

MAKING COMPRESSED AIR VISIBLE

FIELD MEASUREMENT AND VALIDATED MODELING REVEALED ACTUAL DEMAND, PRESSURE LOSSES AND A HIGH-ROI OPPORTUNITY TO REDUCE WASTED ENERGY

A REFINERY INCREASED VISIBILITY INTO AIR SYSTEM TO UNDERSTAND WHERE COMPRESSED AIR WAS GOING, HOW THE SYSTEM WAS PERFORMING AND WHERE ENERGY WAS BEING WASTED.

Compressed air represents a significant energy cost for industrial facilities, yet many sites have little visibility beyond a handful of pressure instruments. At this refinery, limited instrumentation meant decisions were inferred on pressure rather than actual measured demands, leaving the team with an incomplete view of compressor output, dryer losses, distribution constraints and compressor blowoff.

CHALLENGE

Although the facility had a few pressures available online, it lacked the instrumentation needed to fully understand compressed air supply, demand and losses.

- How much air each compressor was supplying?
- What pressure was being lost across dryers and piping?
- Which instruments could be trusted
- Which compressors were overloaded or underloaded and blowing off

Without that information, costly decisions relied on broad assumptions rather than actual system conditions.

SOLUTION

Hydrus Works filled the instrumentation gap with independently logged field flow and pressure measurements, generating over one million operating data points over a two-week period. The team measured compressor and unit flows, logged pressure at over 30 locations, characterized dryers, cross-checked online pressure readings, and identified unreliable online instruments.

These measurements were used to build and validate a hydraulic model that reflected how the system actually operated in today's conditions, not simply how it was designed.

RESULTS

The field-validated model provided:

- Total system demand broken down by compressor, area and consumer
- Pressure-loss profiles for dryers, long piping runs, bottlenecks and undersized piping
- Visibility into compressor load distribution, partial loading and blowoff
- Scenario analysis showing how setpoint changes would balance compressors, reduce blowoff (save energy), while providing a high resolution view of the scenario's impacts to the overall network

Model-based optimization gave the process team a defensible path to minimize blowoff without risking system pressure, and turned limited visibility into a measurable, high-ROI operating opportunity.

Field measurement transformed a pressure-only view into a validated picture of compressed air performance, exposing avoidable blowoff and enabling smarter setpoint decisions.