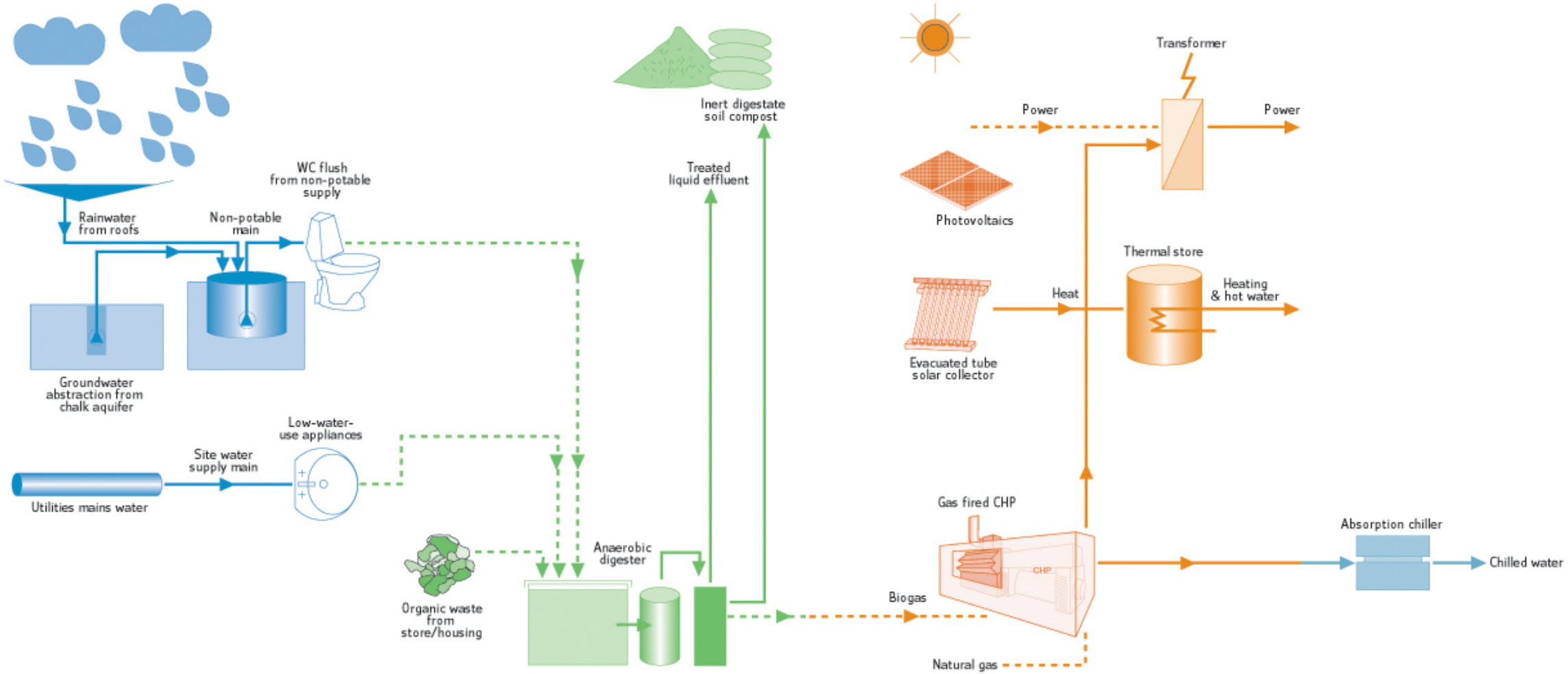
Sustainable features of The Bridge at Tolworth scheme



WATER

The scheme uses three water sources: rainwater, groundwater and treated mains water.
Rainwater run-off from the green roof and from the roofs of each of the apartment blocks is stored in a tank beneath each block – this will be used to flush toilets and irrigate the green roof.
A borehole, which taps into the chalk aquifer deep beneath the south end of the site, will supplement the rainwater for "non-potable" uses. In addition, BDP has recommended that the design of the apartment blocks incorporate low-water-use appliances to keep water demand to a minimum. According to Trevor Butler, director of sustainability at BDP, this system will reduce the water demand from utility supplier Thames Water by 40%. Potable water will come from the utility main.

ORGANIC WASTE

Non-organic waste can be disposed of in the supermarket's recycling area, but what of the organic waste from the supermarket and residents? Normally, organic waste is disposed of off-site, but on this scheme the organic waste will provide fuel for a combined heat and power system after being fed into an anaerobic bio-digester, where it is used to create "biogas" (or methane, as it is more commonly known). Sewage from the apartment blocks will also feed the bio-digester, and the resulting gas will be mixed with natural gas to power the combined heat and power engine.
Nothing is wasted: inert soil compost and the treated liquid effluent from the bio-digester is intended to fertilise "energy crops" as it is not suitable for fertilising food crops. As technologies develop, the CHP unit could be replaced by a fuel cell in the future.

COMBINED HEAT AND POWER

A mixture of biogas and mains gas fuels the CHP unit, which is sized to provide sufficient power to meet the store's base electrical load. Meanwhile, waste heat from the CHP is piped to a buffer unit where it will provide the domestic hot water. Depending on the apartments' design, waste heat from the CHP may also be used to provide heating. Additional power will come from photovoltaic roof panels, which generate enough power to meet the domestic lighting load. Additional evacuated tubes could generate hot water if the housebuilders shun the CHP option.
Should it all go wrong, the scheme has been designed with 100% back-up using gas-fired boilers to provide heating and hot water when the CHP is out of action. Likewise, the electricity supply has been sized to cope with load when the CHP unit is off-line.

ABSORPTION CHILLER

In addition to providing domestic heating and hot water, waste heat from the CHP unit is also used to provide cooling through an absorption chiller. Unfortunately, the chilled water produced by the absorption chiller is not cold enough for use in the store's freezers. Instead, it will be used to remove waste heat from the condensing units attached to the store's freezer cabinets.
The advantage of this arrangement is that water-cooled condensers, which are smaller and quieter than the more conventional air-cooled units, can be used.
However, Butler does admit that this is not the most efficient arrangement, and explains that this aspect of the development is still under review while the designers try to find a way to use the waste heat directly in the scheme.