iSCADA

Real-time interactivity between Man and machines over the internet

HOSTED ENERGY PROFILING SERVICES (iHEPS)

Solutions Provider

MSC-Status
Company

iNTERNET-BASED HOSTED ENERGY PROFILING SERVICES iHEPS

The Devices World developed iHEPS product is built around our iSCADA (internet based Supervisory Control And Data Acquisition) hosted data acquisition technology. iHEPS aims to help large electrical energy consumers understand their energy usage patterns, achieve energy efficiency and reduce energy costs. Deployment of the iHEPS solution will allow facilities managers to do the following:-

1. **SAVINGS ON ELECTRICAL UTILITY BILLS (ENERGY EFFICIENCY)**

   iHEPS will determine whether existing electricity is being consumed in an efficient pattern that will incur the lowest possible cost. Large consumers are billed by the utility not only on the total energy consumed, but also on maximum demand, power factor and time-of-use. Such elaborate billing tariff structure gives rise to potential saving opportunities by optimizing the consumption pattern to take advantage of the tariff structure.

2. **ASSESSMENT OF ELECTRICAL SUPPLY EQUIPMENT UTILISATION**

   iHEPS will determine not only the common load curve of kW consumption, but also on Total energy (kVA) and power factor. These data reflect the utilisation levels of electrical supply equipment of the consumer. Areas of overloading and under utilisation, together with the time of occurrence and pattern, can be easily identified. These profiles can serve as useful tools for planning purposes, especially during facilities expansion exercises.

3. **IMPACT OF NEW TARIFFS ON ELECTRICITY COSTS**

   Our privatised electrical utility has planned and will progressively implement new tariff structure in a drive to achieve better profitability. For large consumers, this could be a source of concern as it is often not very clear how the introduction of new tariffs will affect the cost of electricity bills and hence their operating budget. With iHEPS, however, the impact of any new tariff structures on the consumer's cost of electricity can be easily and accurately assessed even before the new tariffs are enforced.

Energy Consumption and impact to consumers

To know how Energy Consumption impacts the the high end consumers (above 1.5 MW in demand), it is important to understand the monthly electricity billing structure. Each month the electricity bill indicates two key billing categories:

a. Accumulated KWh consumption – Peak Hours and Off Peak Hours
b. Peak Demand KW commonly known as Maximum Demand (MD)

The Accumulated consumption in KWh for each day is split into the Peak Hour (8 am to 10 pm) and Off Peak Hour (10 pm to 8 am) consumption. This is commonly called Time of Use tarrif and is only available to large consumers.

Peak Demand is the average load consumption in KW which is recorded every 30 minutes during the Peak Hours, and the consumer is penalised with a Peak Demand surcharge based on the highest average (30 minutes) value recorded (Diagram 1).
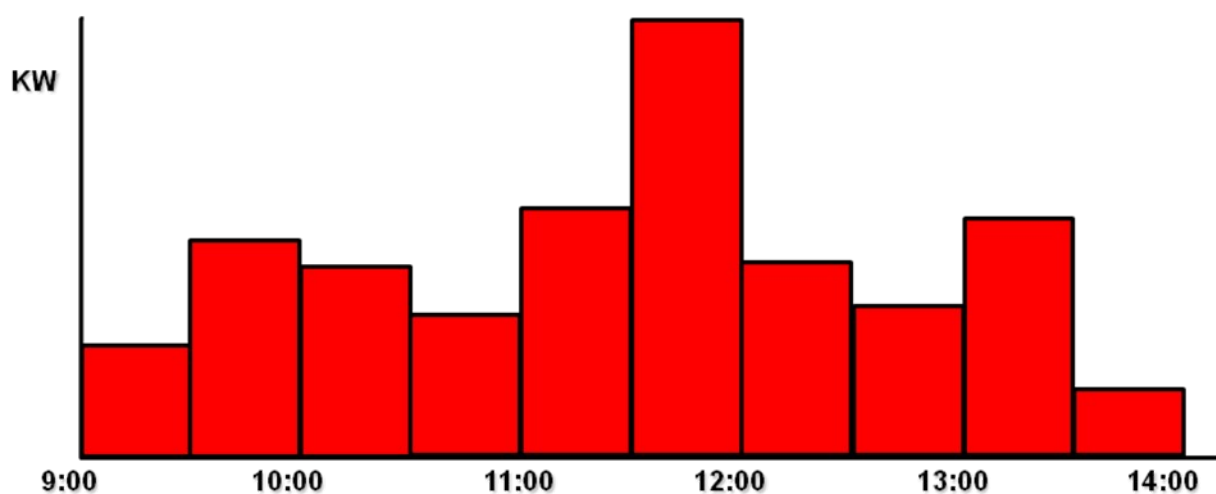

Diagram 1

Consumers pay as high as 100x the unit price for Peak Demand surcharge against KWh consumption unit price (refer Diagram 2).
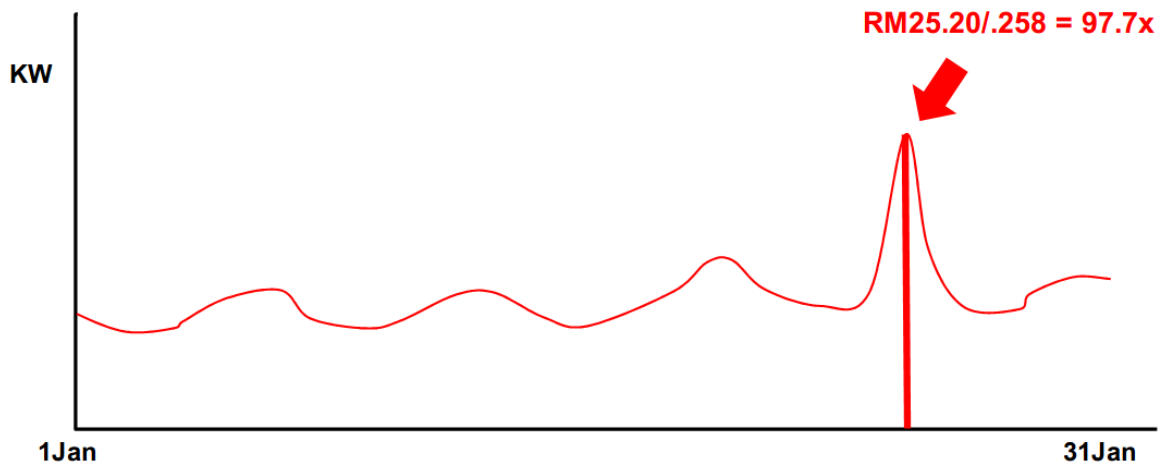
Diagram 2

iHEPS provides instantaneous real-time (minute by minute) electricity demand (KW) load profile data to capture Peak Demand usage. From the data, customers will be able to set targets that will provide mobile alerts which allows for effective intervention to avoid unnecessary demand peaks. This type of active intervention (demand response) when used in concert with the (KW) load profile will allow for the active use of demand response measures to mitigate Maximum Demand (MD) surcharges (refer Diagram 3).
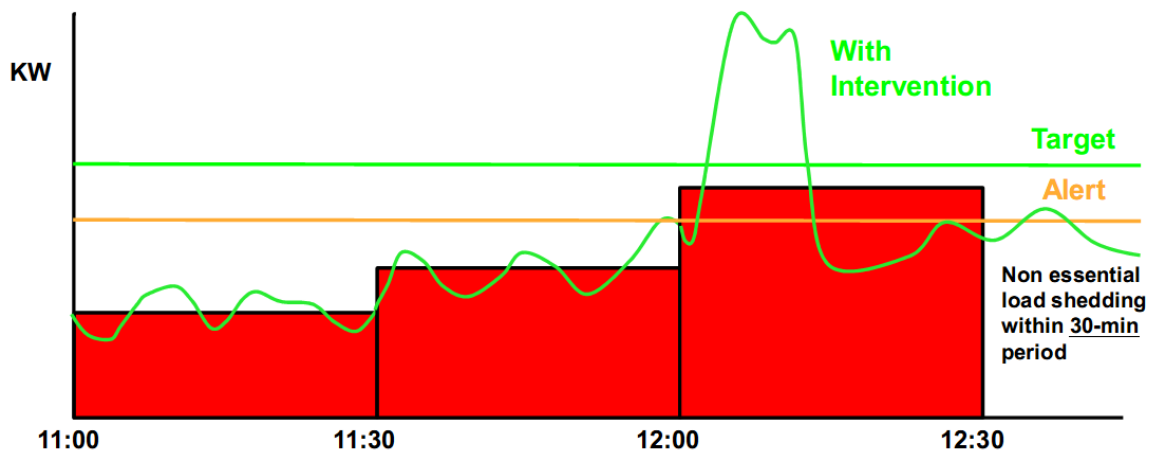

Diagram 3

Without mobile alerts and intervention, the Peak Demand will continue to be high(refer Diagram 4).
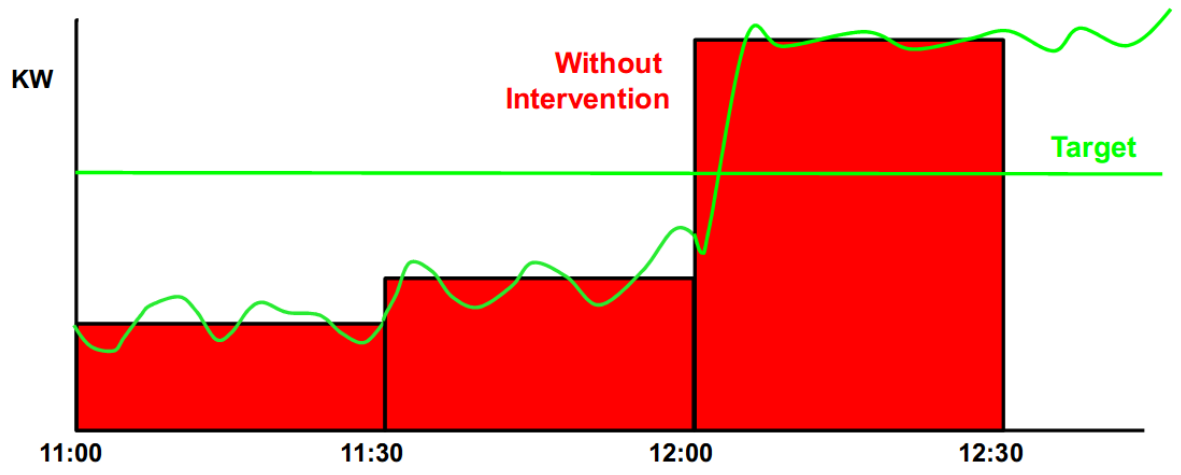
Diagram 4

iHEPS is a comprehensive energy consumption monitoring solution that comprises of three basic packages:

- Data Acquisition- Load Curve Recording e.g. Peak Demand (Dp) surcharge
- Processing, Evaluation & Recommendation Strategy for managing & reducing Dp surcharge
- Long Term Monitoring Through Hosted Data Acquisition - Tool for managing & reducing Dp surcharge

i) DATA ACQUISITION

This package captures energy consumption data from electrical energy metering devices, located at strategic points in the distribution system. The iSCADA **gateway** will collect data on energy flows (kWh & kVArh) from existing meters. Otherwise appropriate meters will need to be installed. Using this raw data, the iSCADA hosted data acquisition system will be able to derive power factor (p.f.) values and kVA consumption load profile.

ii) PROCESSING, EVALUATION & RECOMMENDATION

Once the basic data has been acquired (over a one to three-month period) the next step is to process the data to generate the following:

a) kW consumption profile
b) kVA consumption profile
c) p.f profile

(a) and **(b)** are normally referred to as load curves.

Evaluation of the load curves and p.f. profile will be conducted to provide a detailed and accurate picture of how electrical energy is being consumed.

A recommendation will be prepared after analysis of the load curves and consultation with the technical department of the facility. This recommendation will outline how the consumption pattern of the facility can be optimised (and altered with minimum disruption to existing operations) in a carefully planned effort to reduce the monthly electricity billing charges. The second element which needs to be incorporated into this plan is the TNB billing schedule (tariff). A well crafted energy saving plan will combine the facility load curve with the TNB tariff to ensure optimisation of energy usage in the facility through implementing energy saving measures as well as the

avoidance of TNB penalties and transfer of load to off-peak usage where possible.

iii) **MONITORING**

After implementation of the recommended procedure to optimise electrical energy usage in the facility, the monitoring of consumption patterns will need to be done on a continuous basis to evaluate the effectiveness of the corrective measures. The monitoring system will also enable the facility's technical management to effect additional changes to their usage pattern and evaluate the usefulness of these changes in their energy efficiency efforts whilst also lowering their electricity bills.

The key advantage of our hosted data acquisition package is that we collect the data on your behalf, process this data to your requirement and present this data to you in the manner you specify. This solution future proofs the entire data gathering process as there is little that you need to do in terms of managing or manipulating your data which we have collected on your behalf. The cost of this service is highly competitive as it more than pays for itself from the convenience and efficiency gained.

Additional benefits offered by the iSCADA system is the built in comprehensive alarm setting and warning feature. On detection of pre-set conditions on the monitored output (for example the kW demand reaching a certain level), the iSCADA system can be programmed to automatically alert specific individuals via SMS alerts or to trigger audible and visual warning signals.
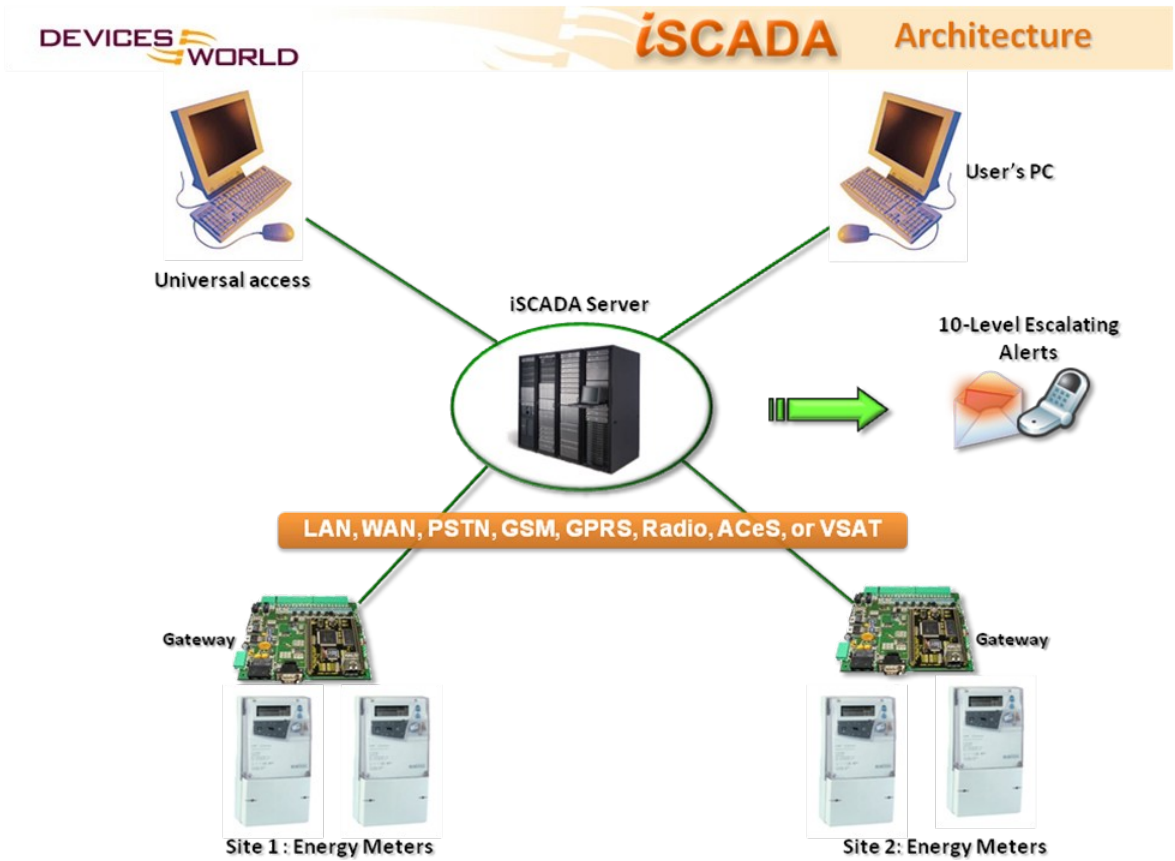
Figure 1: iSCADA Architecture

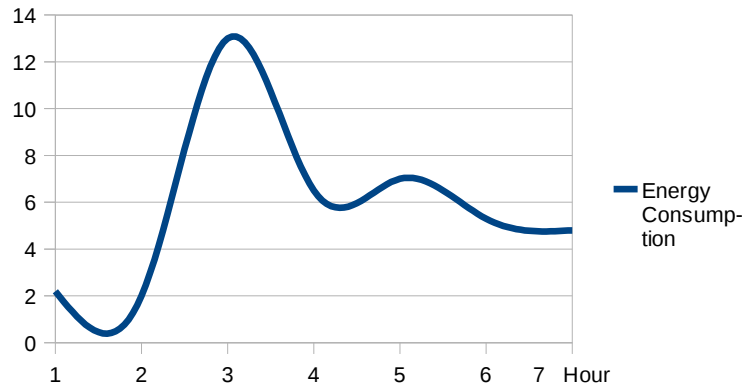Figure 2: Data acquisition from meter to the iSCADA system

Figure 3: Data acquisition and recording normal Load Curve
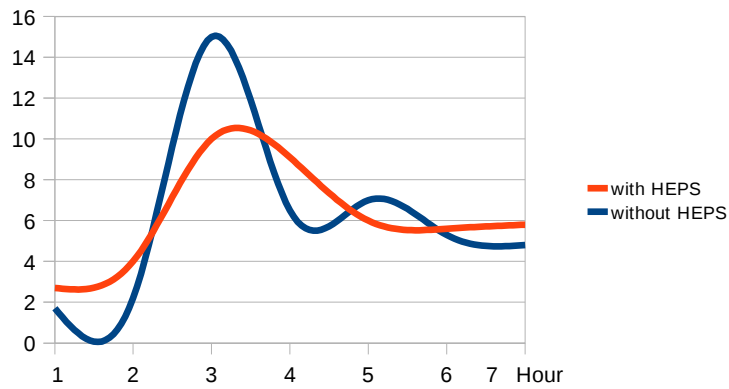with high peak demand and uneven consumption.

Figure 4: Possible changes to Load Curve using iHEPS assistance by
shifting consumption to off-peak periods and reducing peak demand.