



ENERGY RECOVERY SOLUTIONS.  
REVOLUTIONARY TURBINES.

## OUR VISION

Waste heat and pressure can supply a significant portion of the world's energy needs by implementing efficient and cost effective means to convert lost energy into useful power. Energent Corporation was created to achieve this new paradigm of energy recovery.

## ENGINEERING

Throughout the stages of product development, Energent engineers perform comprehensive analysis to identify performance and reliability enhancing opportunities utilizing state-of-the-art tools.

- Process simulation and thermodynamic analysis
- SolidWorks, SolidEdge (3D modeling)
- COSMOS-M Finite Element Analysis (FEA)
- NUMECA Computational Fluid Dynamics (CFD)
- XL Rotor for rotor dynamics analysis

## MANUFACTURING

Energent's manufacturing and assembly facility occupies over 60,000 ft<sup>2</sup>. Three 5-axis milling machines, numerical control mills, and lathes are used to manufacture turbines, compressors, and turbomachinery housings. The facility is ISO-9001 certified for quality assurance.

## CUSTOMER SERVICE

From analysis and design to equipment start-up, our engineering, manufacturing, and field service personnel continually demonstrate commitment to customer satisfaction.

Energent believes in a design process that offers a direct line to our project engineers.

## TESTING

For performance and quality assurance, every product manufactured by Energent is factory tested prior to delivery. High pressure LN<sub>2</sub> and nitrogen vapor facilities allow full system testing.



- Full speed mechanical and electrical tests which include control system and ancillary equipment
- Factory wired—complete system functionality
- Customer witness of factory testing encouraged

## CORPORATE STRUCTURE

Energent is a member of Cryogenic Industries, a group of companies specializing in industrial gas and cryogenic equipment for over 40 years.



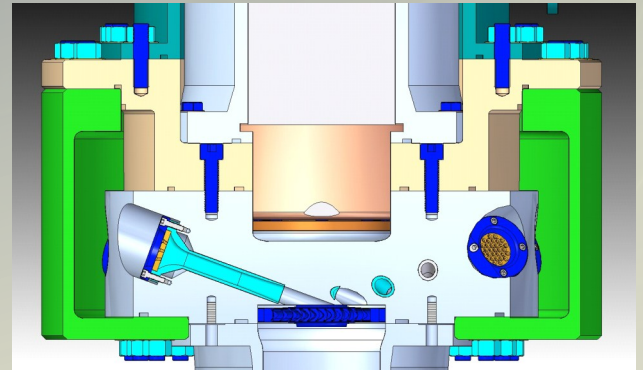
## OUR TECHNOLOGIES

### VARIABLE PHASE TURBINE (VPT)

Suitable for power generation from any flow with a pressure drop, the **Variable Phase Turbine** combines discrete converging-diverging nozzles with an axial impulse turbine to recover energy from supercritical, flashing liquid, vapor, and liquid expansions.

**APPLICATIONS** Pressure letdowns (J-T valve replacement)  
Power Systems: Kalina cycle, ORC, VPC

**BENEFITS** Synchronous speeds → eliminates gearbox  
Hermetic system → eliminates shaft seal



### EULER TURBINE — RADIAL OUTFLOW

The **Euler Turbine** is a radial outflow turbine, making it uniquely suited to handle vapor expansions where particulate or moisture are present. Its titanium alloy blisk turbine rotor provides strength as well as corrosion and erosion resistance.

**Microsteam Turbine Power System** — 275 kWe power system utilizing the Euler Turbine for back pressure steam letdowns to replace existing pressure reducing valves (PRVs).

**APPLICATIONS** Vapor pressure letdowns (PRV replacement)  
Power Systems: Kalina cycle, ORC

**BENEFITS** Single-button start, user friendly controls  
Complete power system package



### WASTE HEAT RECOVERY

Both the Euler Turbine and Variable Phase Turbine have been applied to waste heat recovery cycles.

The Euler Turbine is ideal for both the Kalina cycle and the organic Rankine cycle because of its inherent moisture resistance and was applied to a geothermal Kalina cycle in Germany.

The VPT allows for use of the Variable Phase Cycle, an efficient thermodynamic cycle, where a two-phase turbine is required for flashing liquid or supercritical expansion.

