Strategic Energy Management (SEM) for HVACR Professionals

Agenda

- Energy 350 Overview
- Intro to SEM
- SEM vs Other Utility Programs
- Participant Experience

- Common Energy Projects
- HVACR Professional Support for SEM Participants

* Please ask questions as you have them

About Energy 350

- Energy Efficiency Consulting
- Portland, Oregon
- ~40 staff members
    - ~50% Professional Engineers
- Commercial and Industrial Energy Efficiency Program Management
- Strategic Energy Management (SEM)
- Retrocommissioning (RCx)
- Technical Energy Studies
- Energy Efficiency Research
    - Condensing RTUs
    - Very High Efficiency DOAS
    - Cold Climate Heat Pumps
    - CO2 Heat Pump Water Heaters
- Evaluation

What is SEM


CEE SM
Consortium for Energy Efficiency
98 N. Washington St., Suite 101
Boston, MA 02114
617.589.3949
www.cee1.org
CEE℠ Strategic Energy Management
Minimum Elements

SEM Minimum Elements

- Employee Engagement
  - C-Suite Executives to Shop Floor Staff
- Culture Change to Reduce Waste
- Behavioral and Operational Changes
- Energy Policy and Goals
- Energy Mapping
- Project Identification and Implementation Management
- Energy Measurement and Analysis
- Energy Management Assessment

SEM vs Other Energy Efficiency Programs

SEM

- Sign up for a year(s) engagement at a time
- Low & no-cost projects
- Whole facility project scope
- Measure savings at the meter-level
- Training provided via workshops and coaching
- Engage a wide range of staff

Other Energy Efficiency Programs

- Timeline based on project completion
- More capital-intensive projects
- Single system project scope
- Measure savings at the equipment level
- No training provided
- Work with an individual or small team

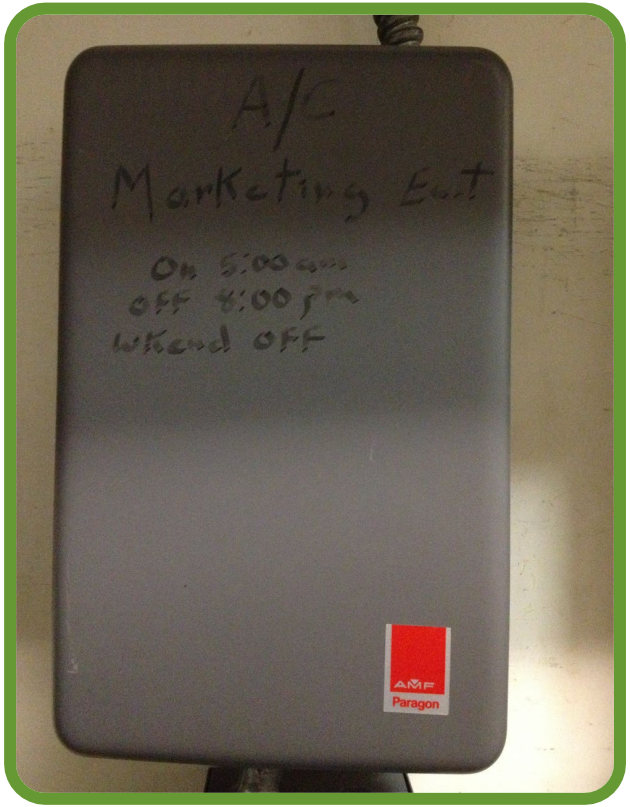
SEM Participants

- Commercial
  - Healthcare
  - Large retail
  - Commercial office
  - Event centers
  - School districts
  - Higher education
  - Many more
- Industrial
  - Manufacturers
  - Food processors
  - Wood products
  - Wastewater
  - Many more

Participant Experience – Energy Team

Build an Energy Team

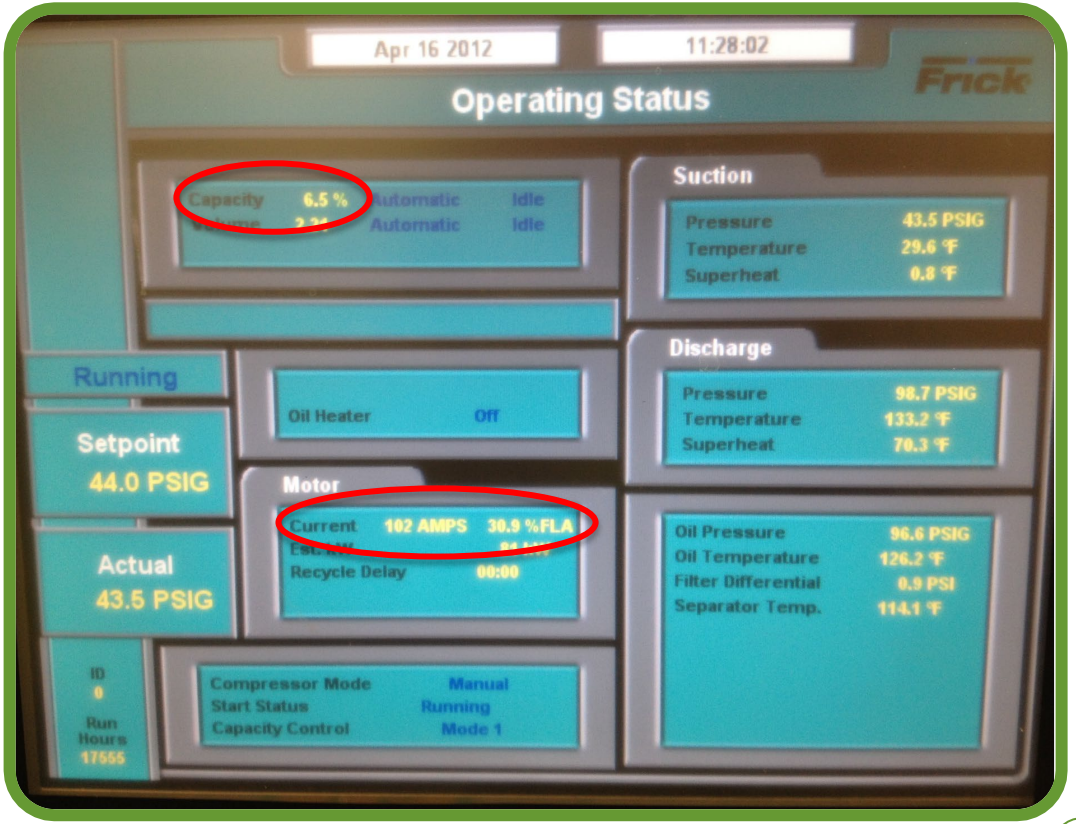
- 3 – 10 people
  - Energy Champion
  - Executive Sponsor
  - Data Lead
- Cross functional
- Meet at least monthly to focus on energy



Participant Experience – Project Identification

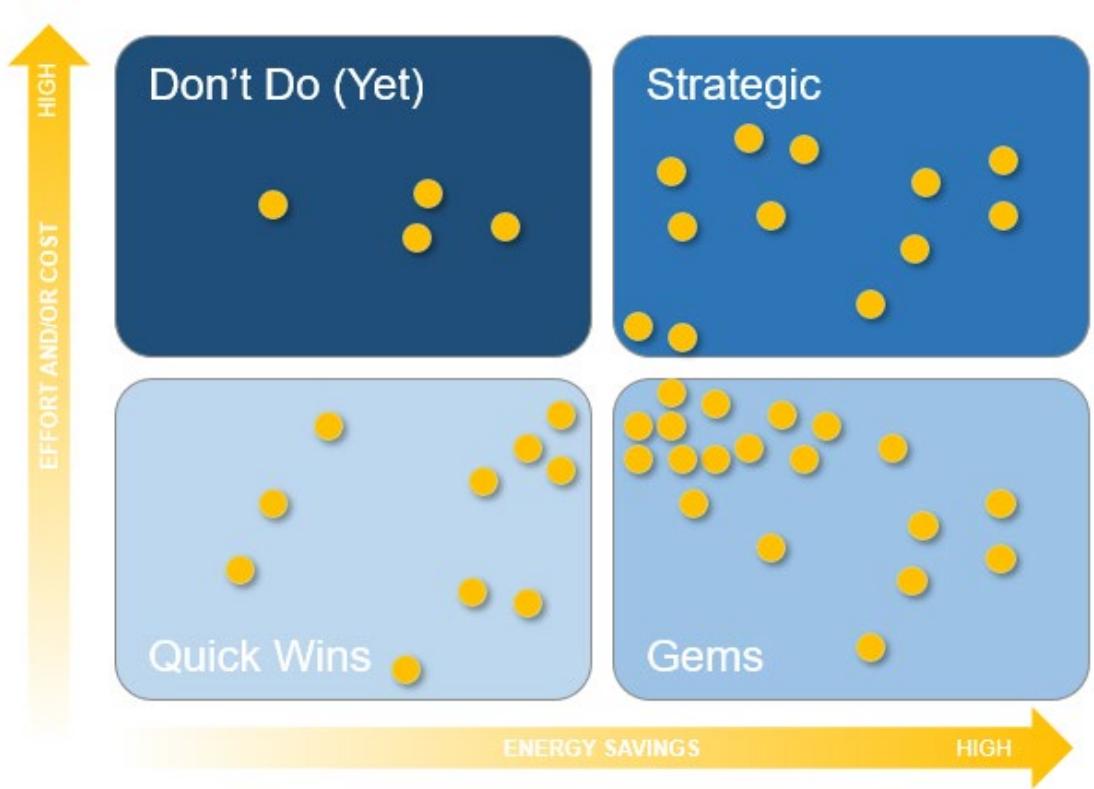
Identify Projects

- Review historical projects and energy studies
- Control scan
    - Analyze available data
- Treasure Hunt
    - 1 – 2 day event
    - 8 – 20 people in attendance
    - Walk the facility and review key energy systems in small teams
    - 40 – 150 projects identified



Participant Experience – Virtual Treasure Hunt

Participant Experience – Value Graph

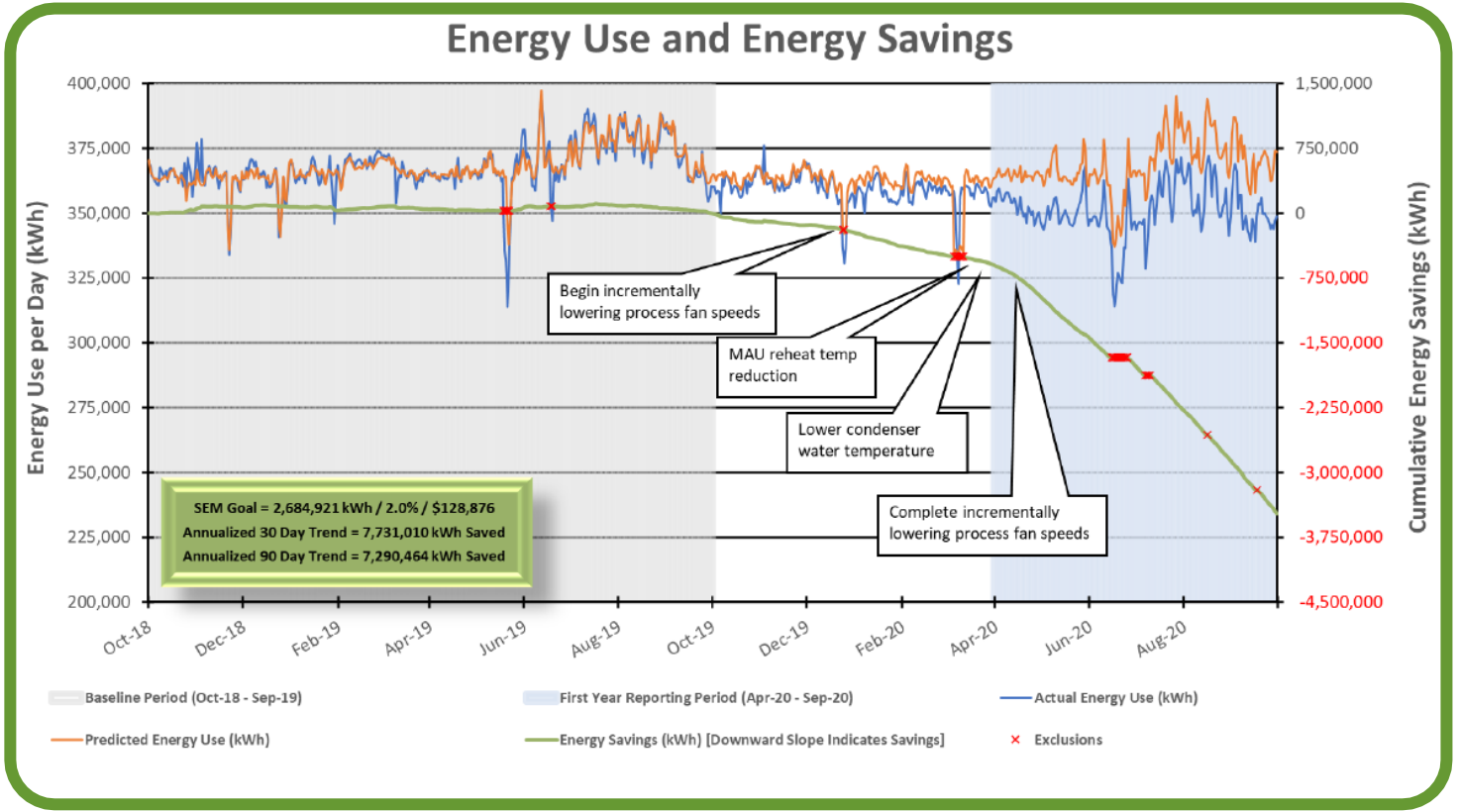


- Enable unoccupied mode for all HVAC units where appropriate
- Reduce output on all LEDs to achieve recommended light levels
- Install automated isolation dampers on all exhaust drops
- Turn off infeed equipment when not in use

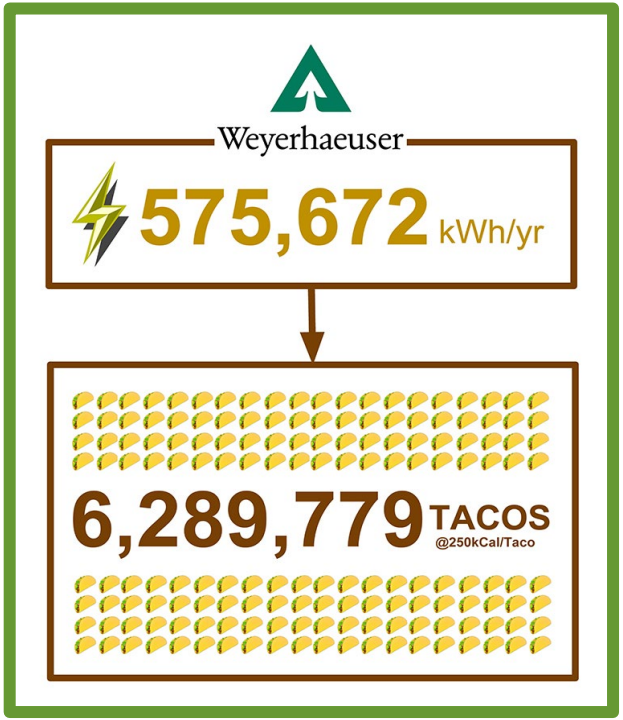
Participant Experience – Opportunity Register

Energy Project		Step 1	Identify			Step 2	Prioritize					Step 3	Implement		
Opportunity #	Opportunity Name		Description	Location	System*		Energy Impact	Energy Savings	Estimated Incentive Potential ($0.04/kWh)	Estimated Annual Energy Cost Savings ($/yr)	Type of Energy Saved*		Next Step	Assigned To	Target Due Date
156	99.9% -> 95% Hepa change		See if Hepa eff. filter change will reduce load on motor	Paint	Dust collection		Quick wins	52,280	$ 2,091	$ 2,928	Electric		3/22/22: Replacement complete. Data loggers deplayed	Qun	4/15/2022
163	Scrubbers (2) controls		Has VFD but not used. Re-enable VFD controls	Coatings	HVAC		Gems	186,456	$ 7,458	$ 10,442	Electric		4/22/22: Work with QA to ensure this can be done.	Brenda	6/1/2022
167	Turn off exhaust rooftop units. Over ventilated		6 exhaust fans @ 10 hp each. Likely can turn two off.	Warehouse	HVAC		Quick wins	15,684	$ 627	$ 878	Electric		4/22/22 - Working up plans to submit to change process	Darin	6/30/2022

Participant Experience – Energy Model

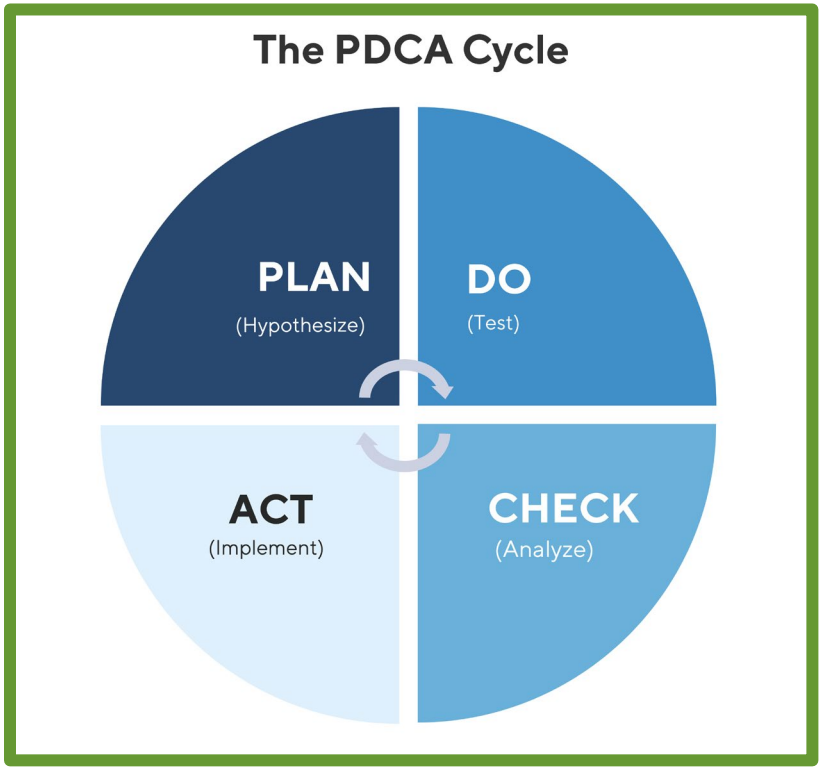


Participant Experience – Employee Engagement



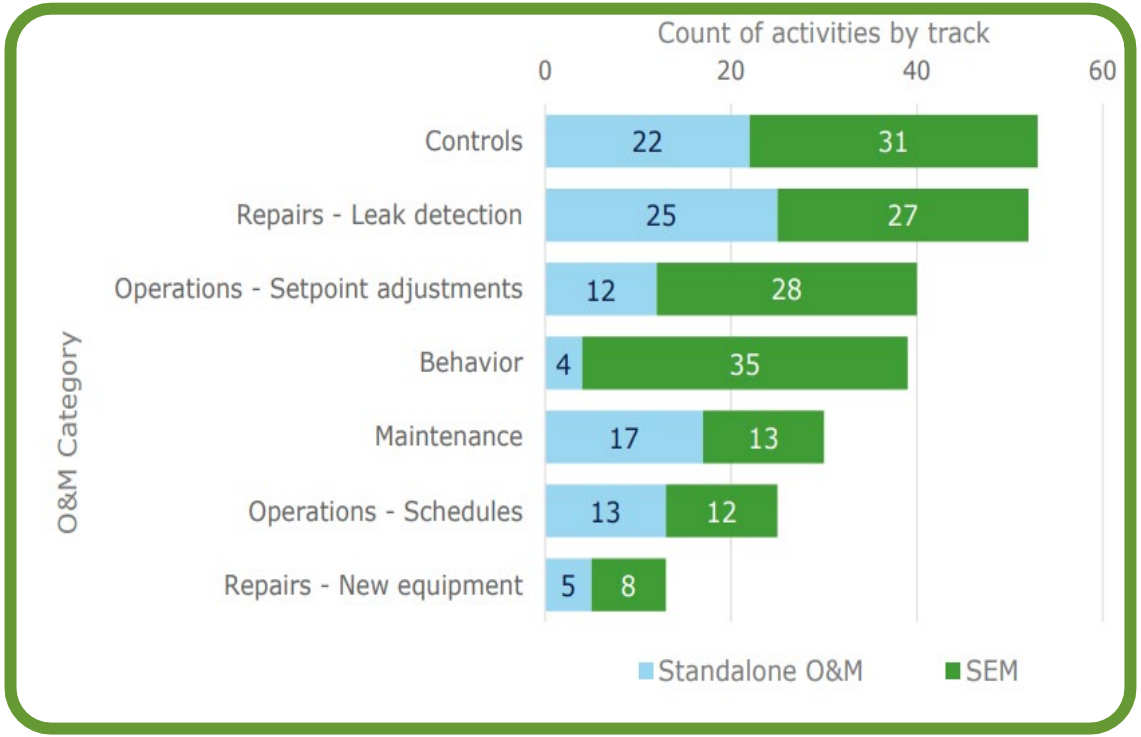
https://blog.energytrust.org/tacos-spark-energy-engagement/

Participant Experience – Continuous SEM



- SEM = Continuous Improvement
  - PDCA
  - Lean
  - Six Sigma
  - Kaizen
  - ADKAR
- SEM has lasting power (5+ years)

Typical SEM Projects

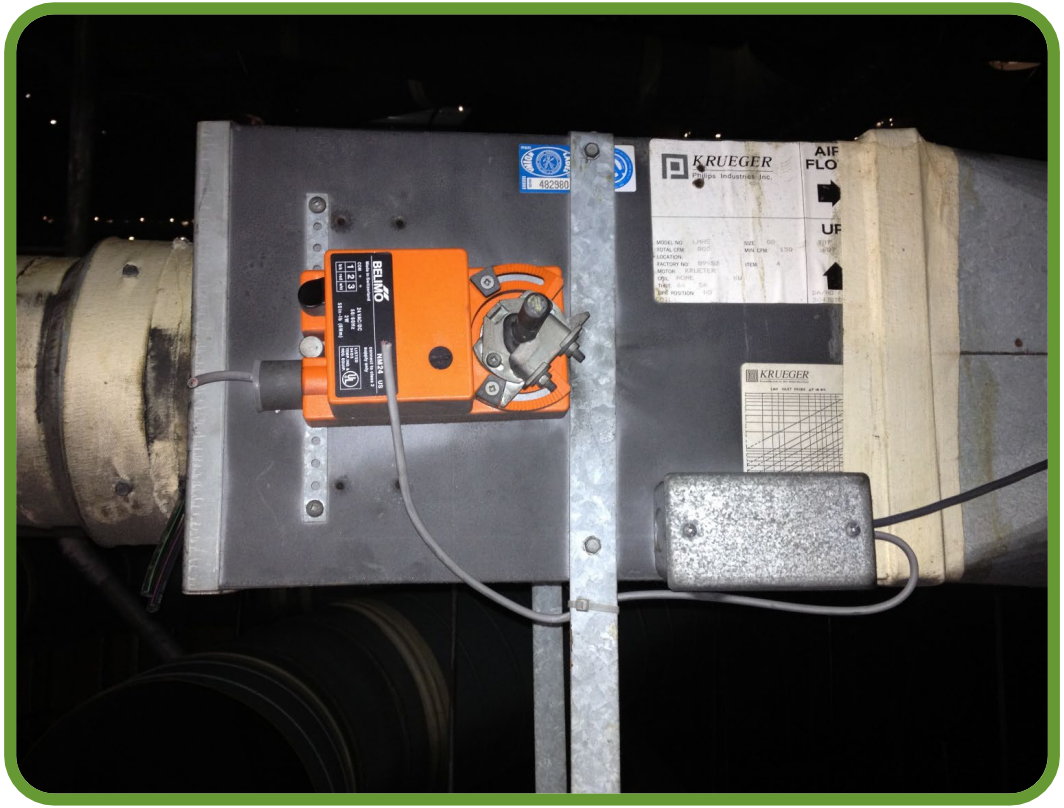


Industrial O&M Persistence Study: Program Years 2010 – 17. Energy Trust of Oregon. 2020

- Low & no-cost
  - Compressed air
  - Lighting
  - HVAC
  - Refrigeration
  - Dust Collection
  - Pumping
  - Hot water
  - Production process
  - Energy intensity/Waste reduction

What's This and What's Wrong?

What's This and What's Wrong?



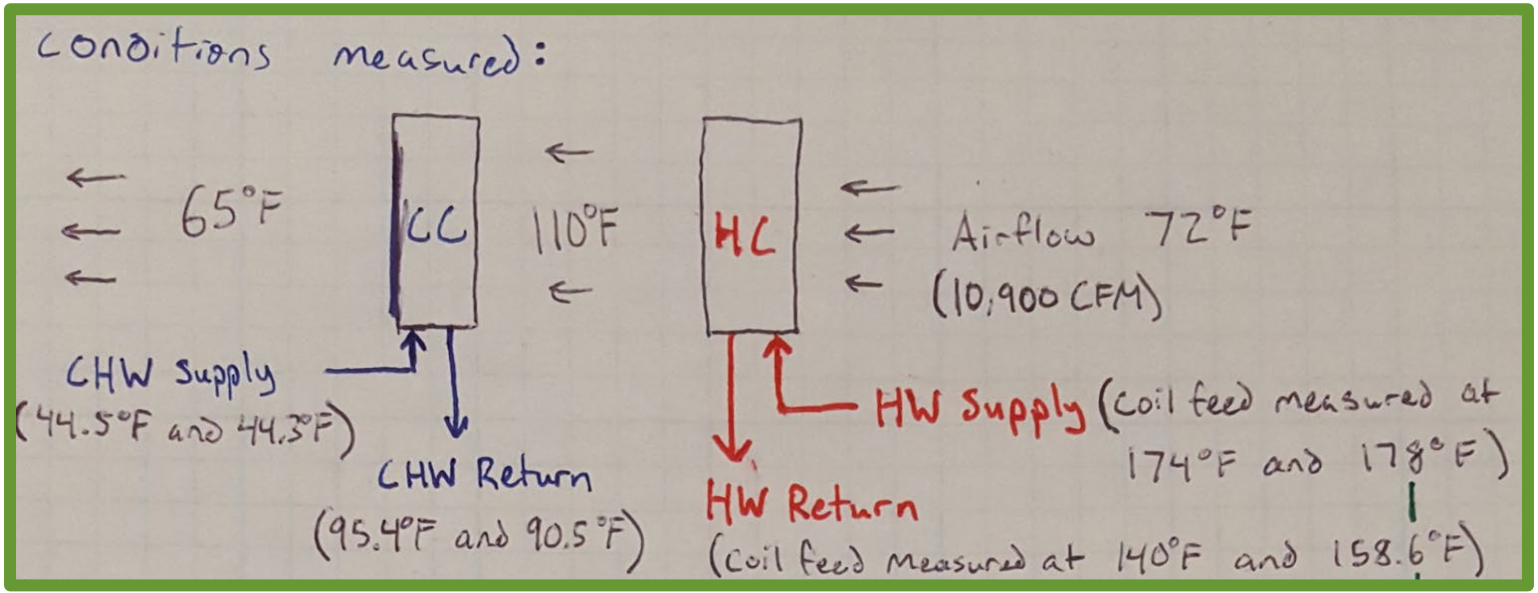
What’s This and What’s Wrong?

What's This and What's Wrong?

So What Exactly is an SEM Project?

Other Common HVACR SEM Projects

- Economizer repair
- Supply air temperature and duct static pressure resets
- Reduce VAV minimum flows
- Address rogue VAV zones
- RTU schedules and setbacks
- Chiller sequencing
- Lower minimum condenser water setpoints
- Repair failed hot water & chilled water valves
- Calibrate sensors
- Enable VFD control and disable mechanical flow control (DD, IGV, throttling valves)
- Schedule exhaust and MAU systems



How to Support Your Customers in SEM

- Ask to participate in a Treasure Hunt
  - Do your own scoping walk
- Send them other project ideas
  - We have found great success in re-evaluating projects that did not previously get support
- Provide controls implementation support
- Help define non-energy benefits of projects
  - Maintenance savings
    - Materials
    - Labor
  - Improved IAQ
  - Reliability

Closing Thought – Assume Nothing – Question Everything!

ENERGY350

Questions?

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