

LUMEN

Aged care and retirement living

Fuel switching options

EECA
DECARBONISATION PATHWAY

AGED CARE AND
RETIREMENT LIVING

Fuel switching options

The following table provides a full list of potential fuel switching options available for aged care sites, grouped by the application (user) of the fossil fuel. Site owners/operators can use this table to understand all the potential decarbonisation options for systems applicable to their site.

Item	Existing system	Available fuel switching options and their advantages
Domestic Hot Water (DHW) System	Gas/Diesel/Coal Fired Hot Water Boiler	<p>A. Heat Pump system:</p> <ul style="list-style-type: none"> Highly efficient Low carbon compared to direct electric heating Mature technology in NZ Typically the preferred option for decarbonising DHW (where practical) due to low ongoing operational (c/kWh) cost <p>B. Electric Boiler system</p> <ul style="list-style-type: none"> Mature technology in NZ Compact system Relatively low capital cost if electrical infrastructure upgrade is minimal Can be installed in place of existing boilers <p>C. Biomass Boiler system</p> <ul style="list-style-type: none"> Mature technology in NZ Very low carbon option per kWh of energy Containerised options would provide reduced building work requirements
Heating, Ventilation & Air Conditioning (HVAC) System	Gas/Diesel/Coal Fired Hot Water Boiler with radiators, and/or fan coil units and/or air handling units	<p>A. Hot Water Heat Pump system:</p> <ul style="list-style-type: none"> Highly efficient Low carbon compared to direct electric heating Mature technology in NZ <p>B. Distributed AC units:</p> <ul style="list-style-type: none"> Mature technology in NZ Highly efficient Provides cooling as a co-benefit Preferred option where practical due to co-benefits <p>C. Electric boiler system</p> <ul style="list-style-type: none"> Mature technology in NZ Compact system Relatively low capital cost if electrical infrastructure upgrade is minimal Can be installed in place of existing boilers <p>D. Direct electric heating (for example - electric panel heating)</p> <ul style="list-style-type: none"> Mature technology in NZ Compact system

Item	Existing system	Available fuel switching options and their advantages
Swimming Pool / Spa Heating	Gas/Diesel/Coal Fired Hot Water Boiler	<p>E. Biomass boiler system</p> <ul style="list-style-type: none"> • Mature technology in NZ • Very low carbon option per kWh of energy • Containerised options are available
		<p>A. Hot Water Heat Pump system:</p> <ul style="list-style-type: none"> • Mature technology in NZ • Highly efficient • Typically the preferred option for decarbonising swimming pool heating (where practical) due to low ongoing operational (c/kWh) cost
		<p>B. Electric boiler system</p> <ul style="list-style-type: none"> • Mature technology in NZ • Compact system • Relatively low capital cost if electrical infrastructure upgrade is minimal • Can be installed in place of existing boilers
		<p>C. Biomass boiler system</p> <ul style="list-style-type: none"> • Mature technology in NZ • Very low carbon option per kWh of energy • Containerised option is available
Kitchen	Gas Hobs	<p>A. Electric induction hobs</p> <ul style="list-style-type: none"> • Mature technology • More efficient than gas
	Gas ovens	<p>B. Electric ovens</p> <ul style="list-style-type: none"> • Mature technology • More efficient than gas
Laundry	Washing Machines	<p>A. Ensure hot water is provided from a low carbon heating system (heat pumps, electric boiler or biomass boiler)</p>
		<p>B. Outsource laundry services to a low carbon laundry service provider</p>
	Gas Fired Dryers	<p>A. Electric dryers</p>
		<p>B. Outsource laundry services to a low carbon laundry service provider</p>

Please Note:

- It is highly beneficial to measure the actual heating demand of the applicable system (DHW, space heating, and/or swimming pool/spa) to ensure that the replacement system is optimally sized. Often the existing system is over-sized.
- If the heating demand is measured, the following benefits can potentially be realised:
 - A potential reduction in capital expenditure as a smaller system (than the existing system) may be sufficient
 - Optimal size of low carbon options would mean an optimal efficiency of the system leading to lower opex
 - Optimised system would potentially avoid the requirements of large space for installing the new system
 - Improved project financials
- The capital expenditure required to decarbonise an existing system depends on many site-specific variables, including : the availability of electrical capacity, the complexity of the existing system, availability of space, noise constraints, consent requirements, age of the building, existing system temperature requirements, condition of the existing system, and system redundancy requirements.
- The ongoing operational expenditure of a fuel switching option depends on the option selected, the energy pricing secured, the network tariff (if electricity is used), and the location of the project.
- Individual site assessments are highly recommended prior to committing to a decarbonisation project. The assessment should include the following:
 - Identification of the preferred option, based on the practicalities of the specific site
 - A high-level design concept for the preferred option
 - An estimate the capital expenditure required for the preferred option
 - An estimate of the ongoing annual operational expenditure (energy cost) for the preferred option
 - An evaluation of the payback period for the preferred option
 - An evaluation of the carbon emissions savings of the project.