The future of Energy Intelligence for Smarter Asset Management
Our Business

Empowering Businesses with Energy Intelligence that helps optimize energy costs and proactively identify losses to move from preventive to predictive maintenance through our Energy Analytics Platform.
Our Company through the time

2010

Incubation at CIIE in IIM – Ahmedabad,
Seed funding from CIIE, IIM - Ahmedabad

2011

Regions covered: 04
Client: 90

2012

Regions covered: 09
Clients: 128
Award

Global Entrepreneurship Award, Barcelona (2012)
Our Company through the time

2013
- Regions covered: 13
- Clients: 237

- Climate Solver (2013)
- India Power Award (2013)

2014
- Regions covered: 15
- Clients: 425

- UNFCCC Lighthouse Activity (2014)

2015
- Regions Covered: 17
- Clients: 627

- Confederation of Indian Industry

2016-19
- Regions covered: 20
- Clients: 748

- Presence in Saudi and Malaysia
- International Ashden Award 2017
- Energy Management
Ecolibrium Energy Today

600+ **Customers**
across India

4000+ **Equipments**
on the platform

100+ Million **Data Points**
captured daily

1,300 MW **Under Monitoring on SmartSense**

1.6 GB **Data Collected Daily**

Incubated by

Supported by

[Logos of partners]
A Snapshot of our notable clients across sectors

- FMCG
  - Coca-Cola
  - Cadbury
  - PepsiCo
  - Nirma

- Engineering and Automobiles
  - Yamaha
  - Harsha Engineers
  - Fiat
  - Ashok Leyland

- Pharma
  - Intas
  - Zydus
  - Sun Pharma

- Government and Utilities
  - DMRCL
  - BSE
  - NSE
  - Teni

- Commercial Buildings and Facilities
  - Embassy Group
  - Wipro
  - Chaayos

- Others
  - Stovec Industries
  - Mahindra
  - Welspan
  - Jindal Steel & Power
  - Praxair

- And 500 more...

Strategic Partners
- O
- JLL
- Rhino Machines Pvt. Ltd.
- SAP
- Honeywell
SmartSense
Evolution from EMS to Analytics

A retrofit, secure, and scalable cloud hosted SaaS (Software as a service) platform which combines the power of Industrial IOT and Deep domain expertise to generate actionable insights to identify energy saving opportunities, and reduce risk of downtime.

Data Acquisition and Reporting
Install device, acquire data and generate reports and alerts

OPERATE MORE EFFICIENTLY
by controlling input costs and optimizing asset quality and utilization

MAINTAIN OR REPLACE ASSETS
using our recommendation engine

SmartSense 1.0
SmartSense 2.0 (Industry 4.0)
SmartSense combines the power of Industrial IOT, and deep domain expertise for quick deployment of Monitoring and Analytics.
SmartSense Features

- **Retrofit**
  Fits to existing Infrastructure
  Supports 200 sensors.

- **Secure Cloud**
  Can be accessed from anywhere
  Client does not have to host and manage IT infrastructure

- **Completely Wireless**
  Real-Time & Scalable
  Minimal or no cabling required. 30 mins to install our h/w platform.

- **Actionable insights**
  Proactive Actions
  Predictive Maintenance
  SMS and email alerts and reports helps to fix the issue before it become a problem

- **Cross Platform**
  Web / Mobile Dashboard
The future of Asset Management

Past
- What Happened
  - Reporting

Present
- What is Happening now
  - Alerts

Future
- What will Happen
  - Extrapolation

Insights
- How and why did it happen
  - Modeling, Experimental design

- What’s the next best action
  - Recommendation

- What’s the Best / Worst that can happen
  - Prediction, Simulation Optimization
Proposition
SmartSense Basic

Access to Dashboard (2 years of historic data/customizable)

Reports / Analyse / Alerts-Events section

Customized widgets

Customized reports (1 Daily / 1 Monthly / 1 Yearly)

Email and dashboard Alerts

It reads more than just your electrical parameters.

It operates on a single platform with universal data access.
Transformer Monitoring Unit
Key Issues for Transformers

- No effective monitoring
- No Predictive maintenance
- Inability to pick on reasons for reduced efficiency and Failure
- Ineffective use of the asset and higher loss and cost of inventory
- High Cost of Maintenance in absence of any credible data
- No real time data for basic decision making
Architecture

Hardware Components of TMU
- CT
- Energy Meter
- Temperature Sensors (Top Oil & Ambient)
- GPRS Modem
- Oil Level Sensor

Software Components of TMU
- Cloud hosted Infrastructure
- DISCOM Dashboard
- Report & Notifications
Proposition

1. **Tap Change** - Change in Tapping as per voltage variation to maintain power quality to consumers
2. **Capacitor Bank** – Reactive Power Compensation to improve Power Factor and reduce line losses
3. **Load Balancing** – Phase Balancing
4. **Harmonics** - Harmonics Audit
5. **Maintenance**
6. **Asset Planning** – Utilization and spares stocking as per loading pattern
Sky-View | Dashboard Snapshot

Showing Various Asset locations

Key Decision making Points:
1. Asset Health Monitoring
2. Network Health Monitoring
3. Maintenance Log
4. Reports
5. Notifications / SMS / e-mail
Data Presentation | Dashboard Snapshot

Showing Comparison of KW/Current/Voltage
Dashboard Snapshot

Showing the Real Time Loading track of a particular Transformer
# Phase wise loading pattern/Consumption for TR-2

<table>
<thead>
<tr>
<th>Slot No.</th>
<th>Phase</th>
<th>Load Imbalance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Load Imbalance

**Load Imbalance**

- Transformer-2
  - Maximum (KW): 138.07
  - Minimum (KW): 25.47
  - Average (KW): 90.90

**Transformer-2**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Transformer-2</th>
<th>Transformer-2</th>
<th>Transformer-2</th>
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<td>12.00</td>
<td>138.07</td>
<td>63.00</td>
<td>190.95</td>
<td>91.88</td>
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</table>

**Transformer-2**

<table>
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<td>25.47</td>
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**Transformer-2**

<table>
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<th>Transformer-2</th>
<th>Transformer-2</th>
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<td>90.50</td>
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</table>

### Transformer-2

- Maximum (KW): 138.07
- Minimum (KW): 25.47
- Average (KW): 90.90
Phase wise loading Voltage Pattern for TR-2

<table>
<thead>
<tr>
<th>Slot No.</th>
<th>From</th>
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<th>Transformer-1</th>
<th>Transformer-1</th>
<th>Transformer-1</th>
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<td></td>
<td></td>
<td></td>
<td>R</td>
<td>Y</td>
<td>B</td>
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<tr>
<td>Maximum</td>
<td>-</td>
<td>-</td>
<td>422.72</td>
<td>424.74</td>
<td>427.24</td>
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<tr>
<td>Minimum</td>
<td>-</td>
<td>-</td>
<td>394.16</td>
<td>396.00</td>
<td>398.92</td>
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<tr>
<td>Average</td>
<td>392.00</td>
<td>415.52</td>
<td>418.33</td>
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<td>Total</td>
<td>-</td>
<td>-</td>
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<td>10-03-2016 20:00:00</td>
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<td>11-03-2016 00:00:00</td>
<td>415.66</td>
<td>417.81</td>
<td>420.19</td>
</tr>
</tbody>
</table>

Voltage Imbalance of Phase B
## MIS Report

### Network Health Report

Data shown is of 10-October-2015 to 17-October-2015.

#### Network Health Summary: Concern Areas

<table>
<thead>
<tr>
<th>Location</th>
<th>Red Areas</th>
<th>Mid Red Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer-1</td>
<td>Power Factor</td>
<td>Current THD</td>
</tr>
<tr>
<td>Transformer-2</td>
<td>Power Factor &amp; Current THD</td>
<td>Voltage THD</td>
</tr>
<tr>
<td>Transformer-3</td>
<td>Power Factor</td>
<td>Current THD</td>
</tr>
<tr>
<td>Transformer-4</td>
<td>Power Factor &amp; Current THD</td>
<td>Voltage THD</td>
</tr>
<tr>
<td>Transformer-5</td>
<td>Power Factor</td>
<td>Current &amp; Voltage THD</td>
</tr>
<tr>
<td>Transformer-6</td>
<td>Power Factor</td>
<td>Power Factor</td>
</tr>
<tr>
<td>Transformer-7</td>
<td>Power Factor</td>
<td></td>
</tr>
<tr>
<td>Transformer-8</td>
<td>Power Factor</td>
<td></td>
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<td>Transformer-9</td>
<td>Power Factor</td>
<td></td>
</tr>
<tr>
<td>Transformer-10</td>
<td>Power Factor</td>
<td></td>
</tr>
<tr>
<td>Transformer-11</td>
<td>Current Imbalance &amp; Power Factor</td>
<td></td>
</tr>
<tr>
<td>Transformer-12</td>
<td>Voltage Imbalance, Voltage THD, Power Factor</td>
<td>Current THD</td>
</tr>
<tr>
<td>Transformer-13</td>
<td>Power Factor</td>
<td>Imbalance</td>
</tr>
<tr>
<td>Transformer-14</td>
<td>Power Factor</td>
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<tr>
<td>Transformer-15</td>
<td>Power Factor</td>
<td></td>
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<td>Transformer-16</td>
<td>Power Factor</td>
<td></td>
</tr>
<tr>
<td>Transformer-17</td>
<td>Power Factor</td>
<td>Current Imbalance</td>
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</table>

#### Performance Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Allowed</th>
<th>Unhealthy</th>
<th>Problematic</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE IMBALANCE (V IMB)</td>
<td>b/w 2% &amp; 5%</td>
<td>&gt;5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CURRENT IMBALANCE (I IMB)</td>
<td>b/w 10% &amp; 50%</td>
<td>&gt;50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER FACTOR (PF)</td>
<td>&lt;0.95</td>
<td>&lt;0.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLTAGE HARMONICS (V THD)</td>
<td>b/w 2% &amp; 5%</td>
<td>&gt;5%</td>
<td>*Kindly log into your SmartSense account for more information/RECOMMENDATIONS</td>
<td></td>
</tr>
<tr>
<td>CURRENT HARMONICS (I THD)</td>
<td>b/w 10% &amp; 50%</td>
<td>&gt;50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case Studies
• Voltage Imbalance of around 30-40% and current imbalance of 25-30% - **Leading to possible degradation**

• Power Factor of 0.95 – **Possible reduction in line losses if improved**

• Transformer severely underloaded – of only around 10-20% -- **Thus increased losses due to fixed losses.**

• Huge Voltage drop in y phase : Check for CT or Winding failure

**Possible Actions could increase the life of the transformer substantially and also decrease losses by nearly 10-15%.**
CESCOM – Case Study | 500 KVA Transformer
• Voltage Drop from 426 to below 410 from August to November 2015
• Power Factor of 0.93

Possible Actions could increase the life of the transformer substantially and also decrease line losses
How do we help you
Preventive to Predictive Maintenance
Creating a world where every watt counts!