

New Engine Technology for California's Combined Heat and Power Market

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PIER Renewables Research
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Fact Sheet

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The Issue

Small-scale combined heat and power (CHP) systems commonly use reciprocating engines that are typically derived from outdated automotive designs. These types of engines have low efficiencies and rely on simple exhaust gas emission control components that have difficulty meeting the California's 2007 CHP emission standards. These inefficient engines also cause under-sizing or poor utilization in commercial applications that have high electric-to-thermal loads. Cost-effective CHP systems ≤ 75 kilowatt (kW) are needed to address significant market populations that have limited CHP options. Advanced and efficient automotive designs – with improved oil control, sophisticated cycle combustion, and better fuel control strategies – are now available, which, when coupled with effective exhaust emissions control components, can offer a possible solution for a cost-effective CHP system that can meet state emission standards.

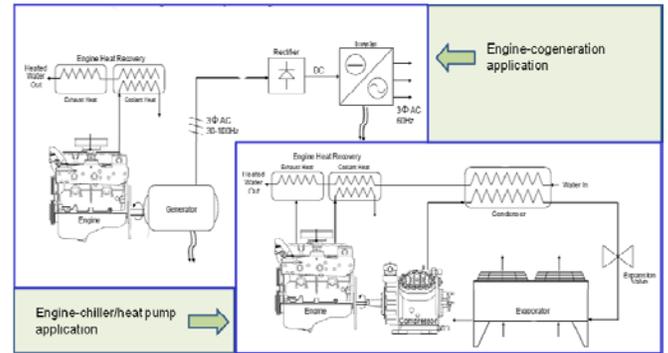
Project Description

The project will adapt a modern automotive engine to run on natural gas and then modify the engine mechanisms to improve its fuel efficiency by about 10 percent. The engine will be combined with appropriately designed and selected components to develop the target products of cogeneration, chiller, and heat pump. The engine improvements will make the system more economical to operate and less costly to maintain and will enable growth of the emission-compliant CHP market.

PIER Program Objectives and Anticipated Benefits for California

This project supports California's goal to encourage the development of environmentally-sound CHP resources and distributed generation. The project will tap into advances made in technologies for engines in the transportation sector and apply them to stationary engines used for small-scale CHP systems. Possible project benefits include:

- Lower electricity costs for CHP owners since the power is produced more efficiently.



New engine technology for CHP (Image credit: Tecogen, Inc.)

- Reduced air pollutants, GHG emissions and natural gas consumption.
- Reduced growth in demand for central power generation, transmission, and distribution, mitigating rising electricity costs.
- A cost-effective CHP option for smaller-size customer class.

Project Specifics

Contract Number: PIR-08-022

Contractor: Tecogen, Inc.

Contract Amount: \$999,824; Match Funding: \$518,712

Contract Term: July 2009 to March 2013

For more information, please contact:

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