

Combined Heat & Power (CHP) for Healthcare

Energy costs are a growing concern for healthcare facilities. In addition, many hospitals have inefficient and crumbling central energy plants. Healthcare owners seek cost effective means of updating aging energy infrastructure, while minimizing risk and positioning vital systems for the future.

To meet those needs, Haskell Energy was formed to provide complete energy systems to hospitals using Combined Heat & Power (CHP) or cogeneration—complete solutions from a single company.

Combined Heat & Power Overview

Implementing a cogeneration system can reduce energy costs and provide superior payback on invested capital.

Facilities with access to natural gas can leverage a favorable *spark gap*, or the price difference between grid-supplied electricity and natural gas.

With a CHP prepackaged power system, owners use less expensive natural gas as fuel in a more efficient power plant. Waste heat created by electricity generation is captured and converted into energy that reduces the need from external sources.

WHY HASKELL ENERGY? WHY NOW?

Hospitals have a significant and constant demand for electricity, heating, steam and cooling, and are good prospects for the benefits provided by cogeneration.

Haskell is a national leader in the integrated delivery of healthcare design, engineering and construction. Haskell Energy provides systems and solutions that generate electricity, chilled water, hot water and steam from renewable, alternative and traditional fuel sources.

Through a standard EPC (Engineer, Procure and Construct) agreement, Haskell Energy can provide a more integrated, economical power plant, and do it with one team—faster.

Energy Trends & Capital Planning

Facilities, operations and finance directors at hospitals face continuously-evolving energy performance requirements. Last year's efficiency improvements quickly become this year's baseline.

As healthcare energy systems require more resources, the following will directly affect healthcare energy planning and design:

- ▶ **Building Code Adoption** - efficiency increases via IgCC and ASHRAE
- ▶ **Sustainability Programs** - LEED and others insist on audits and real data
- ▶ **Energy Modeling** - More emphasis on design performance, user impact and commissioning
- ▶ **Net-Zero** - Municipalities have begun legislating buildings generate as much energy on-site as they use
- ▶ **Real-time Energy Pricing** - Daily or hourly utility prices are growing

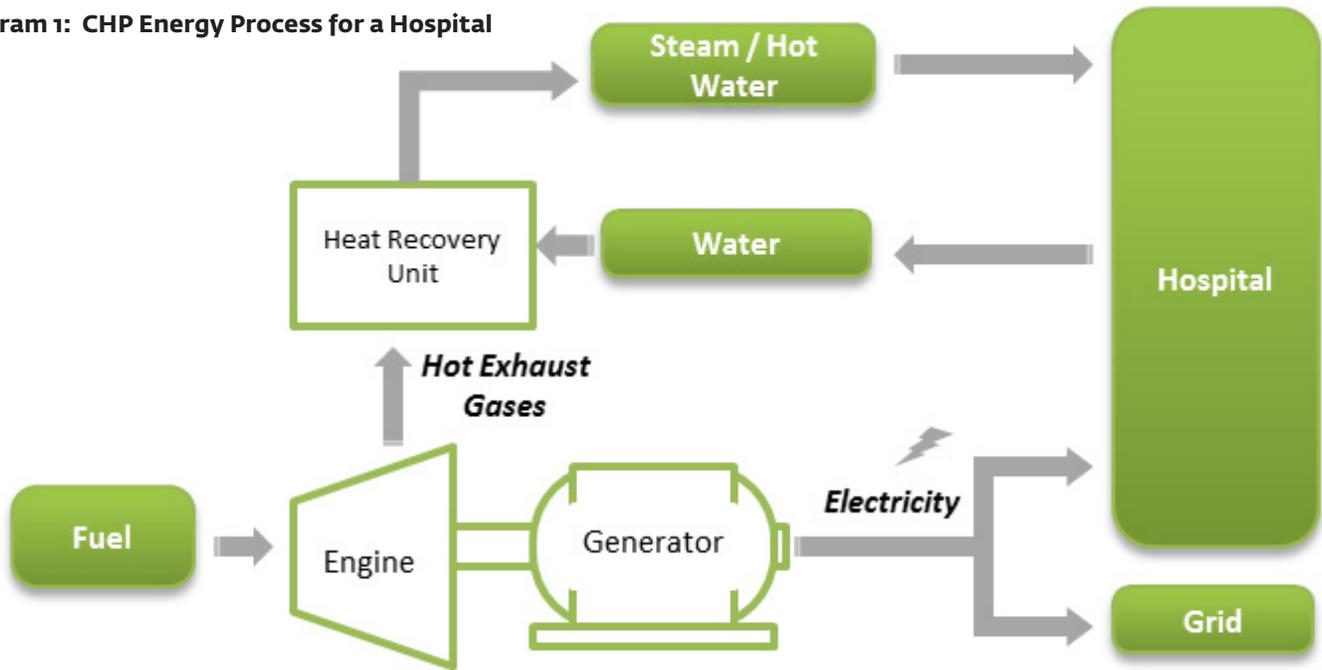
The Haskell Energy solution can provide additional value because it helps mitigate the risk of some of the above concerns. For instance, if a carbon tax or cap-and-trade system is put in place, owners with CHP will be better positioned to manage outcomes.

How It Works

Haskell Energy offers a complete energy solution [see diagram 1]. We provide a single team turnkey experience, which includes integrated technology, engineering design and construction expertise. The CHP generation system is sized, designed and packaged, factory assembled, shipped to the site and installed by Haskell—owner coordination headaches are minimized.

While power production from electricity is only 33-35% efficient, CHP delivers 70%. A two-megawatt CHP system can provide 500 tons of cooling, and help offset 50%+ of your hospital's current grid power demand.

Diagram 1: CHP Energy Process for a Hospital



COMBINED HEAT & POWER HOSPITAL CASE STUDY

Size and Type of Hospital – 225 beds, Suburban

Annual Electricity Cost **\$1,650,000**

(16 M kWh @ \$0.10 / kWh)

Annual Gas Cost **\$236,520**

(80% of boiler @ \$4.50/MBTU)

Total Utility Costs **\$1,881,160**

CHP System Size (Power Load) **2 MW**

(8000 hours / year)

Total CHP Energy Costs **\$950,000**

(Gas + O&M)

Annual Savings - \$931,160

Capital Cost (incl. 10% federal tax credit) - **\$3.15 million**

Simple Payback - **3.38 years**

Internal Rate of Return - **30%**

Typical System Installation - 12 months (9 months fast-track)

Hospitals that currently use electricity and natural gas as their primary fuel sources can expect to see electricity demand and costs drop, while gas demand will rise. However, the cost impact, including operations and maintenance, will be proportionately less.

Benefits of Power Cogeneration

Where appropriate, a CHP system offers:

- ▶ **30-60% energy expense reduction**
- ▶ **Short payback: 3-6 years**
- ▶ **Smaller footprint for infrastructure**
- ▶ **Continuous backup emergency power**
- ▶ **Broadens energy portfolio & reduces cost risk**

Many of these positively affect operating efficiencies, expenses and margins. CHP lease and ownership options provide additional capital flexibility.

CHP Improves Hospital Operations

The U.S. Energy Information Administration expects energy prices to increase 2-4X by 2035. Also, by 2035 a type of natural gas, shale gas, is expected to account for triple its current supply share. For certain healthcare providers, the return on investment for Combined Heat & Power is already strong, and only getting stronger.