INTEGRATING VARIABLE RENEWABLE ENERGY ONTO THE GRID

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GHANA
THE GREENER ENERGY IS THE ONE YOU DO NOT USE.

ONE OF WEDNESDAY’S ESEF PRESENTER
ENERGY EFFICIENCY IS ESSENTIAL FOR INTEGRATING VARIABLE RE INTO DISTRIBUTION GRIDS!
THE VIRTUOUS CYCLE

DISTRIBUTION UTILITIES ➔ TECHNICAL PERFORMANCE ➔ FINANCIAL PERFORMANCE ➔ POLICY ➔ DISTRIBUTION UTILITIES

UTILITY ENERGY EFFICIENCY
Conference Paper, Resolving West Africa’s electricity dilemma through the pursuit of smart grid opportunities (Elhag, 2014)
Source: Econstors (Resolving West Africa’s electricity dilemma through the pursuit of smart grid opportunities) – Elhag, 2014
<table>
<thead>
<tr>
<th>Region</th>
<th>T&amp;D Loss (%)</th>
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<tbody>
<tr>
<td>Central Africa</td>
<td>33.9</td>
<td>27.6</td>
</tr>
<tr>
<td>East Africa</td>
<td>25.3</td>
<td>15.9</td>
</tr>
<tr>
<td>North Africa</td>
<td>16.5</td>
<td>22.7</td>
</tr>
<tr>
<td>South Africa</td>
<td>28.5</td>
<td>15.5</td>
</tr>
<tr>
<td>West Africa</td>
<td>35.7</td>
<td>27.4</td>
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</tbody>
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UTILITY ENERGY EFFICIENCY AT WORK – THE ECG CASE

THE TRUE GRID INTELLIGENCE (TGI) PILOT PROJECT
What’s causing the difference between billed and measured data: Technical Loss? Theft? Error?

Measured     Billed

7.2% difference
IN-GRID VISIBILITY

Step 2: Exploratory Investigation to find area of loss
IN-GRID VISIBILITY
IN-GRID VISIBILITY

Step 3: Detailed Investigation to pinpoint cause of loss
IN-GRID VISIBILITY

Step 4: Retrieve temporary sensors and deploy permanent sensor if needed
True Grid Intelligence (TGI)

The Methodology

The Hardware

The Software
2,060 kWh (72.4%) discrepancy: 231 kWh/Day (using 8.92 days of data out of 8.88 days)
<table>
<thead>
<tr>
<th><strong>PROJECT RESULTS SUMMARY</strong></th>
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<tbody>
<tr>
<td><strong>6</strong> Months</td>
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<tr>
<td><strong>76</strong> Detailed Customer Investigations</td>
</tr>
<tr>
<td><strong>10</strong> Investigations showed direct evidence of loss or suspicious consumption patterns</td>
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<td><strong>05</strong> Investigations’ Results were confirmed</td>
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<tr>
<td><strong>&gt; US$1.5M</strong> Commercial Losses identified</td>
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<td><strong>351%</strong> Return on Investment</td>
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BENEFIT-COST ANALYSIS

Legend (Benefit/Cost Ratio)
- > 4.0  Great
- 3.0 - 3.9  High
- 2.0 - 2.9  Moderate
- 1.0 - 1.9  Low
- <1.0  Not Recommended
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