

MPSC Working Group Update

2011 Re-Commissioning “Lite” Pilot Initiative
Results and Next Steps, 3-20-2012



- Start-up and deliver a pilot initiative for re-commissioning (RCx) services to customers served by utilities participating in Efficiency United



Recommissioning is not an energy audit. Instead, recommissioning focuses on how an existing building's HVAC and control systems are working, how these systems interact, and whether they operate according to manufacturer guidelines and recommendations.

- Contract start: August 1, 2011
- Program design/preparation complete: September 30, 2011
- In the field: October 1, 2011
- Work completed: December 31, 2011



1. Test an “RCx Lite” concept:
 - Target “smaller” customers than typical RCx programs
 - Target measures specific to these markets
 - Conduct on-site audits, deliver reports quickly—will these elements deliver cost-effective measure implementation?
2. Use next-generation energy assessment/data collection software tool (EnComp®) to help with Goal #1

3. Determine value of collecting customer energy equipment information electronically and see if quicker reporting about efficiency opportunities drives implementation by customers
4. Determine if pre-screening customers and targeting specific measures for RCx improves cost-effectiveness and measure implementation
5. Target multiple “smaller” customer markets for RCx opportunities to see if the RCx Lite concept works better for some markets than others

- Used EnComp®
 - Developed a Re-Commissioning Application
- Segmented customers by utility
- Field work
- Reporting
- Follow-up
- Assessment and Recommendations

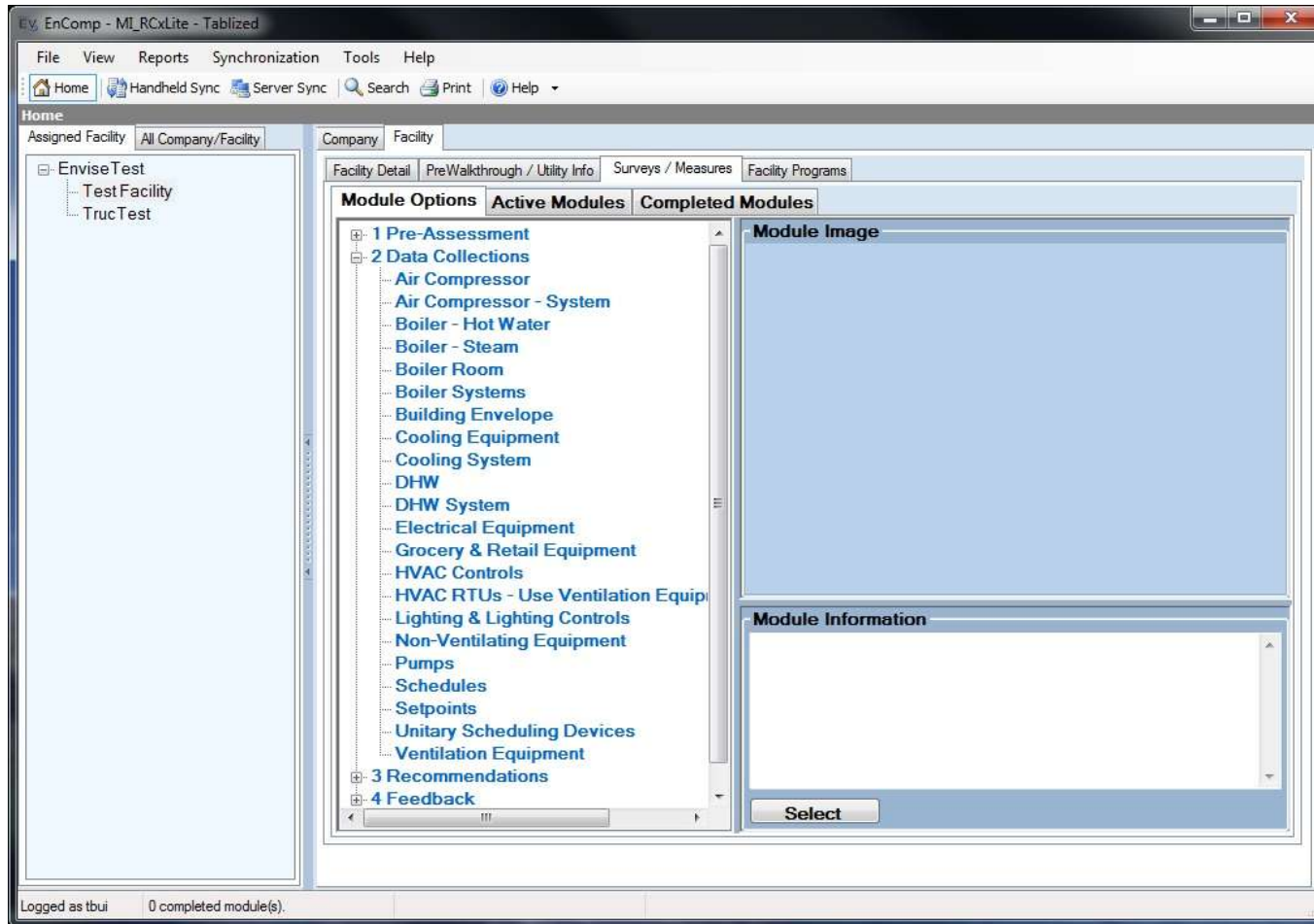
- What?
 - EnComp helps users conduct RCx assessments and audits (e.g., Levels I and II ASHRAE audits) quickly, efficiently, and accurately
- Who uses it?
 - The CLEARResult team, utility account managers, contractors, etc.
- How?
 - Walk through a facility, enter information about energy systems using a tablet PC/Smartphone loaded with EnComp software



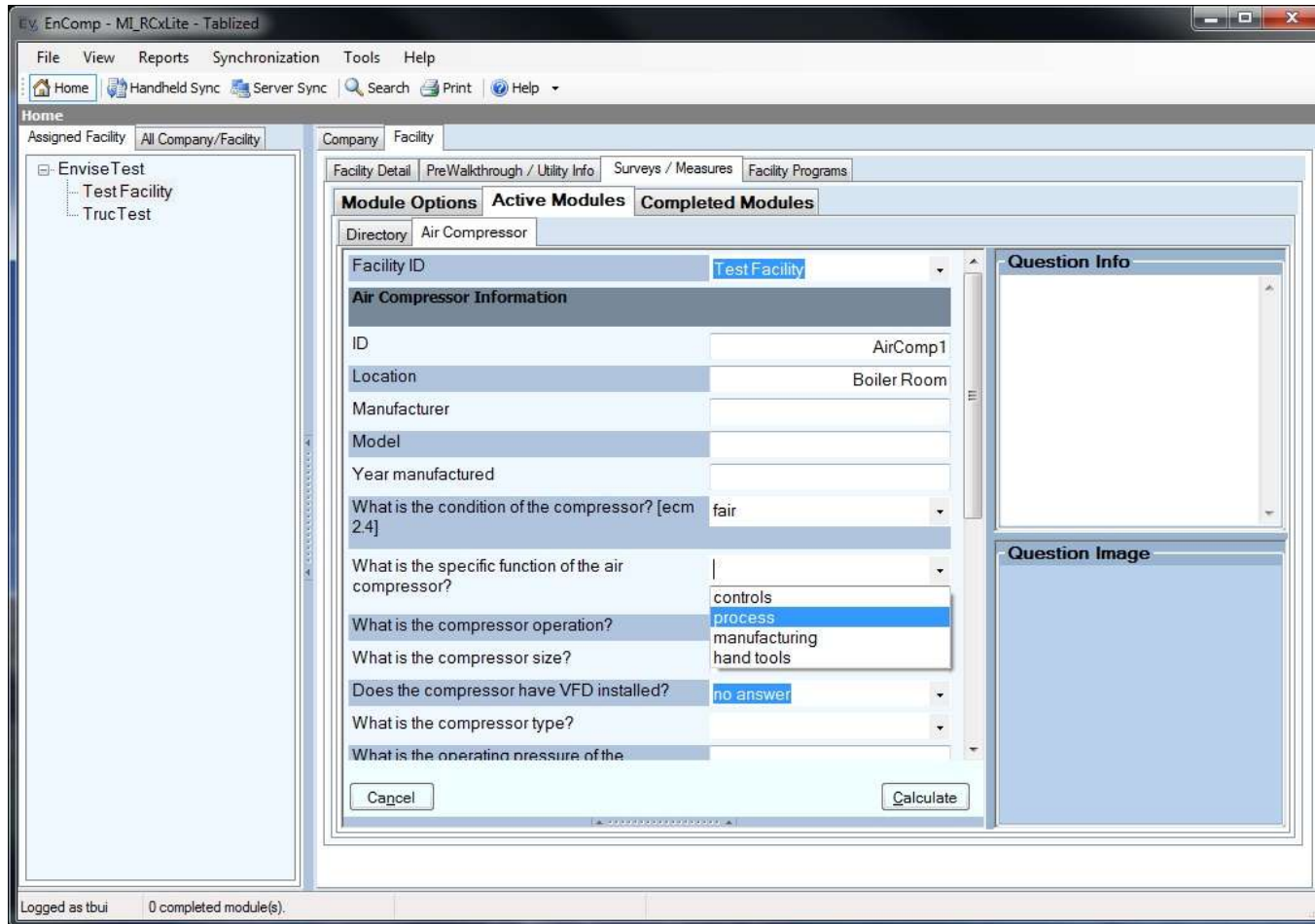
- **Better. Smarter. Faster.**
- Users complete facility assessments in hours, rather than weeks
- Staff members use consistent calculations/data sets—no more “rogue” spreadsheets floating around
- Managers obtain a robust set of reports for managing energy efficiency activities and results
- Data flows back to SQL database for data mining and management



- Ask screening questions
- Collect facility data
- Recommend RCx measures for implementation at each facility
- Generate reports quickly
- Work with customers and trade allies to implement projects



**Sample EnComp RCx Application Screen:
Module Options Screen**



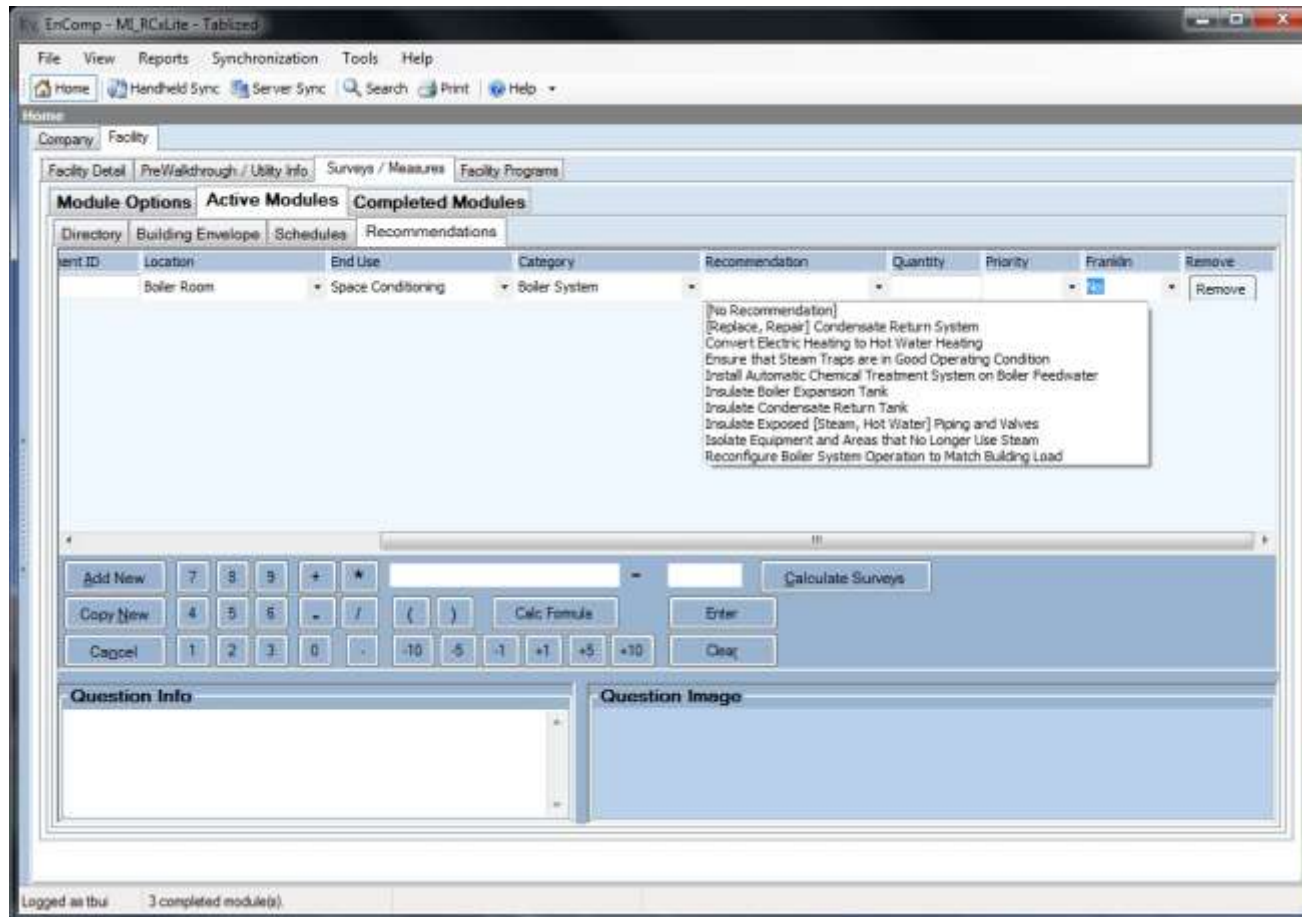
Sample EnComp RCx Application Screen: Air Compressors

The screenshot displays the EnComp RCx application interface. The window title is "EnComp - MI_RCxLite - Tablized". The menu bar includes File, View, Reports, Synchronization, Tools, and Help. The toolbar contains Home, Handheld Sync, Server Sync, Search, Print, and Help. The main content area is divided into several sections:

- Home**: Contains tabs for Company and Facility.
- Facility Detail**: Includes tabs for PreWalkthrough / Utility Info, Surveys / Measures, and Facility Programs.
- Module Options**: Includes tabs for Directory, Building Envelope, Schedules, Recommendations, and Truc TestModule.
- Facility ID**: A dropdown menu set to "Test Facility".
- General Information**: A form with the following fields:
 - Equipment ID: AHU 301
 - What is the unit type?: air handling unit
 - Location: Roof
 - Areas Served: Kitchen and Gym
 - Year manufactured: (empty)
 - What is the condition of the unit? [8.53-estab hvac prevent.]: fair
 - Recommendation: Establish Regular Preventative Maintainer
 - How is the unit controlled? [8.15-reprogram,8.33-retimeclock,8.61-mgmt]: not controlled
 - Are occupancy sensors used to start units [8.66-min temps,8.73-occ cntr]: no
 - Recommendation: Timeclock on Air Handling Equipment
 - Recommendation: Add Programmable Thermostats
 - Recommendation: (empty)
- Question Info**: A large empty text area.
- Question Image**: A large empty image area.
- Buttons**: Cancel and Calculate.

At the bottom of the window, it shows "Logged as tbui" and "3 completed module(s)".

**Sample EnComp RCx Application Screen:
AHU Recommendation**



**Sample EnComp RCx Application Screen:
Recommendation Screen**

- Worked with Efficiency United utilities and their customers
- Conducted 60 RCx audits
- Targeted customers:
 - K-12 public schools: 24
 - Private schools: 2
 - Government facilities: 5
 - Commercial facilities (groceries, retail, office): 24
 - Other (healthcare, worship): 5
- Size range of facilities: approx. 15,000 to 80,000 square feet
- Both electric and gas customers/recommendations

- Conducted 2-3 hour on-site assessments accompanied by customer(s) in most cases
 - Teams of 2 engineers/RCx experts worked together
 - Walked through facility, used Tablet PCs loaded with EnComp software to enter customer/facility info
 - Four to six hours to generate each report and customize them; delivery was sometimes in person, sometimes via email/mail depending on schedules and customer preferences

Reporting—Sample Reports

Each report is typically 5-8 pages...here are some samples from one report...

Efficiency United is pleased to present this re-commissioning report to help you identify energy-saving opportunities at your facility. Efficiency United is committed to educating commercial utility customers about energy efficiency and offering cost-effective solutions and rebates for reducing energy use. Efficiency United funds this pilot re-commissioning program.

On 12/02/2011, we conducted a re-commissioning assessment at your facility to identify potential "low-cost" efficiency improvements to help you save energy and better manage energy costs. We inspected major mechanical equipment and systems, lighting controls, and general building operations. The recommendations listed in this report are based on information from our recent site visit and all assumptions used will help you select and implement energy saving measures. You may need to conduct additional research or analysis prior to implementing specific projects.

Efficiency United is not responsible for the actual level of energy and cost savings achieved from any and all recommended measures. City of Ironwood is responsible for ensuring that all measures meet all applicable code requirements and that all utility project prerequisites are obtained prior to project implementation.

DETAILED DESCRIPTIONS

More detailed descriptions for each of the proposed improvements are listed below.

1. Verify that linkages and/or actuators are operating correctly

Equipment ID: AHT-1
Location: Auditorium, Mead Priority: High

During the onsite review, it was noted that linkages and/or actuators were either not operating correctly or not accessible. Linkages and actuators modulate to control the amount of outside air and return air. Broken actuators and linkages result in increased energy consumption for space conditioning.

Verify that:

1. Outside air dampers automatically close when supply fans are shut off, and
2. Return air and outside air dampers operate in unison when one opens, the other closes?

If actuators and/or linkages are not operating correctly, replace or repair actuators and linkages as necessary.

2. Install automatic temperature controls on the boiler system

Equipment ID: H1, H2
Location: Boiler Room Priority: High

fan are not capable of optimizing the use of multiple boilers and firing rates, which may cause stress to the tubes and

EFFICIENCY UNITED RE-COMMISSIONING REPORT

Client:
City of Ironwood
215 S. Marquette St.
Ironwood, MI 49931

Facility:
Administration Building
115 S. Marquette St.
Ironwood, MI 49931

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Efficiency United LLC
City of Ironwood - Administration Building

The Re-Commissioning (RC) assessment of Administration Building identified 19 potential energy reduction measures. A summary of the re-commissioning recommendations are listed below from high to low priority.

SUMMARY TABLE OF RE-COMMISSIONING RECOMMENDATIONS

No.	Recommendation	ID	Location	Priority
1	Verify that linkages and/or actuators are operating correctly	AHT-1	Auditorium, Mead	High
2	Install automatic temperature controls on the boiler system	H1, H2	Boiler Room	High
3	Install new ventilation controllers	RA1, RA2	Open / Locker Rooms, Auditorium Storage	High
4	Replace control valves on radiators with thermostatic control valves	RA1, RA2	Offices	High
5	Reduce thermostat reset/override heating and cooling	RA1, RA2	Offices	High
6	Ensure adequate outside air for combustion	H1, H2	Boiler Room	Medium
7	Insulate the exposed hot water piping and valves in the boiler room	H1, H2	Boiler Room	Medium
8	Install verify hot water reset on the boiler system	H1, H2	Boiler Room	Medium
9	Repair to balance boiler flow dampers	H1, H2	Boiler Room	Medium
10	Insulate domestic hot water storage tank	DDW-2	Boiler Room	Medium
11	Repair DRY circulation pumps	DDW-2	Boiler Room	Medium
12	ADA programmable thermostats	General	General	Medium
13	Repair seals on bottom edges of exterior doors	Exterior Doors	Main Entry	Medium
14	Replace repair dampers	EF-1	Auditorium	Low
15	Repair/replace visual diagnostic indicators on mechanical equipment	FWV, H1, H2	Boiler Room	Low
16	Ensure boiler vents is not unobstructed	UE	Boiler Room	Low
17	Repair all break thermostats	General	General	Low
18	Repair seals on bottom edges of exterior doors	Exterior Doors	General	Low
19	Outside air covers	RTU-2	Roof	Low

Efficiency United LLC
City of Ironwood - Administration Building

Priority: High

provide better control of individual unit ventilators in energy-occupied open locker rooms in the basement had hand over the ceiling. Reducate these radiator controls and ensure proper air providing heat to a storage room beside the auditorium, previous to such an unoccupied space.

monstrate control valves

Priority: High

provide better control of individual radiators. These water into the radiator based upon its control input by the

- Initial findings
 - Customers were very happy to work with us, very cooperative, and eager to learn ways to improve their facilities
 - Schools represent a great target market—once school administrators learned of the initiative, they referred us to other schools
 - We spent time educating customers as well as performing technical work
 - Trade allies are very interested and a key partner—they should be leveraged

- “Nice approach. I learned a lot”
- “Report is to the point. Tells me what I need to focus on”
- “Thanks for spending the time at our store. I found out things I never knew”
- “I like the fact you are focused on things that save us energy but don’t cost us a lot to do”

- **First year impacts**
 - 57% of reports recommended 10-20 measures
 - Top recommendations:
 1. Controls (94% of sites and over 40% of all end uses)
 2. Envelope-related (64% of commercial facilities)
 3. Boiler-related (60% of public school facilities)
 - 200,000 kWh and 60,000 therms of savings implemented in just 2 full months of field work
- **Interesting side-note: we discovered many safety/code compliance issues during our site visits (e.g., outside air dampers kept closed at nearly every facility)**

- Did the approach work?
 - *Yes!*
 - Macro impacts
 - *The “lite” approach offers a cost-effective way to provide RCx services to a market that is typically not served: <150,000 s.f. facilities*
- Proposed Next Steps
 - *Further refine targeting of markets and measures*
 - *Add calculations for key prescriptive measures into EnComp RCx app for more robust reporting*
 - *Get into the field with program revisions by May 2012*

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