



Recycled Energy in the Oil and Gas Industry

Recycled Energy — also known as waste heat to power — is a form of clean energy that uses leftover heat from industrial processes to generate electricity with no additional fuel, combustion or emissions. Recycled energy systems capture heat from exhaust stacks or pipes that would otherwise be lost to the atmosphere, and convert the energy in the heat into electricity. 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.



Benefits of Recycled Energy

- Reduce the cost of purchased electricity and/or fuel
- Reduce monthly electrical demand charges
- Sell excess power to generate additional revenue
- Improve electrical reliability for key processes
- Reduce carbon footprint
- Generate power on site where it is needed
- Generate renewable energy credits (RECs)
- Generate electricity that can be used to meet renewable energy standard (RES) obligations.



Do you have a Good Recycled Energy Opportunity?

If you have a steady source of waste heat of at least 200 degrees Fahrenheit, you may have a good opportunity to reduce your energy costs and capture other benefits. Free technical assistance is available through the Southwest [Combined Heat and Power \(CHP\) Technical Assistance Partnership](#) (see contact information on the reverse). Their experts can help you decide whether your potential recycled energy application is promising and warrants a more detailed feasibility study.



Financing Options

There are several options for obtaining financing for new recycled energy systems:

- Power purchase agreements (PPAs) allow industrial hosts to focus on their core competencies while companies that specialize in recycled energy projects own and operate a recycled energy system using the host's waste heat. Each configuration is unique, but the host's role could include leasing the equipment and providing site access to the owner/operator, in addition to providing the heat.
- The Colorado [Commercial Property Assessed Clean Energy](#) (C-PACE) program partners with private capital providers to offer commercial and industrial building owners financing for clean energy projects at competitive rates. C-PACE loans are repaid through the facility's property tax bill, and in many cases, annual energy cost savings exceed the annual payment. The loans can transfer with the property if sold.
- The [Green Colorado Credit Reserve](#) (GCCR) is a loan loss reserve created by the Colorado Energy Office to provide incentives to private lenders to make small commercial loans up to \$100,000 for capital improvements that promote energy efficiency and renewable energy.
- [Tax credits](#) are available to businesses investing in recycled energy in Enterprise Zones. A Qualified Renewable Energy Investment that is placed into service between 1/1/2015 and 12/31/2020 may be taken as a refund of 80% of the credit earned.
- The [TRUE Pioneer Grant](#) and [CORE Community Grants](#) support projects that reduce carbon emissions and promote renewable energy and energy efficiency in the Roaring Fork Valley (Glenwood Springs to Aspen).
- Xcel Energy's [Recycled Energy Program](#) offers its customers an incentive of \$500/kilowatt (kW) of recycled energy system capacity installed. This incentive will be paid monthly over 10 years at a rate of approximately \$.012/kilowatt-hour (kWh)¹ and applies to the total recycled energy system output (up to 10 MW capacity), whether used on-site or sold to a utility or other wholesale electricity provider.² Preapproval by Xcel Energy is required.

1 The exact incentive rate will be calculated based on Xcel Energy's approved weighted-average cost of capital, which could change slightly in future years; and on an assumed capacity factor of 70 percent. The monthly payments from Xcel Energy will continue until the net present value of all the incentive payments amounts to \$500/kW. Depending on the recycled energy system's actual electricity output and hours of operation, the payments may continue for slightly less or slightly more than 10 years.

2 Any excess electricity generated by the recycled energy system (beyond on-site needs) may be sold to a utility or wholesale provider at a negotiated rate.



Recycled Energy Technologies

There are many solutions for generating electricity from waste heat. From 25 kW systems that can be set up in a couple hours, operated and monitored remotely, decommissioned, and redeployed as needed in oil and gas fields and remote locations, to custom configurations that can generate more than 100 MW from high volume, high temperature waste heat streams. The two most common technologies for recycled energy systems are the steam Rankine cycle and the organic Rankine cycle. Both of these technologies involve a heat recovery boiler and a turbine generator. Examples of recycled energy systems in oil and gas operations can be found on the [Colorado Energy Office website](#).



COLORADO
Energy Office

General Questions:

Susan Brodie | Heat is Power Association | susandbrodie@gmail.com | 630-292-1304

Lindsey Stegall | Colorado Energy Office | lindsey.stegall@state.co.us | 303-866-2594

Recycled Energy Opportunity Evaluation:

Gavin Dillingham | U.S. DOE Southwest CHP Technical Assistance Partnership | gdillingham@harcresearch.org | 281-216-7147