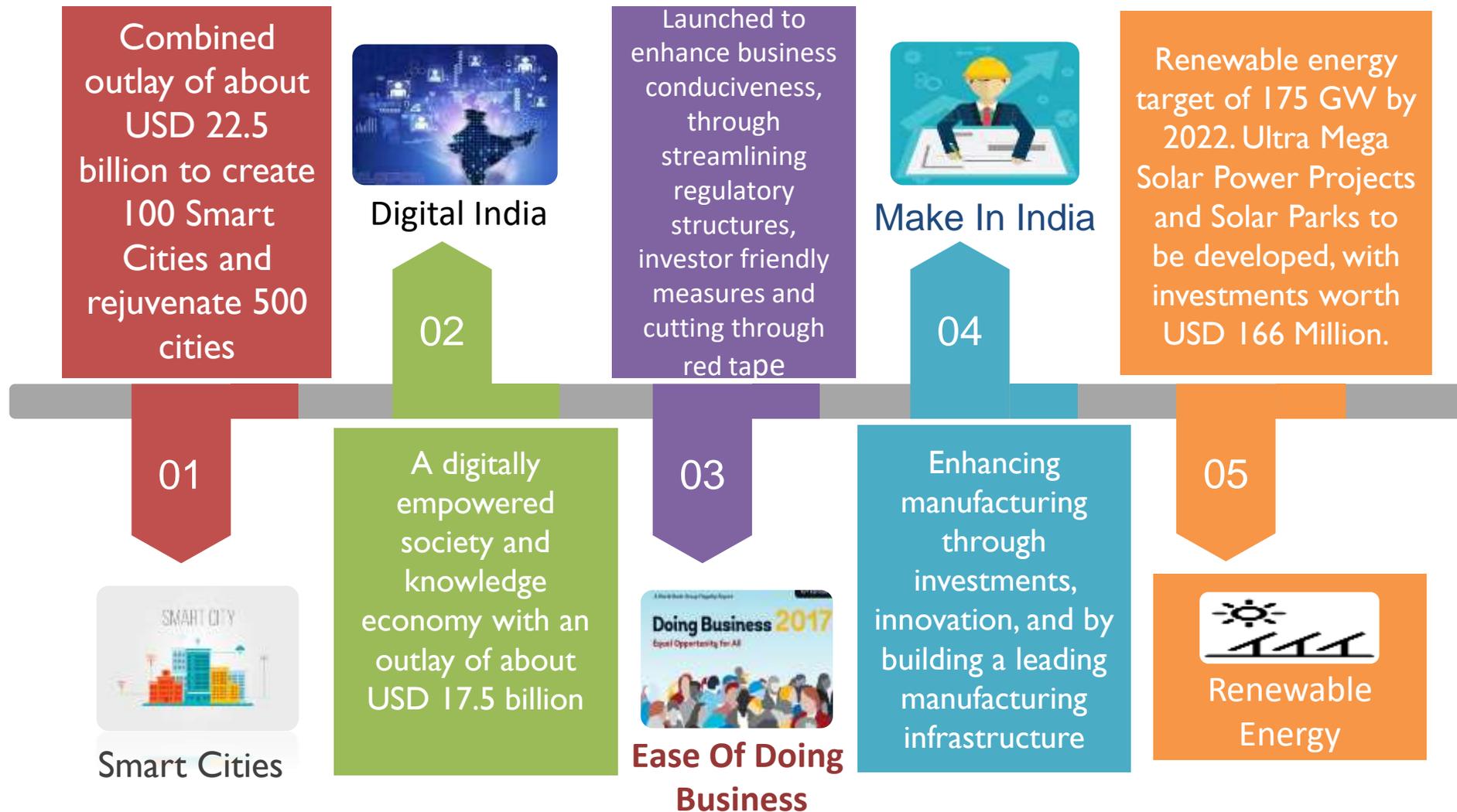
IT-OT Convergence



A Seamless Integration between the different technologies would be crucial for *The Deployment of the Storage in the System* and *The Creation of Smart Cities*.

GIS – Geographic Information System; SCADA – Supervisory Control and Data Acquisition; DMS – Distribution Management System; DA – Distribution Automation; AMI – Advanced Metering Infrastructure ; ESB – Enterprise Service Bus; FFA – Field Force Automation; ICT – Integrated Communication Technology; BI – Business Intelligence; DA – Distribution Automation

Opportunities Abound in India



R&D support

- State-of-the-art facilities including world-class lab infrastructure and maker spaces
- Access to test beds on the ground for pilots and field testing



GTM strategies

- Hands on operational support for commercial grade product development and go to market strategies
- Access to in-house experts in investment banking, marketing, product development, venture creation, HR
- Access to the development sector partners using and the Tata Trusts ecosystem



Funding Support

- Seed support to selected enterprises
- Start-up will get the opportunity to pitch for capital to scale-up as well, post incubation



Market Access

- Support in market assessment and product commercialisation



Design for Manufacturing

- Assistance with designing, rapid prototyping and design for manufacturing
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Office space and shared services

- State-of-the-art co-working space
- Conferences, seminars, training, boot camps and thought leadership publications
- Access to amenities and facilities at workspace
- Shared services support – accounting, taxation, secretarial, legal, IP, HR and payroll
- Facilitated interaction with stakeholders including government agencies, if and as required



Mentorship Network

- Mentorship by a curated and customized set of most qualified experts, specialists, and sector leaders



International Collaboration

- Incubation support to innovations from other Mission Innovation countries, esp the Sister Nations to India
- Encourage and support Indian innovators to collaborate internationally



Partnerships

- Networking & partnership opportunities with wide range of stakeholders



Entrepreneur-In-Residence (EIR) Fellowship programme

- Especially designed fellowship programme for enterprising individuals

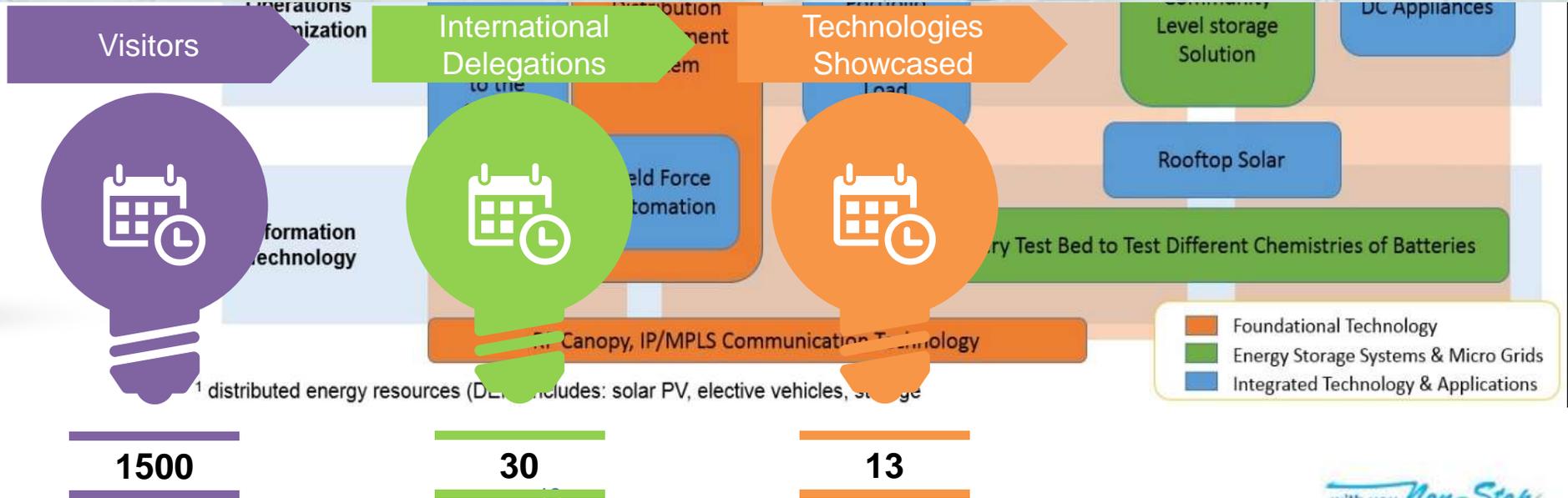
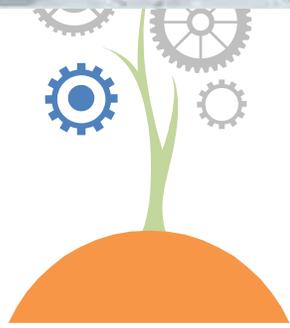


Launchpad

- Programme designed to provide pre-incubation support to early-stage enterprises that are not ready for incubation support



TATA Power DDL's Smart Grid Lab



Thank You



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