

TransPacific Energy, Inc.

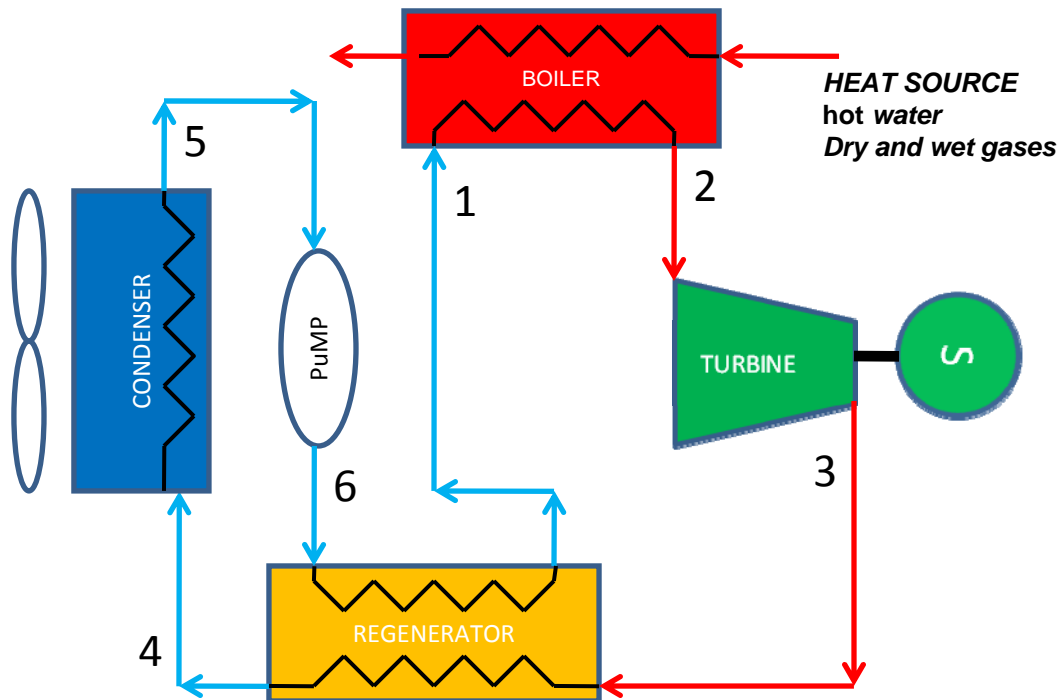
www.transpacenergy.com

Innovative Energy Solutions for a Cleaner World.

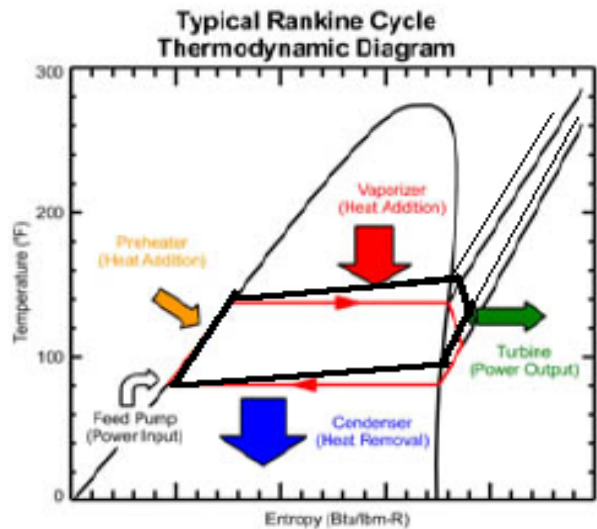
Tel: 1-866-919-8275

ORGANIC RANKINE CYCLE ORC

The Rankine cycle is a closed loop thermodynamic cycle with a working fluid where an external heat source generates steam at its boiler. Water is the working fluid. Steam turbines, installed in power plants (coal fired, nuclear or biomass) are based on the cycle. In an Organic Rankine cycle (ORC), the working fluid is not water but an organic fluid such as butane or pentane, ammonia etc. This cycle is more suitable for low temperature heat source application than steam cycle.



- 1-2: The organic fluid is vaporized and superheated in the evaporator
- 2-3: The organic vapor is expanded through the turbine
- 3-4: Expanded vapor heat up the organic liquid
- 4-5: Vapor is condensed
- 5-6: Organic liquid is pumped
- 6-1: Organic liquid is heated up with vapor from turbine outlet



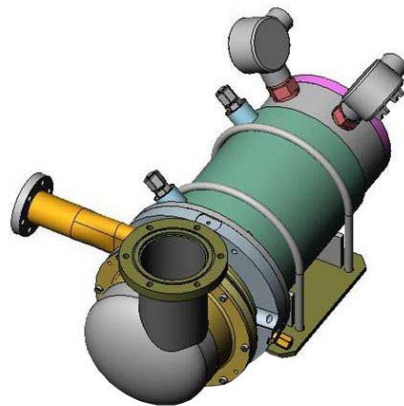
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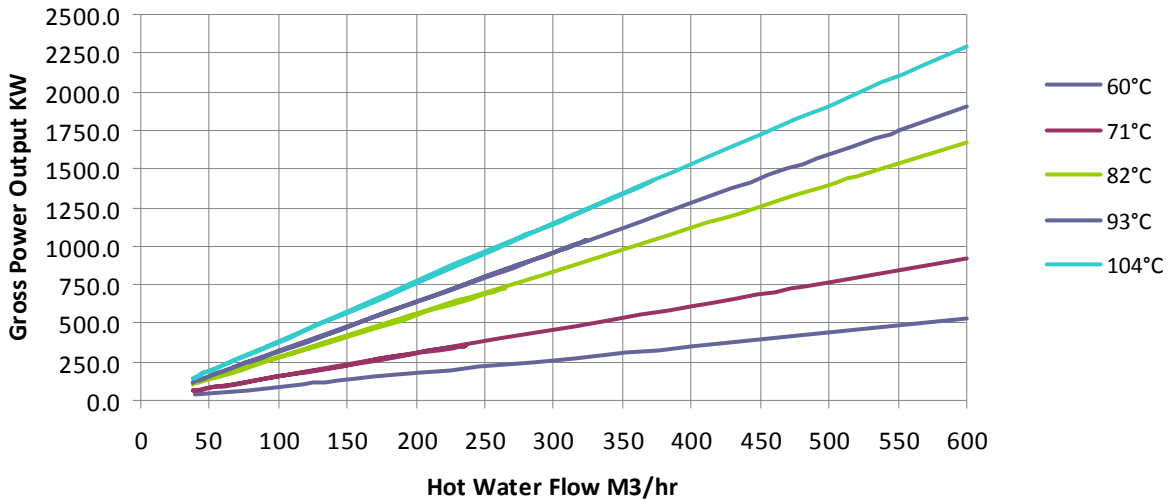
TransPacific Energy (TPE) ORC uses environmentally sound refrigerant mixtures formulated to maximize heat recovery at heat source temperatures from 25°C up to 500°C with enhanced electrical efficiency up to 35%. This permits a wide range of applications of the TPE ORC to generate power from waste and untapped heat sources such as liquid and effluent flue gases. Typical turbo generator shown below is for illustration purposes only and final product may vary.



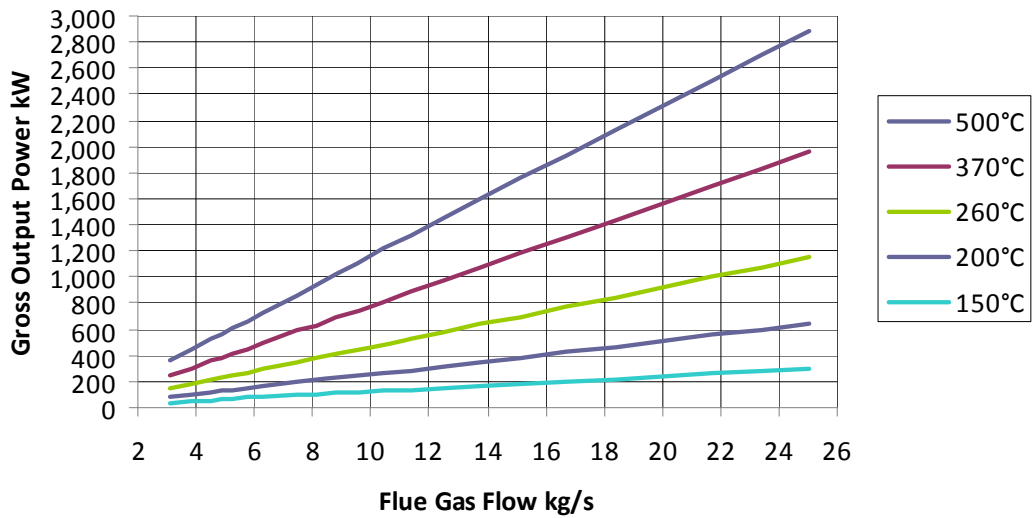
TPE ORC ADVANTAGES:

- *Enhanced Heat to power electrical efficiency*
- *Availability higher than 98%*
- *Easy to install and limited footprint (skid mounted)*
- *Simple automated operation*
- *Low operation and maintenance cost*
- *Non flammable, non toxic working fluid*
- *Broad Temperature Applications*
- *Environmentally sound; no fuel consumption, reduce carbon emission, and greenhouse gases, zero acid rain.*

ORC Power Output-Hot Water Single Unit



ORC Gross Output: Flue Gas Single Unit



FIELD APPLICATIONS OF TPE ORC

GAS FLARE:

- Waste landfill
- Waste water treatment plant
- Refineries
- Petrochemical industries



INDUSTRY EFFLUENT:

- Paper industry
- Glass industry
- Cement industry
- Food industry (sugar, milk,...)
- Biofuel



THERMAL PLANTS:

- All fossil fuel
- Solar thermal
- Geothermal



POWER PLANTS:

- Cogeneration (gas turbine and engines)
- Biomass
- Biogas



OCEAN THERMAL ENERGY:

- Coastal activities
- Offshore platform
- Ocean Thermal Energy Conversion (OTEC)

