CONFIDENTIAL

Digitalization in DISCOMs

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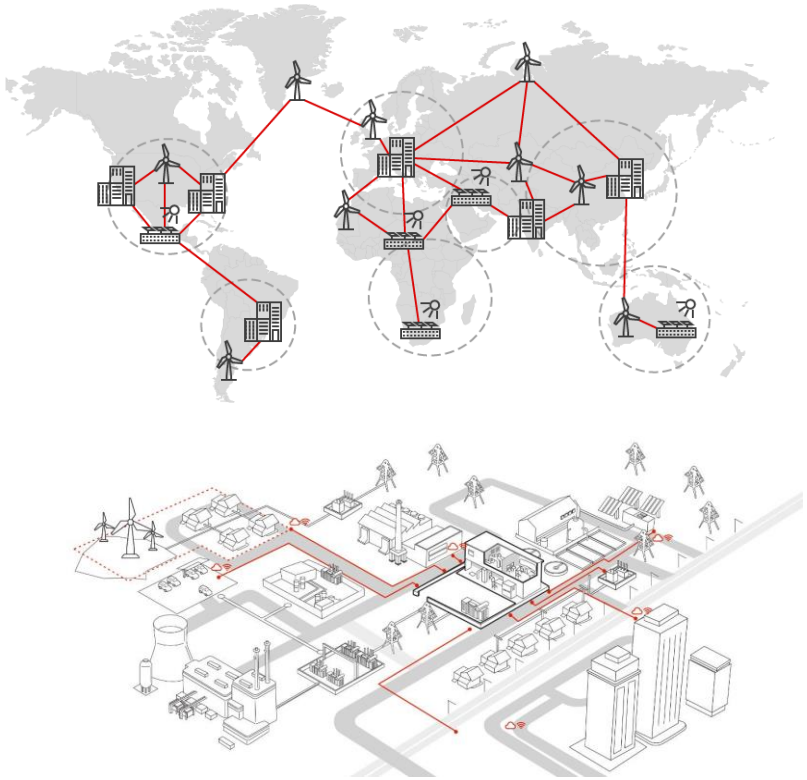
Energy & technology innovation driving future DISCOMs

A fundamental re-design of the entire energy system



From	To
Central, predictable generation	Volatile & more distributed generation
Predictable consumptions	Flexible prosumers
Inertia, reserves & predictable short conditions	Virtual inertia, storage & power circuit electronic components
Electricity grid	“System of Electricity Systems”
Power System	Sector coupled energy system
Fault prevention and avoidance	Pro-active and predictive fault management

Innovation is the opportunity for mastering the energy transition

Pre-requisites for future DISCOMs

Stronger

- **Transport more** renewable electricity, further, with **less losses and CAPEX**
- **Optimal power quality** for lower OPEX and fewer outages
- **Highest resiliency** against physical and cyber threats with no performance degradation

Smarter

- **Safer and faster installation**, readily reconfigured and upgraded
- **Assets that predict when they will fail,** for fewer outages, and an optimized workforce
- **Improved T&D network coordination,** for lower total costs

Greener

- **Lowering the T&D losses** (energy efficiency) and carbon footprint (GHG*)
- Support the integration of the **highest percentage of renewables** into the grid
- **Greener insulation gases and fluids,** that can do no harm

*Greenhouse Gas

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Digitalizing DISCOM assets – available opportunities

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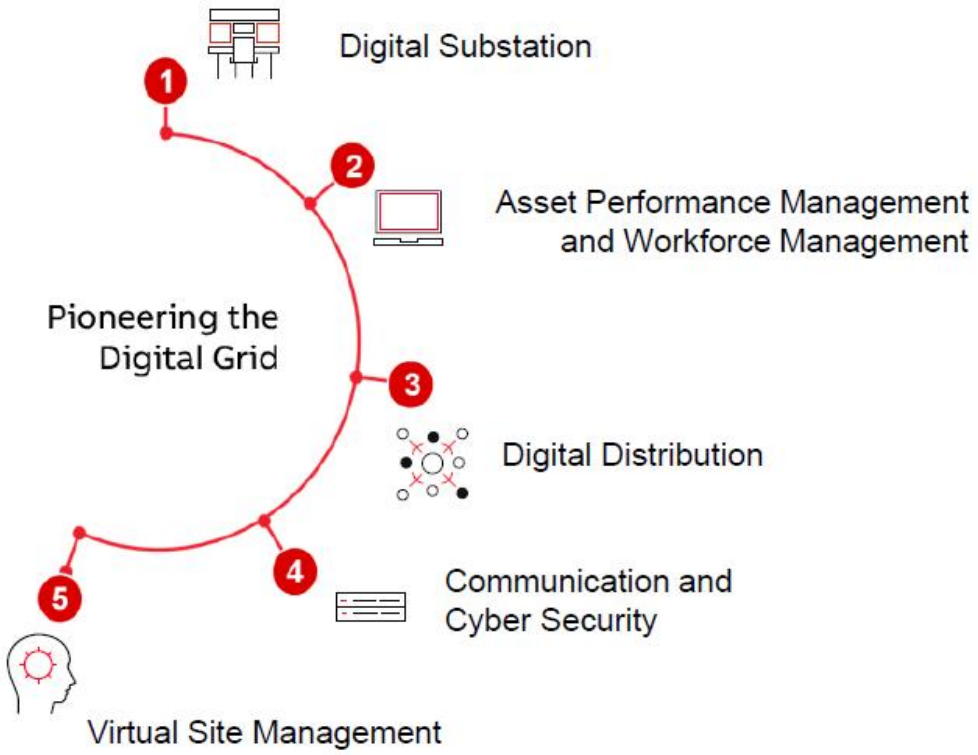
- Substation Automation, Digital Substation
- Distribution Automation
- Mission-critical Communications
- Service & Digital Solutions
- Grid Edge Solutions
- Network Control
- Energy Portfolio Management



Create new values with AI based cutting-edge data analytics and optimizing technology

Right decisions for distribution assets made faster

Delivering detailed asset performance data for real-time insights

Up-to-the-minute data provides...

- Load data
- Grid data
- Market data
- Weather data

IoT

Real-time data
Hourly, daily, and weekly load profiles

Historical data

Asset Performance Management

Alert! Possible failure in four weeks due to part deterioration.

Recommendation:
Reduce load until issue is addressed

IoT > EAM
Work order generated; replacement part ordered

IoT > WFM
Work crew and equipment scheduled

IoT > EMS
Network reconfigured to redistribute load

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Demand management for new load e.g. EVs

The future of electrified transportation today

On-board wireless maintains connectivity with Digital Enterprise at all times

IoT data services

Digital Enterprise and SCADA

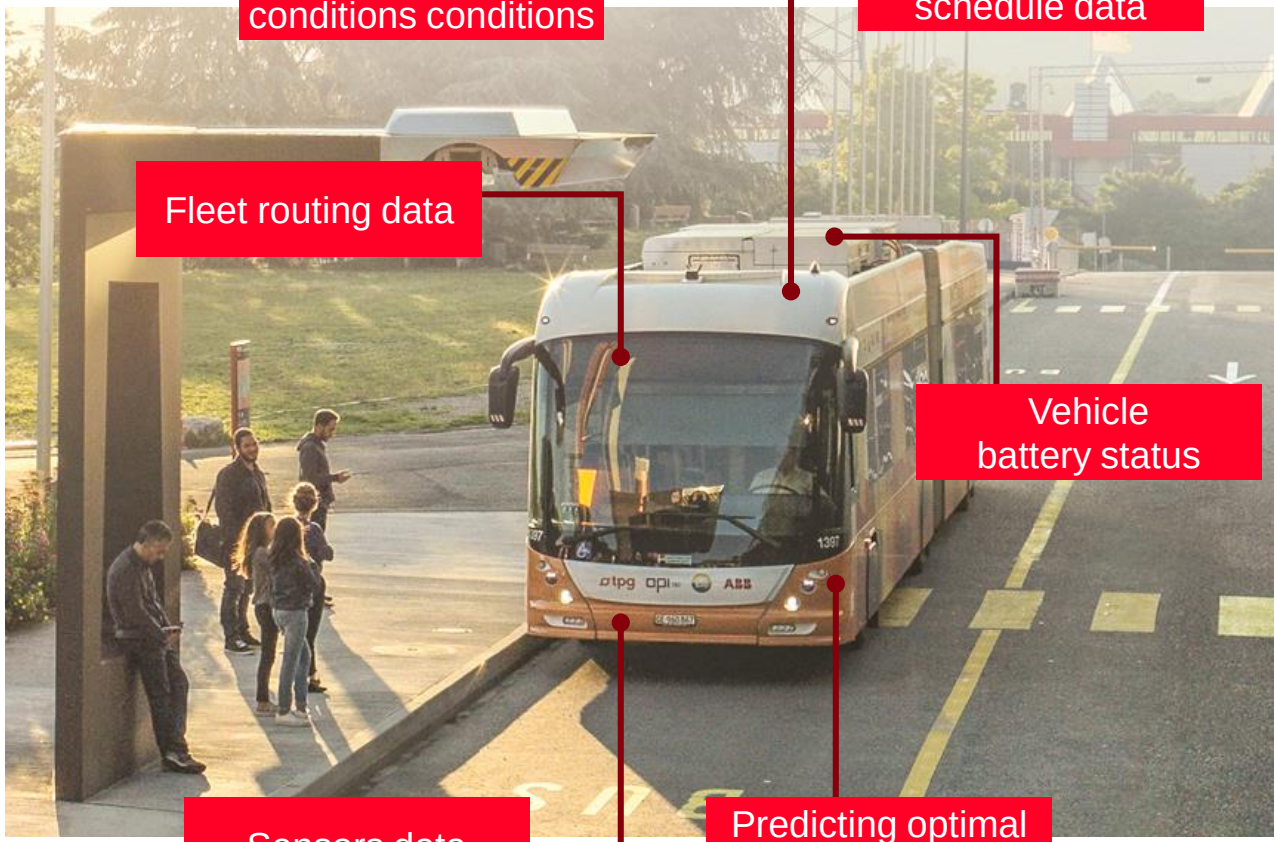
Supervision and orchestration

Electrified depot

- Grid connection
- Fleet-scale charging stations
- Battery storage

Depot functions

- Concurrent charging
- Charge needed based on dispatched route
- Condition monitoring
- Load monitoring
- Maintenance



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Powering good for sustainable energy

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Technology and business model innovation leveraging collaboration on Digital & Energy Platforms

Energy/Utilities | **Industry** | **Mobility** | **Smart Life (Cities)** | **IT**

Data ↓ Solutions ↑

Energy Storage | ... | Data Center Optimization | ...

Co-creating innovative solutions with stakeholders across the value chain (plan-build-operate) leveraging energy platforms and a focus on intelligent grids

Digital platforms + **Energy platform**

Operational Technology (OT) X IT | People X Technology X Services

Power generation

- Wind
- Solar

Transmission & distribution

- Mobility solutions
- Industry solutions

Solutions for buildings & cities

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