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# CHP Case Study

## Introduction

The Gatorade Company, Inc., a division of PepsiCo, completed construction of a combined heat and power (CHP) system at its processing plant in Mountain Top, PA in November 2016. The objective of this project was to reduce cost and to help achieve their goal to reduce greenhouse gas emissions 20% by the year 2030.

CHP Efficiency

| Equipment Size | 2 MW |
|---|---|
| Electric efficiency | 37% |
| Thermal efficiency | 48% |
| Overall efficiency | 85% |

This project was developed internally by PepsiCo engineers with financial support from their electric utility company. The gas installation was supported by UGI Utilities, Inc.

The CHP plant consists of one 2MW motor designed to recover hot water at 150°F from its jackets and aftercooler, and to generate saturated steam at 100 psig from its exhaust gases. The recovered hot water is used to pre-heat process water prior to pasteurization and the steam is injected into the general plant steam grid.

This project has an expected electric efficiency of 37% and a thermal efficiency of 48%, which is reasonable for a project of this size. The overall efficiency of 85% is significantly higher than other conventional power generator units.

## Waste heat recovered

As is common in most successful CHP systems, the CHP equipment is supported by two boilers which also generate steam at 100 psig. These boilers were previously responsible for the whole steam and hot water generation, and now their utilization is being reduced by the CHP thermal production, which is a typical benefit of installing a CHP system. In any case, a complementary thermal redundancy is strongly recommended to respond to quick changes in demand and to shave peak load, as CHP generators perform better on a base load regime.

## The UGI EE&C rebate

As of January 2017, UGI Gas began offering a CHP rebate of $750 per kW on equipment installed; not to exceed 50% of project cost or a maximum of $250,000. The rebate is available to current and new UGI Gas customers who take service under rate schedule DS or LFD.

> **"This CHP installation enables us to not only save money on our annual operating costs, but also provides an environmental benefit as well. With a simple payback of 5 years, this project was an excellent opportunity to partner with UGI."**

- Andy Lempera *Supply Chain Sustainability Director, PepsiCo*

To learn more about CHP, contact your UGI Sales Rep or email **savesmart@ugi.com**.

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# Financial analysis

Gatorade's system generates 14.8 GWh and 74,000 MMBTU of electric and thermal energy annually, which generates savings over $1.2 million. The total investment for this project was close to $3.5 million, which was supported with a $500,000 incentive from the customer's electric utility company. The additional operational cost, which includes fuel and maintenance, is estimated at $160,000. Overall, the project has a simple payback of 5.08 years. With a UGI CHP rebate, the simple payback is reduced to 4.66, and the ROI is increased from 19.7% to 21.5%.

## Cost-Benefit

| | Base Case | With UGI Rebate |
|---|---|---|
| Energy savings | $1,200,000 | $1,200,000 |
| Extra gas consumption | $450,000 | $450,000 |
| Maintenance | $160,000 | $160,000 |
| **Net Savings** | $590,000 | $590,000 |
| Total investment | $3,500,000 | $3,500,000 |
| Incentives | $500,000 | $750,000 |
| **Net investment** | $3,000,000 | $2,750,000 |
| ROI | 19.7% | 21.5% |
| **Simple payback (years)** | 5.08 | 4.66 |


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