

## CO<sub>2</sub> EFFLUENT FROM COAL-FIRED PLANTS...CAPTURED



**ENIS EnerGen** will license its technology to customers who wish to capture the carbon dioxide effluent of a coal-fired power plant...without underground sequestration. More power output can be achieved if there is nearby existing fuel-driven Generator Sets (GenSets) that are co-located with steam driven GenSets in cold climates or are co-located with steam-driven GenSets and/or chillers in hot climates.

We will also provide technical support throughout our CTT Device project design, development and construction process. Potential clients would include electric utility companies, independent power producers, wind and solar developers and transmission owners.

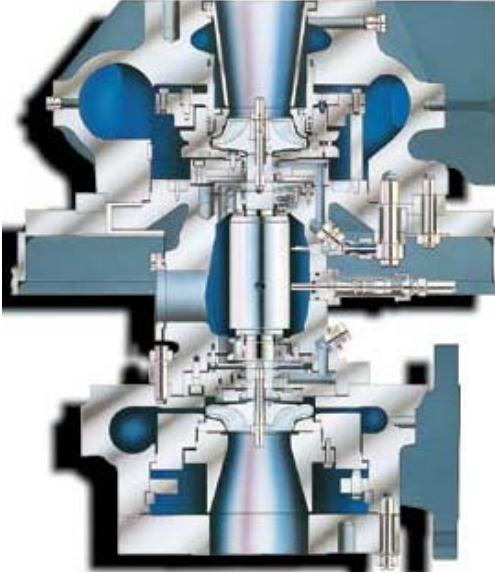
Capturing CO<sub>2</sub> from smokestacks is the most energy-intensive part of the process. According to the International Panel of Climate Change (IPCC), which devoted a comprehensive study on the technology 3 years ago, capturing technology (including compression for further transport and storage) raises the energy consumption of a coal plant by an average of 32 percent. The downstream system of pipelines will raise this 32 percent to 50%.

In the example of a 100,000 kW coal-burning power plant, our patented Compressor, Turbocompressor and Turboexpander (CTT) system requires the use of a compressor rated at 27,400 kW. However, there is recoverable waste heat of -4,115 kW from the compressor and -25,042 kW from the turbocompressor. In the typical combined heat and power (CHP) scenario, the nearby steam-driven GenSet or a Chiller available usefully recovers this waste heat. Furthermore, the 487.6 pounds per second of air at -109.3°F is warmed to +32°F, the chilling capacity is -17,445 kW. Thus the 27,400 kW input generates -4,115 kW, -25,042, kW and -17,445 kW or 46,602 kW. This system performs as a typical heat pump wherein the

$$\text{Coefficient of Performance} = \text{C.O.P.} = 46,602 \text{ kW} / 27,400 \text{ kW} = 1.7$$

There is more power output than input...as is the case of most heat pumps.

**Whereas all other CO<sub>2</sub> sequestration techniques are wasteful of energy, this patent disclosure permits energy savings.**



The system consists of (1) Compressor (2) Two-stage turbocompressor (3) Two-stage turboexpander (4) Mixing chamber of CO<sub>2</sub> effluent and super-chilled air (-140 to -180°F) (5) Conveyor belt for dry-ice product.

The turbocompressor and turboexpander are connected on a common shaft for “free-spooling.”

Waste heat is recovered from the compressor and turbocompressor while the super-chilled air downstream of the mixing chamber is used for HVAC, cold storage facilities, inputs to fuel-driven GenSets, etc.



Another configuration of the same system uses high pressure compressed air storage vessels that permit the energy generated at night to be stored and then used when there is great power demand during the daytime. This configuration can be designed to be more efficient than batteries when in the range of 10 MW and discharge times between 4 to 6 hours.

The same technology is applicable to desalination and to mineral recovery from saltwater and from brackish water.

### **Main Contacts:**

#### **ENIS WINDGEN™ RENEWABLE ENERGY SYSTEMS LLC**

- DR. BEN M. ENIS, CHAIRMAN, CEO  
HENDERSON, NEVADA 89052  
(702) 617-2533  
[ben@renewablewindenergy.com](mailto:ben@renewablewindenergy.com)
- DR. PAUL LIEBERMAN, PRESIDENT  
TORRANCE, CALIFORNIA 90503  
(310) 371-2198 [paul@renewablewindenergy.com](mailto:paul@renewablewindenergy.com)

#### **BRULIN ASSOCIATES LLC**

- MR. SEPTIMUS VAN DER LINDEN, PRESIDENT  
CHESTERFIELD, VA 23832  
(804) 639 5679  
[brulinassoc@comcast.net](mailto:brulinassoc@comcast.net)