

An aerial, black-and-white photograph of a large industrial plant, likely a power or cogeneration station. The facility features a complex network of pipes, walkways, and structural steel. A prominent feature is a long, horizontal structure with a series of circular openings, possibly a cooling tower or a large fan array. In the foreground, there are several large, rectangular structures, possibly storage tanks or part of the building's foundation. A red crane or lifting device is visible on the left side of the image. A red square logo with the letters 'AB' in white is centered over the image. Below the logo, the text 'COGENERATION WORLD' is written in white capital letters on a red background.

AB

COGENERATION WORLD



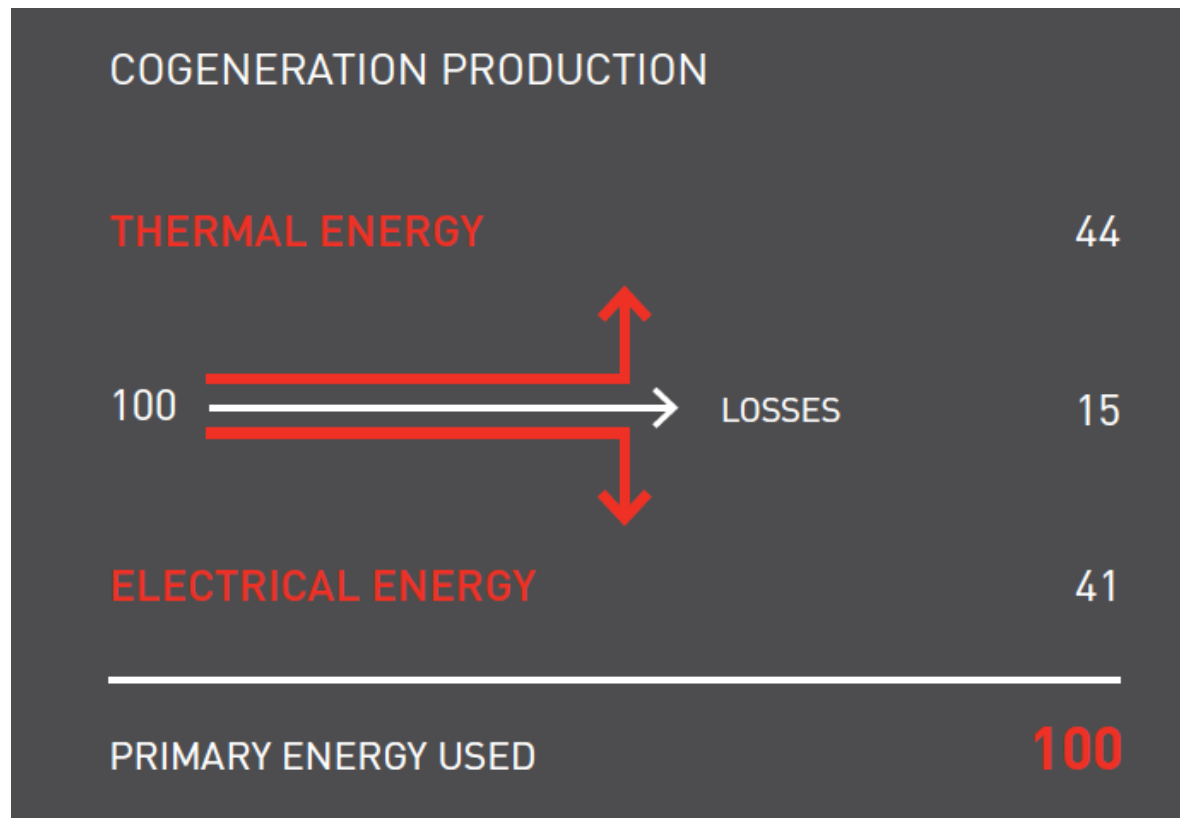
IDEA 2016 – ST PAUL (MN)

RECIPROCATING ENGINE CHP FOR DISTRIBUTED ENERGY SOLUTIONS

- ❑ What is the cogeneration?
- ❑ Why cogeneration?
- ❑ Reciprocating engines
- ❑ Case History: Aria Hospital

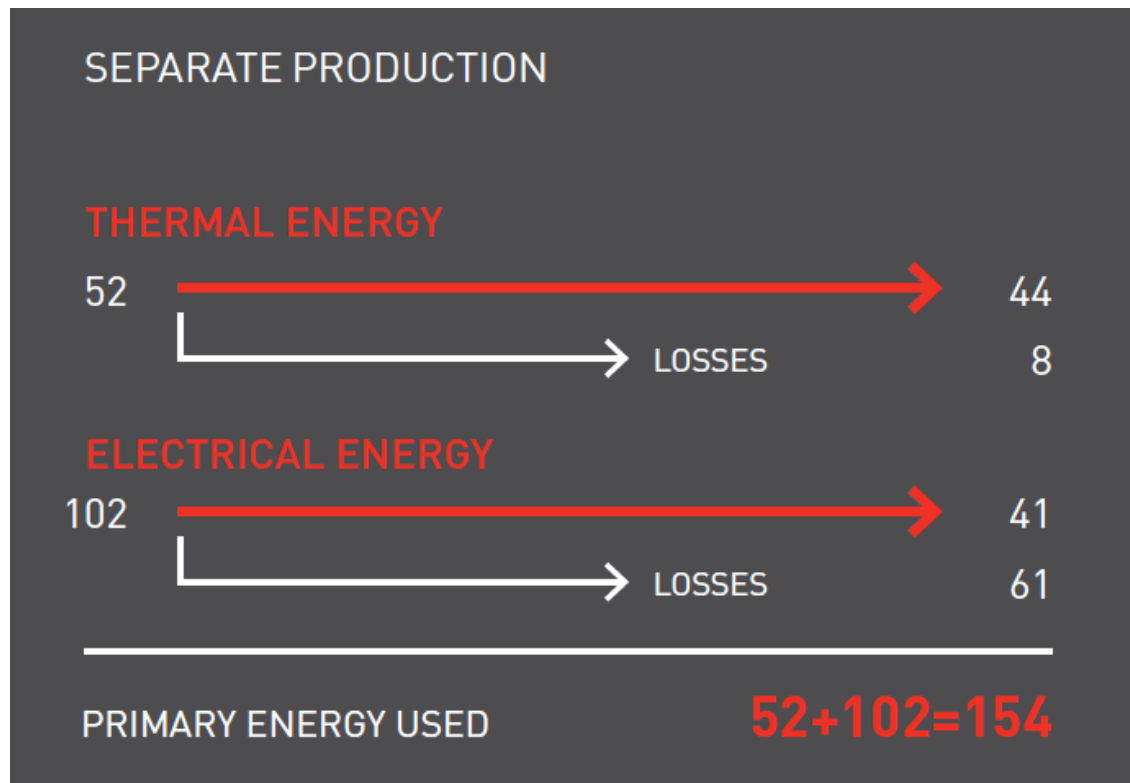
WHAT IS THE COGENERATION?

Combined heat and power (**CHP**) is an efficient way to generating electric power and thermal energy starting from a single **fuel source**.



WHAT IS THE COGENERATION?

Instead of purchasing electricity from the distribution grid and **separately** burning fuel in an on-site boiler to produce thermal energy, an industrial or commercial facility can use combined heat and power to provide both services in one **energy-efficient step**.

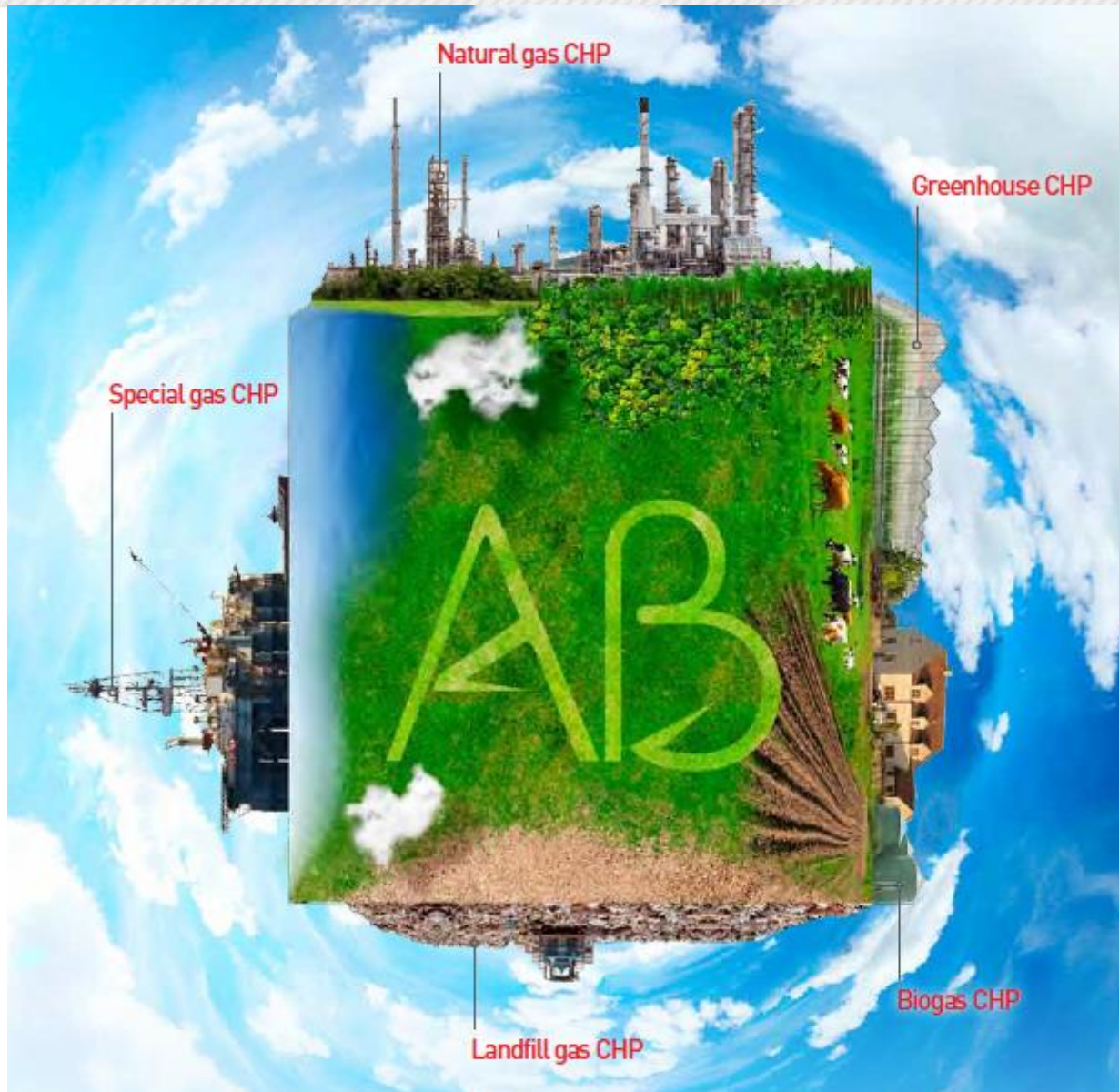


The US DOE stated:

CHP is a clean energy solution that directly addresses a number of national priorities, including improving U.S. competitiveness by:

- ❖ *reducing energy operating costs,*
- ❖ *increasing energy efficiency,*
- ❖ *reducing greenhouse gas emissions,*
- ❖ *enhancing our energy infrastructure,*
- ❖ *improving energy security and resiliency, and...*
- ❖ *... "growing" the U.S. economy.*

THE WORLD OF COGENERATION



THE WORLD OF COGENERATION

POSSIBLE APPLICATIONS



NATURAL GAS



INDUSTRIES:

Manufacturing

- Beverage
- Ceramic and Bricks
- Chemical
- Dairy
- Food
- Metallurgy
- Paper Mills
- Pharmaceutical
- Plastics
- Textile

Commercial

- Data Centres
- District Cooling
- District Heating
- Hospital
- Hotels
- Shopping Mall

Greenhouse



BIOGAS



INDUSTRIES:

Agriculture
Agro-industrial wastes
Landfill
WWTP (Waste Water Treatment Plant)



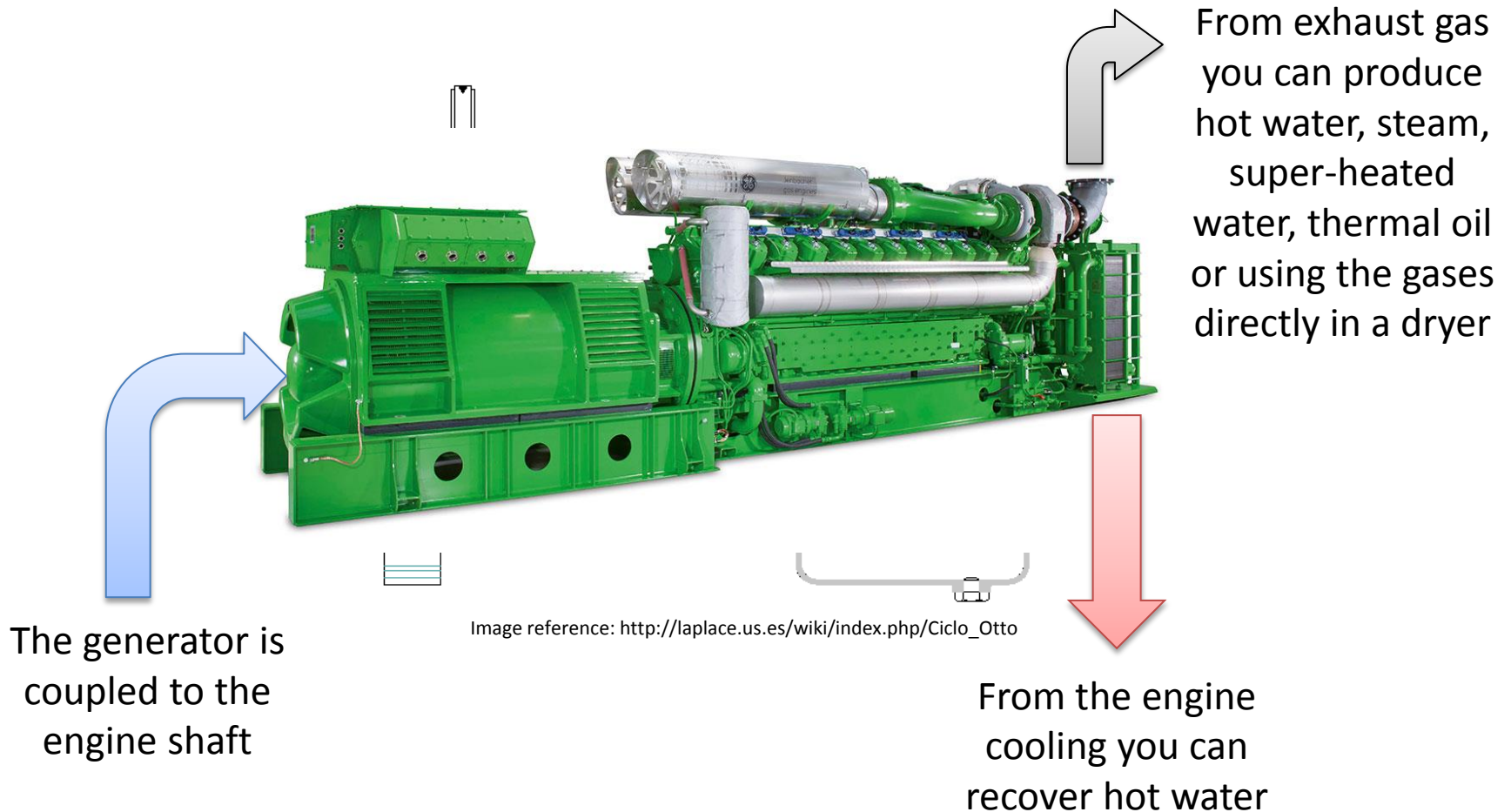
SPECIAL GAS



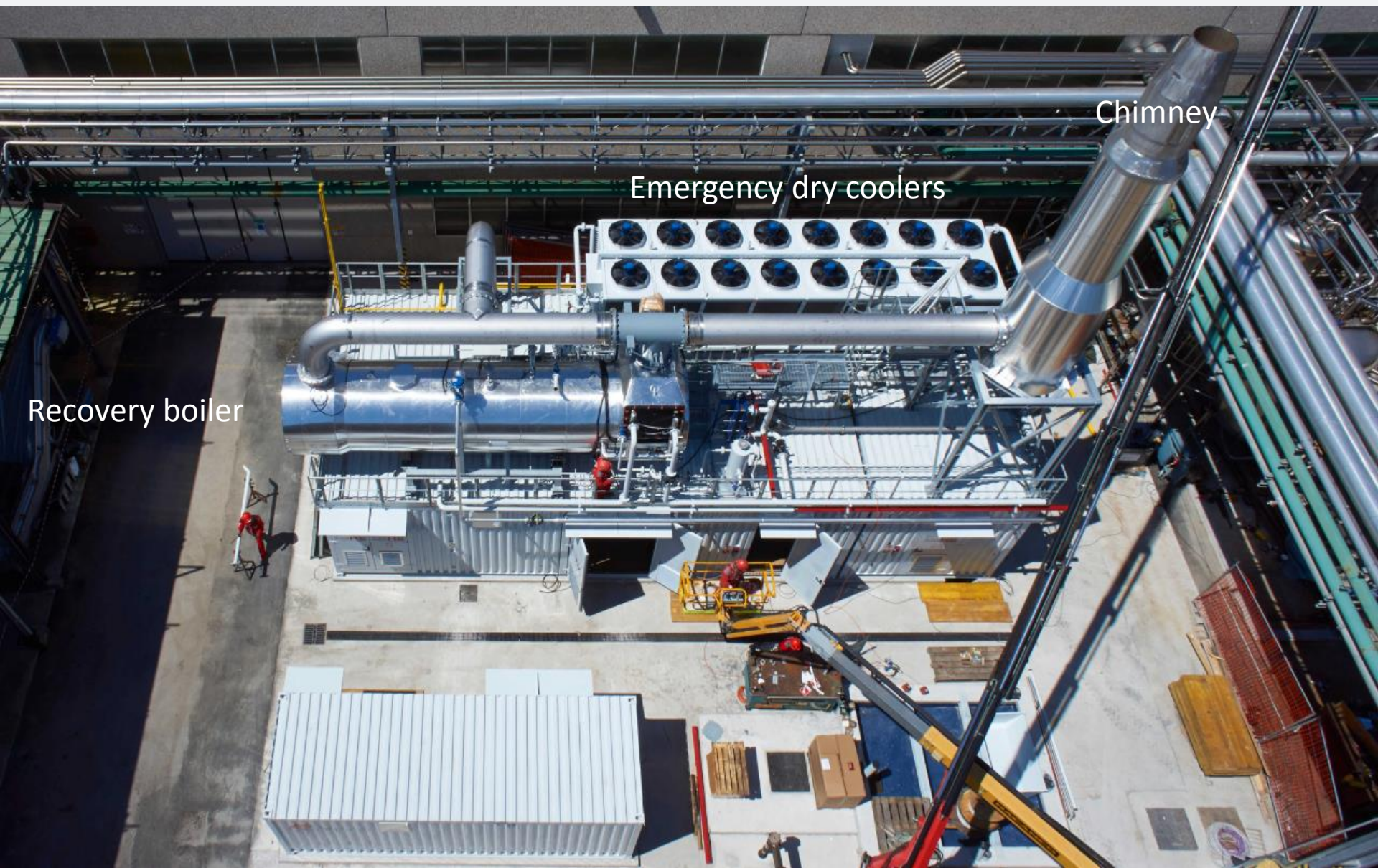
INDUSTRIES:

Coal Mine
Oil extraction (APG)

How do they work? Otto cycle combustion



CHP Plant The Other Main Components



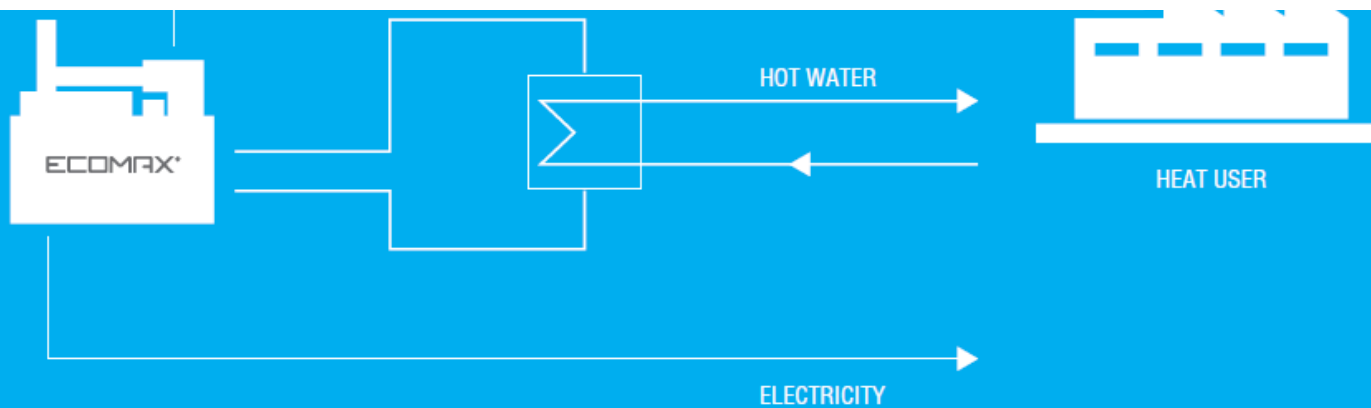
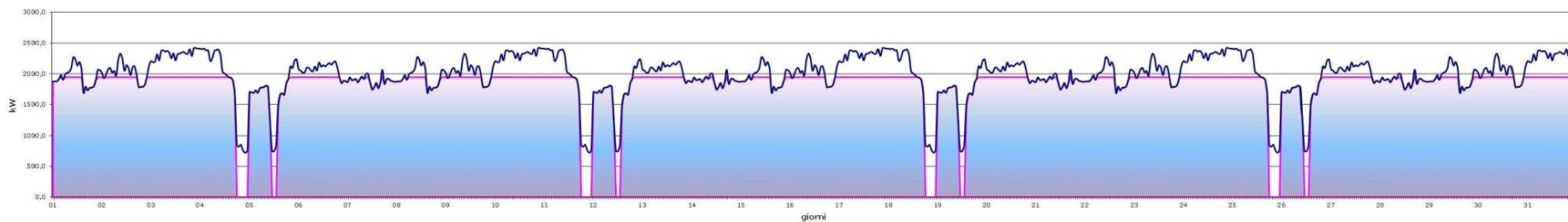
Recovery boiler

Emergency dry coolers

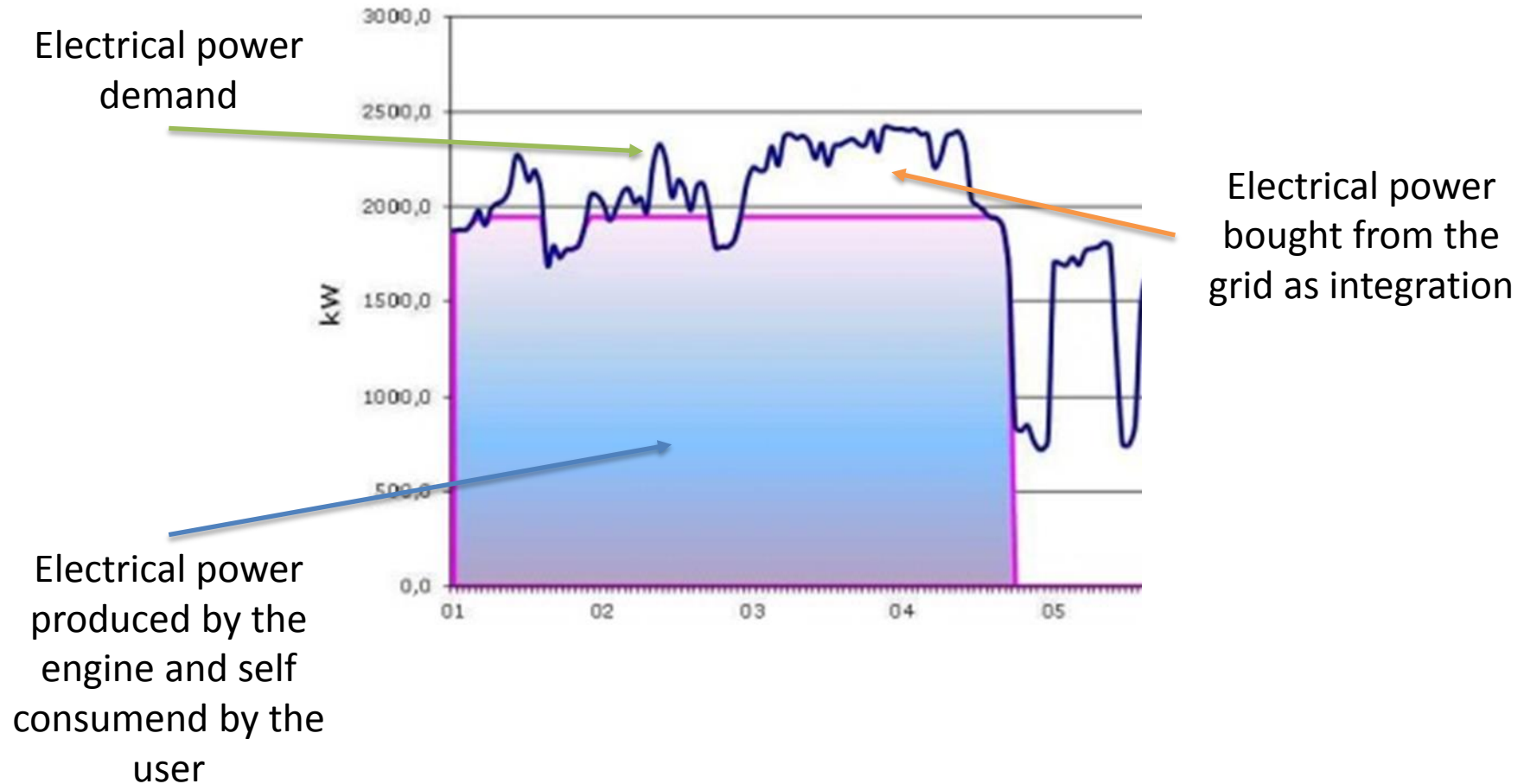
Chimney

TECHNICAL FEASIBILITY

EXHAUST GAS

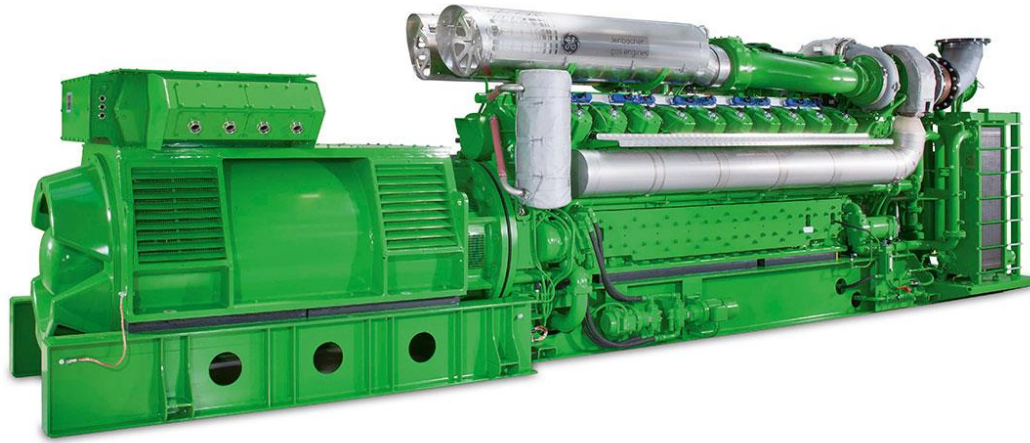


TECHNICAL FEASIBILITY ENGINE DIMENSIONING → ELECTRICAL POWER



- ❑ The thermal energy is the key factor
- ❑ To cool down the thermal energy produced by the engine costs money
- ❑ That's why the engine dimensioning must consider the end-user thermal energy consumption in order to avoid to waste energy and money

ECONOMICAL FEASIBILITY THE MAGIC FORMULA



- + Electrical energy produced
- + Thermal energy produced by the engine cooling
- + Thermal energy produced by the exhaust gas
 - Gas consumption
 - Maintenance costs

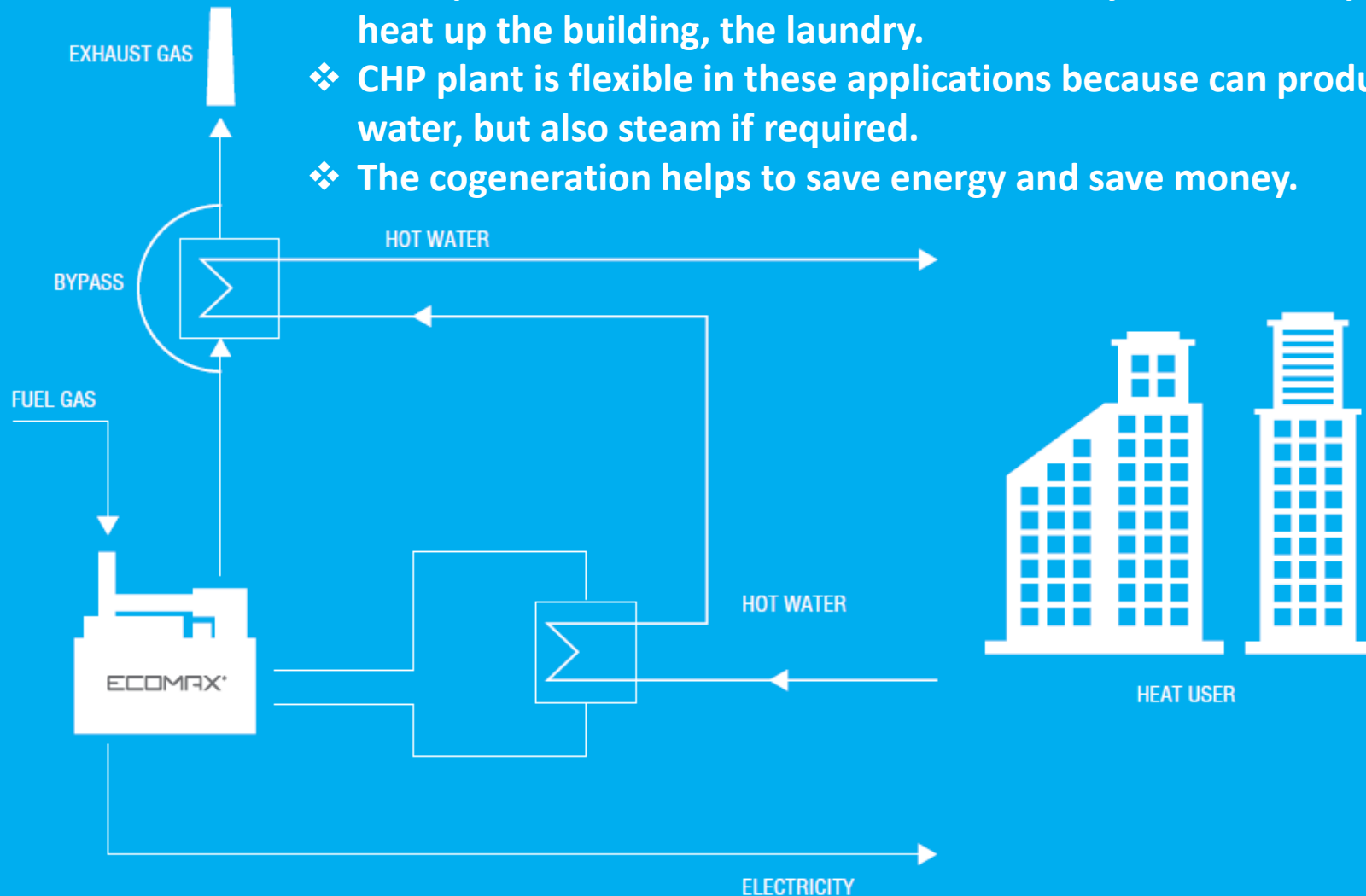
→ ENERGY and MONEY SAVINGS

CASE HISTORY ARIA HOSPITAL IN PHILADELPHIA

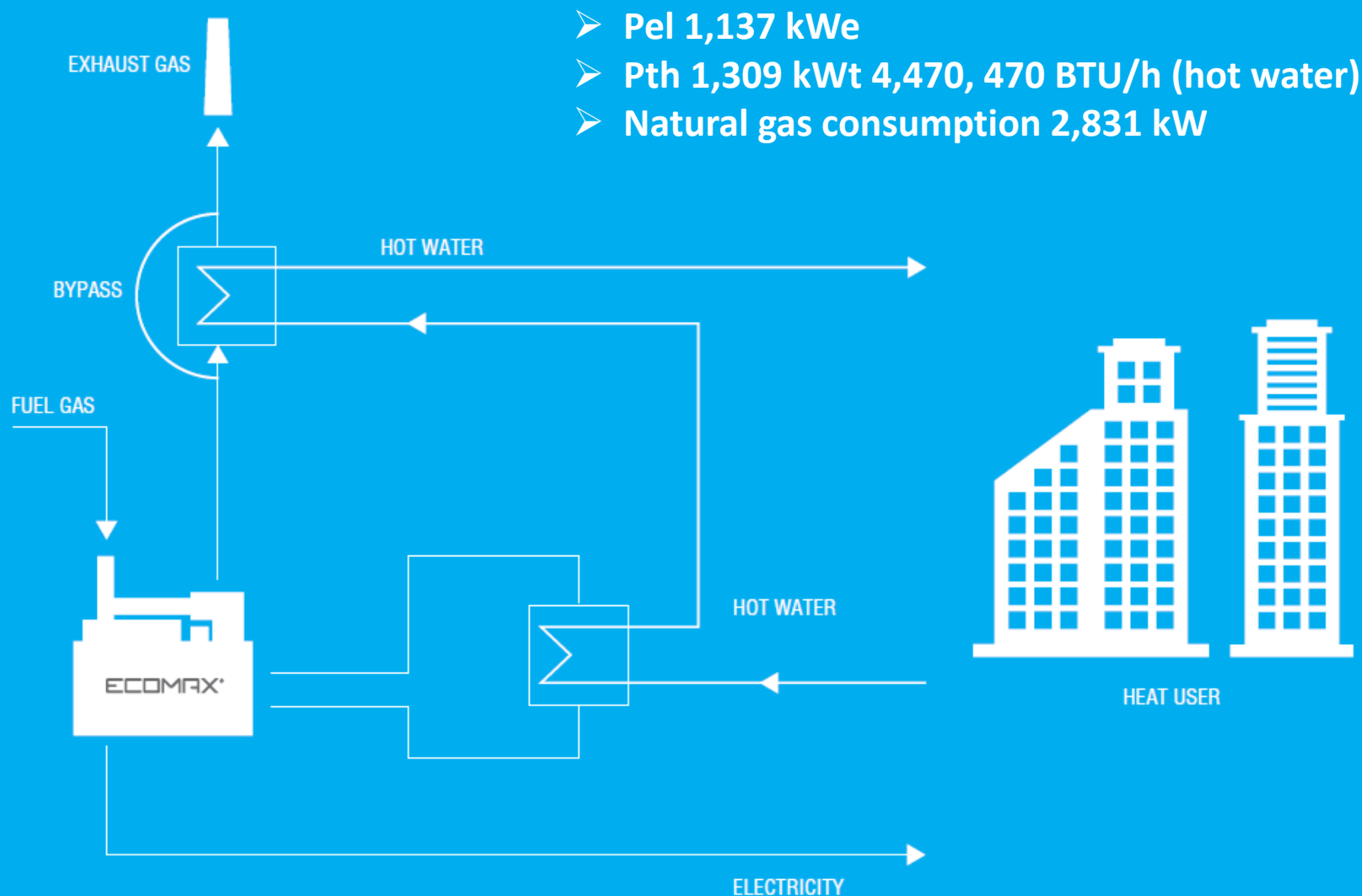


ARIA HOSPITAL IN PHILADELPHIA THE CASE

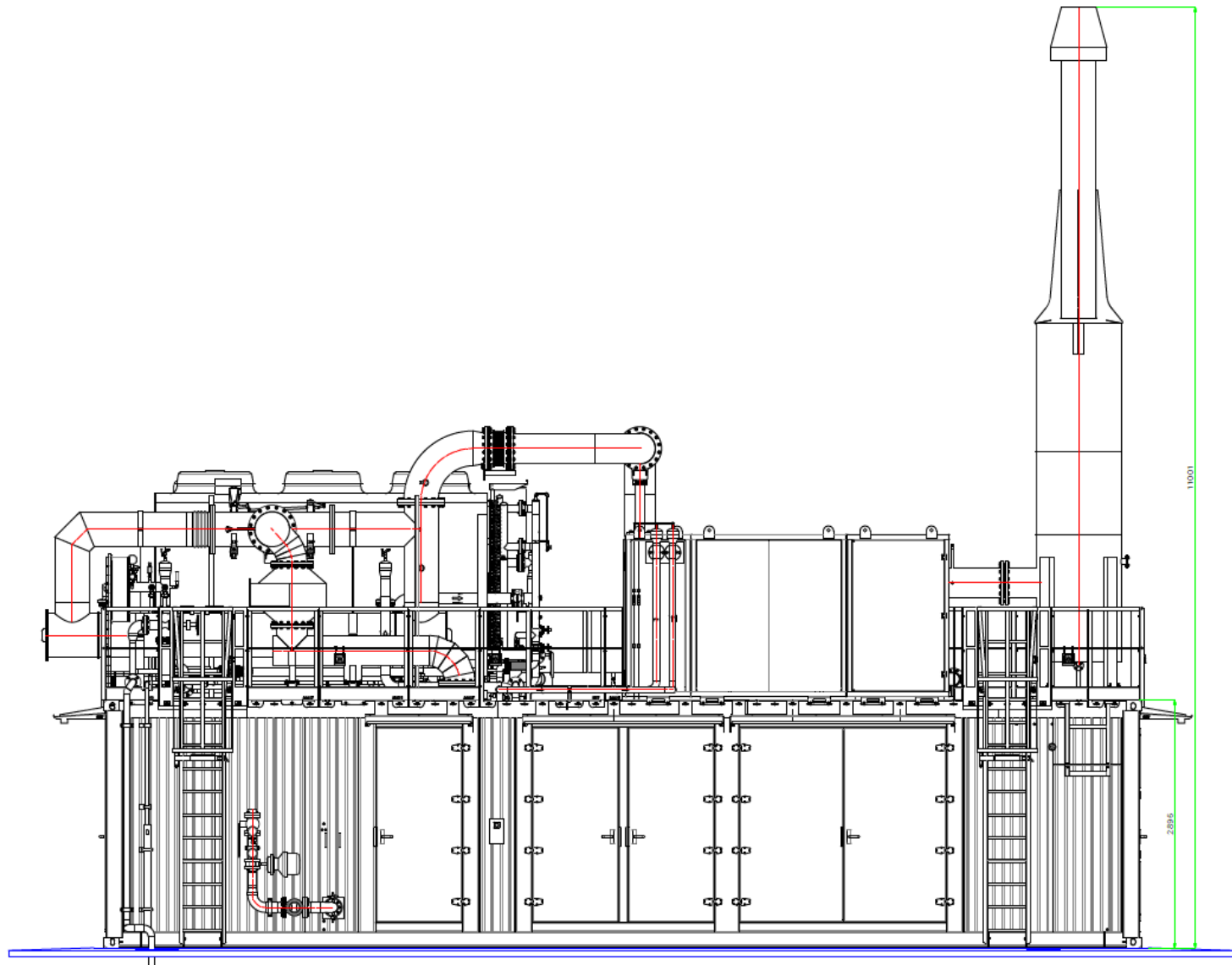
- ❖ A hospital consumes tons of hot water every hour of every day to heat up the building, the laundry.
- ❖ CHP plant is flexible in these applications because can produce hot water, but also steam if required.
- ❖ The cogeneration helps to save energy and save money.



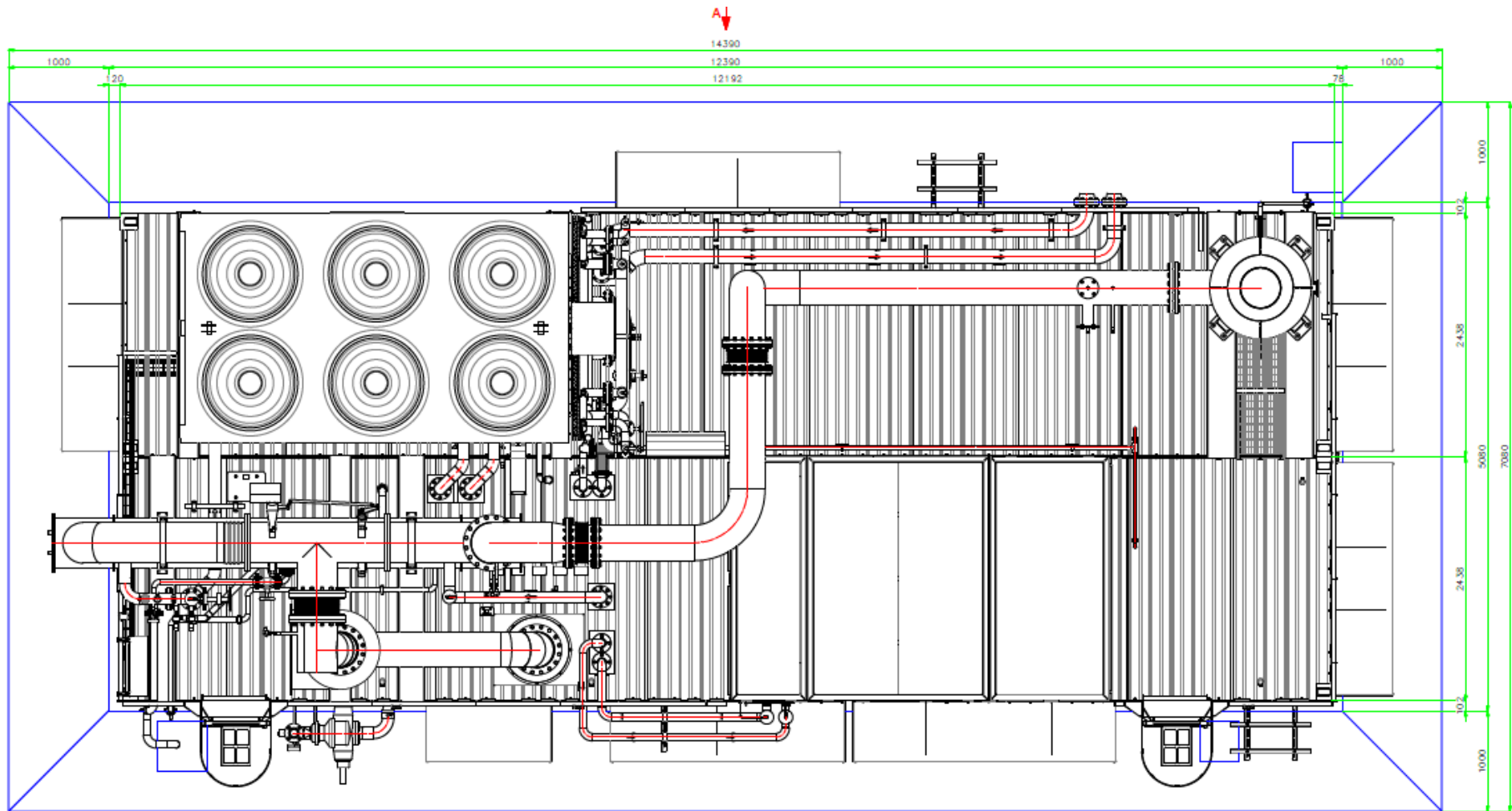
ARIA HOSPITAL IN PHILADELPHIA DATA



ARIA HOSPITAL IN PHILADELPHIA THE LAYOUT



ARIA HOSPITAL IN PHILADELPHIA THE LAYOUT



COGENERATION CHANNEL TO SPREAD THE CHP CULTURE



The first and only web channel entirely dedicated to COGENERATION and all its applications.

- Case histories and best practices from around the world
- More than 400 online videos
- 12 thematic sections

www.cogenerationchannel.com

The screenshot displays the COGENERATION CHANNEL website. At the top, there is a navigation bar with a language dropdown set to 'Italiano', a 'Newsletter' link, and a search icon. Below this is a secondary menu with links for 'Chi Siamo', 'Ricerca Video', 'Upload Video', 'News ed eventi', and 'Contatti'. The main header features a large image of an industrial facility at night, with a video player overlay showing a title in Italian: 'Prospettive del mercato dei motori a gas e driver in USA'. Below the header is a 'CATEGORIES' section with a grid of 12 topics: Efficienza energetica e cogenerazione, Applicazioni industriali e commerciali, Applicazioni greenhouse, Teleriscaldamento, Gas special, Biogas e biomasse, Le soluzioni per il frazionamento, Tecnologie e gestione dell'impianto, Componenti ausiliari, Case histories, Associazioni e policy, and Mercato e ricerca. The 'POPULAR' section follows, featuring three video thumbnails with titles in Italian: 'Marie Donnelly: La cogenerazione è fondamentale per la politica energetica Europea', 'Francesca Amadori & Michele Noera: Una centrale di cogenerazione d'eccezione: il caso Amadori', and 'Richard Lasdo: Cogenerazione, una grande opportunità per le industrie canadesi'. The 'LATEST' section at the bottom shows two more video thumbnails: 'Adi Golbach: La cogenerazione per le strutture ospedaliere: più efficienza meno...' and 'Miranda Schreurs: Germania: necessari provvedimenti in materia di efficienza energetica'. On the right side of the page, there are two vertical banners: one for 'Mobil SHC Pegasus' with the text 'Unleash your productivity. Mobil SHC Pegasus*' and a 'Learn more >' link, and another for 'siat' with a circular logo.



THANK YOU!

ANY QUESTIONS? NOW OR...

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