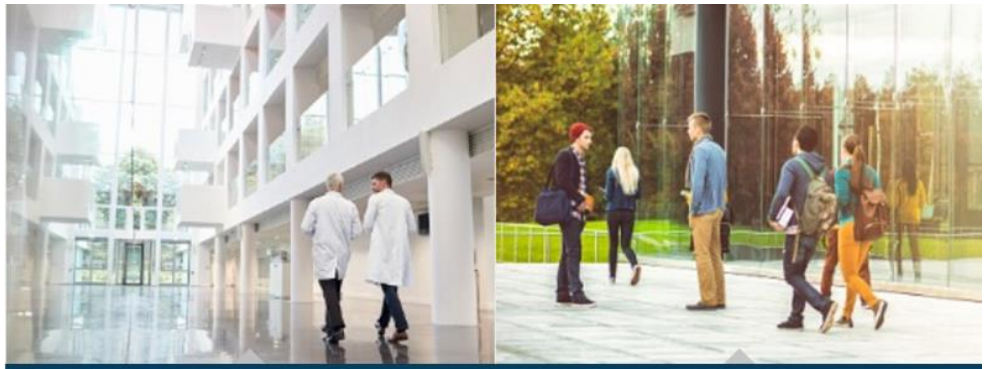
HVAC System Optimisation

hysopt

Hydronic System Optimisation

About Hysopt



Hospitals

University Campuses

Public Sector Buildings

District Heat Networks

CIBSE BUILDING PERFORMANCE AWARDS 2020
WINNER

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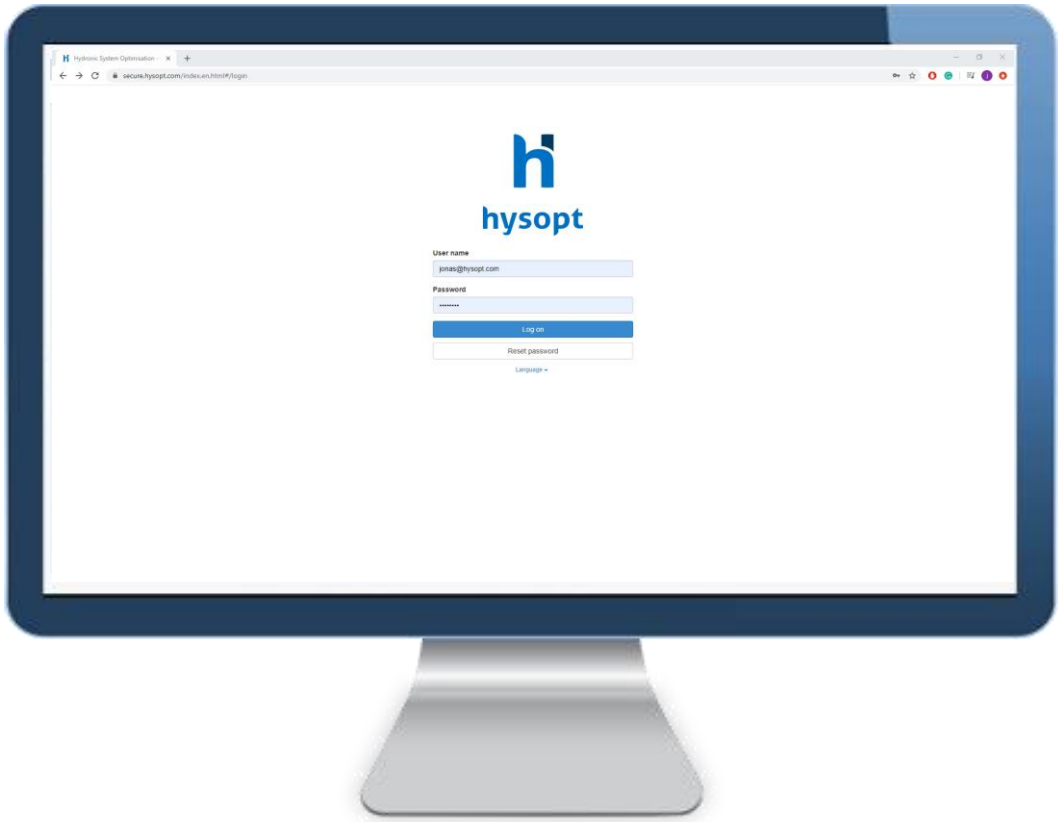
Design for Performance

Performance
at the design stage

- **Design & Calculation tool – static, peak load conditions**
- **Dynamic Simulation tool – partial load behavior**
- **Measure and compare performance of different hydraulic concepts**
  - **Opex / Carbon / Comfort /Capex**
- **Typical issues we tackle…**
  - **Correct hydraulic system design and control strategy**
  - **High return temperatures**
  - **Pump energy cost reduction**
  - **Optimal hydraulic integration of boilers/ chp/ low carbon heat plant**
  - **Calculation errors & Oversizing**

Static - peak load vs
Dynamic – partial load behaviour



Secure the Integrity of the Design

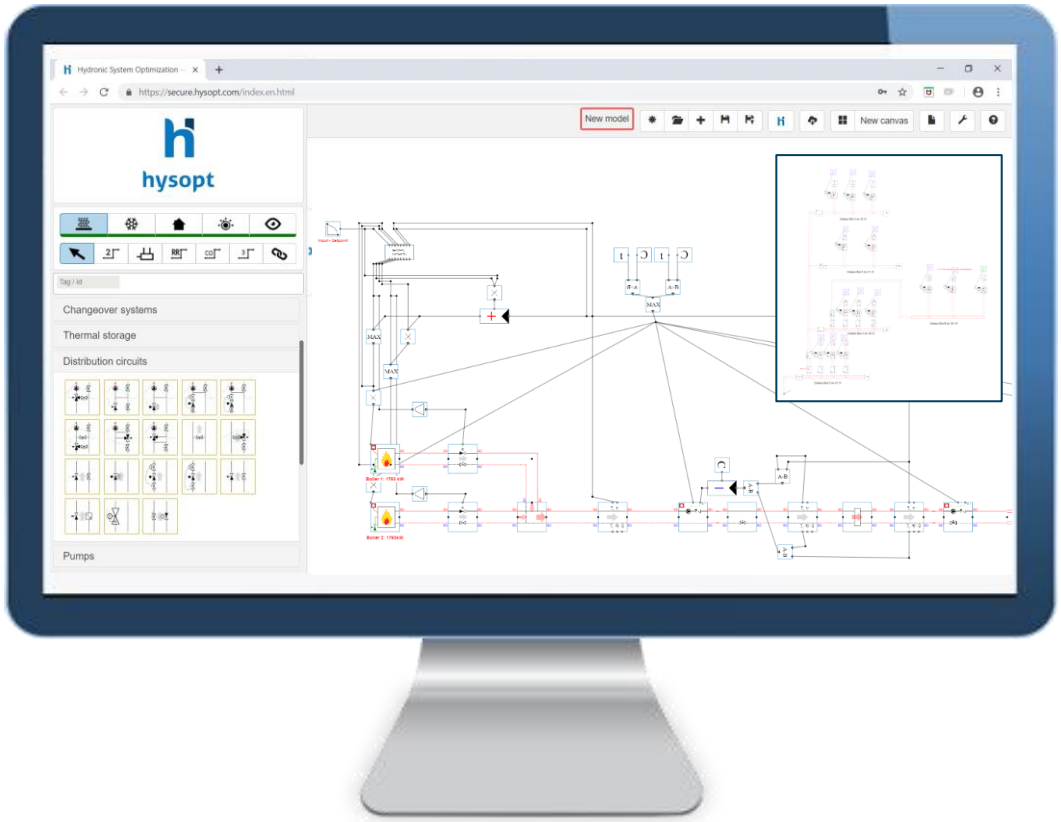
Performance
at the design stage

Secure Design Integrity

- Optimised component selection – lowest energy
- Commissioning
- Shareable cloud-based model

Digital Twin
of your P&ID

- Lifecycle management of the installation



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What you can expect

Performance at the design stage

200+ HVAC optimisation projects

30% fuel cost energy saving

Secure Design Integrity

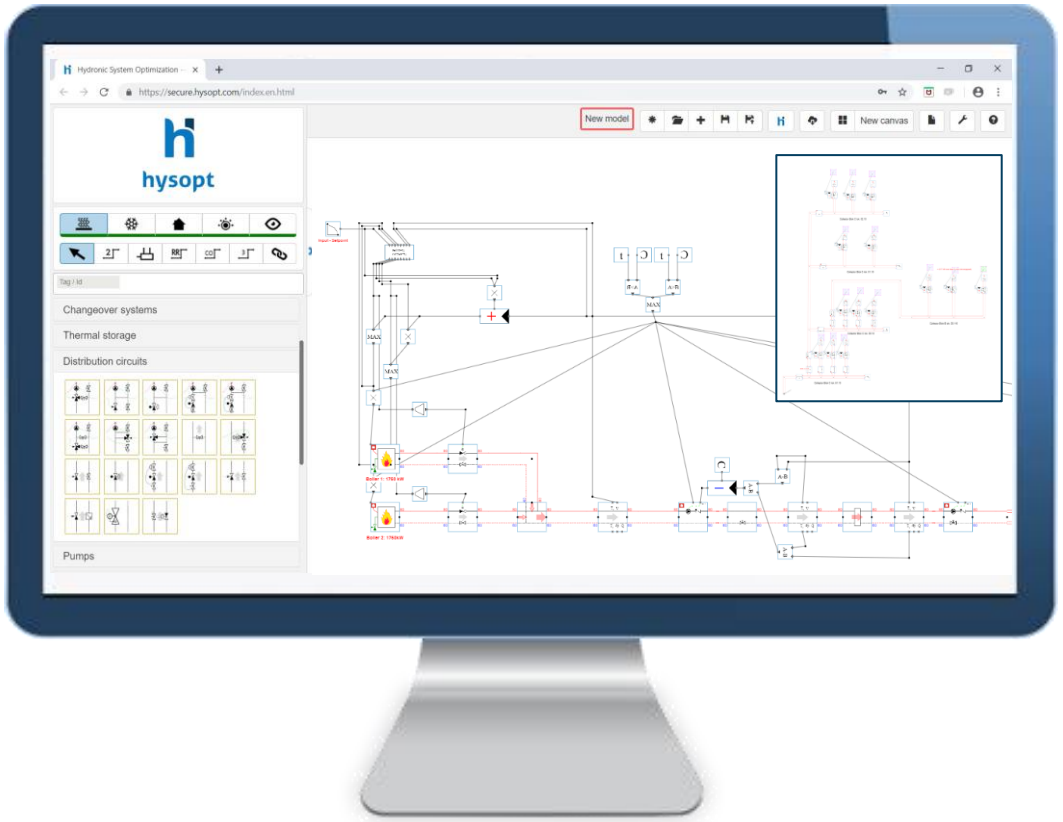
Faster RoI on CHP installations

10% capex savings

Digital Twin of your P&ID

90% less errors

75% Payback in under 3 years



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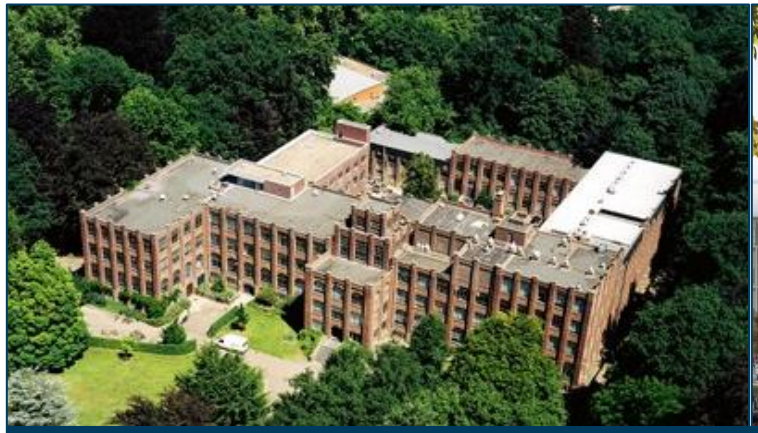
The Problem – Lack of Performance Insights



Existing Buildings

New Builds

Incorrect Sizing:

Full load conditions; Addition of safety margins

Poor integration of low carbon technologies

Lack of transparency at the design stage

Poor component selection

Commissioning by Trial & Error

Oversized systems

High capex

Poor opex and CO_2 emissions

Sub-optimal integration of technologies

“Performance Gap” at handover stage

Hysopt – Typical Projects

Boiler / Distribution System Optimisation/ Upgrade

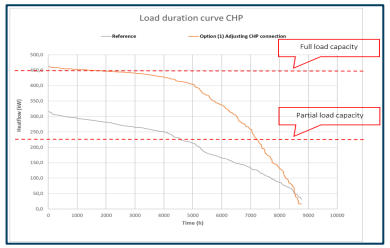
Existing Installations
Energy cost savings
Comfort improvements

10-20% annual energy savings
Improved thermal comfort
RoI <3 years
Digital Twin

>50 examples!

CHP Optimisation

Existing installations
Significant annual energy cost savings
Comfort / Performance improvements



30-50% annual energy savings
Improved thermal comfort
RoI 1-2 years!
Digital Twin

Low Carbon Technologies & Heat Networks

Existing Installations
Make the right choices – compare performance vs KPI's
Capex, Opex, Carbon Savings, Comfort Optimisation
Protect design integrity into Commissioning/Operation

5-15% lower capex
Up to 30% lower energy costs
Objective comparison of all options
Right first time install/commission

New System Design & Specification

New Installations
Make the right choices – compare performance vs KPI's
Capex, Opex, Carbon Savings, Comfort Optimisation
Protect design integrity into Commissioning/Operation

5-15% lower capex
Up to 30% lower energy costs
Objective comparison of all options
Full transparency
Right first time install/commission

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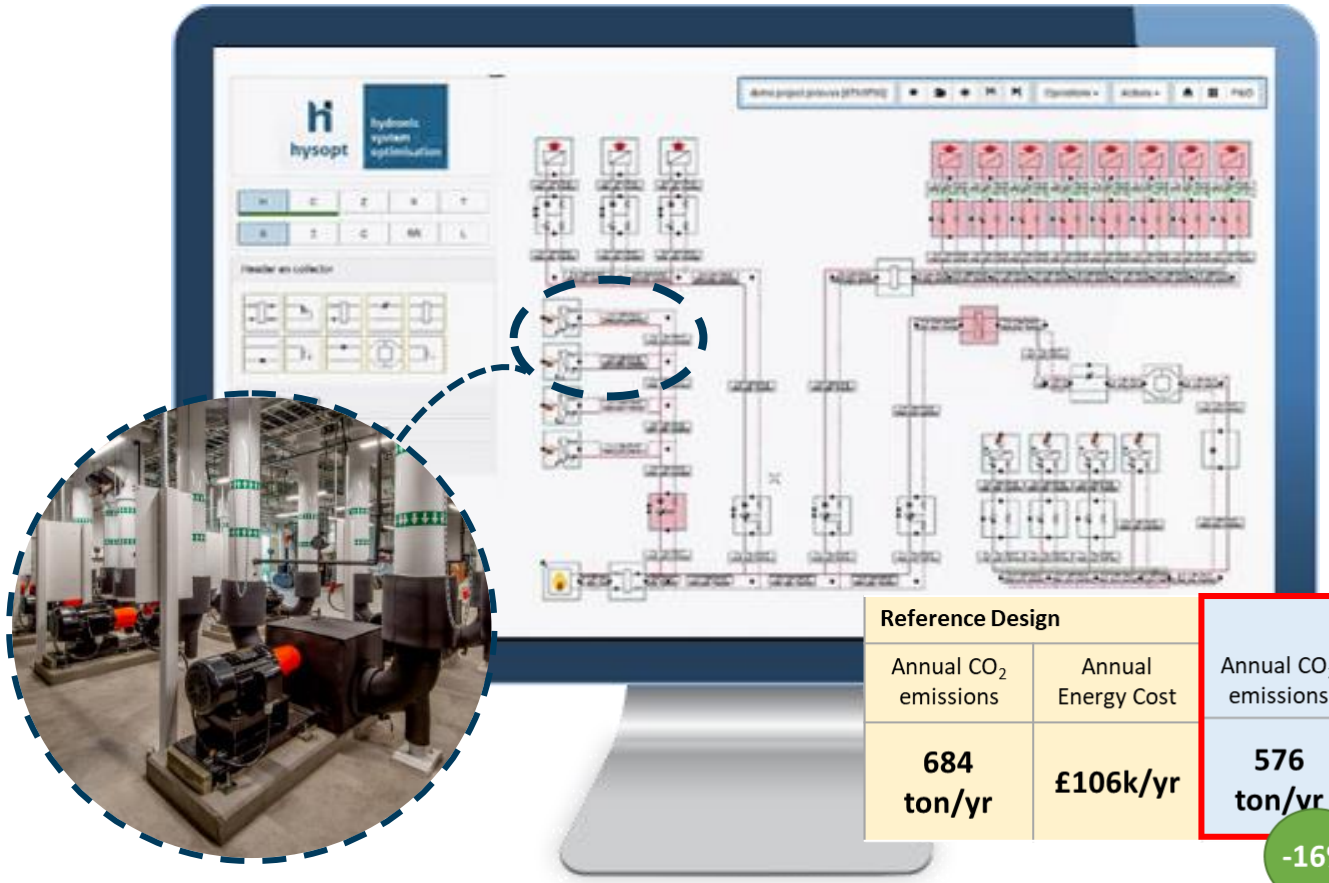
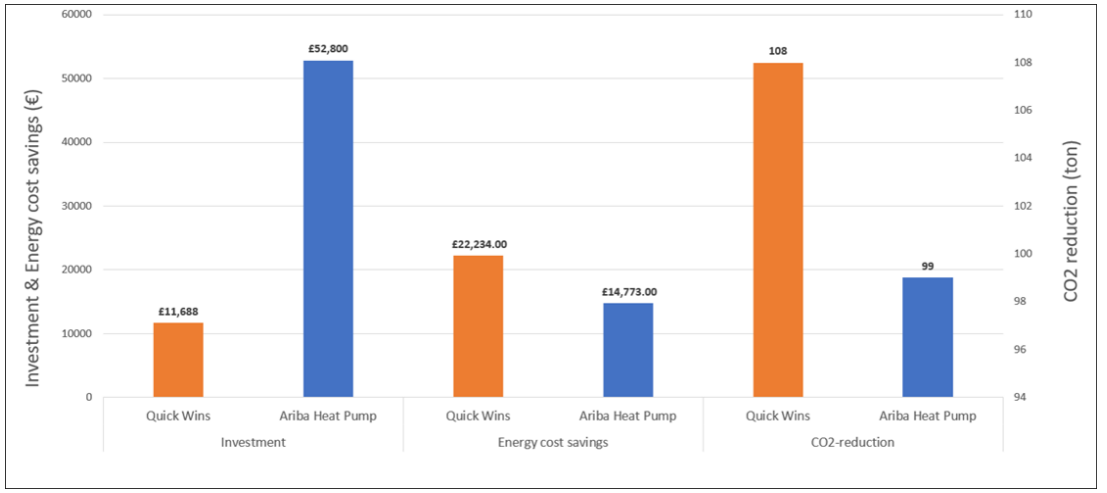
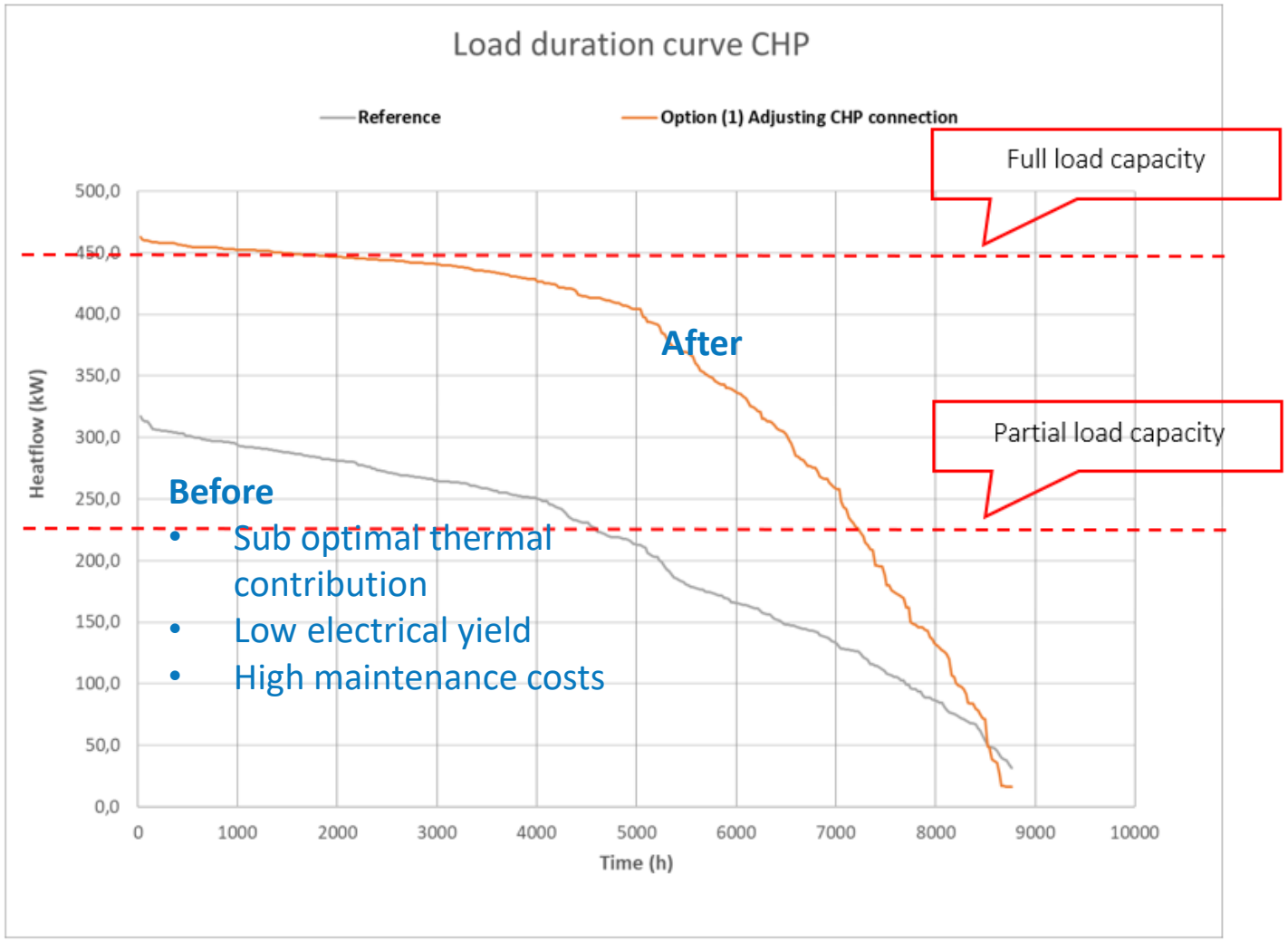
Mid & South Essex NHS Foundation Trust





Reference Design		Optimised Design "Quick Wins"				Heat pump (DHW & Cooling)			
Annual CO_2 emissions	Annual Energy Cost	Annual CO_2 emissions	Annual Energy Cost	Investment Cost	Payback	Annual CO_2 emissions	Annual Energy Cost	Investment Cost	Payback
684 ton/yr	**£106k/yr**	**576 ton/yr**	**£84k/yr**	**£116k**	**5.2 yrs**	**585 ton/yr**	**£91k/yr**	**~£500k**	**>30 years**
		-16%	**-21%**			**-14%**	**-14%**		

CHP Optimisation – example case (hospital)



Before		After
79% Boiler Contribution	→	55% Boiler Contribution
21% CHP Contribution	→	45% CHP Contribution
€115k Electrical production	→	€250k Electrical production
€224k Total annual energy cost	→	€117k Total annual energy cost

Results

€106k Annual energy cost saving	48% Annual energy cost saving	2.4 Years payback

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Hysopt Plan of Work

Design Check & Conceptual Optimisation

- Project License Fee: £5/kW
- Engineering Services: £110/hr

Decision

Detailed engineering

- Engineering Services: £110/hr

Installation

Inventory

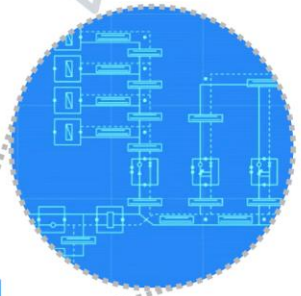
- P&ID
- Floorplans
- Measured data
- {m³}, {kW}, {°C}

Model implementation

- Load matching

System check

Design flow rate: 0.56m3/hr
Achieved flow rate: 0.37m3/hr



Simulation

Optimisation

Deliverables

- ✓ Reporting
- ✓ Conceptual Digital Twin
- ✓ Optimisation suggestions
- ✓ Investment analysis

Inventory

Detailed model implementation

System check

Component selection

Deliverables

- ✓ Reporting
- ✓ Detailed Digital Twin
- ✓ Installation report
- ✓ Commissioning report
- ✓ Optimisation suggestions
- ✓ Investment analysis

- ➤ Reduced CO2 and energy consumption
- ➤ Digital Twin for life and maintenance
- ➤ Cycle management Improved comfort

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