

2014 National Symposium on Market
Transformation

Opportunities in Residential HVAC

Scott Yee
Midwest Energy Efficiency Alliance
April 1st, 2014



Midwest Energy Efficiency Alliance(MEEEA)

MEEEA is a collaborative network whose purpose is to **advance energy efficiency** to support sustainable economic development and environmental preservation.



MEEA's Role in the Midwest

- Nonprofit serving 13 Midwest states
- 10+ years serving states, energy offices, utilities and communities
- Staff of 25 in Chicago
- Actions
 - Designing & Administering Energy Efficiency Programs
 - Evaluating & Promoting Emerging Technologies
 - Regional Voice for DOE/EPA & ENERGY STAR
 - Coordinating Utility Program Efforts
 - Delivering Training & Workshops
 - Advancing Energy Efficiency Policy
 - Promoting Best Practices

HVAC SAVE



HVAC SAVE is a utility program that recognizes that HVAC equipment operating performance does not equate to rated performance, that reasonable losses occur at the installation and in the duct system, and that those losses can be mitigated and incremental savings captured.

What is HVAC SAVE?

- HVAC Quality Installation (QI) and Quality Maintenance (QM)initiative
- Performance tests
- Sponsored in Iowa by MidAmerican Energy, Alliant Energy, Black Hills Energy, and Cedar Falls Utilities
- Two primary program elements
 - Training/Certification
 - Field performance testing and verification

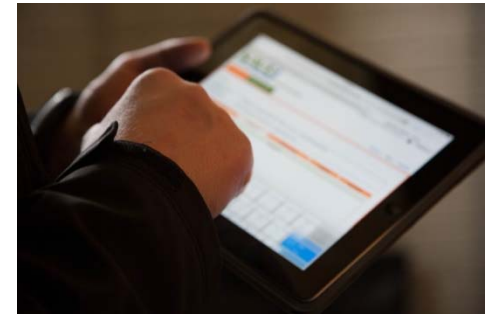
HVAC SAVE Objectives

1. Achieve and verify energy savings
2. Provide quality contractors with a set of practices and tools to verify quality work
3. Create a screening tool for homeowners to identify quality contractors
4. Get better data on installations, system performance and tune-ups

HVAC SAVE program elements

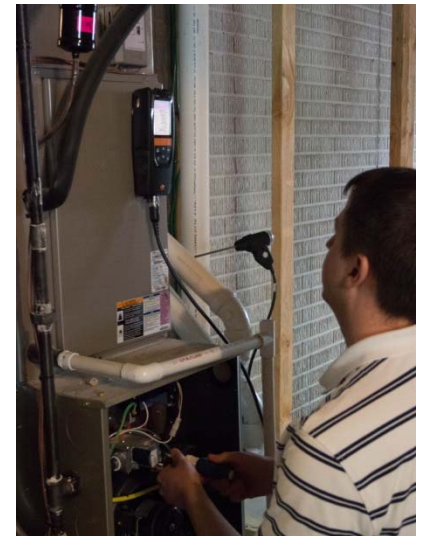
(1) Training and Certification

- MEEA created HVAC certification and partnered with ESI
- Develops pool of trained and certified HVAC professionals



(2) Field Performance Testing and Software Tool

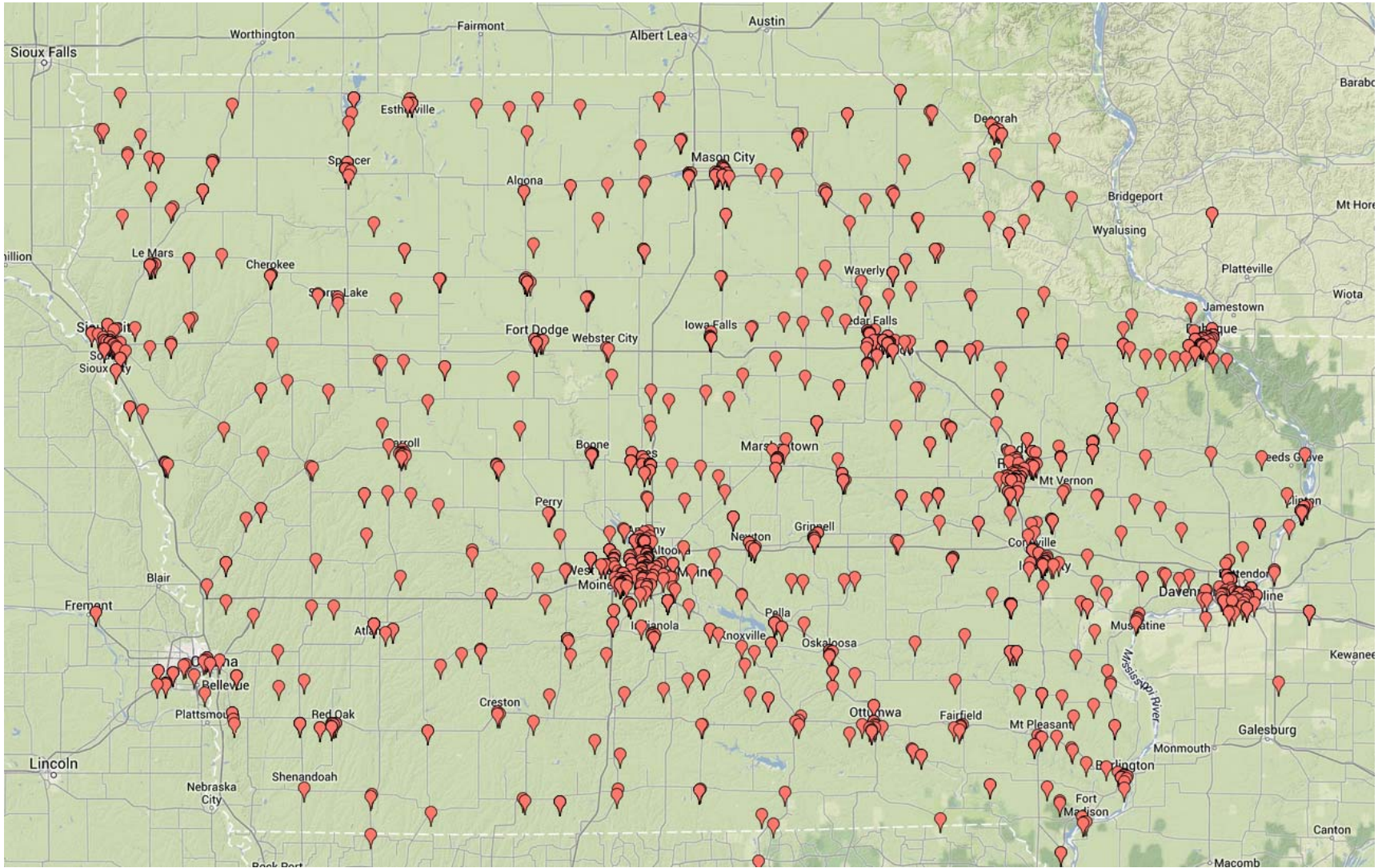
- Web based
- Measure, adjust, verify, and report
- www.hvacsaveoftware.com



HVAC SAVE program statistics

- Years active: 4 years
 - Number of trainings: 91
 - Trained individuals: 1700+
 - Number of companies: 675
 - HVAC SAVE certified installations: 8000
 - Installations per day: 40
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- January 1st, 2014 – HVAC SAVE became a requirement for a furnace, AC, ASHP, GSHP rebate

HVAC SAVE Trade Allies

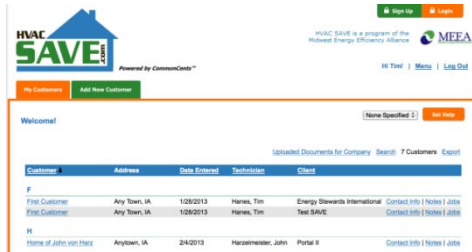


HVAC SAVE program overview

1. Contractors take initial system measurements



5. Contractor tests out work completed



2. Measurements recorded into Software

HEATING EQUIPMENT TESTING CONTRACTOR REPORT

Job Name: East River Park
 Technician: Bob
 Address: 123 Main St, Des Moines, IA 50315
 Date: 5/21/2013
 Start Time: 8:00 AM
 Finish Time: 12:00 PM

Equipment Information

Manufacturer	Model	Year	Capacity
Carrier	58CXC	2012	3.5
Carrier	58CXC	2012	3.5


Equipment Performance Results

Test	Value	Pass/Fail
Load Capacity	100%	Pass
Efficiency	95%	Pass
Temperature Rise	20°F	Pass

4. Contractor makes repairs

3. Software provides printouts for homeowners and contractors.

HVAC SAVE program elements




Tim Hanes
1234 Main St.
Pleasantville, IA 50225
515-710-9750
tim@whyesi.com


Holt Plumbing & Heating, Inc.
111 2nd Ave.
West Des Moines, IA 50263
515-710-9722
service@holthvac.com

Performance

Equipment Performance




Duct Performance




Equipment Diagnostic Results


Equipment Age




Equipment Rated Efficiency




Equipment Temperatures




Equipment Airflow




Equipment Pressure




Filter Type




Filter Condition




Filter Pressure



Coil Pressure




Blower Condition




Duct Diagnostic Results


Supply Duct Temperature




Supply Duct Leakage




Supply Duct Pressure




Supply Duct Balance




Return Duct Temperature




Return Duct Leakage








Return Duct Pressure



Return Duct Balance



Iowa Utility Sponsors & Supporters

HVAC SAVE program elements



test save new home with es
1111 main st
Des Moines, IA 555555
333-555-5555
tim@whyesi.com

Heating Equipment Testing Contractor Report Furnace

Energy Stewards International
8450 Hickman Rd. Suite 26
Clive, IA 50325
515-710-9750
tim@whyesi.com

General Information

Job Name	heat furn qc cfu	Date	1/21/2013
Technician	tim	Start Time	1:00 AM
Altitude	900	Finish Time	1:00 AM

Equipment Information

Furnace
Manufacturer **Lennox**
Model # **furn mod**
Serial # **furn ser**
Rated AFUE **94**
Rated Input **100000**
Rated Output **94000**

Indoor Coil
Manufacturer **Lennox**
Model # **evap mod**
Serial # **evap ser**

Outdoor Equipment

Manufacturer **Lennox**
Model # **outdoor mod**
Serial # **outdoor ser**
Rated SEER **16**

Equipment Performance Results

SAVE Score	120	Adjusted Input	69231
Measured Btu/h	78019	Adjusted Output	65077

Duct Performance Results

Supply Duct		Total Duct	
SAVE Score	75	SAVE Score	67
Btu/h Loss	19644	Btu/h Loss	25635
Return Duct			
SAVE Score	92		
Btu/h Loss	5991		

System Performance Results

SAVE Score	80	Measured Btu/h	52384
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test save new home with es

heat furn qc cfu

Equipment Airflow

Measured CFM	1290	Fan Speed	Medium Low
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Static Pressure Measurements

Equipment		Filter	
Suction Pressure	0.4	Before Pressure	0.2
Discharge Pressure	0.37	After Pressure	0.4
Total ESP	0.77	Pressure Drop	0.2
Duct		Coil	
Supply Pressure Drop	0.1	Before Pressure	0.37
Return Pressure Drop	0.2	After Pressure	0.10
Total Pressure Drop	0.3	Pressure Drop	0.27

Equipment & Outdoor Temperature Measurements

Equipment		Outdoor	
Supply DB	125	Ambient DB	32
Return DB	69		
ΔT	56		

Register & Grille Temperature Measurements

Supply Register		Return Grille	
Register #1 DB	110	Grille #1 DB	70
Register #2 DB	0	Grille #2 DB	0
Register #3 DB	0	Grille #3 DB	0
System			
Average Register DB	110		
Average Grille DB	70		
ΔT	40		

HVAC SAVE program elements



National Support for HVAC SAVE

Building America (NREL)

- Under GTI PARR
- Funding to collect and analyze SAVE field data
- Multi-year opportunity to do billing and energy use analysis

US EPA Grant

- Multi-year funding to develop outreach and marketing materials
- Develop consumer and contractor facing pieces
- Develop website that houses research, data and case studies

HVAC SAVE QI and QM measures

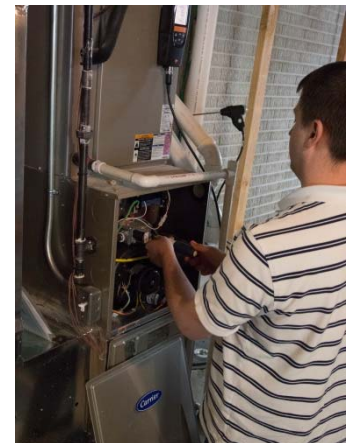
Quality Installation

- Using proper sizing, tuning, and airflow, the installer optimizes the installation
- Installed equipment must test out at 85+ of nameplate rated capacity to rate as 'Excellent' and qualify for program
- Measurements are taken at the equipment level, excluding the ductwork (to date)



Quality Maintenance

- Combustion tuning
- Adjust fan speed
- Modify filtration
- Repair duct work
- Duct sealing
- Increase airflow
- Increase delivered BTUs
- Add return ductwork



HVAC SAVE Energy Savings

Scenario #1: 90,000 BTU furnace, 92 AFUE, 70 Equipment SAVE Score, 70 Duct SAVE Score.

Scenario #2: 90,000 BTU furnace, 92 AFUE, 95 Equipment SAVE Score, 85 Duct SAVE Score.

		Scenario #1	Scenario #2
Equipment Rated BTUs		90,000	90,000
Equipment Loss	AFUE	82,800	82,800
Installation Loss	Equipment SAVE Score	57,960	78,660
Duct Loss	Duct SAVE Score	40,572	66,861
Total System Performance		45%	74%

HVAC SAVE Utility Cost Effectiveness



HEATING & COOLING SAVE-CERTIFIED EXPERTS
Specialized Training to Save Money Now and Years to Come

HVAC SAVE ENERGY EFFICIENCY RESULTS

The new System Adjustment and Verified Efficiency (SAVE) certification assures you that the heating and cooling professional installing your new heating, ventilation and cooling (HVAC) system is properly trained in energy efficiency installation and measurement. Your HVAC SAVE-certified contractor's assessment will see to it that you purchase the most appropriate, energy-efficient system for your home, and that it's installed correctly for optimum savings and comfort.

SAVE-CERTIFIED CONTRACTORS SAVE YOU MONEY

- ★ **REBATES**
In Iowa, beginning in 2014, Alliant Energy and MidAmerican Energy will require that HVAC equipment eligible for rebates be installed by a SAVE-certified contractor.
- ★ **LOWER ENERGY COSTS**
By having your HVAC SAVE-certified contractor assess, install and maintain your system, you are assured it is as efficient as possible in order to save you money on your energy bills month after month, year after year.
- ★ **PROPERTY VALUE**
The ability to present future buyers of your home with a verified efficiency rating certificate will assure them of the quality of the HVAC system to preserve your home's value.

HVAC SAVE: APPROVED BY ALLIANT ENERGY AND MIDAMERICAN ENERGY
As part of Alliant Energy's and MidAmerican Energy's longstanding efforts to promote energy efficiency for you and your home, both companies have embraced the HVAC SAVE certification, urging Iowa contractors to complete the rigorous training required to become SAVE-certified.

SAVE-CERTIFIED PEACE OF MIND
To ensure your heating and cooling professional has the knowledge and understanding to install and maintain your heating and cooling system – and save you money – trust a SAVE-certified contractor approved by Alliant Energy or MidAmerican Energy. For a complete list, visit www.hvacsave.com.



HEATING & COOLING SAVE-CERTIFIED EXPERTS

- ✓ Save Money
- ✓ Save Energy
- ✓ Add Comfort
- ✓ Preserve Value
- ✓ Peace of Mind

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Iowa's Power and Light
www.alliantenergy.com/hvacsave

MIDAMERICAN ENERGY
Iowa's **save some green.**
www.midamericanenergy.com/ee

Most furnaces, heat pumps and central air conditioning systems are so reliable you can depend on them to last for decades. But, this may not be so if you have been living with an underperforming system.

Alliant Energy and MidAmerican Energy Company want you to work with a SAVE-certified professional so you are getting the best performance out of your system.

FOR MORE INFORMATION ABOUT HVAC SAVE CERTIFICATION, PLEASE CONTACT:
800-245-9876
www.hvacsave.com

SAVE MONEY NOW AND YEARS TO COME

• Furnace

- Measure life 15 years
- Cost for SAVE install \$300
- NPV \$412
- Societal B/C is 1.37

• Central Air Conditioner

- Measure life 11 years
- Cost for SAVE install \$300
- NPV \$593
- Societal B/C is 1.98

HVAC SAVE contractor success

- **Contractor**

- *Initial reaction was very vocal and negative*
- Reputation building
- Utility promotion
- Reduce warranty costs
- Rebate income
- Enables a system-level 'whole house' look



“When we started it was an eye opening experience. Now we have performance information that tells us when our installation process is truly complete.”

“We perform these tests for our new homes programs anyway. The software makes it a lot more convenient and the rebate income is gravy.”

Questions?

Scott Yee

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