Low Carbon Growth Plan for Australia

Retail Sector Summary Report

June 2011

more give, less take

Preface

ClimateWorks Australia (ClimateWorks) was founded in 2009 through a partnership between the Myer Foundation and Monash University, with a mission to substantially reduce Australia's greenhouse gas emissions over the next five years. ClimateWorks believes the practical steps required to achieve these reductions are more likely to be undertaken if presented in an easy to understand, overarching and cohesive climate change strategy for Australia.

In March 2010 ClimateWorks released the *Low Carbon Growth Plan for Australia*, which presents a range of actions to reduce greenhouse gas emissions at lowest cost across the economy. This report identifies least cost abatement opportunities for the **Retail sector**[1], which are based on the opportunities outlined in the *Low Carbon Growth Plan for Australia* and constructed on the following principles:

- Include only opportunities for which technology is commercially available or on the path to commercialisation
- Exclude opportunities or action occurring under current policies (as at March 2010)
- Exclude changes to lifestyle

Specifically, this report aims to highlight the energy and cost savings that can be achieved from the implementation of the technologies relevant to the Retail sector. It focuses on the buildings occupied by the Retail sector and does not extend to the supply chain.

ClimateWorks hopes readers find this a useful contribution in understanding the energy saving technologies available to the Retail sector and the financial benefits these technologies can provide.

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[1] The Retail sector is a subsector of the 'Buildings' sector, as presented within the *Low Carbon Growth Plan for Australia* and comprises the following:

- Food retailing (including supermarket and grocery stores and specialised food retailing)
- Personal and household retailing (including department stores, clothing, furniture, vehicle, recreation, and household goods retail stores and household equipment repair services)

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Executive Summary

The Australian Retail sector can significantly reduce its energy use, and hence the amount of money spent on energy bills, between now and 2020. These actions can be implemented at relatively low cost and create profitable opportunities for the sector.

Key Findings:

- If fully implemented, the actions included in this report could result in a total annual savings of A$1 billion[2].
- For most actions, the cost of upfront capital expenditure is less than $10 per square metre of floor space.
- All of the actions identified offer a net savings after annualising the capital expenditure over each asset's life. The average net savings equates to approximately $2 per square metre of selling area, representing a net annual savings of A$627 million[3].
- Half of the opportunities offer a payback of less than five years[4].
- Whilst all of the opportunities identified within the Retail sector generate a positive return, there are a number of barriers which prevent the opportunities being implemented in the Retail sector. For example:
    - Capital constraints – where some improvements such as lighting come at a low additional cost, but some other measures such as solar-powered equipment are capital intensive
    - Long payback periods – where measures that offer long payback periods, such as insulation or water heating, can be perceived as non-critical to the business
    - High transaction costs – where the cost of pursuing energy efficiency (gathering information, setting up financing etc) is high due to the fragmented nature of the Retail sector (e.g. thousands of retail stores) or the nature of the project (e.g. retrofitting a small retail store)
    - Split incentives - where buildings are occupied by tenants or short-term owners and any capital made by the owner to improve energy efficiency will be recouped in part by the tenant or the next owner
    - Information gaps and decision process – where businesses may not closely follow how much energy they use and the savings that could be achieved through improved energy efficiency
- There is a major role for financial institutions to play in shaping solutions to unlock the barriers and helping businesses achieve the savings outlined in this report.

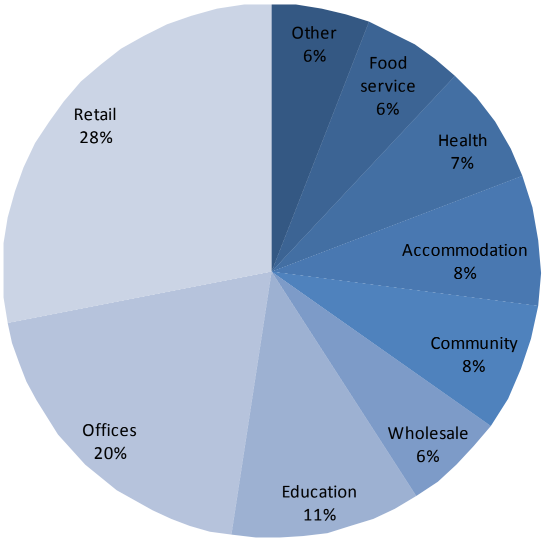
[2] Assuming an electricity price of A$157/MWh and excluding upfront capital costs and interest
[3] Assuming an electricity price of A$157/MWh and a cost of capital of 11%
[4] Taking into consideration the cost of capital, assumed to be 11%

Energy use in the Retail Sector

The Retail sector is estimated to produce approximately 2.52% of Australia's total greenhouse gas emissions in 2020[5]. The emissions from the Retail sector are associated with energy consumed in heating and cooling, lighting, and appliances. This includes the consumption of gas, wood, oil and electricity.

Of existing commercial buildings, the Retail sector is expected to represent approximately 28% of energy consumed in 2020 (see Exhibit 1). This is followed by Offices and Education, representing 20% and 11% respectively.

Exhibit 1: Energy use in the commercial buildings in 2020 (% of total)



Source: ClimateWorks team analysis (2010)

Although Australia has a mild climate compared to other developed nations and so requires less energy for the heating and cooling of buildings, cheap energy prices have led to inefficient equipment and buildings shells. As a result, the energy saving opportunities in the sector are driven largely by energy efficiency improvements to the built environment.

Energy Saving Opportunities

The Opportunities

The Retail sector can significantly reduce its energy use, and hence the amount of money spent on energy bills, between now and 2020. These actions can be implemented at relatively low cost and create profitable opportunities for the sector. Not only can the actions presented in this report result in significant financial savings and contain ongoing operating costs, they can result in a number of co-benefits including:

- Reducing greenhouse gas emissions, which contributes to environmental benefits.
- Increasing the comfort of the workplace for employees e.g. through better controlled heating and cooling systems.

[5] ClimateWorks team analysis (2010)

A number of actions that are realistically achievable using known technologies between now and 2020 have been identified to reduce energy use within the Retail sector. These measures can be split into three categories:

- Improved efficiency through technology – this involves retrofitting buildings with technology that has a higher efficiency rating (compared to the existing) and does not require a change in usage by the technology user e.g. lighting retrofits involve changing to more efficient light bulbs without changing the number of lights or hours the lights are switched on for.
- Energy waste reduction – this involves changing the usage of energy consuming equipment e.g. downsizing a boiler or removing the number of light fixtures in a building.
- Construction and refurbishment of new buildings – this involves constructing or refurbishing buildings to a higher energy efficiency standard compared to current requirements.

Exhibit 2 below provides an overview of the specific opportunities identified for the Retail sector.

Exhibit 2: Identified Opportunities

Measure	Description
Improved energy efficiency through technology	
Retrofit lighting	Replacing inefficient T12 or T8 fluorescent bulbs with new super T8 and T5 fluorescent bulbs, replacing CFLs (Compact Florescent Lamps) with LEDs (Light Emitting Diodes). Installing lighting control systems such as dimmable ballasts or photo-sensors to optimise light for occupants in a room. For example, installing master switches that are timed to turn off electricity overnight or occupancy sensors that switch off artificial lighting when no one is present. This is particularly effective in transient or intermittent spaces such as bathrooms, parking garages and storage areas etc.
Retrofit electronics	Ensuring new electronics purchases (including televisions /electronic menus, lap tops, computers systems) are in the top performers of their category in relation to energy usage.
Retrofit elevators and appliances	Ensuring new elevator or appliance purchases (devices such as a cash register, electrical fans) are in the top performers of their category on energy usage/efficiency.
Retrofit water heating	Replacing standard gas water heaters with tankless gas, condensing gas, or solar water heater. Replacing electric water heaters with heat pump or solar water heaters.
Retrofit insulation	Improving the air tightness of a building by sealing areas of potential air leakage, weather striping doors and windows through wall/roof insulations, external shading (such as overhangs, shading devices and light coloured exteriors), or standard sealants or caulking. This can reduce heat loss in the winter, thus reducing the need for heating and keeping cool in the summer.
Retrofit HVAC[6] equipment	Installing highest efficiency HVAC system when current system expires. This includes replacing older models with new, premium-efficiency or

[6] Heating, Ventilation and Cooling

Measure	Description
	variable speed motors. Improving HVAC control systems to adjust for building occupancy and minimise re-cooling of air. This system, often referred to as a Building Management System, acts to interact directly with the building systems to monitor and control the environment to optimise efficiency.
Positive interaction - HVAC	Experience shows that most energy efficiency improvements can also deliver secondary benefits in terms of reduced need for HVAC. Involves downsizing of HVAC system once other equipment improvements have been implemented (e.g. lighting, cooking, and refrigeration). For example, putting doors on refrigeration systems reduces the heating load of supermarkets and improving the insulation of large ovens or installing more efficient light bulbs decreases the cooling load of bakeries or buildings.
Retrofit refrigeration	Replacing open refrigeration spaces by closed ones. For example, in the case of a supermarket or deli, placing refrigerated products such as meats and cheeses in freezer style displays (i.e. behind closed doors). This also involves ensuring new purchases are top performers of their category on energy usage.
Retrofit cooking	Better insulating of commercial ovens (such as those used in bakeries etc) This also involves ensuring new purchases are top performers of their category on energy usage.
Energy waste reduction	
Energy waste reduction	Involves removing or downsizing unnecessary equipment such as lights or boilers. For example, lights can be positioned such that specific work areas or parts of a store can be illuminated, which can allow reductions in overhead lighting density. Similarly, many boilers used for hot water systems are larger than required, meaning that it takes more energy to heat water for which only a small portion of hot water is consumed.
Construction of new buildings	
New build elevators, appliances, electronics, refrigeration & cooking	Ensuring any purchases of elevators, appliances, electronics, refrigeration and cooking for new non-residential buildings are in the top performers of their category.
Construction of new buildings to a 6 star equivalent	Building new non-residential buildings to a 6 star equivalent in the National Australian Built Environment Rating System (NABERS)[7]. These improvements could be achieved through improved building design and orientation, usage of better materials etc

[7] NABERS is a performance-based rating system for existing buildings although stars have not yet been defined for all building types, which is why it has been referred to as 6 star 'equivalent'. For buildings where there is no NABERS, this means reducing energy by the same amount as from 5 to 6 stars for offices.

Other Relevant Opportunities

Cogeneration

Cogeneration, also called combined heat and power or CHP, is a technological opportunity which provides primary energy savings by creating heat and electricity from the same fuel source. For example, a cogeneration plant can be set up as a main source of energy for a building (such as a hospital).

Installation has been low in comparison to the existing potential, which is the result of barriers on the market that prevent it from rapid development as well as problems related to the realisation of the projects.

We consider cogeneration to be a realistic opportunity for buildings and one that should not be discounted by investors, however it has been excluded from the discussion below on the primary basis as there is little information required to translate to a generic opportunity on the cost curves shown in this report (i.e. specific information on the optimal type and size of the plant and optimal configuration of the system).

The Impact of Lifestyle and Behavioural Changes

The opportunities discussed in this report consider only those that do not require changes in the lifestyle of individuals (e.g. making a conscious decision to turn off the lights when leaving a room). This was a deliberate design choice, as it allows for analysis of how much energy can be saved without individuals changing the way we consume on a daily basis.

Behavioural change can still offer a large and often economically attractive method of reducing energy use. In the Retail sector, there are a variety of adjustments individuals and businesses can make to their work patterns to reduce energy use, many of which could save money. Examples of include:

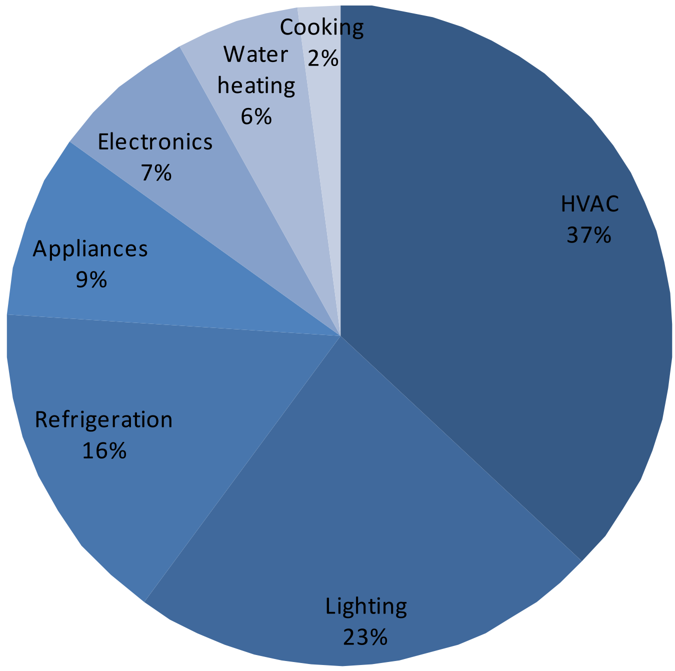
- Reducing set temperatures on thermostats
- Switching appliances from standby to off when not in use
- Switching off lights when leaving a room (if sensor systems not already installed)

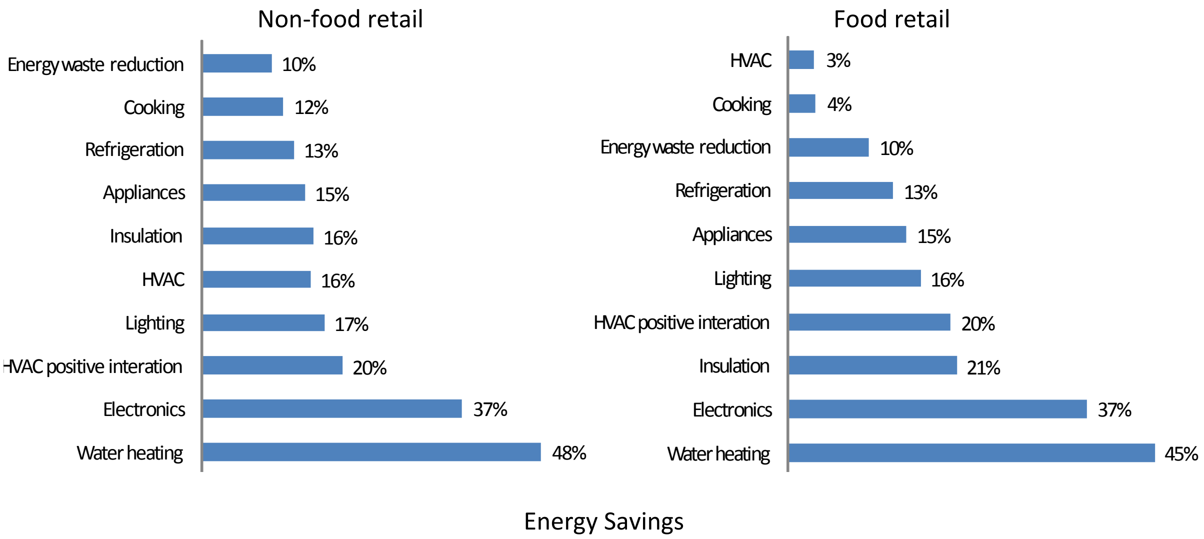
The benefits can range significantly depending on the outcome or the uptake by individuals.

The Savings

The following diagram presents the predicted energy consumption by end use in the Retail sector in 2020 and the identified energy savings of each opportunity across the Retail sector (see Exhibit 3).

Exhibit 3: Retail energy consumption and savings by end use in 2020[8]



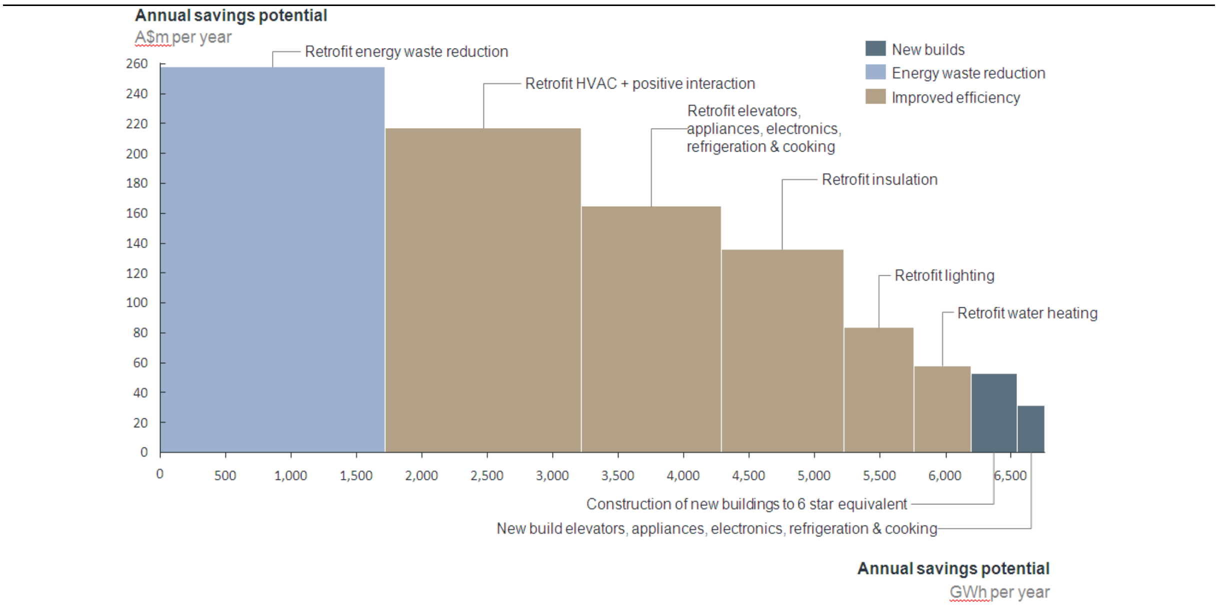


Source: ClimateWorks team analysis (2010)

The following chart presents the potential annual energy savings in order of greatest annual financial savings (see Exhibit 4).

[8] Retrofit elevators and appliances and electronics, refrigeration and cooking have been grouped together as one opportunity, as has retrofit HVAC and HVAC positive interaction.

Exhibit 4: Annual energy savings



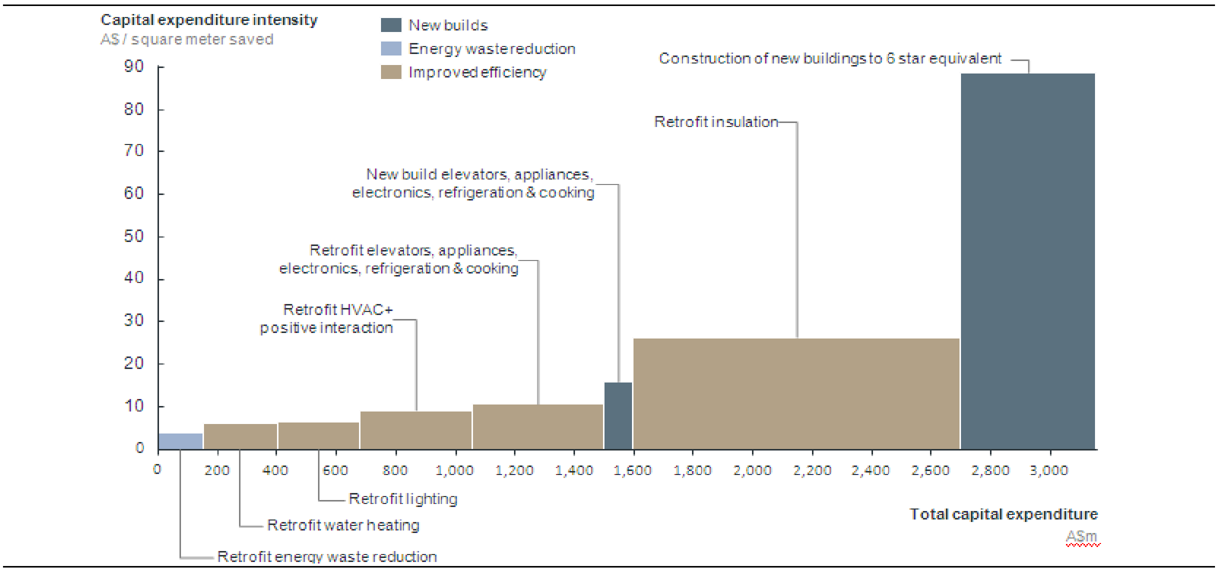
Source: ClimateWorks team analysis (2010)

If fully implemented, the measures included in this report could result in an average energy savings of 18% per year across the opportunities. This represents total annual savings of **A$1 billion** across the Retail sector[9] with energy waste reduction, retrofitting of HVAC systems and appliances etc representing the largest savings (see Exhibit 4).

The Upfront Costs

The following chart presents the approximate total capital expenditure that would need to be spent per square metre for the Retail sector to achieve the annual energy savings illustrated in Exhibit 4. This excludes transaction costs, such as the time required from managers or professional advice acquired to enable implementation.

Exhibit 5: Capital expenditure costs - per square metre floor space



Source: ClimateWorks team analysis (2010)

9 Assuming an electricity price of A$157/MWh and excluding upfront capital costs and interest

As shown in Exhibit 5, construction of new buildings to a 6 star equivalent and retrofit insulation are most capital intensive opportunities for the Retail sector. However the cost of upfront capital is less than $10 per square metre of floor space, for the majority of the remaining opportunities. To achieve the energy savings as presented in Exhibit 5, a total of $3155 million in capital would need to be invested.

The Net Effect

The above analysis shows there are significant financial savings that could be achieved by investing in these opportunities, most of which can be implemented with relatively low upfront costs. The following charts present the annual net cost[10] of taking action for the Retail sector. Exhibits 6 and 7 present the identified opportunities in order of least net cost per energy saved and net cost per greenhouse abatement respectively. (Note - Opportunities underneath the horizontal axis represent a net savings and opportunities above the horizontal axis represent a net cost)

Exhibit 6: Net cost of action – energy saved

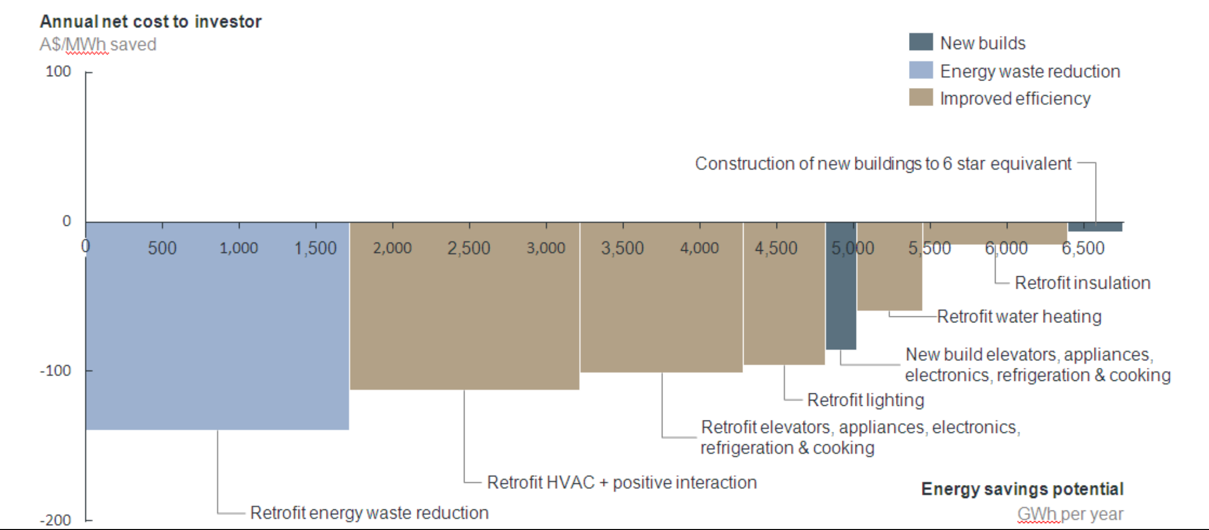
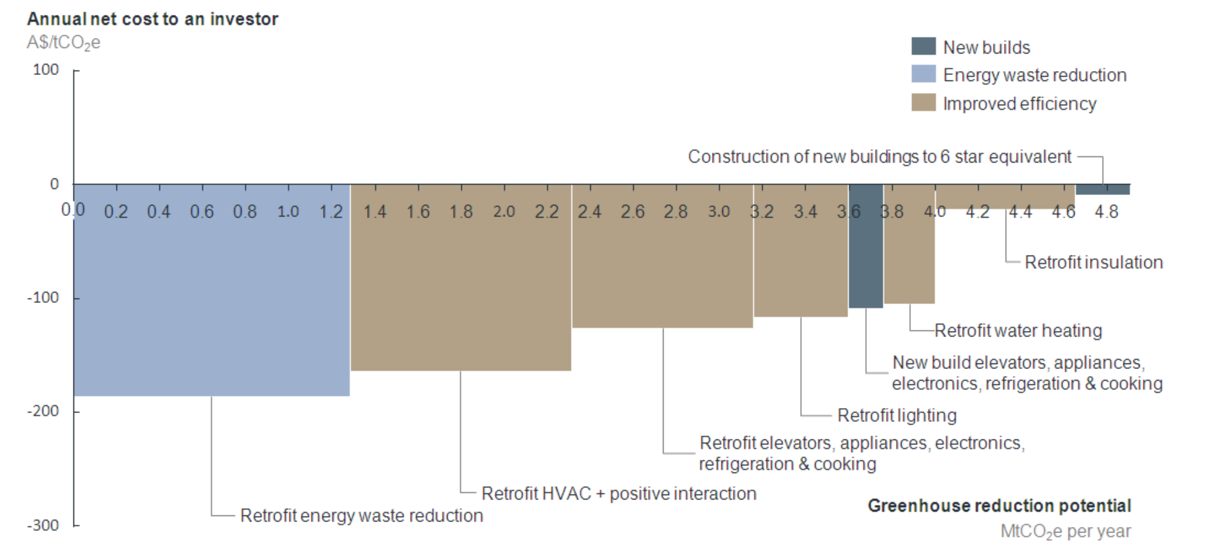


Exhibit 7: Net cost of action – abatement



Source: ClimateWorks Analysis (2010)

[10] Represents the annualised cost of capital over the lifespan of the technology

All of these opportunities offer a net savings, with the average equating to just over A$85 per MWh, A$127 per tCO_2e or approximately $2 per square metre selling area[11]. This represents net annual savings of **A$627 million.**

In summary, the most economical opportunity in existing buildings is in reducing energy waste, which could deliver at least 10% energy savings with very little capital expenditure required (A$150 million across the sector). Of all the opportunities, it is also lowest capital intensity in terms of floor space.

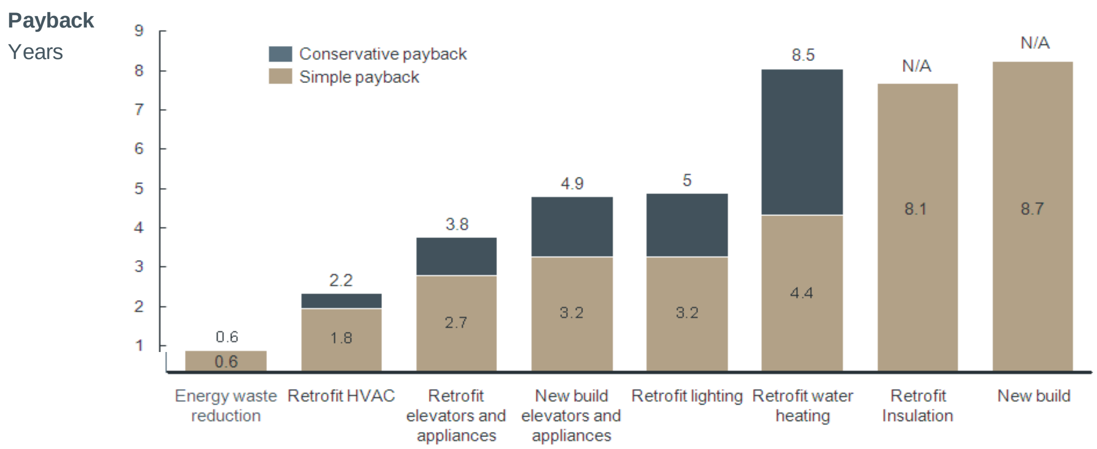
Technological improvements together represent the largest savings potential, most of which offer net savings from an investor's perspective (see Exhibits 6 and 7) and can be implemented at relatively low capital expenditure (see Exhibit 5). This analysis includes the secondary benefits of downsizing of HVAC system once these equipment improvements have been implemented.

Increasing the energy efficiency of non-residential buildings to be constructed in the future above current standards (by the equivalent of a one star improvement for office buildings in the NABERS rating system) is the most expensive option and is the most capital intensive (see Exhibit 5). However, it could deliver energy savings at a net cost of A$15 per MWh or A$18 per tCO_2e to the investor (see Exhibits 6 and 7).

Payback

The estimated payback lengths for each technology are presented in Exhibit 8. For each technology, two paybacks are present: a simple payback (assuming no interest on capital costs is paid) and a more conservative payback (assuming a fixed annual repayment of 11% on capital). It is expected that the payback will lie somewhere within this range. Note that no conservative paybacks are shown for retrofit insulation and construction of new builds as, the conservative payback period is greater than the lifespan of the asset.

Exhibit 8: Estimated paybacks



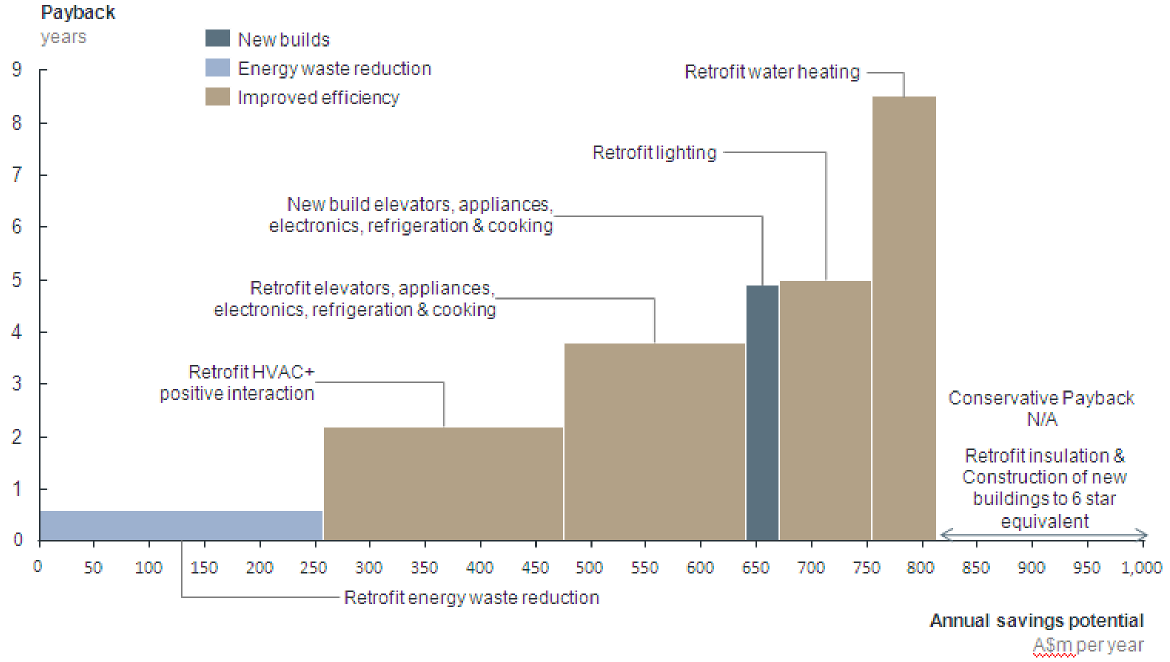
Source: ClimateWorks Analysis (2010)

Exhibit 8 shows that over half of the actions have a payback of five years or less, even taking into consideration interest repayments. The relatively easy task of removing or downsizing unnecessary equipment such as lights or boilers has a payback of less than eight months.

Exhibit 9 presents the conservative paybacks and the annual savings in 2020 as a result of the technology being implemented.

[11] Assuming an electricity price of A$157/MWh and a cost of capital of 11%

Exhibit 9: Estimated paybacks against savings



Source: ClimateWorks Analysis (2010)

The three actions with the lowest payback periods comprise over half of the total annual financial savings that can be achieved from implementing energy reducing technologies.

Challenges

Most of the opportunities in the Retail sector (and the building sector more broadly) are profitable, even without a carbon price. Despite this, there are many non-price barriers which can make it difficult to capture the opportunity. These can be split into three categories:

- Capital constraints and investment priorities
- Market structure and supply constraints
- Information gaps and decision process

The discussion below examines these barriers in more detail.

Capital constraints and investment priorities

Some improvements such as lighting or high-efficiency appliances come at a low additional cost, but some other measures such as insulation are capital intensive, offer long payback periods and are usually perceived as non-critical to the business.

Access to Capital

As businesses only have access to a finite amount of capital, they face capacity constraints on the amount of capital they can access from lenders. They therefore take a strategic view of how they deploy that capital For example, start up or small health practices often do not have the resources to invest in more expensive energy efficient appliances even though the investment will pay for itself in energy savings.

Access to capital can also be restricted despite positive project fundamentals, due to lenders assessment of the risk profile of the project manager. This counterparty risk assessment is usually based on the credit history or amount of funds already committed to the company or industry.

As much of the capital spent on energy efficiency projects is not transferable once invested (e.g. windows, insulation or tailored machine parts cannot be easily removed and reused), there is little collateral if a borrower defaults. As such, lending standards for non recourse projects can restrict access to capital.

Long pay-back periods

Even where decision-makers can access sufficient capital to undertake profitable energy saving projects, investments may not be pursued because they have lengthy payback periods. Investors with a short term profit focus are unlikely to view such opportunities as attractive.

Investment priorities

Profitable emissions reduction opportunities may also not occur where its rate of return is less than alternative investments, or where the emissions reduction activity is not considered core business. This is evident in high growth industries where increased market share may be prioritised over cost reduction opportunities.

Market structure and supply constraints

Market barriers include transaction costs, split incentives, and contract structures.

Transaction costs

Transaction costs are the indirect costs of projects that involve multiple participants, including the time involved in deciding and implementing actions, such as energy audits, price negotiations, cost of gathering information to choose a product etc. The fragmented nature of the Retail sector (e.g. thousands of retail stores compared to just two steel producers) and the nature of the project (e.g. retrofitting a small retail store compared to a large department store) can result in high energy reduction transaction costs – for example small retail businesses may need to invest significant time to acquire the information, set up the financing and find the equipment or contractors to install it.

Some energy service companies (ESCOs) have made a business of aggregating small scale projects on behalf of commercial building owners or city councils, therefore lowering the cost of assessment, planning and implementation of energy efficiency retrofits.

Split incentives

Split incentives arise in the Retail sector when buildings are occupied by tenants or short-term owners: any capital investment made by the owner to improve energy efficiency will be recouped in part by the tenant or the next owner.

Some large commercial real estate companies have begun to subsidise energy efficiency upgrades of their tenants' buildings, even though there is no immediate financial benefit to them (but rather to the tenant). This is because they have recognised that demand for energy efficient buildings will increase in the future (particularly as energy prices rise and climate change awareness increases) and are positioning themselves as leaders in the market.

Contract structures

Some long term or less variable contract structures diminish the positive impact of short term action, or of changed price signals. The profitability of energy efficiency opportunities can be strongly impacted by the energy price that businesses negotiate or the rate at which their energy costs vary with usage. Some retail businesses, including those located within shopping centres, may have little incentive to reduce their energy consumption when energy use is included in rental payments rather than paid separately.

Information gaps and decision process

Access to adequate and accurate information is vital to achieving the full energy savings potential outlined in the energy reduction cost curve. Even when an opportunity is profitable, it will not be captured if decision-makers are not aware of it, or are not convinced of its impact.

Information gaps

Information gaps arise in a number of circumstances. Decision-makers may have a concern about energy consumption or greenhouse gas emissions but be unaware of the potential solutions, or may dismiss known energy saving activities because they do not have the knowledge to determine their effectiveness. In many cases businesses - in particular those with low energy bills as a proportion of outgoings - may not closely follow how much energy they use, and the savings which could be achieved through improved energy efficiency. Moreover, the equipment needed to estimate and verify energy savings is not readily available and comes with a cost for business, making it difficult to build traction on energy efficiency measures. Even when energy efficiency measures are pursued, savings are often undermined by a lack of understanding of the proper use of new equipment, or inadequate investment in the skills of auditors and contractors.

Decision process

Even where full information about energy saving opportunities is available, a company's decision process may make it difficult or impossible for managers to act. This can occur in large companies or departments where capital investment and operating expense budgets are separate, sometimes resulting in the net effect of limiting upfront capital at the expense of higher total life-cycle costs. Other criteria may also take priority over the profitable use of energy efficient equipment. For example, procurement policies within Retail businesses may give preference to locally produced but inefficient appliances. Even the decision processes of smaller businesses may reduce uptake of energy savings opportunities, as they delegate these decisions to their suppliers, who can be motivated by competing incentives. For example, plumbers or small contractors play a decisive role in the choice of small business water heaters, but may not choose the most energy efficient option, prioritising instead the equipment with which they are most familiar or on which they achieve the highest return (which is usually the lowest upfront cost, but not most efficient option).

Next Steps

The previous sections of this report identify the energy saving opportunities that are available to the Retail sector at low cost and the main challenges to achieving that reduction. Included below is discussion on the implementation of the opportunities, including levels of ease associated with implementation and important factors to consider when planning for implementation.

Ease of implementation

Implementing each of the actions identified in the *Low Carbon Growth Plan for Australia* and in this report requires different types of effort. For the purpose of this report, we have categorised the opportunities presented in this report in with respect to the level of difficulty associated with implementation:

- Relatively easy to implement – generally opportunities that do not require planning and can be implemented now.
- More difficult to implement – generally requires some level of planning and can be implemented in the short – medium term (i.e. within a couple of years).
- Most effort to implement – requires advanced planning, is difficult to secure funding and approval and therefore takes significant time to implement.

The following presents the opportunities under each category.

Relatively easy to implement	More difficult to implement	Most effort to implement
• Retrofit energy waste reductions • Retrofit lighting • New build elevators, appliances, electronics, refrigeration and cooking • Retrofit elevators, appliances and electronics	• Retrofit HVAC • Retrofit Insulation • Retrofit water heating • Retrofit refrigeration and cooking	• Construction of new builds to a 6 star equivalent

Important Factors to Consider when planning for implementation

Whilst the opportunities presented in this report can be implemented individually and at any point in time, it is suggested the most suitable time to complete retrofits is when a building is undergoing a refurbishment. In addition, it is worthwhile implementing a suite or package of the opportunities rather than individually. In doing so this will result in greater efficiency, minimise disruption associated with implementation and save money.

There are is also range of grants and programs offering funding and assistance for low carbon and energy efficient projects within the building sector. These include, for example:

- Australian Carbon Trust – Energy Efficiency Trust: The Australian Carbon Trust recently announced a set of agreements to invest up to $23.7 million over the next 3 years through innovative energy efficiency financing programs in commercial buildings across Australia. These programs will leverage private sector funding to make available over $300 million in new financing for Australian businesses, large and small to improve energy efficiency in commercial buildings
- Energy Saver Incentive Scheme Victoria (VEET): The Energy Saver Incentive sets a target for energy savings, initially in the residential sector, and requires energy retailers to meet their own targets through energy efficiency activities, such as providing households with energy saving products and services at no cost or reduced cost. The Initiative is currently being expanded to include small businesses.
- Green Building Fund: Aims to reduce the impact of Australia's built environment on greenhouse gas emissions. During the 2010 election campaign, the Federal Government announced its intention to provide an additional $30 million to expand the Green Building Fund, broadening its scope to include hotels and shopping centres as well as commercial office buildings. The next round of the program is expected to be called once the details of the expansion of the program to include shopping centres and hotels has been finalised.
- Tax Breaks for Green Buildings: From 1 July 2011, businesses that invest in eligible assets or capital works to improve the energy efficiency of their existing buildings – from 2 stars or lower to 4 stars or higher – will be able to apply for a one-off bonus tax deduction. The incentive will enable businesses to claim a bonus tax deduction of 50 per cent of the cost of the eligible assets or capital works.

Capturing the savings outlined in this report requires action to address the range of barriers that currently block effective action. ClimateWorks hopes this report (and the substantive fact base that underpins it) will be a useful prompt and guide the actions required from government, business and consumers to achieve the energy saving potential for the Australian Retail sector at lowest cost.

APPENDIX 1: Key Assumptions

General Assumptions:

Measure	Assumptions
Electricity price	$157/MWh in 2020 The electricity price in 2020 represents a 33% increase on 2010 electricity prices, which for commercial buildings is estimated to be approximately $119/MWh. The electricity prices (for both 2010 and 2020) are based on an adjustment to the average retail price projections (sourced from Figure 4.4 of MMA's Report to Federal Treasury: Impacts of the Carbon Pollution Reduction Scheme on Australia's Electricity Markets) and retail margin and costs (estimated using information from the Independent Pricing and Regulatory Tribunal of New South Wales and Queensland Competition Authority). The average retail price projections have then been adjusted to represent commercial buildings electricity prices by applying an index on the average retail price.
Abatement electricity intensity	0.82 tCO_2e/MWh
Cost of capital	11% interest across Retail sector

Measure-Specific Assumptions:

Measure	Assumptions
Retrofit lighting	Energy savings in 2020 estimated to be 16% for food retailing and 17% for non food retailing Lifespan of lighting fixtures estimated to be 24 years Capital costs of implementation estimated to be $6.4/m^2
Retrofit elevators and appliances, electronics, refrigeration and cooking	Energy savings in 2020 estimated to be: - Elevators and appliances: 15% - Electronics: 37% - Refrigeration: 13% - Cooking: 4% for food retailing and 12% for non food retailing Equipment run on electricity and gas/oil estimated to be 46% and 54% respectively for food retailing and 97% and 3% respectively for non-food retailing Average lifespan of retrofit appliances etc estimated to be 18 years Average capital costs of implementation estimated to be $10.4/m^2

Measure	Assumptions
Retrofit water heating	Energy savings in 2020 estimated to be 45% for food retailing and 48% for non food retailing Water heaters run on electricity and gas estimated to be 54% and 46% respectively Lifespan of water heater estimated to be 20 years Capital costs of implementation estimated to be $6.1/m^2$
Retrofit insulation	Energy savings in 2020 estimated to be 21% for food retailing and 16% for non food retailing Lifespan of insulation estimated to be 56 years Capital costs of implementation estimated to be $26.2/m^2$
Retrofit HVAC equipment	Energy savings in 2020 estimated to be 19% for food retailing and 29% for non food retailing HVAC equipment run on electricity and gas/oil estimated to be 80% and 20% respectively Lifespan of HVAC equipment estimated to be 20 years Average capital cost of implementation estimated to be $9/m^2$
Positive interaction – HVAC	20% savings in 2020 No capital cost
Energy waste reduction	Energy savings in 2020 estimated to be 10% across all end uses Equipment run on electricity and gas/oil estimated to be 90% and 10% respectively for food retailing and 80% and 20% respectively for non-food retailing Capital costs of implementation is $3.6/m^2$
New build elevators and appliances	Energy savings in 2020 estimated to be 28% Equipment run on electricity and gas/oil estimated to be 92% and 8% respectively Average lifespan of retrofit appliances etc estimated to be 15 years Capital costs of implementation is $15.7/m^2$
Construction of new buildings to a 6 star equivalent	Office buildings are taken as a reference as they correspond to the average energy consumption per m^2 in the building fleet New average energy consumption for central services is 68KWh/m2 Energy savings estimated to be 40% based on technological savings of 50% and implementation rate assumed to be 80% across new buildings Building consumption of electricity and gas/oil estimated to be 80% and 20% respectively Lifespan of new build estimated to be 67 years Capital costs of implementation is $88.7/m^2$