Efficient Buildings for a Cooler Planet
Technologies of the Future – GRIHA Summit 2017

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How is the world of energy changing?
The Old World of Energy: Singular flow of Electricity from source to load

The New World of Energy: Electricity is **Distributed & Connected**
Our World will be...

**MORE ELECTRIC**
- Demand for electricity driven by sustainability, intelligent devices, and evolution of key energy consumers (e.g., mobility)

**MORE DISTRIBUTED**
- Provide local energy to facilities, around positive energy and micro grids, to empower users
- Falling prices of renewable energy and storage

**MORE CONNECTED**
- Internet of Things will connect at least 50bn devices by 2020

**MORE EFFICIENT**
- 2/3 of energy efficiency potential remains untapped¹
- Buildings, industry & infrastructure end-users and datacenters all look to improve performance, efficiency and environmental footprint

¹ World Energy Outlook 2012, OECD / IEA, internal analysis

Efficiency gains will come from IT/OT convergence
Technology changes fueling innovation

Current Energy and Climate Scenario
We believe access to energy is a basic human right... and the present way of managing energy is unsustainable.

1.3 billion people currently do not have access to electricity.

Another 1 billion people have unreliable and intermittent supply of electricity.

Source: IEA, Economist.
The world in the next 40 years

- Energy consumption will double (\( \times 1.5 \))
- \( \frac{\text{CO}_2 \text{ emissions}}{2} \) need to be halved
- We have to become 4 times more efficient (\( \times 4 \))

Note: Forecast for 2050 compared to 2009 levels

Indian Scenario

- A quarter of our population has no access to electricity and another third has only 4-6 hours of daily access to electricity.
- To maintain economic growth and development, our power generation capacity needs to triple by 2030:
  - An addition of a 600-700 MW power plant every week for the next ~15 years.
- We have committed to reducing our emissions intensity by a third
Turning to the cheapest, cleanest and most abundant source of energy

Energy Efficiency as a Resource

- Energy that is NOT used, therefore NOT needed to be generated
  - NEGA-watts
- When done right, energy efficiency comes with a compelling business case
  - A free lunch you get paid to eat!
The energy efficiency opportunity

<table>
<thead>
<tr>
<th>Sector</th>
<th>Best in Class Energy Costs</th>
<th>Business as Usual Energy Costs</th>
<th>Energy Efficiency Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offices</td>
<td>Rs 3.25/sq ft/month</td>
<td>Rs 14/sq ft/month</td>
<td>75%</td>
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<tr>
<td></td>
<td>Rs 325/emp/month</td>
<td>Rs 1400/emp/month</td>
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</tr>
<tr>
<td>Hotels</td>
<td>Rs 11/sq ft/month</td>
<td>Rs 23/sq ft/month</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Rs 9000/room/month</td>
<td>Rs 16000/room/month</td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td>Rs 8/sq ft/month</td>
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<td>Rs 6900/T</td>
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- Cost-effective when done right, with a compelling business case
- Compounding losses in electricity supply become compounding gains with end-use energy efficiency:
  - Takes 4 units of primary energy input at power plant to provide 1 unit of electricity
  - 1 unit of electricity saved at end use reduces need for 4 units of primary energy input
- Two-thirds of our building stock and electricity generation infrastructure needed in 2030 is yet to be built

Making energy use visible, meaningful and actionable

Energy is invisible. Energy efficiency is the absence of that which is invisible.

5% savings just through increased visibility
Making energy use visible, meaningful and actionable

Example – Hourly Lighting Profile

Observations:
• Lighting controls (daylight and occupancy sensors) working very well during the day time.
• Lighting energy use peaks at around 7-8 pm and does not shut down to lower (base load) levels until well after midnight.
• Base load lighting level appears to be ~3 kWh per hour; significant variation observed above this during non-working hours.
• Possible opportunity for reducing lighting energy use after 8 pm. (~60 kWh X 22 = ~1320 kWh/month)

Super-efficient IT/ITES Building

• Hyderabad; 1350 employees, 22,500 sq ft
• Energy Performance Index of 90-95 kWh/m².year
• Helped identify ~5% savings
  • Using energy use visibility to build enhanced analytical capability
  • No audit or on-site assessment involved
  • Low-cost tune-ups, no investment required
• Validated by facility management team
Our own energy management story
Schneider Electric Energy Action

• In-house energy management program

• Targeted 17 of our most energy intensive facilities

• Avoided energy costs of over **INR 7.5 crores** in 5 years (2012-16) over 2011 baseline

• Results vetted by a global team every month; audited by external auditors every year

• 13 ISO 50001 certified sites, 3 IGBC (2 Gold, 1 Platinum) rated sites, 1 LEED Platinum rated site

Why do buildings matter?
Our cities will get bigger and there will be more of them. They will have to be smarter and more efficient.

Buildings are the bedrock of cities...

Buildings consume 53% of world electricity.
Electricity consumption in buildings will grow by 80% by 2040.

Source: IEA, 4Degree Scenario

Buildings are the bedrock of cities... and totally rely on electricity and energy

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CSR achievements in India
Up to 2015

16,200 remote households electrified with off grid solar in 325 remote villages

Livelihood training to over 52,700 unemployed youth

Outreach to 350 schools on energy efficiency

686 Green Teachers and 26,000 students registered as Green Ambassadors

120 Scholarships to Engineering and Diploma students from financially disadvantaged background
Schneider Electric India footprint

- **Employee strength**: 20,000+ People
- **R&D focus**: 1,500+ R&D Staff (based in India)
- **Industrial footprint**: 28 Factories
- **Channel strength**: 60,000+ Points of Sales
- **Partners**: 2,200+ Partners