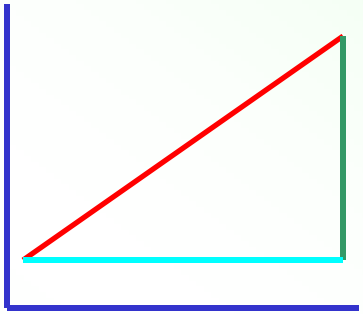
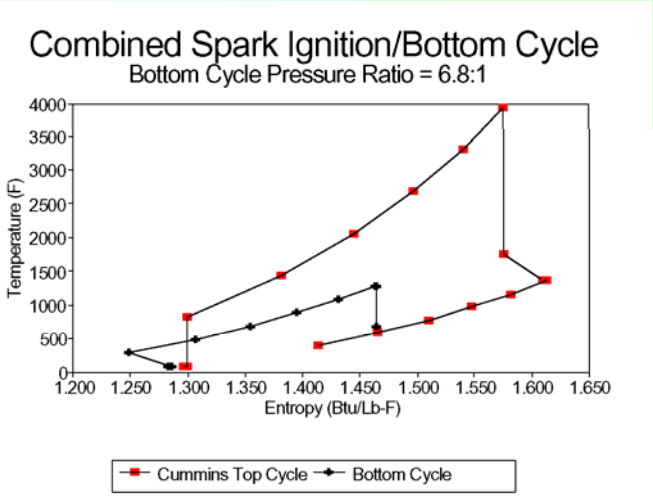
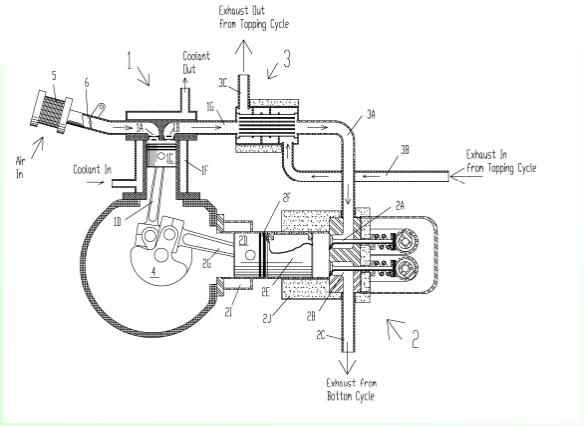
Proe HRPG™ Heat Recovery Power Generator for 15-20% Additional Electric Power From Existing Reciprocating and Gas Turbine Gensets – WITHOUT STEAM

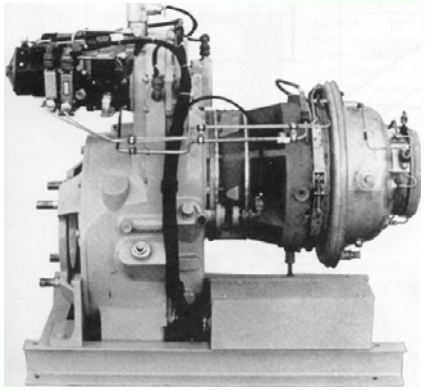


Proe HRPG™

Heat Recovery Power Generator







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Proe HRPG™ US Patent #6,672,063
Afterburning Ericsson Cycle Engine, Proe 90™ Recuperator, and Proe Afterburning™ Cycle Engine are protected by US Patents Number: 5,894,729; 6,390,185 and 7,028,476

For Additional Information Contact Richard Proeschel at (800)315-0084 or (330)723-4469 raproe@proepowersystems.com

Proe Power Systems, LLC

Why Did Proe Power Invent Two Types of Engines?

… for Two Applications:

1) Proe Afterburning™ Cycle Engine:

- Purpose: Produce the maximum amount of mechanical energy from a combustion process of a liquid, gaseous, or solid fuel
  - Combustion process can be dedicated combustor or integrated with an existing furnace process
    - Increases combustion efficiency of industrial furnaces by providing a forced blast of clean hot air while simultaneously producing power
  - Provides Clean and Efficient Combustion of Solid Fuels for Village Power & Waste Heat Recovery from trash or bio-waste Incinerators
  - Clean exhaust meets 21st Century environmental requirements
  - Ideal for alternative fuels: CNG, propane, hydrogen, methanol, ethanol, bio-waste (solid, liquid or gas) etc
- `40% Shaft efficiency/ `36% Electrical Efficiency + Potential CHP

2) Proe HRPG™ Heat Recovery Power Generator:

- Purpose: Recover the maximum amount of mechanical energy from the exhaust of an existing top cycle engine (gas turbine, internal combustion etc)
  - "Bolt-on" means for increasing fuel efficiency of existing engines by 15-20%
  - Clean hot air exhaust can be used for direct CHP

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Objectives of HRPG™ Bottom Cycle

- **Utilize high temperature exhaust from existing reciprocating engine, turbine engine or SOFC to:**
    1. **Generate additional electrical power (primary objective)**
    2. **Recover heat for CHP (secondary objective)**
- **Maximum electrical power augmentation requires a bottom cycle that makes the best use of the topping cycle exhaust heat**
    1. **Topping cycle exhaust temperature reduced as close to ambient as possible**
    2. **HRPG™ exhaust temperature is also as low as possible**

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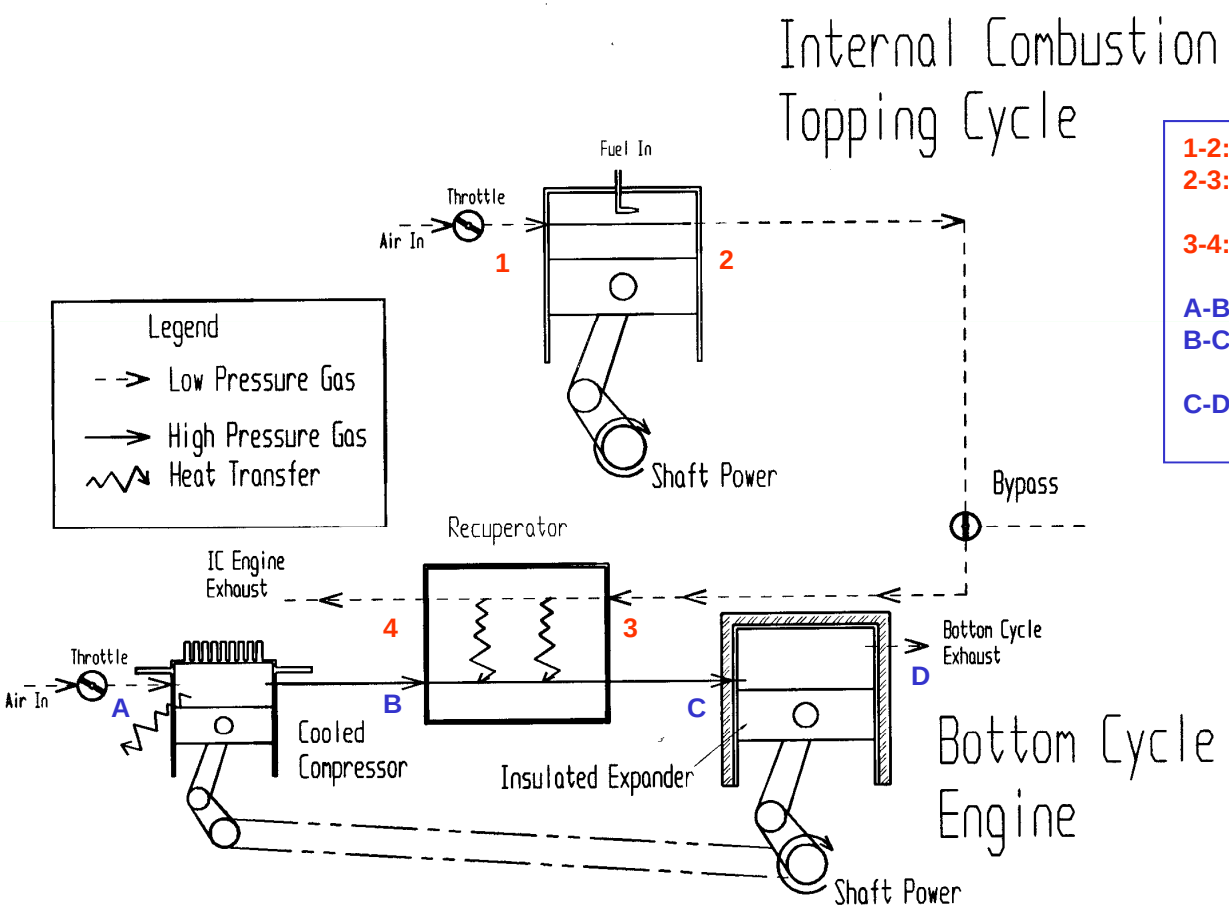
Combined Cycle Engine with IC Top Cycle and Proe Power HRPG™ Bottom Cycle



1-2: Topping Cycle
2-3: Exhaust Adjusts to Backpressure
3-4: Exhaust Cooled in Recuperator
A-B: Cooled Compressor
B-C: Compressed Air Heated in Recuperator
C-D: Expansion in Insulated Expander

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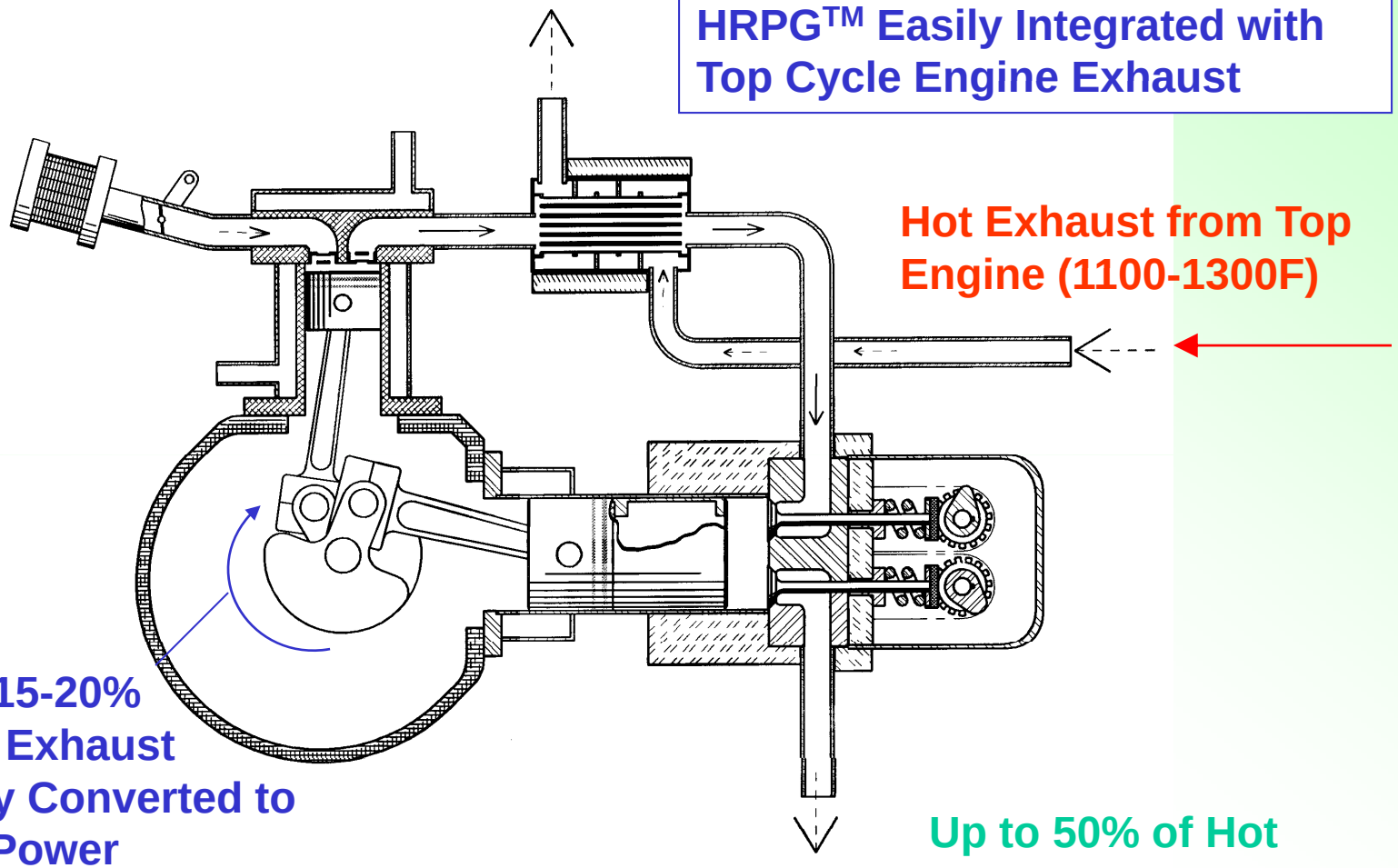
HRPG™ Easily Integrated with Top Cycle Engine Exhaust



Hot Exhaust from Top Engine (1100-1300F)

Up to 15-20% of Hot Exhaust Energy Converted to Shaft Power

Up to 50% of Hot Exhaust Converted to Warm, Clean Air for CHP (300-500F)

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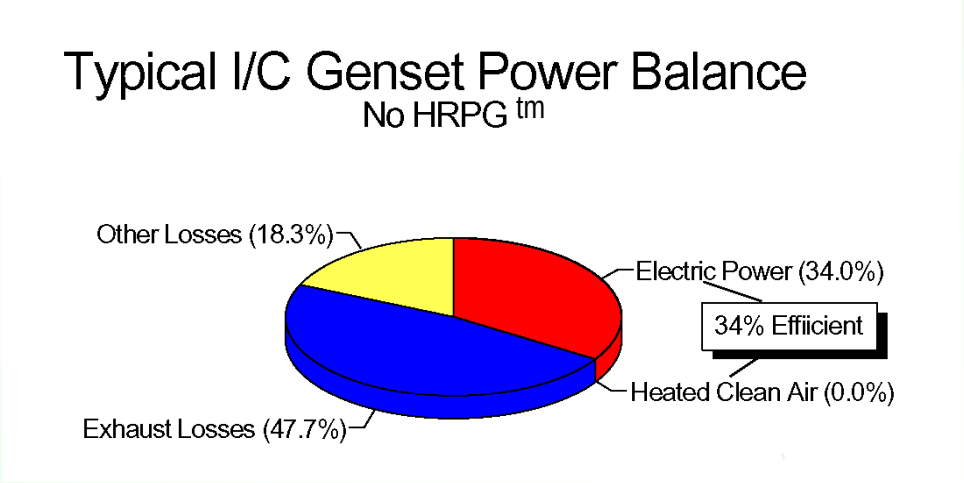
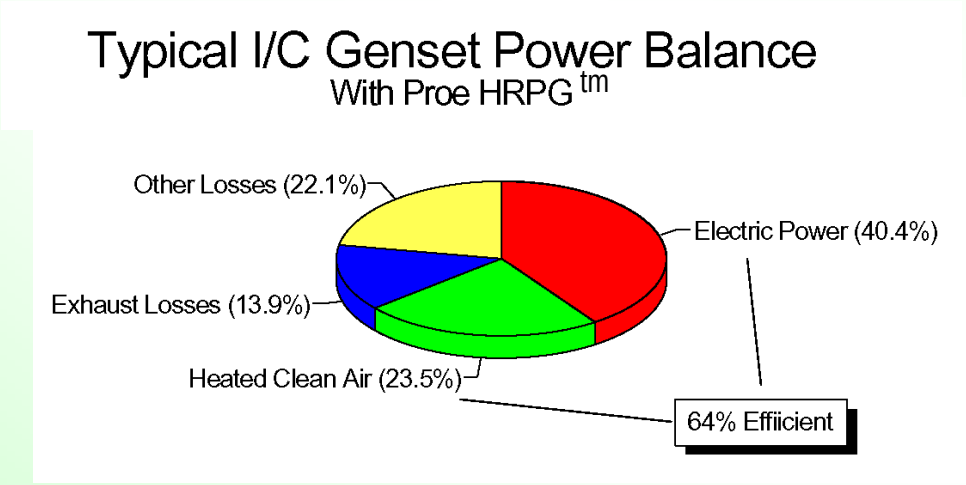
Simple/Effective Route to High Efficiency CHP





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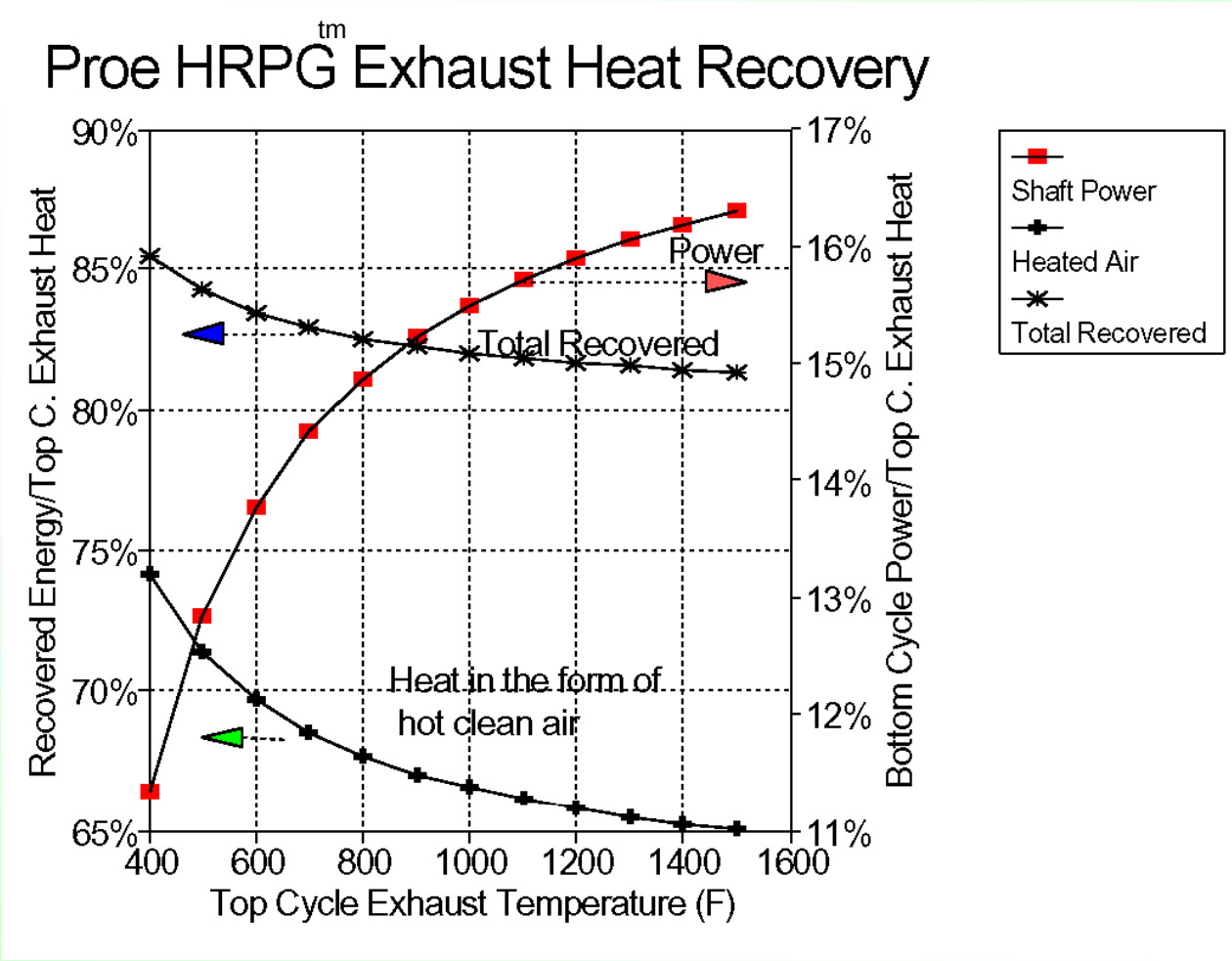

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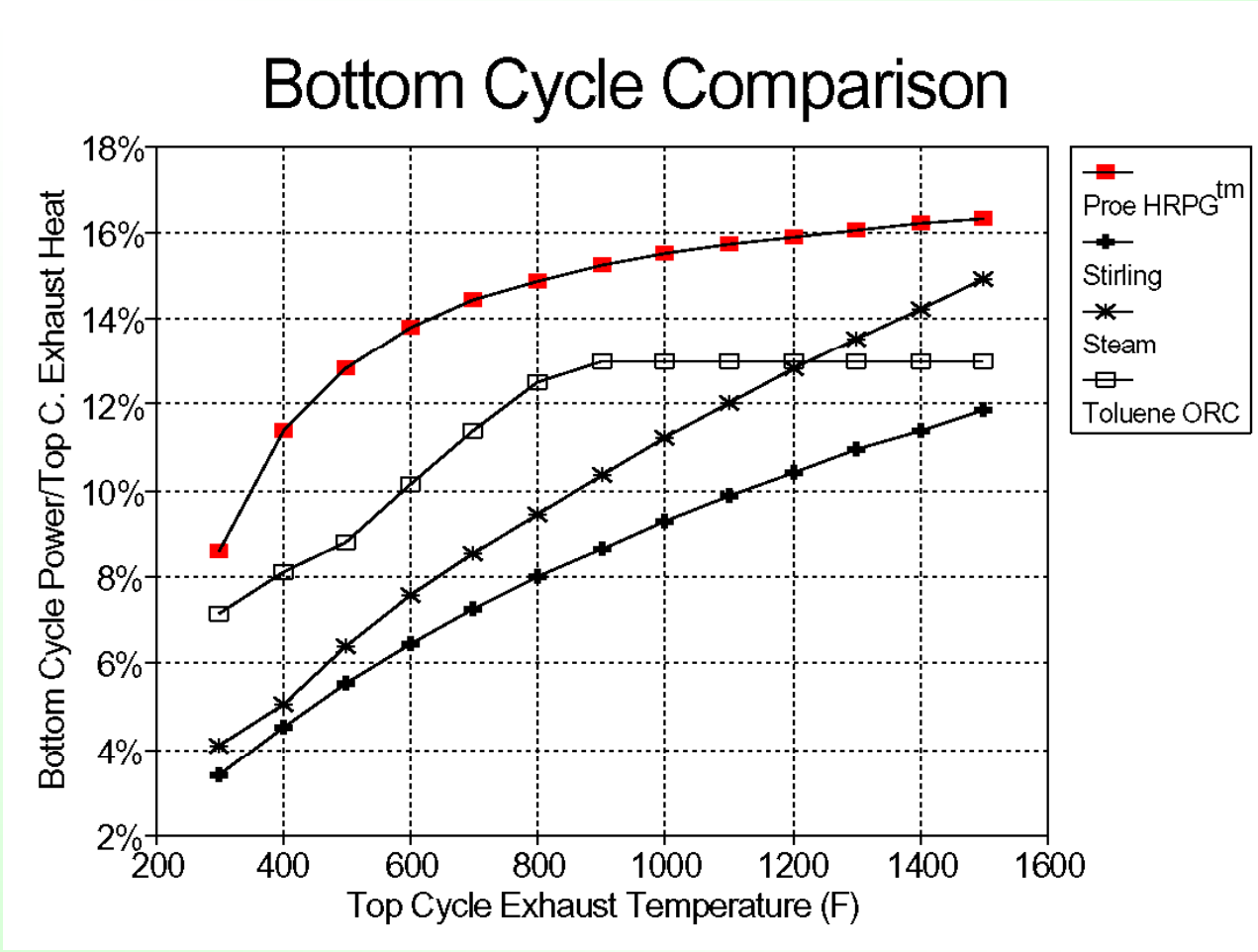
The Simplest & Most Effective Bottom Cycle Available



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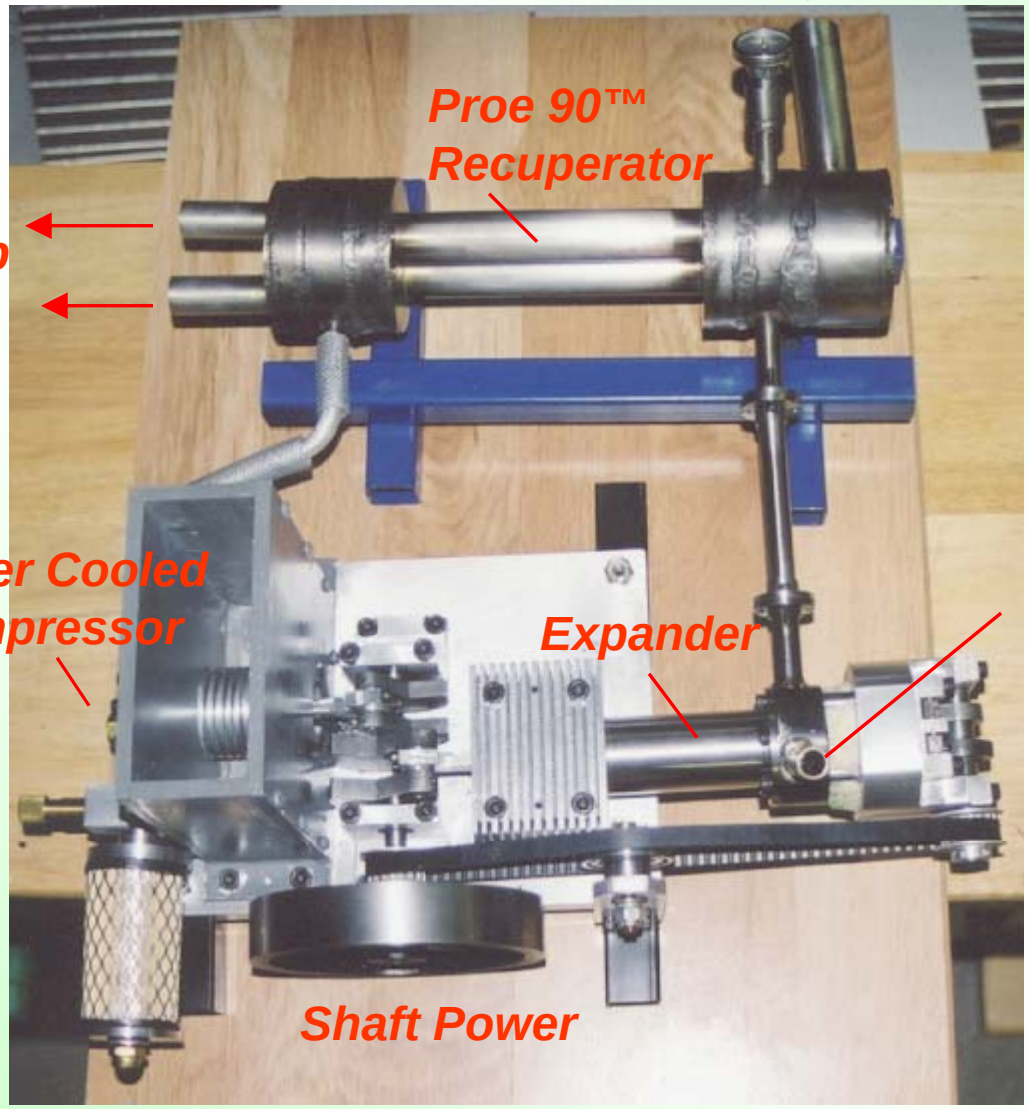
Proe HRPG™ Desktop Demo



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