

USE CASE

New build multiple unit development

The Client

A developer is planning to build 200 homes in 100 identical semi-detached units. Most of the construction will take place offsite, which minimises the time, expense and local environmental impact inherent to operating a construction site.

The Problem

The developer intends to design the buildings so that all their services are electrical. Electrical heating has several advantages over gas heating:

- It avoids the expense of a connection to the gas main
- The greenhouse gas emissions per kWh are lower than for gas and the discrepancy is projected to increase as renewable electricity generation replaces fossil fuels
- It enables the use of fast-response electric heaters which are cheaper to install and maintain than gas-powered central heating.

However, electricity is around three times as expensive as gas per unit of heat energy, and the all-electric approach is only viable at all because the homes will be built using high-quality fabric that retains heat very efficiently. The developer still needs to find ways to maximise heating efficiency.



AT A GLANCE

Project Description	Multi-unit new build residential development
atBOS Control Apps	Heating, cooling, ventilation, hot water, entry, lighting
atBOS Cloud Apps	Metering, Analysis, Alerts, Responses
Mechanical systems	Electric panel heaters, mechanical extract ventilation, exhaust air heat pump

The Atamate Solution

Using high-quality materials gives each building an envelope that allows very little air leakage, enabling airflow through the homes to be controlled by mechanical extract ventilation (MEV). That control enables the incorporation of an exhaust-air heat pump (EAHP) to maximise efficiency.

As shown below, outside air enters through damper-controlled vents in bedrooms and living rooms where electric heaters warm it to the comfort temperature. It then passes to bathrooms and kitchens where it is drawn into ducts that pass through the EAHP, which extracts the heat energy into the hot-water tank, and out through the exhaust vent.

The whole system can be operated by atBOS, using a network of sensors and meters to continually monitor the indoor environment and energy flows within a home. Integrating the ventilation with the space and water heating avoids using energy unnecessarily and maximises the value of energy that is used:

- Rooms are only ventilated when their air quality falls below a pre-defined setpoint, defined by carbon dioxide, humidity, VOC and temperature levels.
- As long as the air in a bedroom or living room is above the air quality setpoint, the inlet dampers are closed so heated air is not extracted unnecessarily.
- Heating is only turned on in occupied rooms that are below the defined comfort temperature, although residents have the option to override the settings using calendar controls or a manual boost function that heats a room to a predefined level above the comfort temperature for a fixed time period.
- Ventilation rates are controlled by a two-speed extractor fan, which usually runs at the more efficient lower speed but can accelerate to the higher speed if air quality is particularly poor.
- Window sensors detect when a window is opened and automatically switch off the panel heaters in that room.

- The atBOS prioritises the use of energy from the rooftop solar panels and uses mains electricity to make up the shortfall.
- Gradual or sudden increases in energy use often indicate a maintenance problem, as do sensor readings falling outside of predicted ranges. An anomaly classified as serious triggers a text alert, and atBOS maintains a log of all anomalies which facilitates fault identification. Rapid fault detection keeps the system running at maximum efficiency and prevents deterioration leading to higher repair costs.

The atBOS uses a network of sensors and meters to collect data, actuators to control devices, and a central hub in every home. Designing atBOS into the homes from the outset keeps capital costs lower than a retrofit because most of the components can be installed in the offsite stage of construction

Added Value

While most developers see atBOS primarily as a system for automating heating, ventilation and air-conditioning (HVAC) services, it can also cover several other core functions and once the decision is taken to install the atBOS infrastructure, it is usually the cheapest and simplest way of doing so.

For a multi-unit development, possible functions include:

- **Entry:** Each front door can be fitted with an entry system that allows entry using a keypad or smartphone app, as well as a conventional deadlock if preferred. A camera and intercom can be accessed through an intercom, allowing residents to remotely admit guests or allow delivery drivers to place a parcel inside a porch without allowing access to the rest of the house.
- **Lighting:** lighting can be automated and scenes can be pre-programmed and chosen through the atBOS user interface or with the HAZE multifunctional switch.

For more information or to get in touch about this project, please call **01865 920101** or email us on info@atamate.com