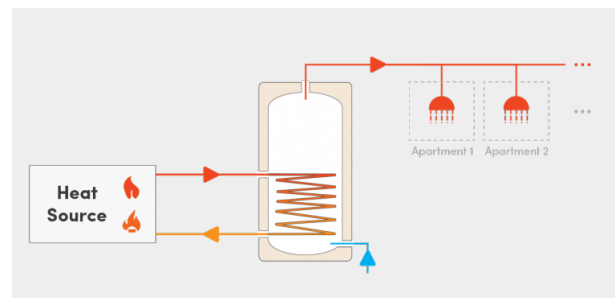


Commercial Domestic Hot Water Heating

Domestic hot water heating can play a major part in the mechanical services of a commercial building. These systems can be of a considerable size for buildings with higher domestic hot water loads, like hotels, hospitals, and care homes and can have high peak DHW demands.

Integration of these systems with the energy sources used for the heating of the building is often overlooked due to separate tender and trade for plumbing and mechanical. But there are many reasons why this should be considered. There are many ways for this to be accomplished which can be confusing. In this article we will explain why integration of domestic hot water heating with the main building heating plant should be considered and the various ways this can be adopted. It's important to remember every home and family are different which means capital and running costs can vary, but for example purposes we have based our options on heating a 200m² home.

Calorifiers:



Historically and in current day, high peak demand DHW heating has been achieved with a large storage cylinder with an internal heat exchange coil (calorifier) heated by a boiler. These have been dedicated systems or part of a space heating system that the boilers also heat making good use of the heating plant. The heating water from the boilers (typically 80°C) is passed through the coil within the cylinder and used to heat the potable water in the cylinder to 60-70°C. The coil is typically placed at low level and heats the cooler water at the bottom of the cylinder causing a natural stratification with the warmer water rising to the top of the cylinder ready to be drawn off to the building. The calorifier needs to be made of material suitable for sanitary potable water.

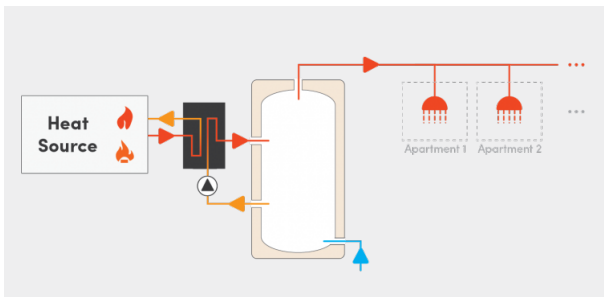
Pro's:

- Good stratification of heat in the cylinder, hot water ready for use at the top and cooler water that needs heating at the bottom surrounding the coil.
- Very high flow rates and good recovery of cylinder temperature.
- Large storage of energy to cover peak periods with a smaller heat source.
- Easy integration of back up electric elements.
- Multiple coils can allow integration of multiple heat sources.

Con's:

- Suits high temperature heat sources better (boilers).
- Takes up more space than other options.
- Some material options can be susceptible to poor water quality and are uneconomical to repair.

External plate heat exchanger:



In some situations with high peak DHW demands and limited space for stored hot water, external plate heat exchangers coupled with DHW storage tanks (without internal coil) can provide a low storage high production solution. Cooler potable water from the bottom of the DHW cylinder is pumped through one side of the external plate heat exchanger and heated up to the desired temperature inside the heat exchanger before being returned to the top of the tank. The external heat source water is passed through

the other side of the heat exchanger and transfers its energy into the potable water ready for use. Large volumes of water can be heated quickly allowing these systems to deal with high peak DHW demands from less storage volume. Care needs to be taken with the selection and design of the components in these systems to ensure the inlet water from the exchanger into the tank is not bypassed to the hot outlet and that the pump speed is controlled to create stratified layers of heat in the tank. Specialist plate heat exchanger DHW heating kits and controllers should be used to prevent these issues.

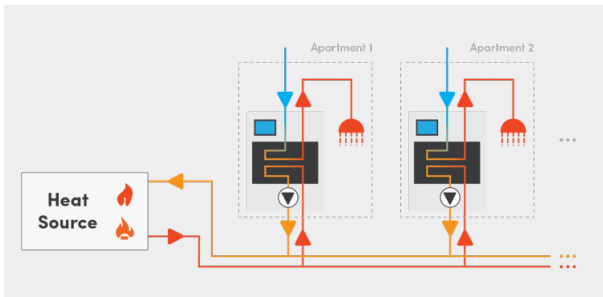
Pro's:

- Efficiency advantages of plate heat exchangers allow lower temperature energy sources to be used (i.e. heat pumps).
- Reduced plant space required.
- Stored water volume re-heated quickly.
- Easy maintenance of heat exchanger and ability to be replaced in the event of a failure.
- Exchanger and tank materials can easily be mixed and matched to suit the required environmental conditions.
- Multiple heat exchangers can be used to allow different heat sources to heat the DHW.

Con's:

- Sub optimal injection point of heated DHW can result in short circuiting of cooler water out to the building.
- Incorrect management of pump speed can cause destratification/mixing of water in the tank.
- Additional specification and installation work required for well planned and executed installation.
- Larger heat source capacity may be required.

Heat Interface Units/instantaneous indirect heaters:



Similar to gas water heaters (califont), instantaneous heating of DHW can be provided from closed loop heating plants. External plate heat exchangers located centrally or individually out at each point of use (room or unit) allow the heating water to heat the cold potable water to the desired tap hot water temperature in a single pass meaning that no stored potable hot water is required for the building. These systems are more suited to large buildings where the peak DHW demand can be significantly diversified with the load easily covered with little or no increase to the size of the heating plant. With limited space requirements these systems can offer significant advantages over the more typical options above. With locally placed Heat Interface Units (HIU) at each room or unit of a building, potable hot water does not need to be reticulated throughout the building and only heating water is required to each area. Locally, potable hot water is created on demand drawing the energy from the heating pipe network.

Pro's:

- No stored hot water saving space and reducing risk of legionella growth.
- Reduced pipe work with local HIU at each room/unit.
- Options to work with lower temperature energy sources (heat pumps) increasing system efficiencies.
- Can easily be include with metering equipment and heating controls to monitor energy usage to each unit for both space and DHW heating.

Con's:

- Larger heating plant capacities required for smaller projects.
- Accurate peak heating and dhw loading requirements required considering realistic diversification models.
- Greater quantity of control valves and/or pumps throughout system.

Via our network of suppliers, Central Heating New Zealand can offer solutions for all of the above options, from our duplex stainless steel calorifiers from Baxi UK and HIU units from Baxi Italy, to the instantaneous water heaters and external exchanger kits from Fiorini. Sometimes a combination of multiple option is the best solution to suit the integration of the various energy sources available to the site. Our commercial team can work together with you to help specify a solution for your next commercial hot water project.