



Recycled Energy in Colorado

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 systems in Colorado are eligible to contribute to the Renewable Energy Standard (RES) as long as the waste heat resource is not from a process whose primary purpose is the generation of electricity.



Key Benefits

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



Recycled Energy may be a good fit for your facility if:

- **Opportunity:** Your facility generates a steady supply of waste heat that dissipates into the atmosphere.
- **Operation:** Your facility needs to lower the temperature of heat at some point in its process.
- **Reliability:** There would be substantial business, safety, or health impacts if your electricity supply were interrupted.
- **Resiliency:** Your facility must run in all circumstances, including during and after storms and natural disasters.
- **Economic Opportunity:** Sale of excess power and renewable energy credits (RECs) could provide a revenue stream.
- **Location:** Electric utility infrastructure does not extend to or is not reliable in a location you'd like to do business.
- **Environmental:** Your company has sustainability or pollution prevention goals or is interested in reducing its impact on the environment.



Recycled Energy Systems Turn Waste Heat into a Valuable Energy Resource

Waste heat between 300° and 2,000° F can be captured from equipment such as low temperature boilers and heaters; mid-temperature ovens, engines and compressors; and high temperature flares, incinerators and thermal oxidizers. Recycled energy can also be generated with the heat from exothermic reactions and pressure reduction.

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, to custom configurations that can generate more than 100 MW from high volume, high temperature waste heat streams. The two most common technologies suitable for turning waste heat into power are the steam Rankine cycle and the organic Rankine cycle, both of which involve a heat recovery boiler and a turbine generator. Additional recycled energy technologies include Stirling engine, Kalina cycle and thermoelectrics.

There are over 100 recycled energy systems in the U.S. at natural gas pipeline compressor stations, gas processing plants, refineries, steel mills, chemical plants, and other manufacturing facilities. The Colorado Energy Office estimates it is economically feasible to generate over 100 MW of recycled energy at more than 125 sites in the state. A large portion of that potential could be generated in the oil and gas, metals, and minerals industries, with promising opportunities in chemical and other manufacturing industries.



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 Upper-West Combined Heat and Power (CHP) Technical Assistance Partnership (TAP) (see contact information below). Their experts can help you decide whether your potential recycled energy application is promising and warrants a more detailed feasibility study.



COLORADO
Energy Office

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