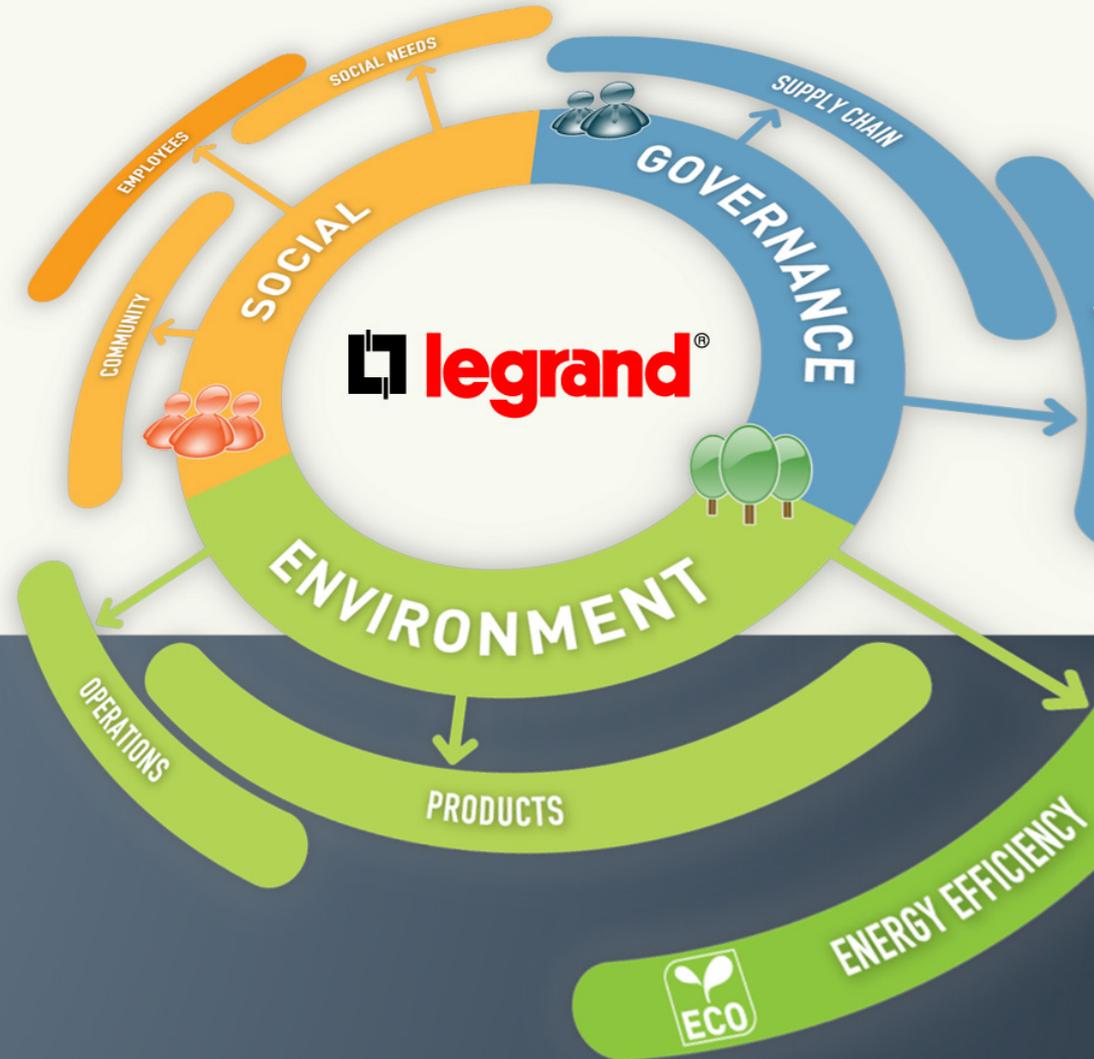


Sustainability Team Presentation

LNA Sub Metering and
Reporting System
Proposal

May 11, 2011





SUB-METERING DRIVERS

- 1. Energy Management Programs**
 - Instantaneous transparency of energy consumption
 - Verification of Energy Conservation Measures
 - Volatile, rising energy prices
- 2. Sustainability**
 - Making the most of a buildings energy use and budget.
- 3. Utility incentives to encourage effective use of energy**
 - Documentation required for rebates (Canada)
- 4. Federal Activity –**
 - Executive Order 13514, EPACK 2005, EISA 2007



SUB-METERING BENEFITS

1. **Tracking usage for benchmarking:**
 - Load type (HVAC, Lighting, Plug Loads)
 - Space size (Watts / square foot)
 - Production volumes (Wh per unit of production)
2. **Identifying unknown opportunities for conservation**
 - Example: classroom electronics
3. **Validating utility vendors**
4. **Billing for usage**
5. **Capacity planning tool**
 - Mechanical / production equipment



SUB-METERING FOR ENERGY MANAGEMENT

Results depend upon user actions from the information:

Action	Observed Savings
Installation of Meters	0% to 2% The Hawthorne Effect
Bill Allocation Only	2.5% to 5% Improved Occupant Awareness
Building Tune-Up And Load Management	5% to 15% Improved Awareness, Identification of Simple Operations and Maintenance Improvements and Managing Demand Loads Per Electric Rate Schedules
Ongoing Commissioning	15% to 45% Improved Awareness, Ongoing Identification of Simple Operations and Maintenance Improvements and Continuing Management Attention

Table 1: Expected energy savings from utility metering.

ASHRAE Journal - April 2011, p 22



SUB-METERING SYSTEM REQUIREMENTS

Component	Function
Meter	Interfaces with the sensors, organizes and stores data
Network	Transports data to storage, wired or wireless (open or proprietary)
Storage	Archives data
Installation	Varies significantly based upon above
Analytics	Converts data to usable information
Dashboard	User Interface
Services	Engineering, Commissioning, Data Entry (rate structures), interpretation



HARDWARE – METERS AND ACCESSORIES

Meter Types

Power Quality

Revenue Grade

- Single Meter
- Multi-meter

Energy Management

- Single meter
- Multi-Meter

\$1.500



Meter
Cost



\$300



EIG Power
Quality Meter



EIG Revenue
Grade Meter



Continental Controls
Energy Management



EMON Multit-Meter



METER OPTIONS AND ACCESSORIES

Mounting:

- Socket
- Equipment
- Wall
- Din Rail

Options:

- Display
- Communication
- AMI / AMR
- Data Storage
- Current Transformers



Socket



Equipment



Din



Wall Mount



Current Transformers



LEGRAND SUB-METER PROPOSAL

1. **Install high density Triacta multi-meters in Legrand Facilities.**
 - First project under way in Alabama
2. **Connect Meters to IT infrastructure (IP)**
3. **Host data on Triacta Servers (no charge).**
 - Can also be connected to Building Automation System
4. **Roll up electrical energy data for LNA management**
5. **Use data to verify payback on energy conservation measures and accelerate analysis of payback.**
6. **Learning experience for LNA.**

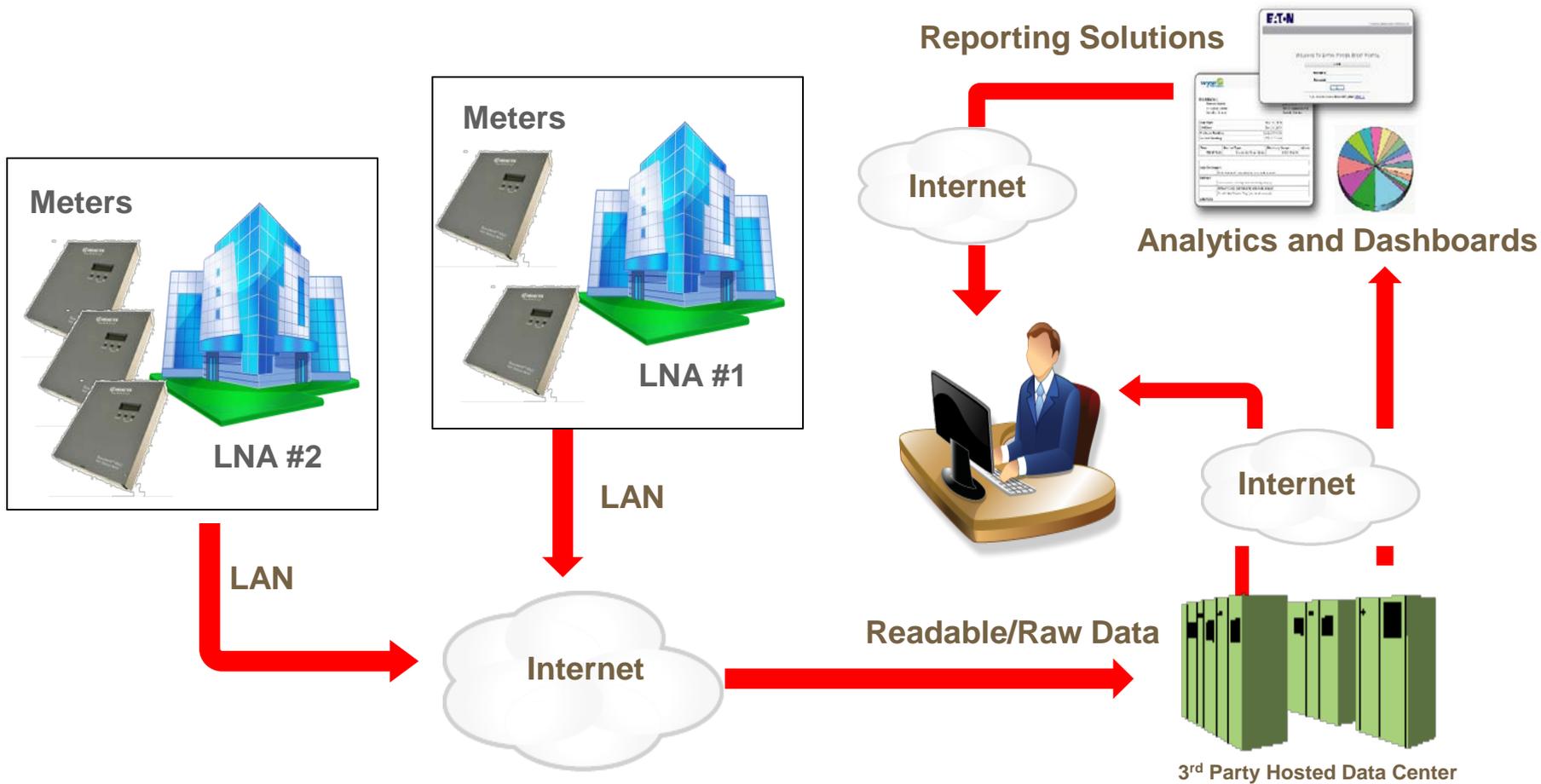


PROJECTED EXPENSE / DOE RECOMMENDED INVESTMENT

Facility	Annual Electric		Payback	Annual Savings	DOE meter Budget		Proposed 2011	Proposed 2012
	Cost \$							
Birmingham, AL	\$	12,166	4	2.5%	\$	1,217	\$	3,800
Carlsbad, CA	\$	21,577	4	2.5%	\$	2,158	\$	1,800
Concord, NC	\$	1,624,573	4	2.5%	\$	162,457	\$	44,000 \$ 22,000
Ft Mill, SC			4	2.5%	\$	-	\$	15,400 \$ 5,200
Livermore, CA	\$	37,490	4	2.5%	\$	3,749	\$	3,800
New London, CT			4	2.5%	\$	-	\$	6,600
Mascoutah, IL	\$	115,265	4	2.5%	\$	9,527	\$	6,600 \$ 2,600
Middletown, PA	\$	56,600	4	2.5%	\$	4,060	\$	4,400
Orem, UT	\$	60,700	4	2.5%	\$	4,070	\$	4,400
Pico Rivera, CA	\$	72,115	4	2.5%	\$	5,612	\$	4,400
Plano, TX	\$	8,699	4	2.5%	\$	870	\$	1,800
R. Cucamonga, CA	\$	34,611	4	2.5%	\$	2,661	\$	2,200
Santa Clara, CA	\$	23,497	4	2.5%	\$	2,350	\$	4,400
Syracuse, NY	\$	21,223	4	2.5%	\$	522	\$	8,800 \$ 2,600
Tijuana, Mexico	\$	30,204	4	2.5%	\$	3,020	\$	12,000 \$ 12,000
Vaughan, Canada	\$	102,265	4	2.5%	\$	8,227	\$	4,400
West Hartford, CT	\$	858,606	4	2.5%	\$	83,861	\$	15,400 \$ 5,200
Total	\$	3,079,591			\$	294,359	\$	144,200 \$ 49,600

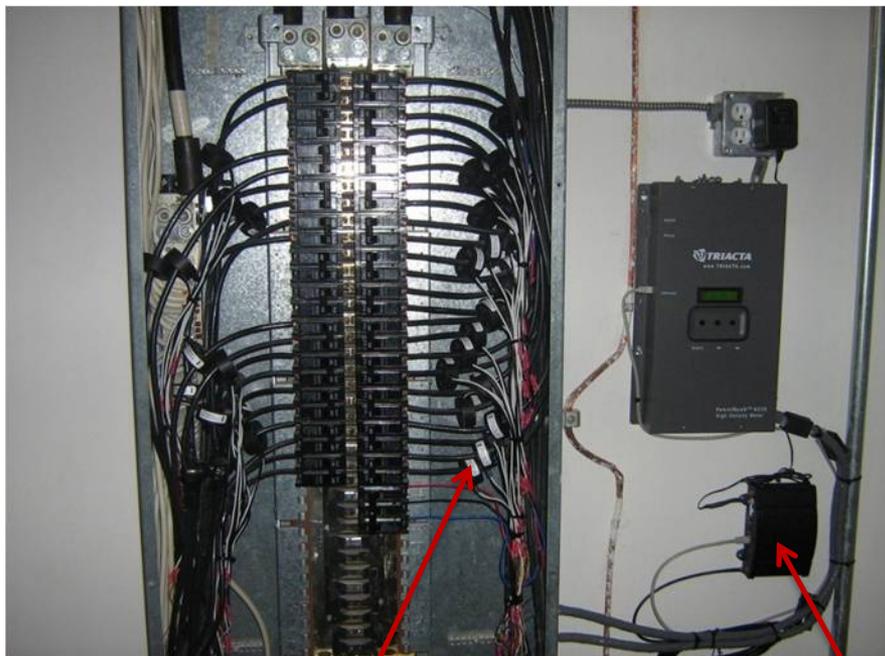


LNA METERING - DATA ARCHITECTURE





TYPICAL INSTALLATION



Current Transformers

LAN

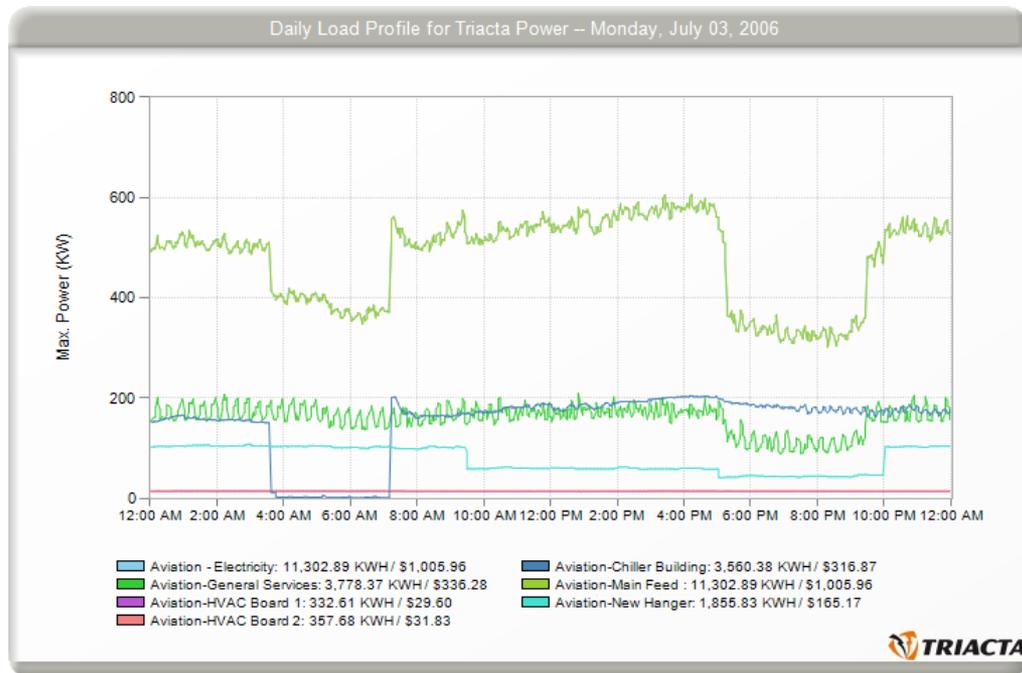


Meter

Application demonstrates monitoring of 24 - single phase circuits.



SOFTWARE: POWERHAWK MANAGER



Cloud-based “Software as a Service” means no installation or configuration hassles

- GUI-based Configuration & Admin Tools
 - AMR & Billing
 - Individual User Accounts
 - Energy Summary Reports
 - Energy Analysis Tools
 - Dashboard
- Views
 - LNA
 - Facility
 - Individual Meter
 - Load type



DASHBOARDS

Dashboards and Analytics are critical to inform users and managers of performance.

Triacta Powerhawk brings visibility to monitor resource usage

- Real-time information
 - By location or load
 - Consolidated, Plant, or Meter views
 - Real time costs using local utility rates
- Displays multiple meters (typically Electricity, Water, Gas)
- Target Curve vs. Actual Usage
- Large qualitative icons (emoticons) for above or below target



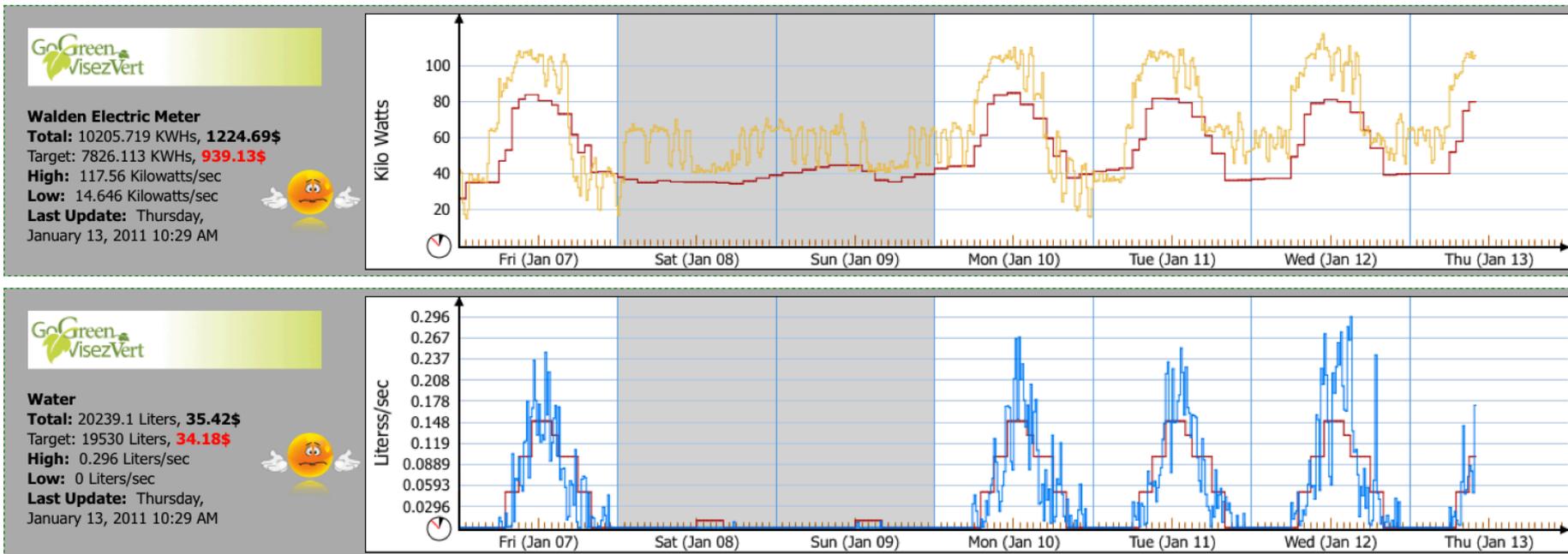
DASHBOARD – TOOLS FOR IMPROVEMENT



PowerHawk Manager by Triacta Power Technologies Inc.

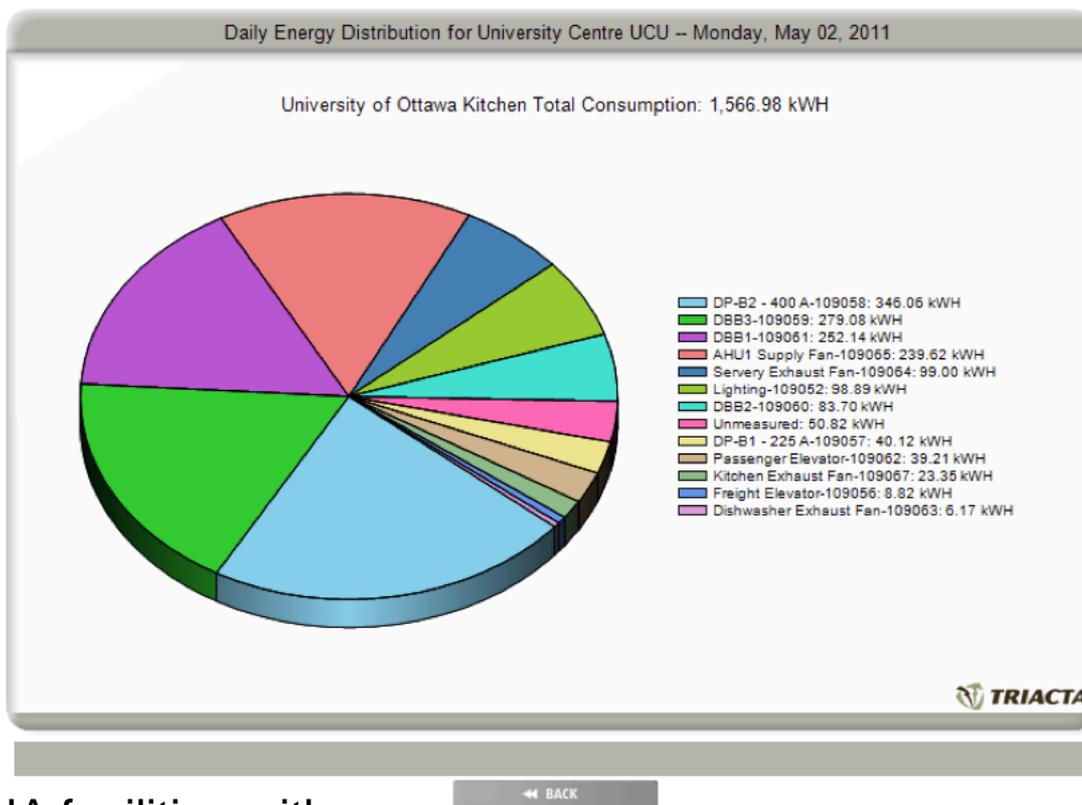
Version: 3.0.1.543

Town Hall meeting at 4:30





ENERGY DISTRIBUTION VIEW



Roll up of all LNA facilities with feature to select more details.





SUMMARY

- **Sub-Metering solutions require Meters, Networks, Software, Dashboards and Services.**
- **Energy Management requires actions to achieve results.**
 - Visibility will stimulate action.
 - Proposal brings visibility to the user and LNA staff.
- **Proposal is the start for electrical energy management**
 - Water, Gas metering options
 - Shows how well we are doing every day.