

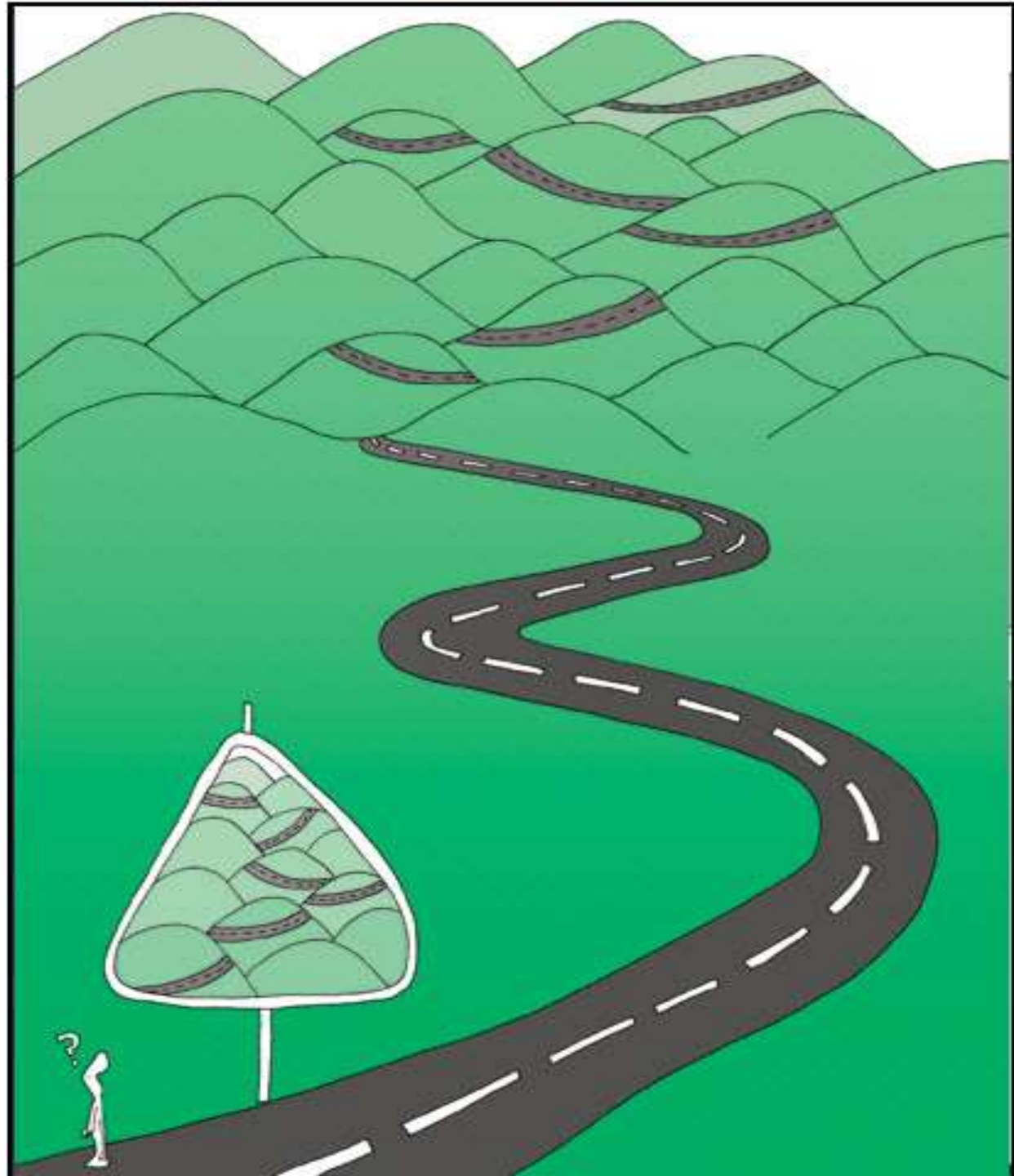
HVAC In Transition

HVAC Market Transformation

A Long & Winding Road

HVACRedu.net

Workforce Development Online for the HVACR Industry



Why Do I Have an Opinion?

- 35 Years as a Tech, Contractor, Educator
- HVAC Workforce Development is What We Do
 - Utilities
 - Xcel Energy QI Program & Data Base
 - GRE QI Program & Data Base
 - SCE ItsAboutQ.net
 - Other Clients
 - Community College Blends
 - Proprietary School Blends
 - Work Force Training Center Blends
 - Contractor Crews
 - Individual Technicians



- An Online HVAC WE&T Program Launched in July 2011
 - 2175 Users current
 - Primary Mission is to boost the workforce to certification
 - SCE Residential and Commercial programs require certified techs
 - Secondary Missions have been multiple
 - Support CQM HVAC Optimization program
 - Refresher fundamentals (Refrigeration Cycle, Air, Electrical)
 - Support ADEC program and other sector strategies
 - Advanced Digital Economizer Controls
 - Support outreach efforts SCE to the Community
 - High Schools
 - Workforce Development through others

Two Ways to Cool Down Means Two Ways to Save.

Air conditioning systems are one of the biggest users of electricity in your home, which is why SCE is offering two rebate programs where you can save energy, money and the environment, all while staying comfortable: They are the Quality Maintenance Program and the Quality Installation Program.

[Read More >](#)



ENERGY STAR[®]
Installation Program



Become an A/C Quality
Approved Installer

Be HVAC Wise and Optimize

Whether you're a customer or a contractor, the HVAC Optimization Program from SCE is designed to increase energy efficiency and improve your bottom line.

[I am a customer](#)

[I am a contractor](#)



[I am a Customer](#)



[I am a Contractor](#)

Xcel Energy MN & CO / GRE MN & Dakotas

- Quality Installation Program in MN
 - Assessment designed to determine awareness of Quality Installation Procedures
 - Provide a Public Search Data Base Online
 - Xcel Energy
 - GRE
- Quality Installation Program in CO
 - Data Base Only

Xcel Energy MN Registered Contractor Public Search



Locate an Xcel Energy Registered Contractor

Contractors who are registered for one rebate program ARE NOT necessarily registered for ALL rebate programs. Not all programs require you to use a registered contractor, but we recommend it because these contractors are more likely to have knowledge about available rebates. If you will be applying for multiple rebate programs, be sure to conduct a separate search for each category you're interested in and read the text clarifying whether a registered contractor is required for that program.

Equipment Category:

- Central Air Conditioners:
- Air Source Heat Pumps:
- Ground Source Heat Pumps:
- Home Performance:
- Insulation:
- Natural Gas Furnaces:
- Natural Gas Boilers:
- Water Heaters:

By participating in any Xcel Energy rebate program, you understand and agree that Xcel Energy is not responsible in any way for your selection of any HVAC or other contractor that will perform work for you, or for the work performed by any contractor you choose. It is solely your decision to choose the appropriate contractor for any work you choose to have done relating to a rebate program. You agree that you will not bring any claim against Xcel Energy relating to any work that any contractor performs, because that arrangement is between you and the contractor only.

For general questions about Xcel Energy's Minnesota residential rebate programs, please call 1-800-895-4999.

Xcel Energy Colorado Registered Contractor Public Search



Locate an Xcel Energy Registered Contractor

Contractors who are registered for one rebate program ARE NOT necessarily registered for ALL rebate programs. Not all programs require you to use a registered contractor, but we recommend it because these contractors are more likely to have knowledge about available rebates.

Select One

- I am looking for a contractor, to do a single improvement
- I am looking for a home energy auditor
- I am looking for a Home Performance contractor, to do several improvements

By participating in any Xcel Energy rebate program, you understand and agree that Xcel Energy is not responsible in any way for your selection of any HVAC or other contractor that will perform work for you, or for the work performed by any contractor you choose. It is solely your decision to choose the appropriate contractor for any work you choose to have done relating to a rebate program. You agree that you will not bring any claim against Xcel Energy relating to any work that any contractor performs, because that arrangement is between you and the contractor only.

For general questions about Xcel Energy's Colorado residential rebate programs, please call 1-800-895-4999.

Next

Great River Energy Registered Contractor Public Search



Locate a Great River Energy Cooperatives' Registered Contractor

In order to receive rebates from Great River Energy Cooperatives' for the Residential Central AC and ASHP Rebate Program, you must use a contractor who is currently registered through HVACReduction.net to install qualifying equipment. These contractors have agreed to the terms of the program and passed a test demonstrating their knowledge of quality installation practices.

Fill in any of the fields below to find a registered contractor. You may search for a specific contractor, or you may search for all registered contractors within a geographic area. (If you are having trouble finding results in your area, try grouping your search by selecting either the company name, City or zip code. This will then sort the results in alphabetical (A to Z or Z to A) or numerical (ascending/descending) order.)

You must select one equipment category.

Equipment Category:

Central Air Conditioners:

Air Source Heat Pumps:

[Click Here for Contractor Listing](#)

Participating electricity distribution cooperatives of Great River Energy

Agralite Electric Cooperative • 320 E. Highway 12, PO Box 22, Benson, MN 56215 • 320/843-4150 • www.agralite.coop

Arrowhead Electric Cooperative, Inc. • PO Box 39, Lutsen, MN 55612-0039 • 218/663-7239 • www.aecimn.com

BENCO Electric Cooperative • 20946 549th Avenue, PO Box 8, Mankato, MN 56002-0008 • 507/387-7963 • www.benco.coop

Brown Count Rural Electrical Association • 24386 Highway 4 North, PO Box 529, Sleepy Eye, MN 56085-0529 • 507/794-3331 • www.browncountyrea.coop

Connexus Energy • 14601 Ramsey Boulevard, Ramsey, MN 55303-0279 • 763/323-2650 • www.connexusenergy.com

Cooperative Light & Power • 1554 Highway 2, PO Box 69, Two Harbors, MN 55616-0069 • 218/834-2226 • www.clpower.com

Crow Wing Power • PO Box 507, Brainerd, MN 56401-0507 • 218/829-2827 • www.cwpower.com

Dakota Electric Association • 4300 220th Street West, Farmington, MN 55024-9003 • 651/463-6212 • www.dakotaelectric.com

East Central Energy • 412 North Main, PO Box 39, Braham, MN 55006-0039 • 800/254-7944 • www.eastcentralenergy.com

Technician Process

- TCA (Technical Core Assessment)
 - Topic Specific Assessment 20 questions
 - 8 Core Sections
 - Equate to NATE or HVAC Excellence Core Certifications
 - **Largest challenge to existing workforce**
 - 21 Specialty Sections
 - Covering BPI, HVAC Excellence & NATE technical certifications
- PEP (Personal Education Plan)
 - Average tech needs 4-5 courses (70-80 Hours of education)
 - Average increase of 170% in knowledge base
- 92% Success on Certification Exams

Technician TCA Results

Represents 1000+ Assessments

Technicians=Contractor Employees

FET = Facility Engineering Tech

Overall Average 61.25%

TCA assessments are designed to measure what is considered to be a “reasonable” competency level to perform HVAC related work satisfactorily

TCA Assessment CORE	Technicians	FET
HVAC Safety	72.93	75.47
Technician Energy Efficiency Awareness	87.61	
Electrical 1 (Basic DC)	57.17	62.25
Electrical 2 (Basic AC)	57.04	58.53
Electrical 3 (Common Components)	54.28	55.47
Electrical 4 (Electric Motors)	51.78	55
HVAC Applied Physics	60.42	63.33
Air Properties and Measurement	54.43	57.95
Refrigeration Cycle (Basic)	75.77	71.95
CORE Overall Average	63.49	62.49
TCA Assessments SPECIALTY		
Economizer	42.91	45.64
Refrigeration Cycle Service & Maintenance	59.82	57.92
Air Conditioning Troubleshooting	45.07	47.46
Comfort Gas Heating	53.46	53.59
Hydronic Heating	50	55
Comfort Heat Pump	48.99	48.81
Load Calculations	63.22	60.32
Air Distribution	62.48	62.88
Building Science	53.43	67.5
Building Performance	51.18	40

A Long and Winding Road (and we just got started)

- **The existing workforce**

- **Contractors**

- **D&B data base = 230,000 Contractors in US**

- **Familial**

- **Average 5 person shop**

- **Unaware**

- **Less than 10% belong to an industry related association or other sources of professional development.**

- **They have little or no connection to the HVAC industry**

- **Apathetic**

- **To WE&T**

- **Free or otherwise**

- **To growth**

- **I'm good where I am**

- **To professionalism as it might be defined by those who know what it means**

- **Of course I'm a professional!**

A Long and Winding Road (Technician Curve)

- **Technicians in the Trenches (existing workforce)**
 - **Very high percentage with no foundation or lost their foundation years ago**
 - The sharpest part of the technician curve
 - No foundation = No comprehension = No HVAC energy efficiency
 - I don't know what I don't know syndrome (or)
 - I don't care what I don't know I'm still getting paid (so bug off)
 - **All of HVAC energy efficiency is directly connected to foundation skills & knowledge!**
 - **High tech efficiency requires higher tech technicians!**
 - **Getting more with less probably isn't going to happen (even if it is automated)**
 - Efficient use of energy requires a deeper understanding of how the refrigeration cycle works
 - Efficient use of energy requires a deeper understanding of how air & water heat transfer works
 - Efficient use of fuel gas energy requires a deeper understanding of how combustion works

HVAC Industry Today



OH-OH

Why Review Technical Basics?

- Many techs are “rusty” on their theory and need a review of the “basics”
- Recently (July 2013) a large chain of retail stores recorded all of the work performed by HVAC technicians at 182 locations across the country. All of the techs were certified by national agencies and employed a long time by established companies, the results.....
 - 32% could not identify if the unit had a TXV or not
 - 58% could not figure out how to measure the Return Air Web Bulb Temperature
 - 57% could not identify if the high side was a liquid or discharge line
 - 36% did not measure the Liquid Temperature – though required to do so
 - 24% listed the Super Heat as “unknown”
 - 100% OF THE TECHNICIANS LISTED THESE UNITS AS HAVING NO PROBLEMS!

WO32

- **Problems on the Roof Top**
 - **All based upon lack of fundamental skills and knowledge**
 - **Purging hoses**
 - **Belt tension and alignment**
 - **Air flow basics**
 - **Refrigeration cycle basics**
 - **Using diagnostic tools**
 - **Economizers**
 - **Using computers***

What To Do?

- **Don't Assume (we all know what assume means)**
 - That certified technicians always know what they are doing
 - That HVAC training programs are all the same (or even close)
 - Public or Private / Accredited or Non Accredited
 - The person teaching HVAC is qualified to teach HVAC
 - That HVAC technicians understand their role in energy efficiency
- **IMO (and others) it is too late for the existing work force (pretty much)**
 - You can lead a horse to water.....
- **Successful market transformation must be initiated at the beginning**
 - This will solve the problem faster than anything else
 - Catch them while they are ready to learn and learn them good!
 - Do the math.....
- **Engage with your HVAC program providers**
 - Address the issues at the source
 - A utility rep with an agenda should be on every HVAC program advisory board

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