

# Compressed Air Energy Audit Field Pack

Measure power, flow, pressure, controls, leakage and end use before adding savings.

|                   |                                                                              |
|-------------------|------------------------------------------------------------------------------|
| Maintainer        | Carl Li, Founder - kWhScan                                                   |
| Version           | 1.1                                                                          |
| Updated           | 2026-07-15                                                                   |
| Use               | Pre-audit field collection and technical review                              |
| Decision boundary | Replace representative values with site-specific data before investment use. |

## Before site work

|   |                                                                             |
|---|-----------------------------------------------------------------------------|
| 1 | Confirm which compressors, dryers and auxiliaries feed the measured header. |
| 2 | Identify representative shifts, products, shutdown and weekend modes.       |
| 3 | Record which end uses establish the minimum required pressure.              |
| 4 | Align power, flow, pressure and production timestamps.                      |

## Sampling note

Preferred resolutions in this pack are kWhScan screening recommendations, not mandatory standards. The site team must set representative periods for its operating modes, production schedule, safety requirements and decision risk.

# Compressed Air Energy Audit Field Pack - field checklist

Yellow columns are intended for site entry. Preserve timestamps and evidence provenance.

| Section       | Field                                               | Unit / format                            | Preferred resolution                                     | Evidence source                    | Site value | Level | Owner | Status | Notes |
|---------------|-----------------------------------------------------|------------------------------------------|----------------------------------------------------------|------------------------------------|------------|-------|-------|--------|-------|
| Boundary      | Included compressors and auxiliaries                | Text                                     | Current configuration                                    | P&ID and site walk                 |            |       |       |        |       |
| Baseline      | Station electricity                                 | kW and kWh                               | 1-minute for 7 representative days plus 12 monthly bills | Power meter                        |            |       |       |        |       |
| Baseline      | Delivered air flow                                  | Nm3/min or scfm                          | Aligned 1-minute for 7 representative days               | Calibrated flow meter              |            |       |       |        |       |
| Pressure      | Discharge, header and critical end-use pressure     | bar(g) or psig                           | Aligned trend plus remote spot checks                    | Controller and pressure sensors    |            |       |       |        |       |
| Controls      | Loaded, unloaded, VSD or blow-off state             | State and kW                             | 1-minute or controller event log                         | Controller export                  |            |       |       |        |       |
| Leakage       | Leak tag, location, flow and repair state           | Flow at stated pressure                  | Full survey before and after repair                      | Ultrasonic survey or measured test |            |       |       |        |       |
| Air treatment | Dryer purge, dew point, drains and pressure drop    | Flow, dew point and pressure             | By operating mode                                        | Controller trend or timed test     |            |       |       |        |       |
| End use       | Required pressure, duty cycle and regulator setting | Pressure and percent time                | Representative production cycle                          | Field observation or trend         |            |       |       |        |       |
| Production    | Shift, line output, shutdown and weekend state      | Site-defined                             | Aligned with energy trend                                | Production record                  |            |       |       |        |       |
| M&V           | Post-change matched trend                           | kW, flow, pressure, state and production | Same boundary and resolution as baseline                 | Verified trend                     |            |       |       |        |       |

# Compressed Air Energy Audit Field Pack - overlap control and M&V

Count each physical effect once and preserve the approved operating boundary.

| Measures                                | Overlap mechanism                                | Aggregation rule                                                |
|-----------------------------------------|--------------------------------------------------|-----------------------------------------------------------------|
| Pressure reduction + leak repair        | Lower pressure also lowers unregulated leak flow | Recalculate residual leakage or assign the pressure effect once |
| Pressure reduction + end-use regulation | Both reduce unregulated demand                   | Model regulated and unregulated users separately                |
| Sequencing + compressor replacement     | Replacement changes the final staging            | Simulate the final equipment set and sequence                   |
| Leak repair + controls                  | Lower demand changes unload and VSD hours        | Apply the repaired profile before control savings               |
| Heat recovery + compressor kWh          | Recovered heat displaces thermal utility         | Report electric and thermal effects separately                  |

## Minimum M&V record

Repeat the same metering boundary before and after the change. Compare matched operating periods or normalize for documented production and operating-hour differences. Do not reduce pressure until critical end-use pressure and transient response are measured.

## Sources and version

| Source                            | URL                                                                                                                         |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| U.S. DOE - Compressed Air Systems | <a href="https://www.energy.gov/cmei/ito/compressed-air-systems">https://www.energy.gov/cmei/ito/compressed-air-systems</a> |
| ORNL - MEASUR                     | <a href="https://industrialresources.ornl.gov/measur/home/">https://industrialresources.ornl.gov/measur/home/</a>           |
| kWhScan methodology               | <a href="https://kwhscan.com/methodology/">https://kwhscan.com/methodology/</a>                                             |
| Maintainer                        | Carl Li                                                                                                                     |
| Version                           | 1.1                                                                                                                         |
| Review status                     | Founder-reviewed; no independent reviewer claimed                                                                           |
| Public method                     | <a href="https://kwhscan.com/methodology/">https://kwhscan.com/methodology/</a>                                             |