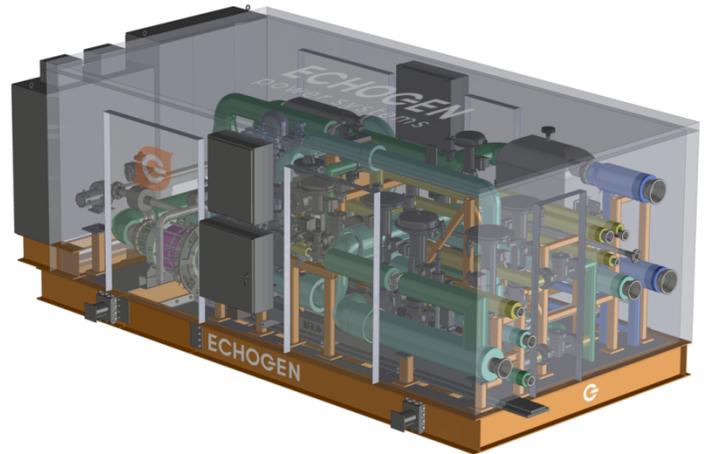


Heat Recovery Solution

**EPS30**

1.35MW Nominal Output



**Echogen's EPS30 Heat Recovery System** is an advanced Rankine Cycle for exhaust heat recovery in marine and land-based applications. Our patented technologies are compatible with a wide variety of heat sources to extract significant amounts of energy and convert it into usable, higher value power.

The EPS30 uses industrial-grade carbon dioxide (CO<sub>2</sub>) as the working fluid, which allows the system to deliver reliable power from a more compact, flexible and low-cost thermal engine. Power output can be optimized for a broad range of heat sources and applications.

Echogen's economical, emission-free power will enable fuel-intensive operations to lower the cost of energy, meet higher environmental standards and improve bottom-line performance.

**Benefits:**

**Compact**

Integrated turbo-alternator and compact system components yield a small, skid-based design suitable for land, marine and offshore applications

**Efficient**

Direct, in-stack waste heat exchanger eliminates boiling and need for intermediate fluid

**Clean**

Produces fuel-free, emission-free electricity to meet environmental regulations

**Safe**

Working fluid is environmentally benign, thermally stable and non-flammable

**Cooled with Air or Water**

No water consumption for operation if air-cooled

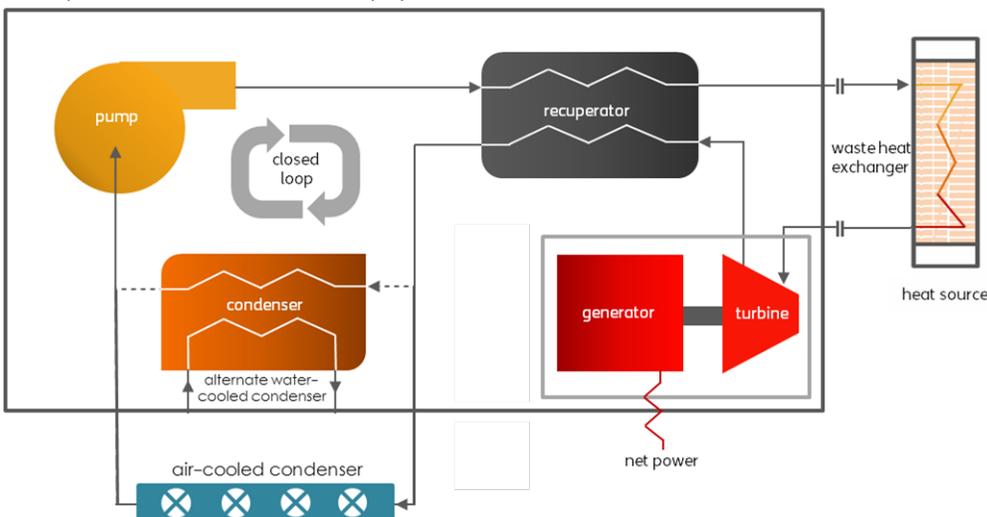
**Low Maintenance**

System is capable of remote operation and does not require on-site personnel

**Long Product Lifetime**

High-quality manufacturing and use of non-corrosive fluids extend the life of system components

Simplified EPS30 CO<sub>2</sub> Heat Recovery Cycle



### Component Design

|                       |  |
|-----------------------|--|
| <b>Generator</b>      | High-speed PM generator with power electronics   |
| <b>Turbomachinery</b> | Integrated CO <sub>2</sub> turbo-alternator/pump |

### Design Standards

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| <b>Classification Rules</b>         | ABS, ASME, IEEE, API (as applicable) |
| <b>Pressure Vessel Construction</b> | ASME Section VIII                    |
| <b>Piping</b>                       | ASME 31.3                            |
| <b>Electrical Components</b>        | NEMA4, IEEE                          |

### System

|                          |   |
|--------------------------|---|
| <b>Working Fluid</b>     | CO <sub>2</sub> , industrial-grade                    |
| <b>Controls</b>          | PLC based   |
| <b>Remote Monitoring</b> | LAN/WAN   |
| <b>Operation</b>         | Designed for remote control                           |
| <b>Package</b>           | Skid-based, enclosed                                  |
| <b>Applications</b>      | Gas turbines, diesel engines, industrial heat, biogas |

### Design Conditions

|                                       |          |               |
|---------------------------------------|----------|---------------|
| <b>Ambient Temperature</b>            | 15°C     | 59°F          |
| <b>Relative Humidity</b>              | 60%      |               |
| <b>Waste Heat Supply Temperature*</b> | 500°C    | 932°F         |
| <b>Waste Heat Flow Rate*</b>          | 17 kg/s  | 37.5 lb/s     |
| <b>Waste Heat Input</b>               | 8,000 kW | 27.3 MMBtu/hr |

\* Alternate low-temperature exhaust design point: 35 kg/s @ 370°C (278,000 lb/hr @ 700°F).

### Electrical Output

|                                       |                       |
|---------------------------------------|-----------------------|
| <b>Gross Output</b>                   | 1.5 MW                |
| <b>Net Output (air-cooled option)</b> | 1.35 MW               |
| <b>Voltage / Frequency</b>            | 480VAC, 3-phase, 60Hz |

### General Specifications

|                        | Size envelope (L x W x H) |                 | Weight, dry |           |
|------------------------|---------------------------|-----------------|-------------|-----------|
| <b>Main Enclosure</b>  | 7.3 x 3.7 x 3 m           | 24 x 12 x 10 ft | 27,000 kg   | 60,000 lb |
| <b>Electrical Skid</b> | 3 x 3 x 2.5 m             | 10 x 10 x 8 ft  | 7,500 kg    | 17,000 lb |

Other equipment may be required specific to installation, including: waste heat exchanger, cooling system and CO<sub>2</sub> storage tank.