UPPER-WEST

CHP TECHNICAL ASSISTANCE PARTNERSHIPS

PROJECT PROFILE

Trailblazer Pipeline Compressor Station

4-MW WHP System

Quick Facts

LOCATION: Peetz, Colorado
MARKET SECTOR: Oil and Gas, Midstream
ANNUAL ELECTRIC OUTPUT: 27,600 MWh/year
EQUIPMENT: Ormat Organic Rankine Cycle Heat Exchanger
FUEL: Waste heat from turbines drive pipeline compressors
IN OPERATION SINCE: 2009
ENVIRONMENTAL BENEFITS: Site produces virtually no emissions. No water is used.
FINANCIAL BENEFIT: $10 million over 20 years
YEARLY ENERGY SAVINGS: $500,000
WHP IN OPERATION SINCE: 2009
NOTE: Qualifies as an eligible energy resource under Colorado's RES. Provides baseload non-intermittent electricity source for Highline Electricity Association.

Site Description

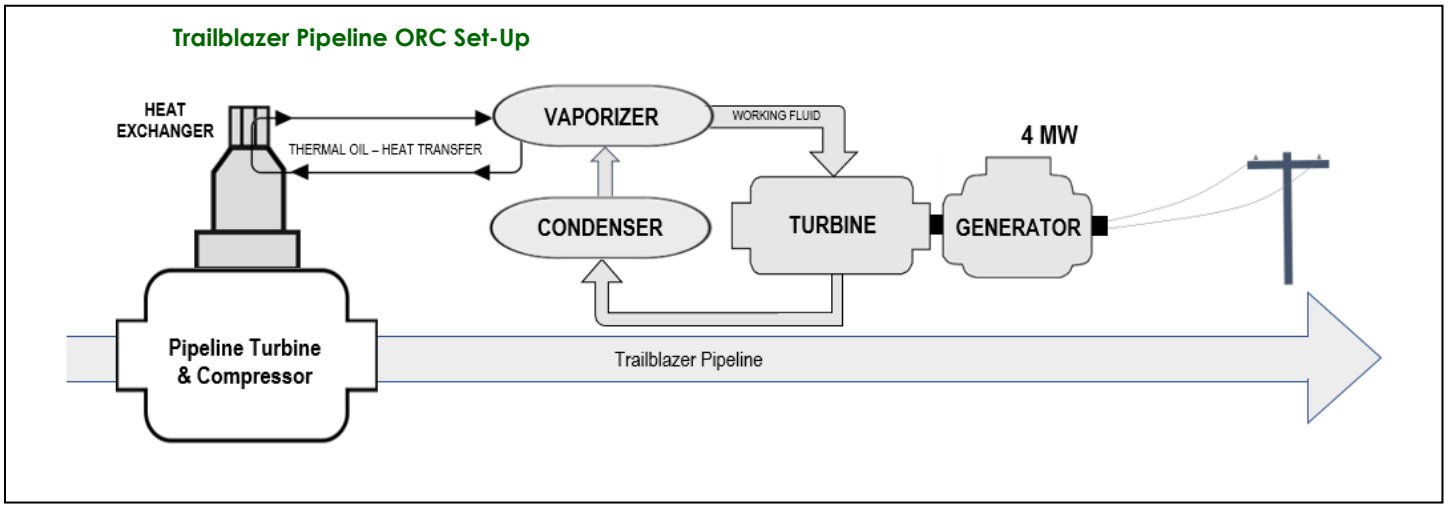
The 436- mile Trailblazer natural gas pipeline transports products through parts of Wyoming, Colorado and Nebraska. Numerous compressor stations maintain the pressure of the gas that travels through the pipeline. Most of these compressor stations are run by turbines that exhaust waste heat.

One compressor station is situated in the service region of Highline Electric Association (HEA). HEA is a member owned rural electric co-op that serves farming and ranching communities in the northeastern corner of Colorado. Rather than venting the exhaust heat to the atmosphere, it is captured by a waste heat to power (WHP) CHP energy system and then used to generate electricity.

Reasons for CHP

The primary driver for installing the WHP for Highline Electricity Association (HEA) was to provide cost savings to its members. Added benefits include:

- More than $10 million savings over twenty years
- Qualifies as an eligible energy resource under Colorado's Renewable Energy Standard (RES)
- Site produces virtually zero emissions



CHP Equipment & Operation

The Ormat Technologies Inc. recycled energy system captures exhaust heat from the pipeline compressor station's two 14,500-hp Solar Mars 100 gas turbines that runs the compressors. The 900ºF waste heat is recovered in the exhaust stack, then transferred to a pentane working fluid in an organic rankine cycle (ORC) heat exchanger. The pentane vaporizes, expands in volume, and drives a turbine generator. After the vaporized working fluid has passed through the turbine, it is air-cooled and condensed back into a liquid.

This process uses no water, has no emissions, and requires no additional fuel. On average, this recycled energy system generates approximately 3 MW per day, with a capacity of 4 MW. Electrical output will vary, depending upon the amount of natural gas running through the pipeline. This, too, varies as the prices and production of natural gas fluctuates.

Collaboration Structure

This WHP CHP project included several collaborative partners: Highline Electric Association (HEA), Ormat Technologies Inc., Kinder Morgan [which subsequently sold the pipeline to Tallgrass Energy], and Tri-State Generation and Transmission Association (Tri-State). Ormat built, owns and operates the recycled energy system. HEA buys the electricity through a 20-year power purchase agreement with Ormat. HEA also buys the renewable energy credits associated with the power generation and transfers them to Tri-State as the generation and transmission provider for HEA as well as other rural electric co-ops. Tri-State supported this project through its Member Local Renewable Project program that provides financial assistance for local clean energy projects. Tallgrass Energy purchased the Trailblazer pipeline and compressor station from Kinder Morgan after the project was built and receives payments from Ormat for the use of its waste heat.

> ***"What was going up in the air is now making electricity."***
>
> ***- Duane 'Dewey' Segelke***
> ***Tallgrass Energy***

Lessons

Highline Electric Association's primary reason for utilizing waste heat/recycled energy was to provide cost savings to their members. HEA anticipates saving more than $10 million over 20 years. This system took approximately 11 months to construct. Basic maintenance (temps, pressure, motors, pumps, etc.) is ~30-35 hours per month. Options to have this included in service contracts are beneficial. Having strong collaborative partners was a tremendous asset in this project.

For More Information

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More CHP Project Profiles:

Upper-West CHP TAP
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