



# Energy 2003

Metering – The Eyes and Ears of O&M

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# Our 45 Minutes

The Process of O&M Programs:

- Static
- Dynamic
- Interactive

- ✓ Value proposition for metering
- ✓ Some low cost- high utility hardware and software
- ✓ Case Studies



# MeterSmart

MeterSmart, a subsidiary of Hunt Power, L.P., markets utility grade meters, sub meters, data collection, processing and web-enabled knowledge applications through two operating divisions, E-MDN and MeterSmart Services.

- ✓ E-MDN has over 250,000 meters in the field.
- ✓ MeterSmart Services remotely reads 250,000 meters each month



# Federal Experience

- ✓ LA Air Force Base
- ✓ Denver Mint
- ✓ Federal Reserve Bank in Philadelphia
- ✓ National Zoo
- ✓ Museum of National History
- ✓ Air & Space Museum
- ✓ U.S Postal Services (including Postal Square in D.C.)
- ✓ Philadelphia Naval Yard
- ✓ White House (Greening of the White House)
- ✓ Vice President Residence at the Naval Observatory
- ✓ Coast Guard Academy in Connecticut
- ✓ Veterans Administration hospital facilities



# Meters Are The Eyes For The O & M Process

Facility Energy Operations and Maintenance is a process, not a product:

- ✓ Scheduling
- ✓ Automation
- ✓ Controls
- ✓ Efficiency
- ✓ Generation



# What is Metering?

- ✓ Meters record facts over time
- ✓ Accuracy can vary
- ✓ Information can vary
- ✓ More readings usually mean more accuracy which translates to more cost

## Why Meter ?

- ✓ Increase productivity
- ✓ Reduce building energy consumption
- ✓ Reduce maintenance costs
  - Predictive maintenance
  - Increase high value wrench time
- ✓ Improve knowledge of in-house staff

## Start with The DOE and PNNL Conclusions for Metering

- ✓ Technology already exists for diagnostics
- ✓ Controls companies have tools but few diagnosticians
- ✓ Pioneers are needed to assemble tools into a working culture

*(note to industry – this is bleeding edge stuff)*

## Typical Tools

The diagram illustrates a typical energy metering setup. It includes a 'Metering Device' (capable of measuring 0-100% of Temp, Humidity, Air Quality, etc.), a 'Pulse Meter (or Modbus Meter)', a 'Modbus RS-485' interface, and a computer system. The computer screen shows a data graph. A note indicates 'Internet (Dialup or LAN)' connectivity.

## Some Providers (E-Source , 1999)

DataPult E-MON	Utilipro.com
Silicon Energy	Master Controls, Inc.
Creative Control Design	EnerShop
Data Freeway	Western Bldg Systems
Energy Interactive	Viron

## Less Providers (1999-2002)

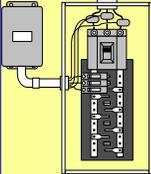
Itron	Enerwise
MeterSmart (E-MON/UDRI)	ABB
	Western Bldg Systems
	Viron

## Simple Is Best

- ✓ A small percentage of your energy budget can fund very effective tools
- ✓ Leverage ESPC M&V tools
- ✓ Recognize the hidden cost of training
- ✓ Have a back-up plan for CHANGE

## Shadow Metering

- ✓ Static : LED and/or Stand Alone Software
- ✓ Dynamic : Remote central station monitoring and web presentment
- ✓ Interactive: LAN or TCP/IP  
Continuous Commissioning  
Real Time Alarming



## Pro-Mon by E-MON

- ✓ Employs patented split core sensing technology
- ✓ UL Listed
- ✓ Stores 36 days of interval data for two channels
- ✓ MV compatible
- ✓ FEMP approved



## AcquiSuite by OBVIUS

- ✓ Aggregate energy and operational information
- ✓ Gather "near real time" performance data
- ✓ Benchmark building operations
- ✓ Monitor performance of building systems
- ✓ Alarm data points

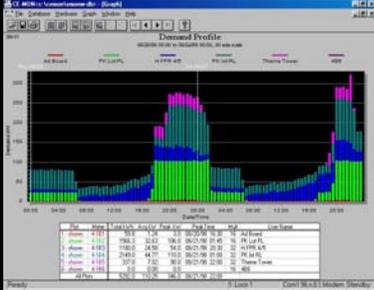


## Mediator by Envenergy

- ✓ Configure network settings
- ✓ Download settings
- ✓ Add or delete devices
- ✓ Upload new configuration
- ✓ Restart the Framework
- ✓ Perform discovery on the network

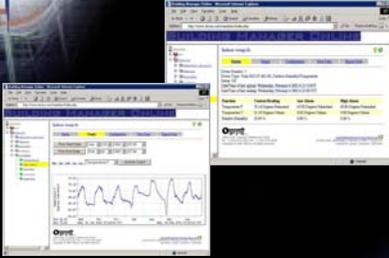


## CE-MON Software



Time	Power	Energy	Power Factor	Power Quality	Power Factor	Power Quality	Power Factor	Power Quality
00:00	100	100	0.95	95%	0.95	95%	0.95	95%
01:00	100	100	0.95	95%	0.95	95%	0.95	95%
02:00	100	100	0.95	95%	0.95	95%	0.95	95%
03:00	100	100	0.95	95%	0.95	95%	0.95	95%
04:00	100	100	0.95	95%	0.95	95%	0.95	95%
05:00	100	100	0.95	95%	0.95	95%	0.95	95%
06:00	100	100	0.95	95%	0.95	95%	0.95	95%
07:00	100	100	0.95	95%	0.95	95%	0.95	95%
08:00	100	100	0.95	95%	0.95	95%	0.95	95%
09:00	100	100	0.95	95%	0.95	95%	0.95	95%
10:00	100	100	0.95	95%	0.95	95%	0.95	95%
11:00	100	100	0.95	95%	0.95	95%	0.95	95%
12:00	100	100	0.95	95%	0.95	95%	0.95	95%
13:00	100	100	0.95	95%	0.95	95%	0.95	95%
14:00	100	100	0.95	95%	0.95	95%	0.95	95%
15:00	100	100	0.95	95%	0.95	95%	0.95	95%
16:00	100	100	0.95	95%	0.95	95%	0.95	95%
17:00	100	100	0.95	95%	0.95	95%	0.95	95%
18:00	100	100	0.95	95%	0.95	95%	0.95	95%
19:00	100	100	0.95	95%	0.95	95%	0.95	95%
20:00	100	100	0.95	95%	0.95	95%	0.95	95%
21:00	100	100	0.95	95%	0.95	95%	0.95	95%
22:00	100	100	0.95	95%	0.95	95%	0.95	95%
23:00	100	100	0.95	95%	0.95	95%	0.95	95%
24:00	100	100	0.95	95%	0.95	95%	0.95	95%

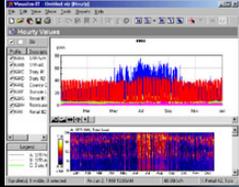
## Building Manager Online



OBVIUS' Graph, Export and Alarm Platform

## RLW Analytics - Visualize It

- ✓ Aggregate buildings
- ✓ Rate Analysis
- ✓ Web enabled
- ✓ Perform Demand and Duration Analysis



## MeterSmart Power Alert

- ✓ Whole Building or End Use Baseline
- ✓ Pricing Information
- ✓ Actual vs. Baseline Comparison
- ✓ Traffic Light Analysis
- ✓ Alarms and phone, pager or email notification



## LA Airforce Base

- ✓ Over 50 sub meters identify energy saving opportunities
- ✓ 21 data accumulators verify savings
- ✓ Stand alone software aids Energy Budgeting
- ✓ Summary reports show compliance with energy reduction mandates
- ✓ Estimated cost- \$50,000
- ✓ Resulting energy savings- \$1,000,000

## Washington National Airport

- ✓ \$6.5 Million annual electric bill
- ✓ Over 1 million square feet
- ✓ Over 200 points of measurement including jet gate power, pre conditioned air, airline offices, restaurants, and retail spaces
- ✓ About \$300,000 to install
- ✓ Annual savings of 25 percent: 10% from tenant billing, 5% from cost allocation, 10% from DSM activity

## Sources For More

- ✓ "Web based Energy Information Systems for Large Commercial Buildings" - <http://buildings.lbl.gov/hpcbs>
- ✓ FEDS 5.0 - <http://www.pnl.gov/FEDS>
- ✓ "Having an Outstanding Building Experience: Services" - Energy Source report EIC 6 July 1999
- ✓ U.S. DOE, Pacific Northwest National Lab- [www.energy2003.ee.doe.gov/](http://www.energy2003.ee.doe.gov/)

## For More Info

Mediator – Envenergy, 805-745-5200  
 AcquiSuite – OBVIUS, 502-670-1201  
 Building Manager Online - OBVIUS  
 PRO-MON– E-Mon, 800-334-3666  
 CE-MON – E-Mon  
 Visualize It - RLW Analytics, 517-529-6277  
 PowerPriceAlert – MeterSmart, 800-520-7773