



A California Nonresidential Lighting Logger Palooza!

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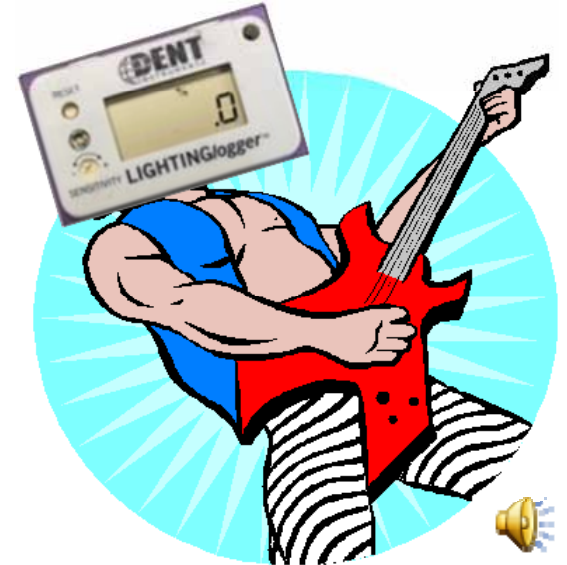
February 10, 2010

Presentation Summary

- Focus of talk is on most important issues
- What makes this a palooza?
- Study overview & objectives
- How Itron made the project happen
- Explanation of key concepts
- Key system components & examples
- Top 5 tips/lessons learned

What Makes This a Palooza?

- NOT part of the Lollapalooza
- More than 7,200 loggers
- Over 1,250 buildings
- Over 14,500 phone surveys
- Downstream and Upstream aspects
- Pre- Post-retrofit metering substudy
- The system assembled to field this effort!



Project Overview

Use lighting loggers to assess/estimate:

- Annual operating hours
- Load shapes for lighting “measure groups”
- Results at the building type and space use type level
- Measure linear fluorescent fixture wattages

How did Itron make this happen?

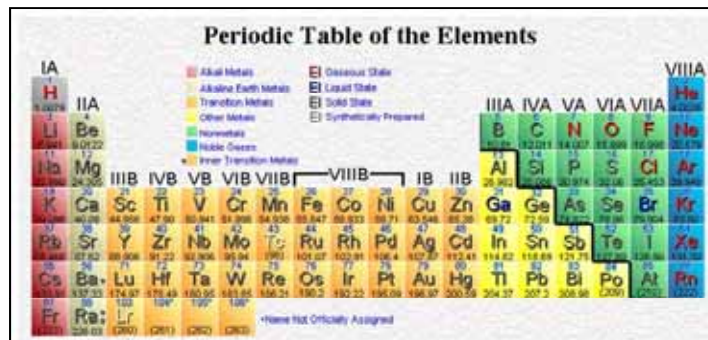
We developed a system that included:

- Automated creation of site-specific on-site survey forms
- Dynamic on-site survey & logger installation procedures to adapt to changes
- An interactive tool to review logger data with on-site survey contextual data

Key Concepts & Study Elements

- IOU Tracking Database
- Measure Groups
- Downstream and Upstream Measures
- Post-Only and Pre-Post Study Elements
- DEER (database for energy-efficiency resources)

Periodic Table of the Elements

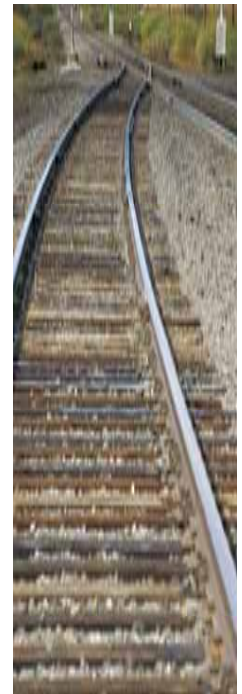


The periodic table is color-coded by metal type and physical state. The legend indicates:

- Alkali Metals (Red)
- Alkaline Earth Metals (Orange)
- Transition Metals (Yellow)
- Other Metals (Green)
- Nonmetals (Light Blue)
- Noble Gases (Dark Blue)
- Inner Transition Metals (Purple)
- Diatomic State (Light Green)
- Liquid State (Light Orange)
- Solid State (Light Yellow)
- Synthetically Prepared (Light Purple)

IOU Tracking Database

- IOU Measure Names
- Measure Groups
 - CFLs, Linear Fluorescent, HighBayLF
- Downstream Measures
 - Not just lighting, verify all EEMs onsite
- Upstream (=Screw-based CFLs)



IOU Measure Name Example

T8-T12, 2L & 4L conversion measures

IOU Measure Name from Tracking Database	Unit Basis
T-8 or T-5 Lamp and Electronic, 4-foot lamp installed	Lamp
(3) 48 T-12 to (2) 48 T-8 Lamp with Elec. Bal.	Fixture
(4) 48 T-12 to (2) 48 T-8 Lamp with Elec. Bal.	Fixture
T8 4' 2L	Measure
T8 4' 4L	Measure
PREMIUM T-8/T-5 LAMP&ELECT BALLAST/NEW FIX-REPLCE OF T-12 LAMP&BALLAST-4 FT	Lamp
PREMIUM T-8/T-5 LAMP&ELE BALLAST/NW FIX-REPL T-12 LAMP&BALLAST-4 FT 2 LAMP	Fixture
PREMIUM T-8/T-5 LAMP&ELE BALLAST/NW FIX-REPL T-12 LAMP&BALLAST-4 FT 4 LAMP	Fixture
PREM T8/T5 LAMP & ELEC BALLAST/NEW FIXT-REPL T-12	Lamp
Premium T8 with T12 34Watt Baseline	Lamp
Premium T8 with T12 34Watt Baseline - Tr1	Lamp
Premium T8 with T12 34Watt Baseline - Tr2	Lamp
Premium T8 with T12 34Watt Baseline - Tr3	Lamp
Premium T8 with T12 40 Watt Baseline	Lamp
Premium T8 with T12 40 Watt Baseline - Tr1	Lamp
Premium T8 with T12 40 Watt Baseline - Tr2	Lamp
Premium T8 with T12 40 Watt Baseline - Tr3	Lamp
3rd Gen. (2) 48 T-8 Lamp with Elec. Bal.	Fixture
3rd Gen. (4) 48 T-8 Lamp with (2) Elec. Bal.	Fixture
3rd Gen. (4) 48 T-8 Lamp with Elec. Bal.	Fixture

Post-Only and Pre-Post Study

- Post-Only: Majority of logged sites
 - Verification of Downstream measures
 - Inventory of Upstream CFLs
- Pre-Post: Special sub-study
 - Loggers installed both pre- & post-retrofit
 - Fixture wattages also measured
 - Customers had to be recruited before confirmed IOU rebate participation

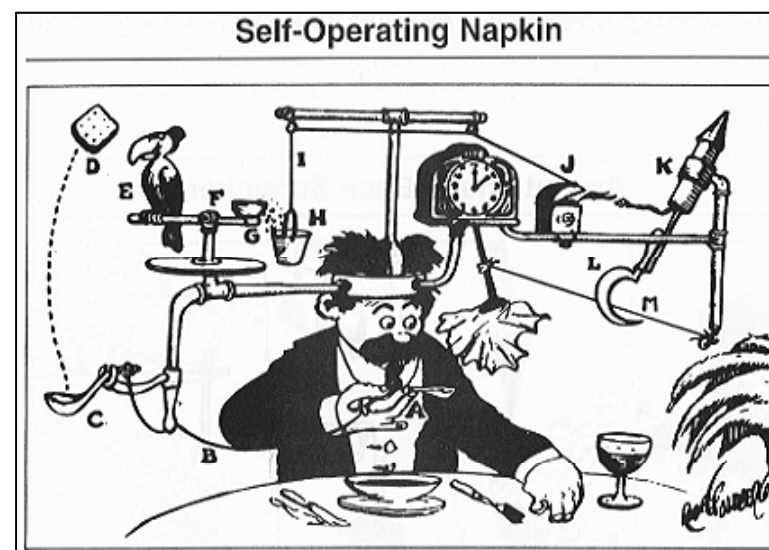


DEER Database

- Deemed Energy Efficiency Resources
- Source of prescriptive energy savings, demand, and costs in CA.
- Multiple versions and measures, not all in one database.
- Not always a clear or one-to-one mapping to IOU measure names

Key System Components

- Logger/Site Quotas
- **Logger Equipment**
- Phone Surveys
- **On-Site Survey Form**
- Field Procedures
- Tracking System & Master Database
- Staff Training, Pilot Test & QC Feedback
- **The viewLoggers Interface**



http://www.anl.gov/Careers/Education/rube/Images/rube_napkin.gif

Logger Equipment

- DENT TOU Loggers
 - Photocell logger (default)
 - Clamp on (clothes-pin) CT logger
- Pre-Post also used HOBO multi-channel
 - Both DENT types sometimes installed on the same fixture for back-up
 - HOBO used for entire circuits
 - Fixture watts also measured



On-Site Survey Form

- Common pages (site information, etc.)
- Measure-specific forms
 - Only print those need for the EEMs at site
- Survey “Templates”
 - Multiple Word docs encoded with bookmarks
 - Populated with data from the master database
 - Used to generate a complete, single Word doc survey form for each site

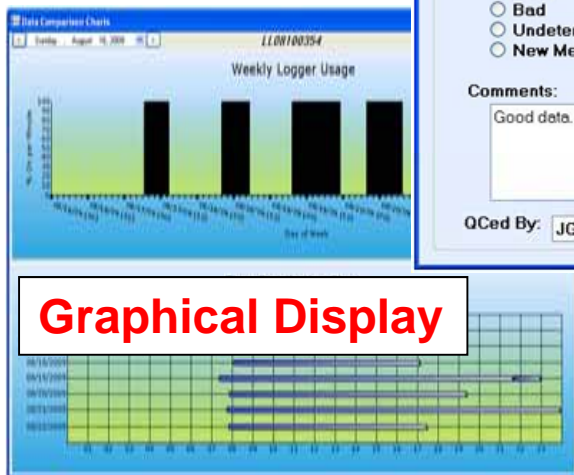
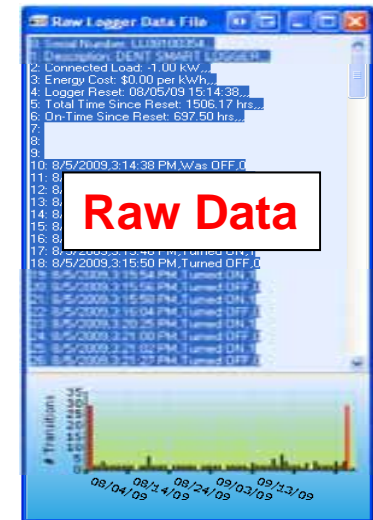
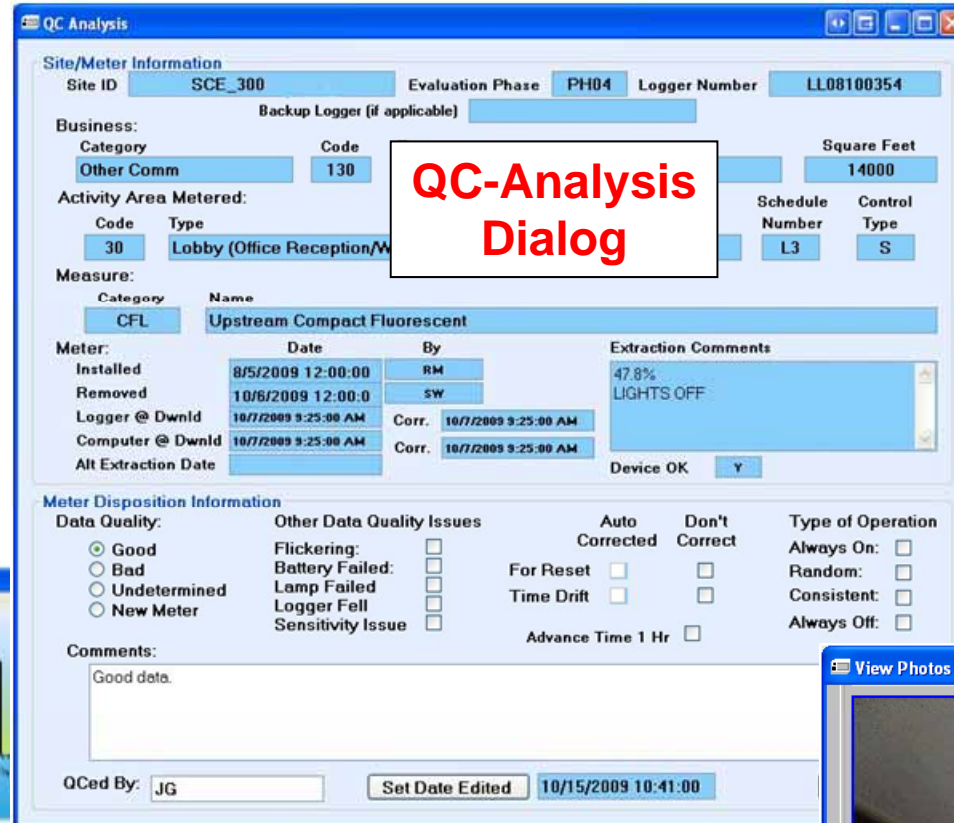
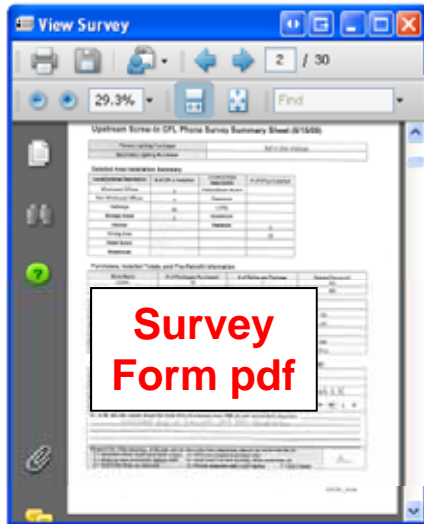
The viewLoggers Interface

- Tool created to view logger and on-site survey contextual data together
 - Raw and processed logger data
 - On-site survey data, survey form, & photos
- Enables discrete disposition of logger data
- Also free-form comments about logger data
- Processes data into hourly values for use in analysis

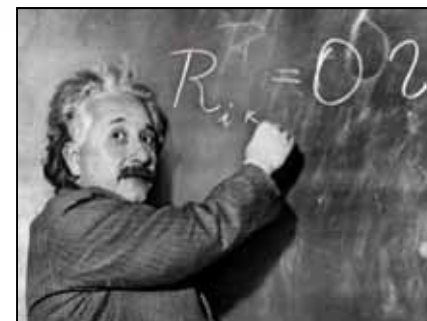
Key System Components



viewLoggers Screen Captures



Lessons Learned



- Know your data!
- Design a system not one-offs
- Do a pilot test or pre-test shakedown
- Treat procedures as living documents
- Expect equipment anomalies
- Expect changes, propagate them quickly
- Provide the B&W, put gray in comments!

Want to know more?

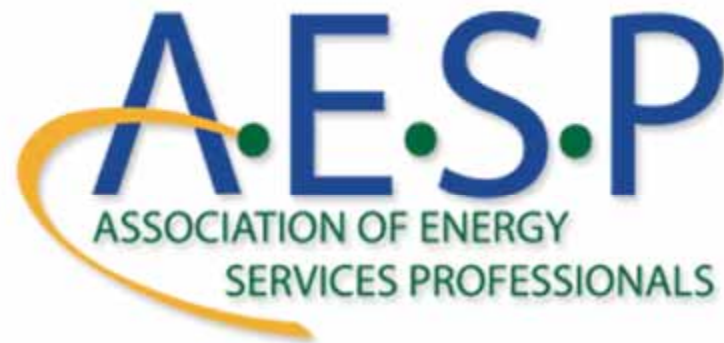
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CPUC Evaluation report available from:

<http://www.energydataweb.com/cpuc/default.aspx>

Thank you, and happy logging!





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