



# Recycled Energy from Pipeline Compressor Station Exhaust Heat

## Site Description

The 436-mile Trailblazer natural gas pipeline, which winds through parts of Wyoming, Colorado, and Nebraska, is dotted with compressor stations that maintain the pressure of the gas as it travels through the pipeline. Most compressor stations are run by turbines that exhaust waste heat.

One such compressor station is located in the service territory of Highline Electric Association, a member-owned rural electric cooperative serving farming and ranching communities in the northeastern corner of Colorado. Rather than let the exhaust heat from the turbines vent to the atmosphere, it is captured by a recycled energy system and used to generate electricity.



### Facts at a Glance

- **Project:** Trailblazer Pipeline Compressor Station
- **Collaborators:** Highline Electric Association (HEA), Ormat Technologies Inc., Kinder Morgan (which subsequently sold the pipeline to Tallgrass Energy), Tri-State Generation and Transmission Association (Tri-State)
- **Location:** Peetz, Colorado
- **Waste Heat Source:** Waste heat from turbines that drive pipeline compressors
- **Capacity:** 4 MW
- **Annual Electric Output:** 27,600 MWh per year
- **Commercial Operation:** 2009
- **Financial Benefit:** \$10 million over 20 years
- **Additional Value:** Power generated helps Tri-State meet its renewable energy standard (RES) obligation
- **Other Applications:** Engine exhaust heat



### Key benefits

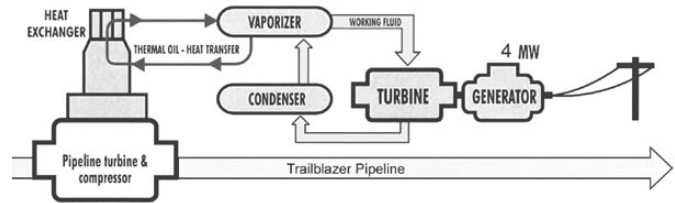
- \$10 million of savings over 20 years
- Virtually no emissions
- No water usage
- Qualifies as an eligible energy resource under Colorado's RES
- Provides baseload, non-intermittent source of electricity for HEA



## Project Details

The Ormat Technologies Inc. recycled energy system captures exhaust heat from the Trailblazer compressor station's two 14,500-horsepower Solar Mars 100 gas turbines which run the compressors. The 900°F waste heat is recovered in the exhaust stack and 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 to a liquid. The process uses no water, has no emissions, and requires no additional fuel.

On average the recycled energy system generates about 3 MW per day. Electrical output varies depending on the amount of natural gas going through the pipeline, which fluctuates with natural gas prices and production.



## Business Structure

Ormat Technologies Inc. built, owns, and operates the recycled energy system. HEA buys the electricity through a 20-year power purchase agreement (PPA) with Ormat. HEA also buys the renewable energy credits (RECs) associated with the power generation and transfers them to Tri-State, the generation and transmission provider for HEA and other rural electric co-ops. Tri-State uses the RECs to help meet its obligation under Colorado's Renewable Energy Standard (RES).

Tri-State supported the project through its Member Local Renewable Project program that provides financial assistance for local clean energy projects (policies 115, 117, and 118). Tallgrass Energy purchased the Trailblazer natural gas pipeline and compressor station from Kinder Morgan after this project was built, and receives a payment from Ormat for use of its waste heat.



## Reason for Installing Recycled Energy

HEA's main driver for this recycled energy project was to provide cost savings to its members. HEA expects to save more than \$10 million over 20 years. In addition, the project has virtually no emissions or environmental impact, qualifies as an eligible energy resource under the RES, and is a baseload, non-intermittent source of clean energy.



## About Recycled Energy in Colorado

Recycled energy systems use waste heat from industrial processes to generate electricity with no additional fuel, combustion or emissions. Recycled energy does not include energy produced by any system that uses waste heat from a process whose primary purpose is the generation of electricity. Power generated from recycled energy systems in Colorado can be used to help utilities meet their renewable energy standard obligations.



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