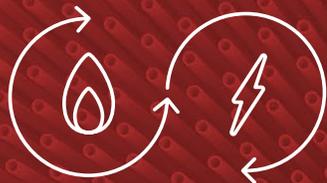


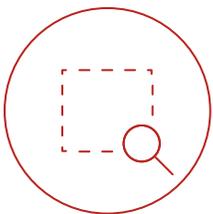
Essential CHP checklist what every engineer needs to know

The essential CHP checklist for design consultants specifying CHP. Discover how to help clients lower their energy costs and improve their energy performance



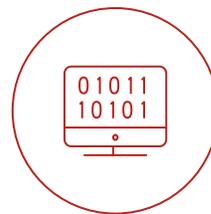
On-site cogeneration, known as **Combined Heat and Power (CHP)**, will help clients lower their energy costs, improve their environmental performance and secure a more reliable supply of energy

This checklist will ensure design engineers involved with CHP selection have all points covered



Initial technical assessment

Site load profiles for electricity, heating and cooling will determine if CHP is appropriate for the project and indicate the size of the CHP required to optimise financial and environmental benefits.



Site energy data

Accurate energy data is needed so that the CHP is neither over nor undersized. This data needs to represent, as closely as possible, the actual annual site energy consumption – broken down into periods for daytime/night, weekdays/weekend and for summer/winter – so that an accurate profile can be produced.



Existing buildings

When replacing a boiler with CHP during refurbishment works or retrofitting alongside existing equipment:

- 1 Obtain historical half-hourly consumption figures from electricity and heating fuel bills, or from a building management system. Suppliers may also be able to provide half-hourly meter readings.
- 2 Otherwise, undertake an energy audit by installing temporary monitoring equipment.



New buildings

- 3 Obtain realistic consumption figures from design information, comparable historical data or by energy modelling.



Site load profiles

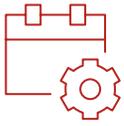
- 4 Using the electrical and heating fuel consumption figures, create energy profiles and calculate the site's heat demand and heat-to-power ratio.
- 5 If heat demand is low, check if there is sufficient cooling demand. A Trigeneration system will use excess heat for absorption chilling.



System design considerations

A standard CHP package can usually be supplied as a complete tested system including the heat recovery equipment. More complex or custom systems will require special consideration when it comes to site integration.





System operational schedules

- 6 Existing site equipment is working efficiently.
- 7 Any plans on-site to implement energy efficiency saving measures.
- 8 Any plans to increase site production levels that might increase energy demand and the site base load.
- 9 If a thermal store is required.
- 10 Whether adjacent sites could use the electrical and heat energy when demand is low on the main site.
- 11 How critical the security of supply is.



CHP selection

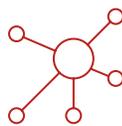
- 12 Select a CHP unit by matching it with the site load profiles for optimum system efficiency.



CHP unit, heat recovery, and its mechanical systems

Confirm:

- 13 There is space on-site to position the CHP unit in an internal or external location.
- 14 Check there are no siting or weight restriction to be considered.
- 15 There is space for ancillary equipment, pipework and access for maintenance:
 - ✓ Heating water circuit pump and control valve
 - ✓ Exhaust system silencer(s)
 - ✓ Ventilation fan and ductwork
 - ✓ Air flow for combustion and exhaust air
 - ✓ Cooling radiator (will need to be positioned outside the building)
 - ✓ Connecting pipework and cabling – installation works will need to be in accordance with mechanical and electrical regulations
- 16 If any additional site infrastructure works are required to accommodate the CHP.



Utility interconnections

Check there is:

- 17 Electrical, heating and cooling connections close to the CHP.
- 18 A reliable and secure primary fuel supply, e.g. natural gas, biofuel.
- 19 An Internet connection for remote monitoring and fault diagnostics.
- 20 An interface to the site control system.

Note

A connection agreement with the electrical utility provider is required to connect the CHP (even if not exporting electricity). A good CHP provider will be able to assist with this process.



System vibration

The installation design should ensure that the CHP unit operation does not create problems of noise and vibration.

The CHP unit is designed to minimize any such impact – fuel and heating, water pipework, along with exhaust system and ventilation ductwork, must be designed to prevent transmission of any noise, e.g. fit flexible pipework connections.

- 21 Check the position of the CHP unit. Units above the ground floor of the building may require additional measures to prevent transmission of noise and vibration.



Emissions and permitting

The client may also have environmental considerations that affect the selected CHP design and operation.

- 22 Establish the client's overall energy strategy and criteria for meeting environmental targets.
- 23 Check whether approval is required for local authority planning regulations.
- 24 Check compliance with building regulations (as applicable).



Project feasibility

- 25 Having established a technical solution for CHP, confirm commercial feasibility of the project to establish an acceptable project payback period and return on investment.



Project costs

- 26 Calculate the capital cost of the equipment, including any site modification works associated with the existing infrastructure.
- 27 Establish maintenance costs: Preventative maintenance is essential for reliable CHP operation, maximum system efficiencies, achieving energy savings and reducing emissions. CHP providers have maintenance specialists who will be able to provide comprehensive long-term maintenance contracts.



Cost saving calculations

- 28 Calculate expected energy savings from installing on-site CHP generation.
- 29 Calculate fuel costs – best fuel purchasing strategy, checking options for alternative fuels.
- 30 Calculate savings on tax liabilities by compliance with incentives.
- 31 Check if there is an additional income stream from selling energy by exporting from site.



Project finance

- 32 Discuss and agree the clients preferred option for financing the project.



Essential steps

- ✓ Obtain accurate site energy data, create load profiles and check the system operational schedule
- ✓ Optimize the CHP unit selection by sizing to meet actual energy demands
- ✓ Check the CHP and ancillary equipment can be accommodated on-site
- ✓ Review project costs and savings
- ✓ Ensure accreditation and compliance to meet incentives and optimize savings
- ✓ Consider all options to finance the project



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Our flexible payment options mean you can have a solution installed with a capital outlay or payment method that suits your company's finances.

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