



Energy Efficiency
PROGRAM

Thanks to Our Sponsors



CARMEAN
ELECTRICAL
HEATING & COOLING
217-789-1155

www.carmeanelectric.com





COMPRESSED AIR SYSTEMS

UNLOCKING ENERGY SAVINGS AND INCENTIVES

Will Wilson
Engineering Technical Review Lead
Leidos Inc.

Compressed Air: A Hidden Operating Cost



Energy Efficiency
PROGRAM

- Compressed air can account for **10% or more** of a facility's electricity use.
- **Leaks, excessive pressure, inefficient controls** and **unnecessary air consumption** increase operating costs.
- Many improvements can be made **without replacing the entire compressor system**.
- Better system performance can **improve reliability, reduce maintenance** and **free up capacity**.

You don't always need a new compressor to tackle high compressed-air costs.

Where Does the Energy Go?



Energy Efficiency
PROGRAM

Compressed air energy losses occur throughout the system.

Supply: Inefficient compressors, ineffective controls and poor sequencing.

Distribution: Leaks, undersized piping and pressure drop.

Demand: Excessive pressure and unnecessary air use.

Treatment: Inefficient dryers and excessive purge air.

Heat: Compressor energy rejected instead of recovered.

Significant savings are hiding in every part of your compressed-air system.

Strategy 1: Find and Fix the Leaks

Company A — Metal Fabrication



Energy Efficiency
PROGRAM

The problem:

- Three 150hp compressors serve a multi-shift facility.
- Leaks are widespread across hoses, fittings, valves and connections.
- Compressors generate air that never reaches a productive end use.

The solution:

- Conduct an ultrasonic leak survey.
- Tag and prioritize leaks by severity.
- Repair leaks and establish a recurring inspection program.

Savings example:

- Annual electricity savings: **300,000 kWh**
- Annual utility savings: **\$27,000**
- Project cost: **\$15,000**
- Incentive: **\$6,000**
- Customer net cost: **\$9,000**
- Simple payback: **4 months**

The cheapest compressed air is the air you never produce.

Strategy 2: Optimize Compressor Controls



Energy Efficiency
PROGRAM

Company B — Food Processing

The problem:

- Multiple compressors operate independently.
- Units spend excessive time unloaded or operate inefficiently at part load.
- Compressor sequencing doesn't match actual demand.

The solution:

- Analyze compressor loading and unloading.
- Establish sequencing based on system demand.
- Enable a master controller and add appropriate storage.
- Install a VFD on the trim compressor.

Savings example:

- Annual electricity savings: **400,000 kWh**
- Annual utility savings: **\$36,000**
- Project cost: **\$45,000**
- Incentive: **\$36,000**
- Customer net cost: **\$9,000**
- Simple payback: **3 months**

Coordinating compressors to run as a team saves energy.

Strategy 3: Reduce System Pressure

Company C — Manufacturer



Energy Efficiency
PROGRAM

The problem:

- The system operates at 115 psig.
- Most equipment can operate at lower pressure.
- Pressure has been increased to compensate for distribution restrictions.

The solution:

- Measure pressure at compressor and critical end uses.
- Correct restrictive filters, regulators and piping.
- Confirm minimum pressure requirements with production.
- Reduce the setpoint incrementally and monitor performance.

Savings example:

- Annual electricity savings: **180,000 kWh**
- Annual utility savings: **\$16,200**
- Project cost: **\$8,000**
- Incentive: **\$6,400**
- Customer net cost: **\$1,600**
- Simple payback: **1.2 months**

Fix pressure-drop problems instead of simply increasing system pressure.

Strategy 4: Stop Using Compressed Air for Everything



Energy Efficiency
PROGRAM

Company D — Machine Shop

The problem:

- Open pipes and improvised nozzles are used for cleaning and cooling.
- Compressed air is used where fans, blowers or engineered nozzles may work just as well.
- Some applications consume air continuously even when not needed.

The solution:

- Identify and quantify inappropriate uses.
- Install engineered air-entraining nozzles where suitable.
- Replace air-powered cooling with fans or blowers where practical.
- Add shutoff valves and operating procedures.

Savings example:

- Annual electricity savings: **100,000 kWh**
- Annual utility savings: **\$9,000**
- Project cost: **\$12,000**
- Incentive: **\$4,000**
- Customer net cost: **\$8,000**
- Simple payback: **11 months**

Use compressed air only when it is the right tool for the job.

Strategy 5: Recover Compressor Waste Heat



Energy Efficiency
PROGRAM

Company E — Warehouse with Industrial Workshop

The problem:

- An air-cooled compressor rejects heat to the outdoors.
- The facility uses natural gas to heat nearby occupied space.

The solution:

- Install ductwork to route compressor exhaust heat to a space requiring heat.
- Add thermostatic control to match heat recovery to demand.
- Verify that recovered heat displaces natural gas rather than overheating the space.

Savings example:

- Compressor capacity: **100 hp**
- Annual natural gas savings: **8,000 therms**
- Annual gas savings: **\$6,400**
- Project cost: **\$12,000**
- Customer net cost: **\$7,000**
- Simple payback: **1.1 years**

Channel compressor waste heat to offset space-heating costs.

Don't Overlook Storage, Dryers and End-Uses



Energy Efficiency
PROGRAM

Other measures worth evaluating:

Air receiver storage: Add appropriately sized storage to reduce short cycling and improve compressor control.

Dryer controls: Install demand-based dew-point controls on eligible regenerative desiccant dryers.

AODD pump controls: Add electronic stroke-optimizing controls to eligible air-operated double-diaphragm pumps.

Distribution: Reduce pressure drop through properly sized piping, filters and fittings.

Maintenance: Keep filters, drains, dryers and control systems operating as intended.

Small equipment improvements add up quickly.

How Ameren Illinois Incentives Fit In



Energy Efficiency
PROGRAM

Standard Incentives

Predetermined incentives for eligible equipment and measures.

Engineering calculations not required. Must meet equipment eligibility requirements.

- **Compressed-air storage receiver tank:** \$2.50 per gallon
- **Compressed-air heat recovery:** \$50 per compressor hp
- **Reduced compressed-air setpoint:** \$2.00 per hp
- **Compressed-air filters:** \$450 per filter
- **AODD pump controls:** \$1,000 per pump
- **Efficient compressed-air nozzles:** \$60 per nozzle
- **Desiccant dryer dew-point controls:** \$5.00 per CFM
- **No-loss condensate drain:** \$400 per drain
- **Variable-frequency drive for air compressor** up to 200 hp: \$125 per controlled hp, capped at 80% of project cost

How Ameren Illinois Incentives Fit In



Energy Efficiency
PROGRAM

Compressed Air Retro Commissioning

Incentives for implementation of **no-cost and low-cost energy efficiency improvements** (0-2 year payback) to compressed air systems in manufacturing and industrial facilities.

Provides a **roadmap of energy efficiency opportunities** for capital improvement projects (2-12 year payback) that may qualify for Custom incentives.

Must include improvements beyond Standard measures.

Incentives to support a **system energy survey**: up to 80% of survey cost

Incentives for **validated energy savings**: \$0.02 per kWh

How Ameren Illinois Incentives Fit In



Energy Efficiency
PROGRAM

Custom Incentives

Projects that don't qualify for Standard or RCx measures.

Savings must be **calculated through engineering analysis** and/or pre- and post-installation system measurements.

Potential applications include compressor sequencing and controls, converting air-powered end uses to electric and broader system improvements.

Incentive: \$0.16/kWh capped at 80% of project cost.

Preapproval is required for Custom projects.

Check current program requirements and applicable caps before committing to a project.

From Idea to Incentive



Energy Efficiency
PROGRAM

A practical path to project implementation

Step 1 — **Identify:** Review compressor operation, pressure, leaks and production needs.

Step 2 — **Check eligibility:** Determine whether the project fits a Standard, Custom or RCx offering.

Step 3 — **Apply:** Submit required application and supporting documentation for preapproval if required.

Step 4 — **Implement:** Complete the project and provide invoices, operating data, and documentation.

Step 5 — **Receive incentive.**

Ameren Illinois Energy Advisors are here to guide you every step of the way!

www.AmerenIllinoisSavings.com/business/find-an-energy-advisor

Don't wait until equipment is installed to ask about incentives.

Energy Advisors and Registered Program Allies



Energy Efficiency
PROGRAM

Turn Expertise into Projects

Energy Advisors

- Conduct facility walk-throughs, **savings treasure hunts**.
- Help **navigate program requirements** and applications.

Program Allies

- Identify **leaks and inefficient practices**.
- Offer **system assessments** and compressor **performance logging**.
- **Recommend** controls, storage, pressure and end-use improvements.
- Develop **savings estimates** and **project scopes**.
- Follow up to **verify performance** and identify the next project.

Apply on your own, or involve EAs and PAs to streamline the process.

Three Actions to Take Back to Your Facility



Energy Efficiency
PROGRAM

Securing incentives that lead to utility savings

Start the hunt for waste: Consider leaks, pressure, compressor controls and inappropriate uses.

Engage the Program early: Contact your territory's Energy Advisor to explore Standard, Custom and RCx incentives before committing to implementation.

Follow through with applications: Stay in contact with Program representatives to provide required documentation and ensure timely review and payment.

You know your operation best. We're here to help.



QUESTIONS AND DISCUSSION



Energy Efficiency
PROGRAM

Thanks to Our Sponsors



CARMEAN
ELECTRICAL
HEATING & COOLING
217-789-1155

www.carmeanelectric.com

