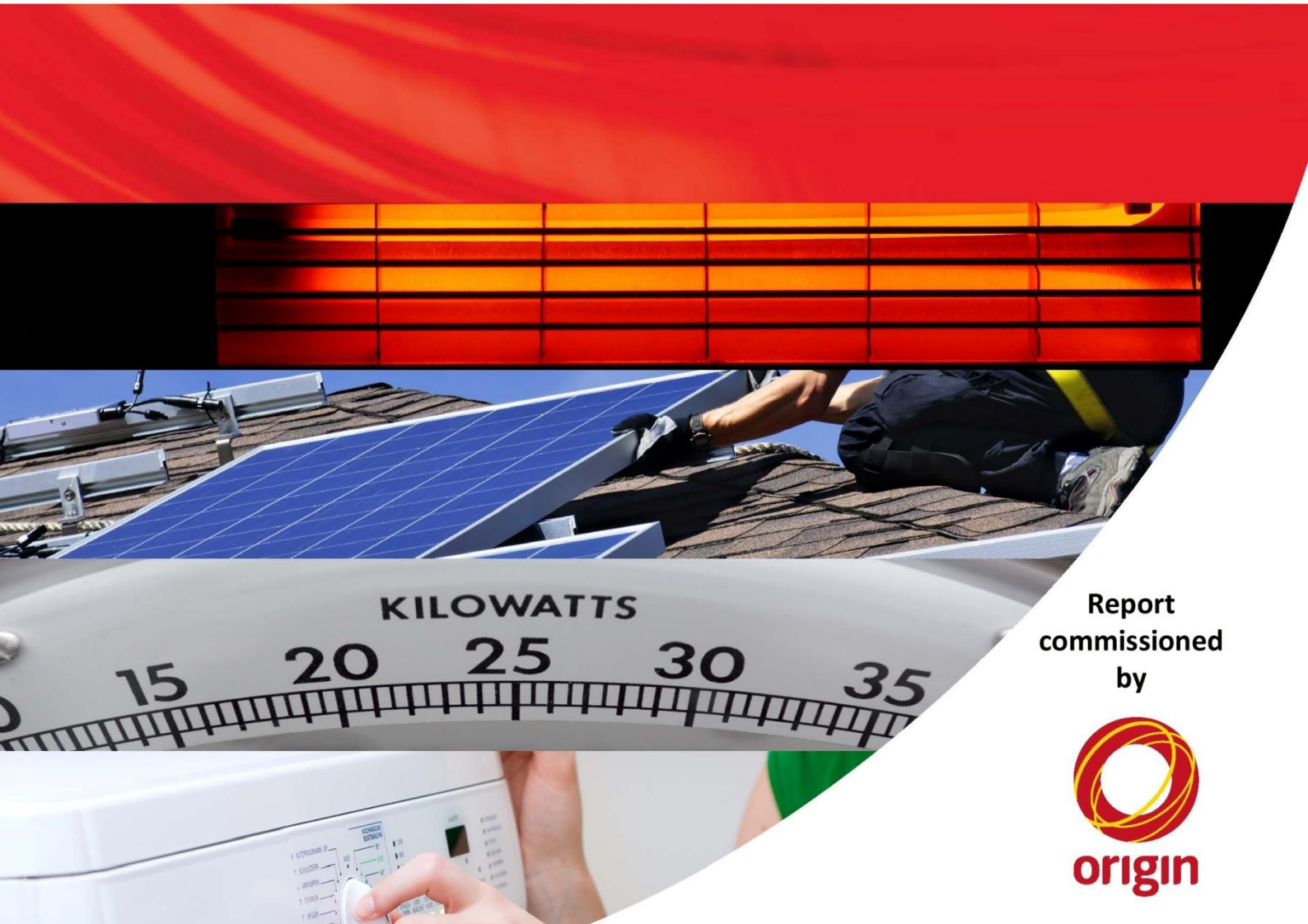
ClimateWorks AUSTRALIA

CSIRO

LOW CARBON LIFESTYLES
A Practical Guide for Households

Victoria

October 2012



Report commissioned by

origin

Preface

ClimateWorks Australia is an independent non-profit organisation whose mission is to facilitate substantial emissions reductions in the next five years in Australia by working with government, business, industry groups and the community via a collaborative action based approach.

CSIRO, the Commonwealth Scientific and Industrial Research Organisation, is Australia's national science agency and one of the largest and most diverse research agencies in the world. They have extensively researched energy efficiency actions households can take to reduce their energy bills and greenhouse gas emissions.

Origin commissioned ClimateWorks and CSIRO to conduct this research and write this report - to help Australians understand what can be done at home to use less energy, reduce their environmental impact and save money on their energy costs.

Acknowledgements

ClimateWorks and CSIRO gratefully acknowledge the support of Origin in preparing this publication.

In particular, ClimateWorks recognises the invaluable contributions of Penny Gray, Anne Armansin and Tim Riley (Origin Energy), as well as Mike Syme (CSIRO).

On our methodology

In developing this report, ClimateWorks has drawn on the comprehensive knowledge base and research of the CSIRO, and on the Low Carbon Growth Plan methodology. More information on the methodology and assumptions can be found further in this report.

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Contents

ClimateWorks AUSTRALIA

Key findings

Every Australian home can use less energy, no matter its shape and size. From choosing a clothes line instead of your clothes dryer when the sun is shining to improving the insulation in your home, this report highlights the wide range of actions available, and helps you to choose those that are most appropriate for your household.

Our research finds that:

1. Simple day to day changes in behaviour and investing in low cost energy efficiency products can significantly reduce your energy bills and contribute to reducing your emissions
2. You can achieve zero carbon emissions while still achieving savings on your energy costs by combining energy efficiency and green energy
3. Just one or two key actions can have a large impact; in particular, installing solar panels can deliver large savings on your bills and emissions

Those key findings are explained in more detail below.

1. Simple day to day changes in behaviour and investing in low cost energy efficiency products can significantly reduce your energy bills and contribute to reducing your emissions

The table below shows how much you can save by:

- Replacing your light bulbs and shower heads with more efficient ones
- Using power boards to switch off your equipment when you're not using them
- Reducing your clothes dryer use and air-drying some loads of washing instead

In Victoria, the financial savings are particularly high as **you can contact your energy retailer or some suppliers and get many of these pieces of equipment installed for free**.

Table 1 – Cost and emmissions savings that can be achieved from day-to-day activities — VIC / electricity & gas

SAVINGS THAT CAN BE ACHIEVED FROM: • Replacing light bulbs & showerhead • Cutting down on stand-by power • Reducing clothes dryer use	NET COST * ($ per annum)	EMISSIONS REDUCTION (% of total emissions)	Equivalent number of cars off the road	Equivalent number of trees planted
If you live in an APARTMENT	-$173	-12%	0.17	2
If you live in a SMALL HOUSE	-$268	-10%	0.26	4
If you live in a LARGE HOUSE	-$380	-9%	0.36	5

* A negative number means a net financial saving for the household, and a positive number a net financial cost

These actions will not only save money, but also reduce your impact on the environment. Reducing your energy use, and in particular your electricity use, will reduce your carbon footprint, or the amount of greenhouse gas emissions your household is responsible for releasing into the atmosphere.

Table 1 provides an estimate of the reduction in emissions these actions could achieve for each type of household. It also shows the number of cars that would need to be taken off the road, or the number of trees that would need to be planted, to reach the same reduction in emissions.

You can increase your energy savings further by investing in an energy efficient product instead of a standard product when you're ready to replace an old one. For example, replacing your existing television with an energy efficient one could save you about $79 a year if you live in an apartment or $118 a year if you live in a large house (a large house is likely to have more occupants, and the TV will therefore be used more).

These 'net savings' already take account of the additional upfront cost of choosing a more efficient television (annualised over its life). Also, as a television can last on average 10 years, you would save 10 times this over its life.

2. You can achieve zero carbon emissions while still achieving savings on your energy costs by combining energy efficiency and green energy

If you are focused on minimising your carbon footprint, this report has a selection of actions that may come at a cost, but deliver large cuts in greenhouse gas emissions. These include installing solar panels, or purchasing green energy from your energy retailer (like GreenPower and GreenGas from Origin).

Table 2 shows how you can use the savings from energy efficiency to purchase green energy and fully offset your household energy emissions while still decreasing your energy bills (see the illustrative scenario for your house type in the section 'What you can do to reduce your energy bills and your emissions' for details).

Table 2 shows how much it would cost you to bring your home type's carbon emissions down to zero thanks to green energy, when you combine it with the same energy efficiency actions as in section 1.

Table 2 – Cost and emmissions savings to achieve zero emmisssions — VIC / electricity & gas

SAVINGS THAT CAN BE ACHIEVED FROM: • Replacing light bulbs & showerhead • Cutting down on stand-by power • Reducing clothes dryer use • Upgrading your TV • Buying GreenGas + GreenPower 100%	NET COST * ($ per annum)	EMISSIONS REDUCTION (% of total emissions)	Equivalent number of cars off the road	Equivalent number of trees planted
If you live in an APARTMENT	-$129	-100%	1.45	21
If you live in a SMALL HOUSE	-$220	-100%	2.48	36
If you live in a LARGE HOUSE	-$309	-100%	3.85	56

* A negative number means a net financial saving for the household, and a positive number a net financial cost

3. Just one or two key actions can have a large impact; in particular, installing solar panels can deliver large savings on your bills and emissions

One or two actions can go a long way to reducing your energy bills or your emissions. The summary tables on the next page show the top 5 actions you can take to save money or to reduce your carbon emissions.

In particular, installing solar panels can allow you to make significant savings both on your energy costs and on your carbon emissions. With current electricity prices and feed-in tariffs, installing a 1.5 kW system in a small house offer a simple payback of less than 7 years (as compared with the 23-year lifespan of the equipment).

Top 5 Things to Do – VIC / electricity & gas

If you live in an APARTMENT

	ACTIONS	NET COST * ($ per annum)	EMISSIONS REDUCTION (% of total emissions)	Equivalent number of cars off the road	Equivalent number of trees planted
TOP 5 ACTIONS – Saving money	• Upgrade to an efficient TV (main TV)	-$79	-6%	0.08	1
	• Install solar power 1.5 kW system	-$66	-47%	0.69	10
	• Upgrade to water efficient shower heads	-$56	-2%	0.04	1
	• Eliminate standby power	-$53	-5%	0.07	1
	• Upgrade to efficient light bulbs	-$35	-3%	0.04	1
TOP 5 ACTIONS – Saving CO_2e	• Buy GreenPower 100%	$89	-70%	1.00	15
	• Install solar power 1.5 kW system	-$66	-47%	0.69	10
	• Buy GreenPower 50%	$45	-35%	0.50	7
	• Buy GreenGas	$52	-30%	0.44	6
	• Buy GreenPower 25%	$52	-17%	0.25	4

If you live in a SMALL HOUSE

	ACTIONS	NET COST * ($ per annum)	EMISSIONS REDUCTION (% of total emissions)	Equivalent number of cars off the road	Equivalent number of trees planted
TOP 5 ACTIONS – Saving money	• Upgrade to an efficient pool pump	-$316	-15%	0.37	5
	• Install solar power 1.5 kW system	-$199	-28%	0.69	10
	• Upgrade to an efficient heater	-$198	-7%	0.18	3
	• Install solar power 2.0 kW system	-$133	-37%	0.91	13
	• Upgrade to an efficient TV (main TV)	-$98	-4%	0.10	1
TOP 5 ACTIONS – Saving CO_2e	• Install solar power 4.5 kW system	$157	-83%	2.06	30
	• Install solar power 3.0 kW system	-$21	-55%	1.37	20
	• Buy GreenPower 100%	$121	-55%	1.37	20
	• Buy GreenGas	$52	-45%	1.12	16
	• Install solar power 2.0 kW system	-$133	-37%	0.91	13

If you live in a LARGE HOUSE

	ACTIONS	NET COST * ($ per annum)	EMISSIONS REDUCTION (% of total emissions)	Equivalent number of cars off the road	Equivalent number of trees planted
TOP 5 ACTIONS – Saving money	• Upgrade to an efficient heater	-$460	-9%	0.35	5
	• Install solar power 1.5kW system	-$398	-18%	0.69	10
	• Upgrade to an efficient pool pump	-$388	-11%	0.44	6
	• Install solar power 2.0 kW system	-$332	-24%	0.91	13
	• Install solar power 3.0 kW system	-$220	-36%	1.37	20
TOP 5 ACTIONS – Saving CO_2e	• Install solar power 4.5 kW system	-$43	-53%	2.06	30
	• Buy GreenPower 100%	$173	-51%	1.95	28
	• Buy GreenGas	$52	-49%	1.91	28
	• Install solar power 3.0 kW system	-$220	-36%	1.37	20
	• Buy GreenPower 50%	$86	-25%	0.97	14

* A negative number means a net financial saving for the household, and a positive number a net financial cost

HOW TO READ THE CHARTS IN THIS REPORT

How to read the charts in this report

This report illustrates the variety of actions to reduce energy bills and greenhouse gas emissions available for three different types of households:

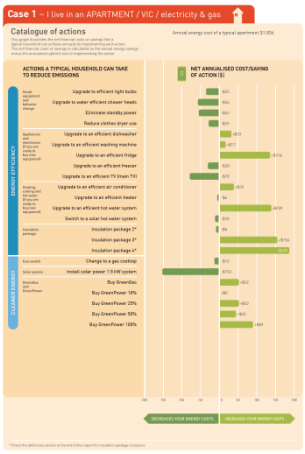
Case 1 – Apartments

Case 2 –Small houses

Case 3 – Large houses

It also provides details on the range of actions available to household type and the average dollar and emissions savings that each action can achieve. For each household type, you will find the following three charts.

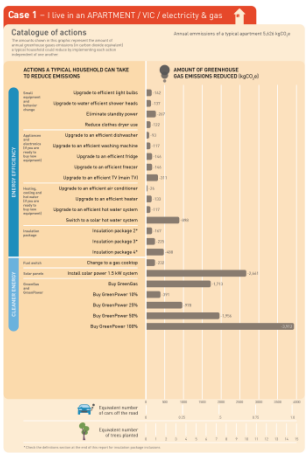
Catalogue of actions



This provides a shopping list of opportunities to cut energy use and reduce greenhouse gas emissions. Depending on your current circumstances and household priorities, you can choose those actions that are most relevant to you:

- Some actions can save you money over the course of a year – such as upgrading to efficient light bulbs, or choosing an efficient TV or pool pump – even after the upfront cost[1] is factored in. These actions are represented as 'negative costs' with a minus symbol and a green bar that extends to the *left* of the $0 line.
- Other actions – such as buying green energy – come at a net annual cost, yet can heavily reduce greenhouse gas emissions. These 'positive cost' opportunities are identified with a plus symbol and a green bar that extends to the *right* of the $0 line.

Using the catalogue of actions, you can estimate the potential annual financial savings (or cost) that your household may be able to achieve by choosing the most suitable actions.



Our catalogues also outline the potential *emissions savings* that a household could achieve through each action.

Every action included in the catalogue of actions can contribute to reducing a household's emissions.

To calculate how much you could reduce your energy costs and carbon emissions by, simply add up the net cost and emissions reductions associated with each action you could implement.

[1] Annualised over the life of the asset

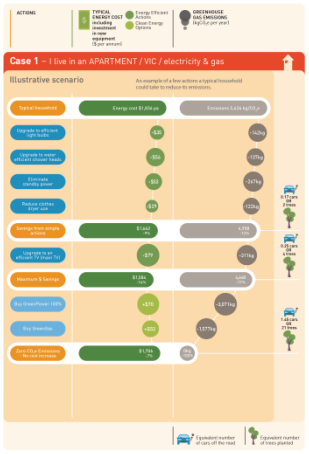
Illustrative scenario

Does your household want to reduce its energy costs, its carbon footprint or both?

For household type, we outline three illustrative scenarios that a typical household may undertake, depending on whether their focus is on:

1. Minimising energy bills
2. Maximising carbon emission reductions while decreasing energy costs
3. Achieving zero carbon emissions

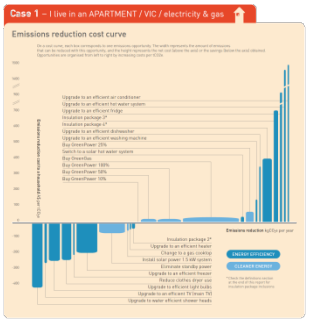
You can choose the actions that are most relevant to you from the catalogue to create a scenario that fits your own circumstances.



Cost curve

Perspective

The emissions reduction cost curve for household type gives a different perspective on the options you have for reducing your energy costs and your carbon emissions. Indeed, it looks at the options from a whole of economy perspective: it considers what can be done across all houses from the type considered, and assesses which actions should be done first to reduce emissions in the most cost-effective way.



How to read the Cost Curve

Each box on the Cost Curve represents one action. The height of each box shows the cost (above the $0 axis) or savings (below the $0 axis) of implementing that action (in dollars per ton of emissions reduced). **The actions on the left of the curve offer the greatest potential to save money, while those on the right hand side come at a cost**. The width of each box shows the emissions reduction to be expected from each action on average per household, across all households from the type considered.

Calculation methodology

You may notice that the numbers shown in the Cost Curve vary from those in the *Catalogue of actions*. This is because **in the Cost Curve, all actions interact with each other, whereas in the *Catalogue of actions* they do not.** For example, you could not buy GreenPower 50% and GreenPower 100% for your household, so each option's impact is decreased on the cost curve by the percentage chance of being undertaken. Also, choosing to purchase GreenPower after implementing a few energy efficiency actions will incur a lower reduction in emissions than if you implement it on its own as it will apply to a lower amount of electricity purchased. See Methodology section for detailed assumptions.

WHAT YOU CAN DO TO REDUCE YOUR ENERGY BILLS AND YOUR CARBON EMISSIONS

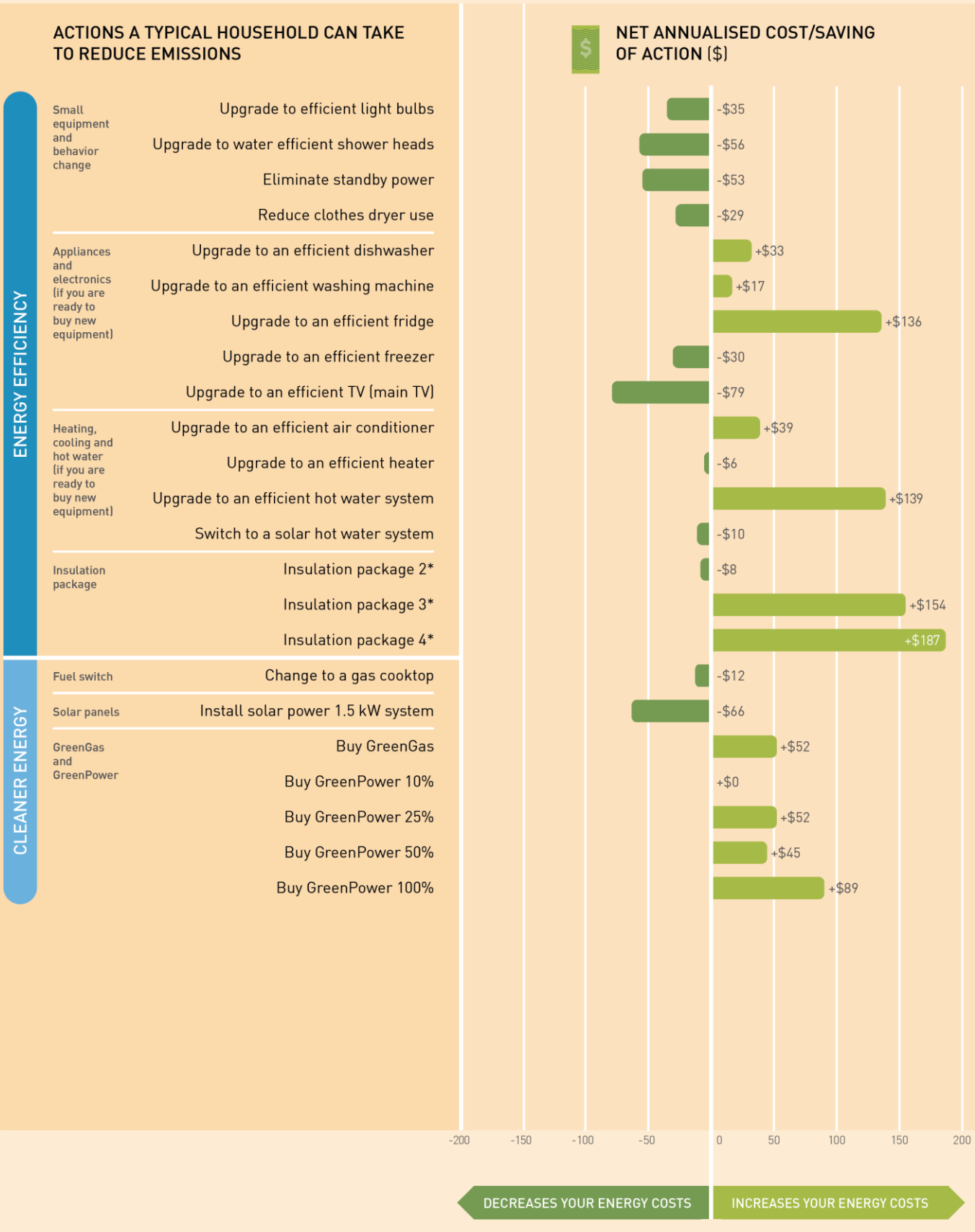
Results by house type

Case 1 – I live in an APARTMENT / VIC / electricity & gas

Catalogue of actions

This graph illustrates the net financial costs or savings that a typical household can achieve annually by implementing each action. The net financial costs or savings is calculated as the annual energy savings minus the annualised upfront cost of implementing the action.

Annual energy cost of a typical apartment $1,836



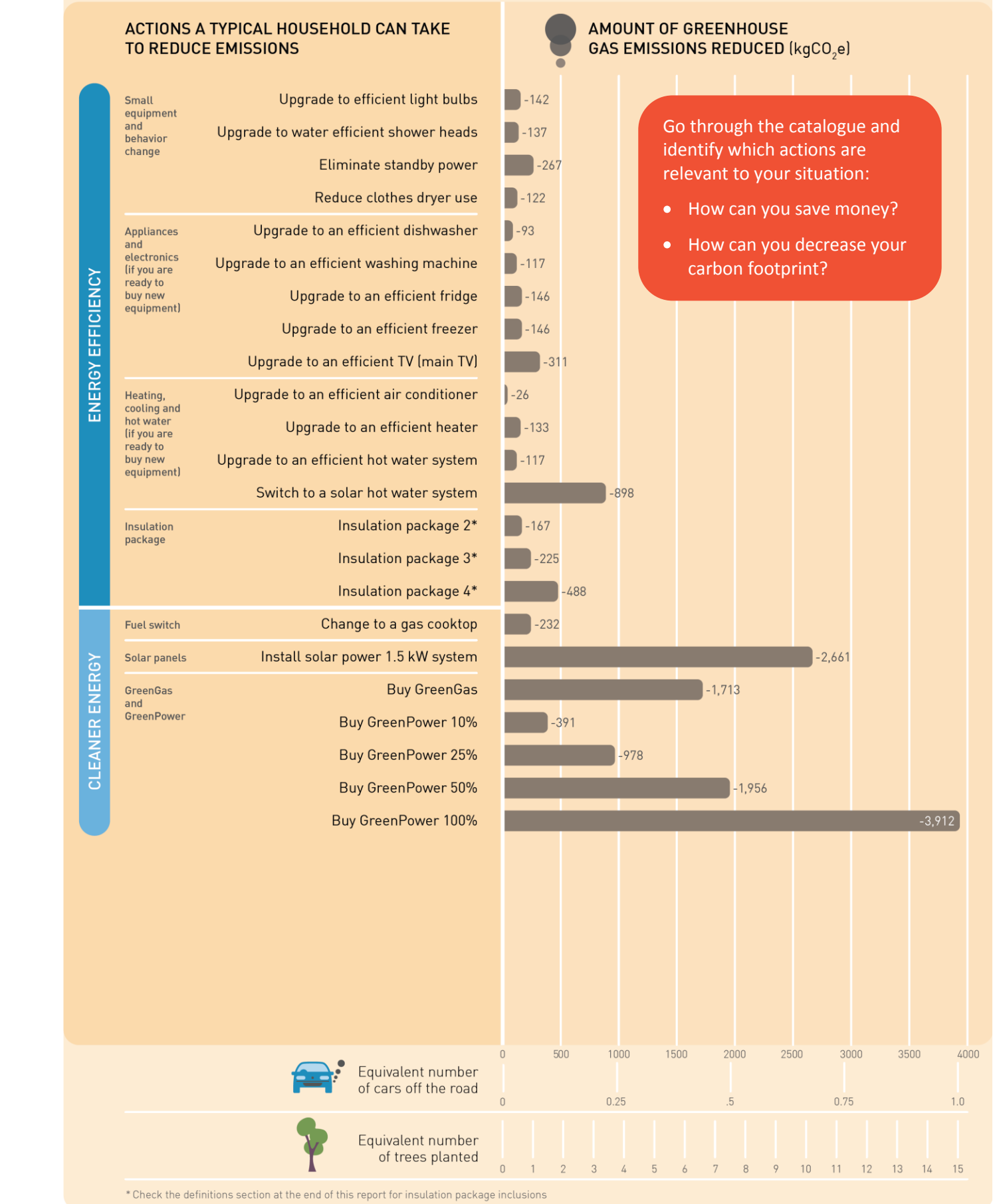
* Check the definitions section at the end of this report for insulation package inclusions

Case 1 – I live in an APARTMENT / VIC / electricity & gas

Catalogue of actions

The amounts shown in this graphic represent the amount of annual greenhouse gases emissions (in carbon dioxide equivalent) a typical household could reduce by implementing each action independent of one another.

Annual emissions of a typical apartment 5,626 $kgCO_2e$



Go through the catalogue and identify which actions are relevant to your situation:

- How can you save money?
- How can you decrease your carbon footprint?

* Check the definitions section at the end of this report for insulation package inclusions

ACTIONS

TYPICAL ENERGY COST including investment in new equipment ($ per annum)

Energy Efficient Actions

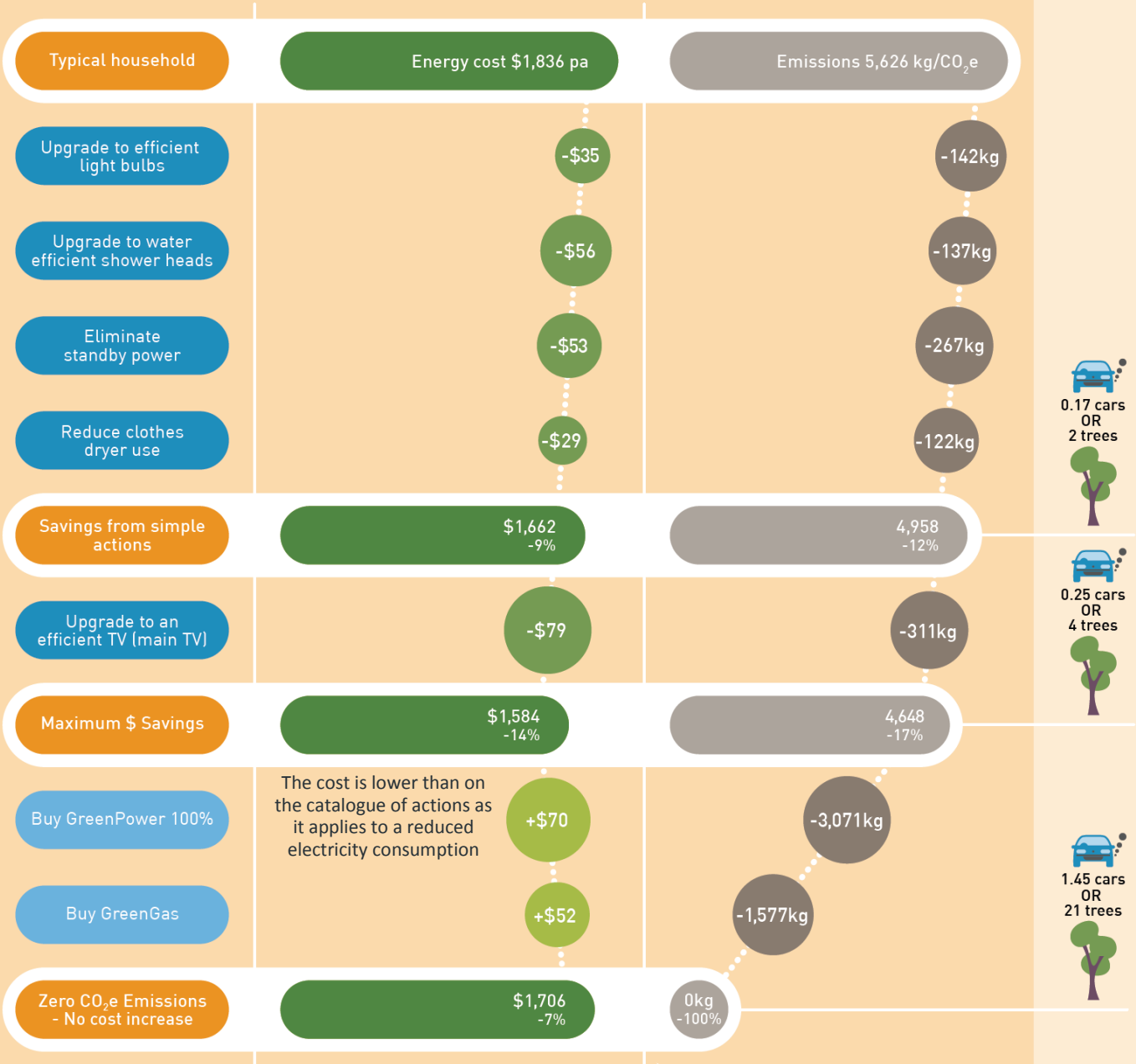
Clean Energy Options

GREENHOUSE GAS EMISSIONS ($kgCO_2e$ per year)

Case 1 – I live in an APARTMENT / VIC / electricity & gas

Illustrative scenario

An example of a few actions a typical household could take to reduce its emissions.



You can achieve zero emissions and still save 7% on your energy costs!

To create your personal scenario:

- List all the actions you would like to implement from the catalogue of actions;
- Add up the energy cost or saving (don't forget the minus signs) and the emissions reduction for each action to determine the overall impact.

Equivalent number of cars off the road

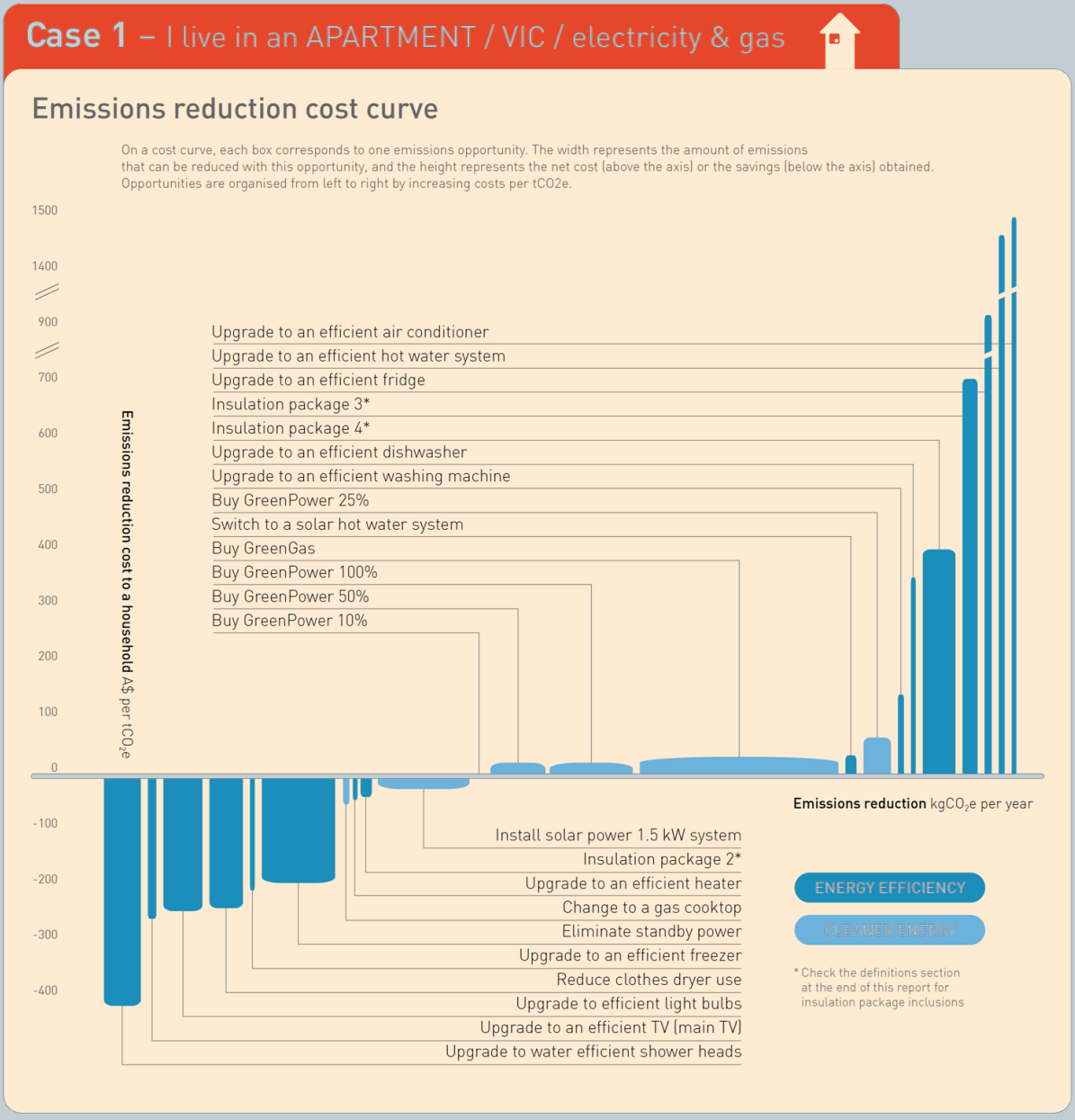
Equivalent number of trees planted

An economic perspective on what you can do to reduce your emissions

Below you will find an emissions reduction cost curve corresponding to your house type. In this cost curve, actions from the *Catalogue of actions* are classified in function of their *abatement cost*, or the amount of dollars that need to be spent to reduce emissions by 1 tCO_2e.

The main difference between looking at the actions through a cost curve and the *Catalogue of actions* are:

Catalogue perspective	Cost curve perspective
• An individual house perspective – the opportunity for a particular household • Actions impact independently of each other • Best for "pick and choose"	• A whole of economy perspective – the opportunity across all similar households • Actions impact in interaction with each other • Best for building comprehensive strategy



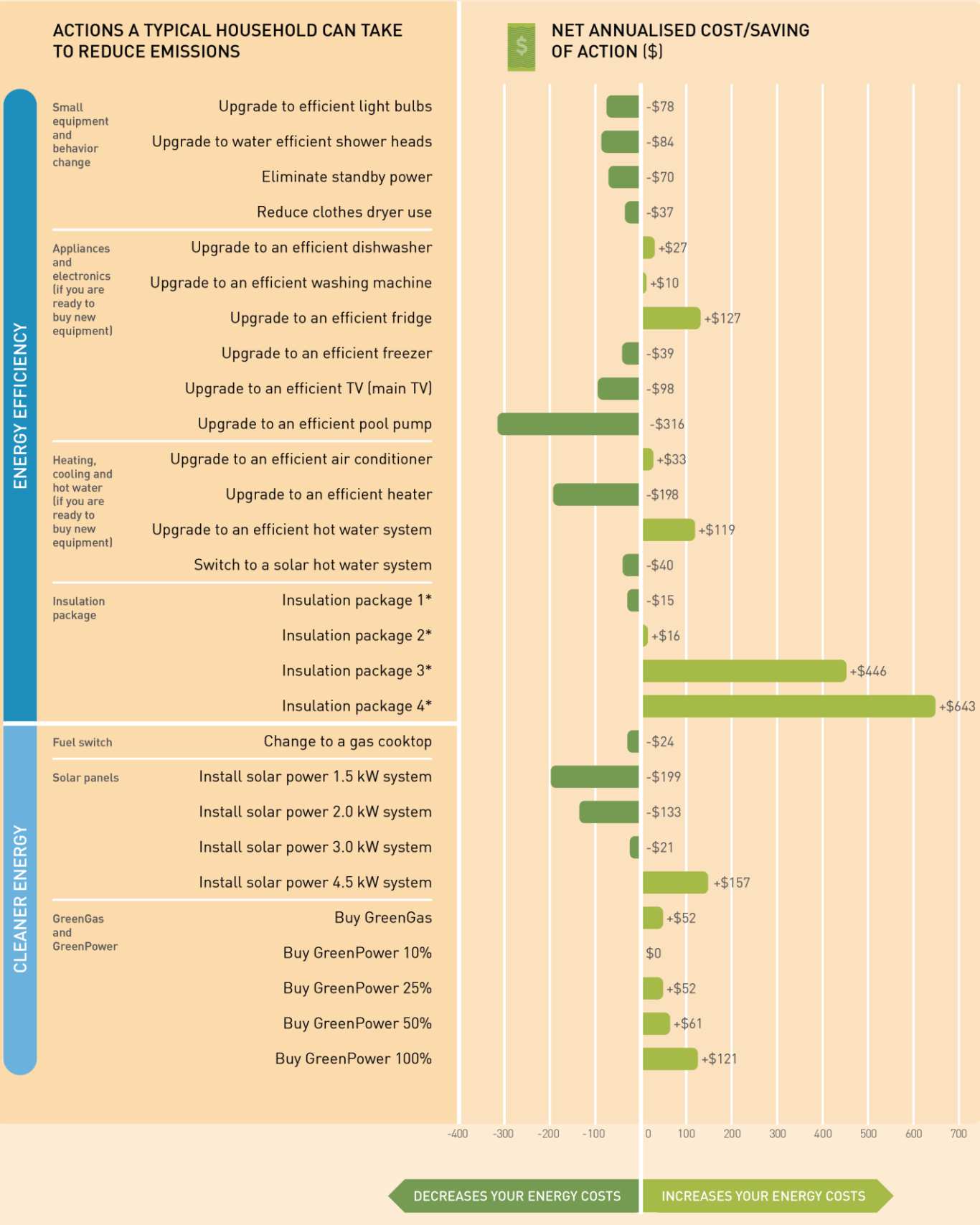
You can use this perspective to learn about the most economically-rational way to reduce your emissions: reading from left to right, you can find which actions should be done first if you were to reduce your emissions in the most cost-effective way.

Case 2 – I live in a SMALL HOUSE / VIC / electricity & gas

Catalogue of actions

This graph illustrates the net financial costs or savings that a typical household can achieve annually by implementing each action. The net financial costs or savings is calculated as the annual energy savings minus the annualised upfront cost of implementing the action.

Annual energy cost of a typical small house $3,236



* Check the definitions section at the end of this report for insulation package inclusions

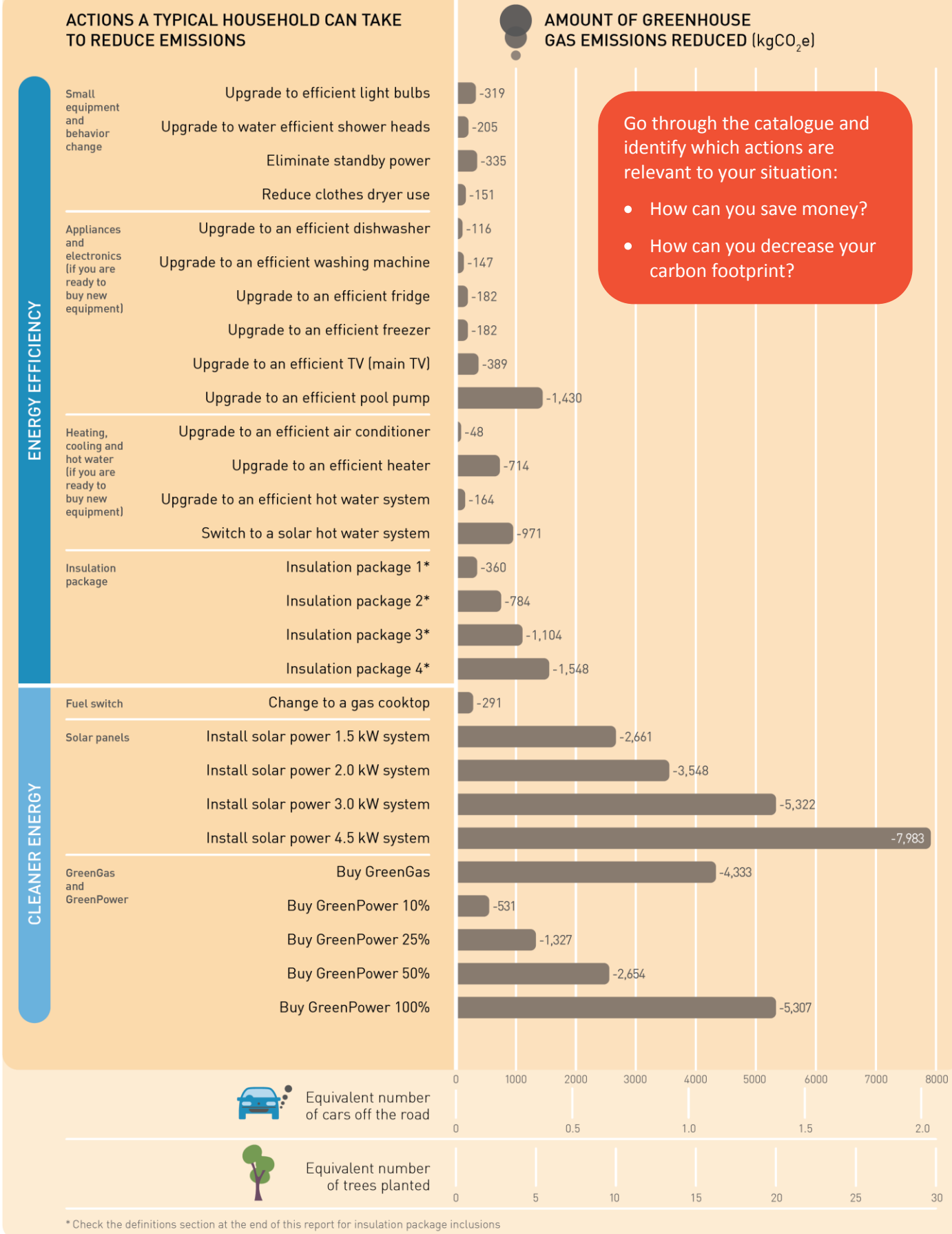
SMALL HOUSE

Case 2 – I live in a SMALL HOUSE / VIC / electricity & gas

Catalogue of actions

The amounts shown in this graphic represent the amount of annual greenhouse gases emissions (in carbon dioxide equivalent) a typical household could reduce by implementing each action independent of one another.

Annual emissions of a typical small house 9,640 $kgCO_2e$



Go through the catalogue and identify which actions are relevant to your situation:

- How can you save money?
- How can you decrease your carbon footprint?

SMALL HOUSE

* Check the definitions section at the end of this report for insulation package inclusions

ACTIONS

TYPICAL ENERGY COST including investment in new equipment ($ per annum)

Energy Efficient Actions

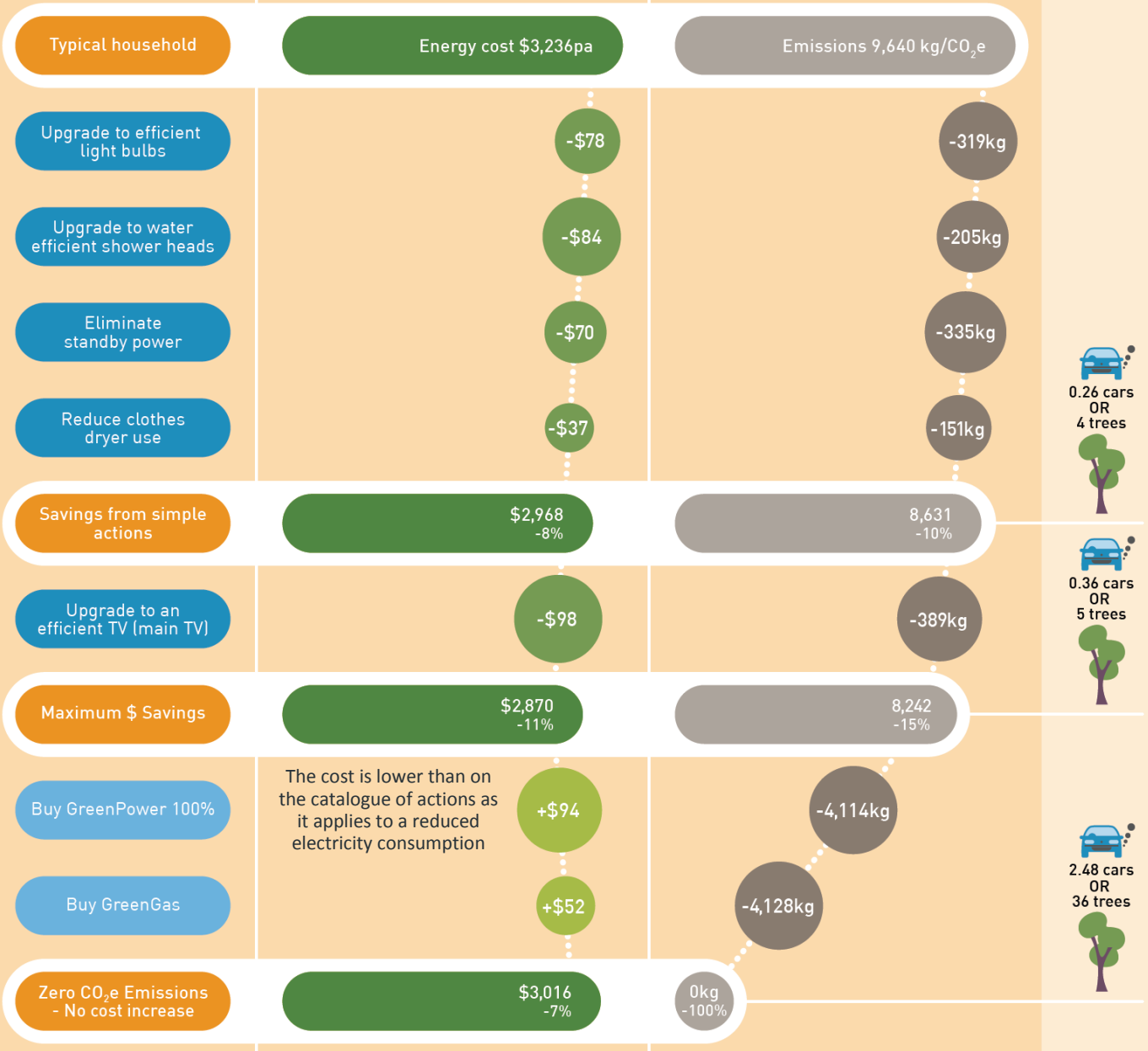
Clean Energy Options

GREENHOUSE GAS EMISSIONS ($kgCO_2e$ per year)

Case 2 – I live in a SMALL HOUSE / VIC / electricity & gas

Illustrative scenario

An example of a few actions a typical household could take to reduce its emissions.



You can achieve zero emissions and still save 7% on your energy costs!

To create your personal scenario:

- List all the actions you would like to implement from the catalogue of actions;
- Add up the energy cost or saving (don't forget the minus signs) and the emissions reduction for each action to determine the overall impact.

Equivalent number of cars off the road

Equivalent number of trees planted

An economic perspective on what you can do to reduce your emissions

Below you will find an emissions reduction cost curve corresponding to your house type. In this cost curve, actions from the *Catalogue of actions* are classified in function of their *abatement cost*, or the amount of dollars that need to be spent to reduce emissions by 1 tCO_2e.

The main difference between looking at the actions through a cost curve and the *Catalogue of actions* are:

Catalogue perspective	Cost curve perspective
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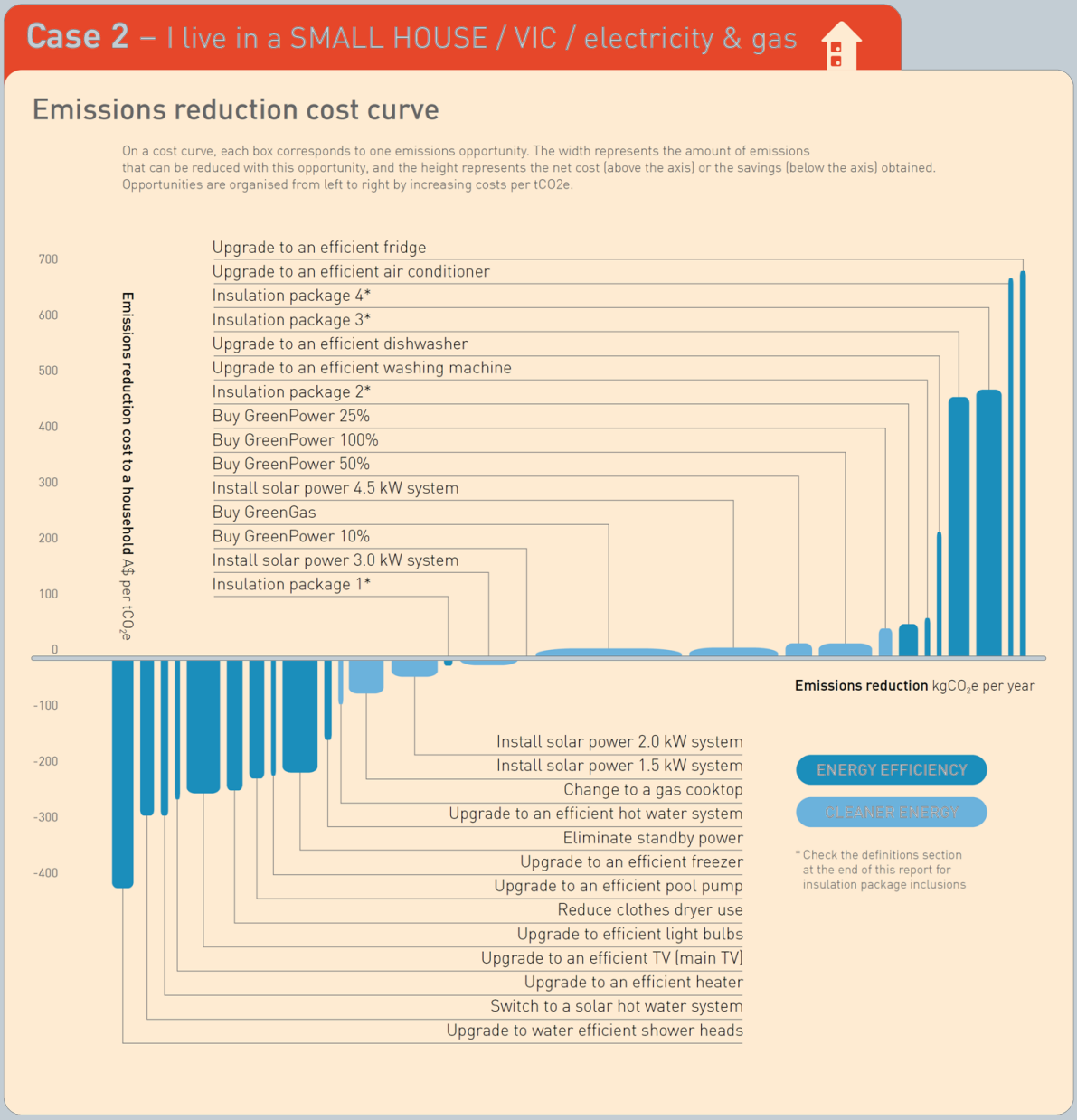


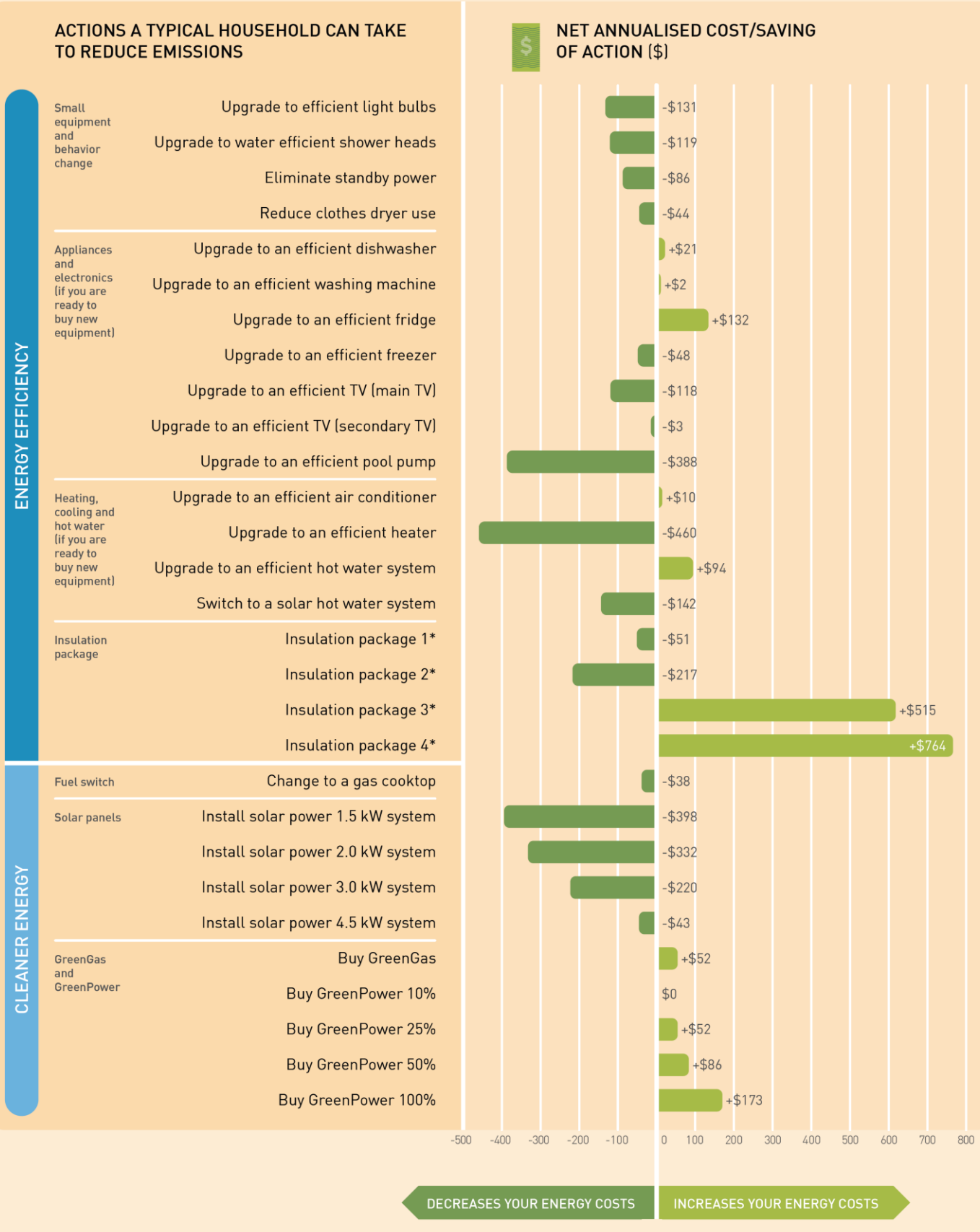
You can use this perspective to learn about the most economically-rational way to reduce your emissions: reading from left to right, you can find which actions should be done first if you were to reduce your emissions in the most cost-effective way.

Case 3 – I live in a LARGE HOUSE / VIC / electricity & gas

Catalogue of actions

This graph illustrates the net financial costs or savings that a typical household can achieve annually by implementing each action. The net financial costs or savings is calculated as the annual energy savings minus the annualised upfront cost of implementing the action.

Annual energy cost of a typical large house $5,029



* Check the definitions section at the end of this report for insulation package inclusions

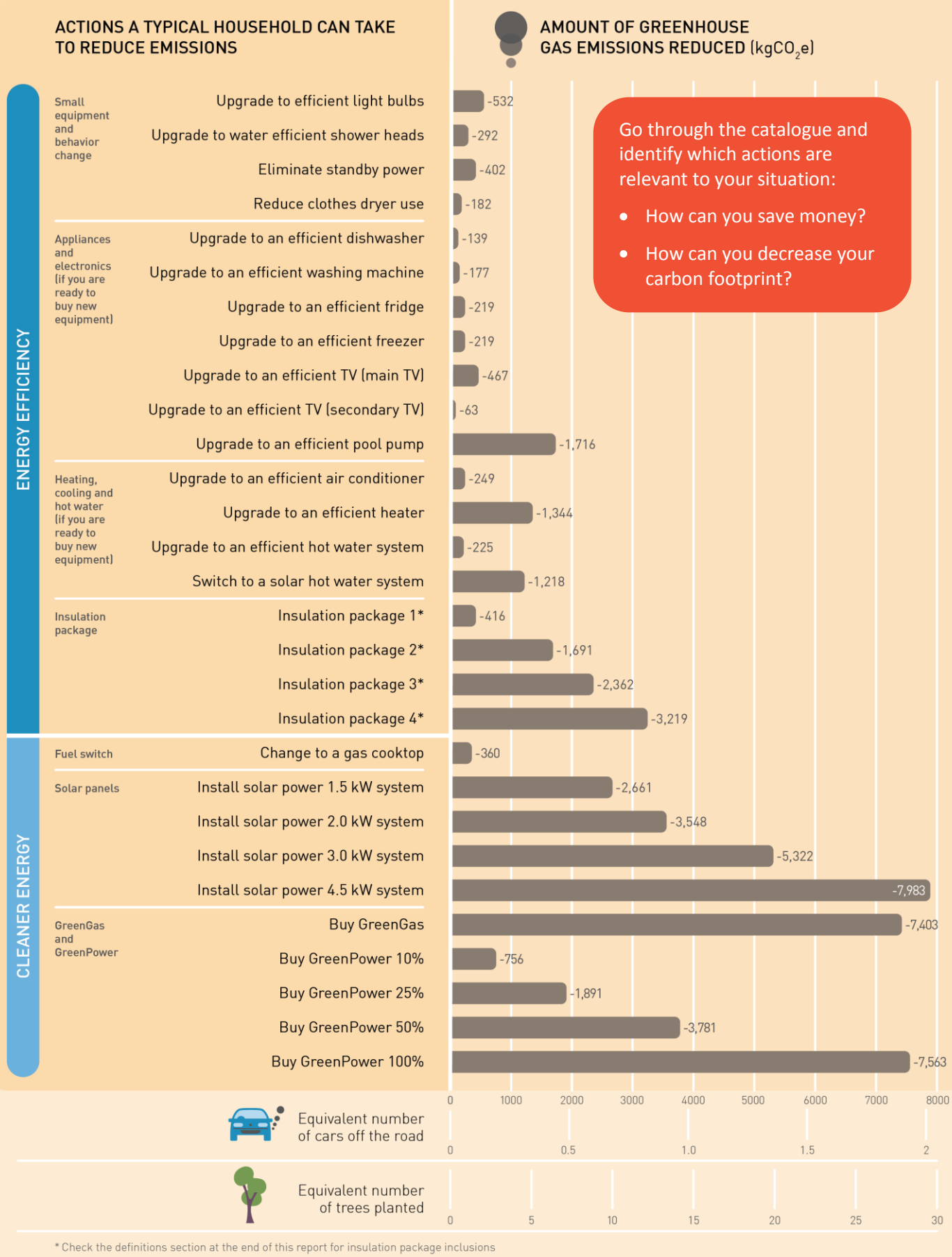
LARGE HOUSE

Case 3 – I live in a LARGE HOUSE / VIC / electricity & gas

Catalogue of actions

The amounts shown in this graphic represent the amount of annual greenhouse gases emissions (in carbon dioxide equivalent) a typical household could reduce by implementing each action independent of one another.

Annual emissions of a typical large house 14,966 $kgCO_2e$



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LARGE HOUSE

ACTIONS

TYPICAL ENERGY COST including investment in new equipment ($ per annum)

Energy Efficient Actions

Clean Energy Options

GREENHOUSE GAS EMISSIONS ($kgCO_2e$ per year)

Case 3 – I live in a LARGE HOUSE / VIC /electricity & gas

Illustrative scenario

An example of a few actions a typical household could take to reduce its emissions.

Typical household	Energy cost $5,029pa	Emissions 14,966 kg/CO_2e
Upgrade to efficient light bulbs	-$131	-532kg
Upgrade to water efficient shower heads	-$119	-292kg
Eliminate standby power	-$86	-402kg
Reduce clothes dryer use	-$44	-182kg
Savings from simple actions	$4,649 -8%	13,558 -9%
Upgrade to an efficient TV (main TV)	-$118	-467kg
Maximum $ Savings	$4,531 -10%	13,091 -13%
Buy GreenPower 100%	+$136	-5,979kg
Buy GreenGas	+$52	-7,112kg
Zero CO_2e Emissions - No cost increase	$4,719 -6%	0kg -100%

0.36 cars OR 5 trees

0.48 cars OR 7 trees

3.85 cars OR 56 trees

The cost is lower than on the catalogue of actions as it applies to a reduced electricity consumption

You can achieve zero emissions and still save 6% on your energy costs!

To create your personal scenario:

- List all the actions you would like to implement from the catalogue of actions;
- Add up the energy cost or saving (don't forget the minus signs) and the emissions reduction for each action to determine the overall impact.

Equivalent number of cars off the road

Equivalent number of trees planted

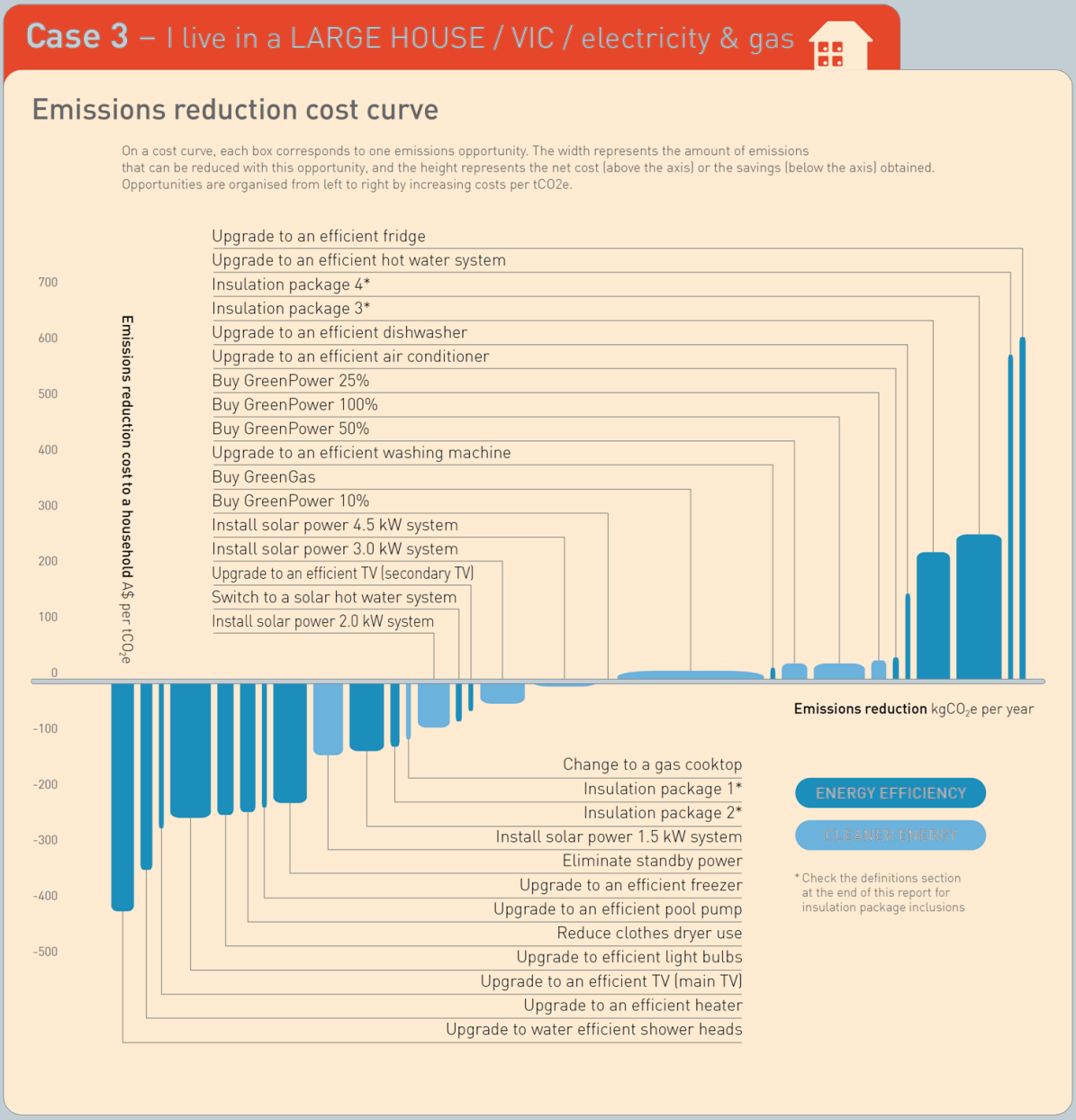
LARGE HOUSE

An economic perspective on what you can do to reduce your emissions

Below you will find an emissions reduction cost curve corresponding to your house type. In this cost curve, actions from the *Catalogue of actions* are classified in function of their *abatement cost*, or the amount of dollars that need to be spent to reduce emissions by 1 tCO_2e.

The main difference between looking at the actions through a cost curve and the *Catalogue of actions* are:

Catalogue perspective	Cost curve perspective
• An individual house perspective – the opportunity for a particular household • Actions impact independently of each other • Best for "pick and choose"	• A whole of economy perspective – the opportunity across all similar households • Actions impact in interaction with each other • Best for building comprehensive strategy



You can use this perspective to learn about the most economically-rational way to reduce your emissions: reading from left to right, you can find which actions should be done first if you were to reduce your emissions in the most cost-effective way.

METHODOLOGY

1. DESCRIPTION OF ACTIONS

Households can cut energy bills and reduce their emissions in many different ways. Further detail on the actions households can choose from is provided below.

Table 1 - Description of the actions included in the modelling

Action name	Description
ENERGY EFFICIENCY	
Small equipment and behaviour change	
Upgrade to efficient light bulbs	Replace old incandescent bulbs with compact fluorescent lighting (CFLs)
Upgrade to water efficient shower heads	Replace average efficiency (2 star) shower head(s) with high efficiency (3 star) shower head(s).
Eliminate standby power	Switch appliances off at the wall when not in use, or through the use of standby power devices.
Reduce clothes dryer use	Reduce your clothes dryer use from 5 loads a week (average in Victoria during colder months) to 2 loads per week and air-dry clothes instead.
Appliances and electronics	
Upgrade to an efficient dishwasher	Replace an existing 2 star dishwasher with a 3.5 star dishwasher.
Upgrade to an efficient washing machine	Replace an existing 2 star top loading washing machine with an efficient 4 star front loading machine –respectively 1 star and 4.5 stars in the Water Efficiency Labelling and Standards (WELS) ratings.
Upgrade to an efficient fridge	Replace an existing 2 star fridge with a 3.5 star fridge.
Upgrade to an efficient freezer	Replace an existing 2.5 star freezer with a new 4.5 star (or above) freezer.
Upgrade to an efficient TV (main TV)	Choose a 5 star plasma TV to replace a 2 star plasma TV.
Upgrade to an efficient TV (secondary TV)	Choose a 7 star LCD (LED) television to replace an existing 5 star plasma television (applicable to the large house only).
Upgrade to an efficient pool pump	For households with pools, upgrade from an inefficient pool pump (2 star equivalent) to an 8 star efficient pump.
Heating, cooling and hot water	
Upgrade to an efficient air conditioner	Replace an inefficient reverse cycle air conditioner in the living/kitchen area of your home with an energy efficient system.
Upgrade to an efficient heater	Replace existing 2 star gas heater with an efficient 4 star heater.
Upgrade to an efficient hot water system	Replace existing 3 star gas storage system with an efficient 5 star storage system.
Switch to a solar hot water system	Replace existing 3 star gas storage hot water system with a continuous flow gas boosted solar system.

Insulation packages	
Insulation package 1	• Upgrade your ceiling insulation from R1.5 to R4
Insulation package 2	Insulation package 1, plus: • Draught-proof your home with door and window seals and exhaust fan dampers
Insulation package 3	Insulation package 2, plus: • Improve window efficiency - provide heavy drapes and pelmets • Improve external shading
Insulation package 4	Insulation package 3, plus: • Install wall insulation to R value of 1.5
CLEANER ENERGY	
Fuel switch	
Change to a gas cooktop	Change existing electric cooktop to a gas cooktop.
Solar panels	
Install 1.5 kW solar electricity panels	Reduce household demand for market-supplied electricity by installing a 1.5 kW solar PV system. (Note, this is likely to be the largest system size available to apartment dwellers).
Install 2.0 kW solar electricity panels	Reduce household demand for market-supplied electricity by installing a 2.0 kW solar PV system.
Install 3.0 kW solar electricity panels	Reduce household demand for market-supplied electricity by installing a 3.0 kW solar PV system.
Install 4.5 kW solar electricity panels	Reduce household demand for market-supplied electricity by installing a 4.5 kW solar PV system.
GreenGas and GreenPower	
Buy GreenGas	Based on Origin's GreenGas offer: 100% offset of the greenhouse gas emissions generated from your household's natural gas consumption with National Carbon Offset Scheme accredited carbon offsets.
Buy Green Power 10%	Based on Origin's GreenPower offer: 10% of a household's electricity consumption will be matched into the grid with electricity from Government accredited GreenPower sources like wind, hydro, solar and biomass or biogas generation.
Buy Green Power 25%	Same as above, with 25% of a household's electricity consumption matched.
Buy Green Power 50%	Same as above, with 50% of a household's electricity consumption matched.
Buy Green Power 100%	Same as above, with 100% of a household's electricity consumption matched.

2. CALCULATIONS OF TREES AND CARS EQUIVALENT

In the report, we translate the emissions reductions that can be achieved by each action in terms of trees planted or cars taken off the road. The table below shows the assumptions that we have used to do so.

Table 2 - Assumptions regarding trees and cars equivalent calculations

Equivalent	Emissions reduction assumed in the model	Source and assumptions
One tree planted	268 $kgCO_2e$ per year	Based on Greenfleet's biodiverse forest.[2]
One car off the road	3,883 $kgCO_2e$ per year	The calculation assumes: • Average fuel consumption of a car: 1,493 L per year[3] • Fuel emissions intensity: 2.6 $kgCO_2e/L$[4]

3. ASSUMPTIONS ON PRICES AND EMISSIONS INTENSITY OF ELECTRICITY AND GAS

Energy emissions intensity assumptions

The greenhouse gas (GHG) emissions associated with the consumption of gas and electricity are the sum of the scope 2 and scope 3 emissions factors from the National Greenhouse Accounts (NGA) Factors[5]:

Table 3 - Emissions intensity assumptions for Victoria

Fuel	Emissions intensity
Electricity	1.35 $kgCO_2e/kWh$
Gas	0.0553 $kgCO_2e/MJ$

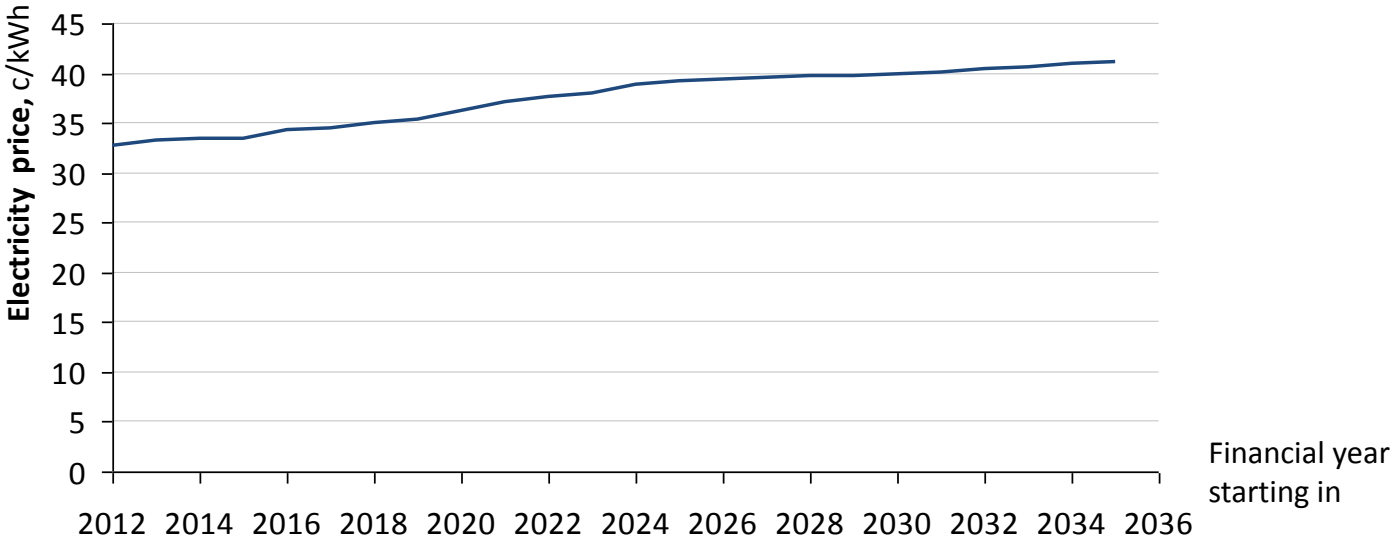
Energy price assumptions

The electricity price assumptions used in the modelling were based on Origin's retail prices for 2012, and projected to 2035 using the following sources:

- AEMC projections of the electricity retail prices until 2013-14 by state[6]
- Treasury modelling of the carbon price package impact[7] and ACIL-Tasman's modelling of the energy sector to 2029-30[8] for prices post 2013-14. It was assumed that all components of the electricity retail price from the AEMC projections would remain stable from 2013-14 until 2035, except for the wholesale component and the impact of the carbon price, which were indexed on respectively ACIL-Tasman's projections of the wholesale electricity price and the average emissions intensity by state and the Treasury's projections for the carbon price values

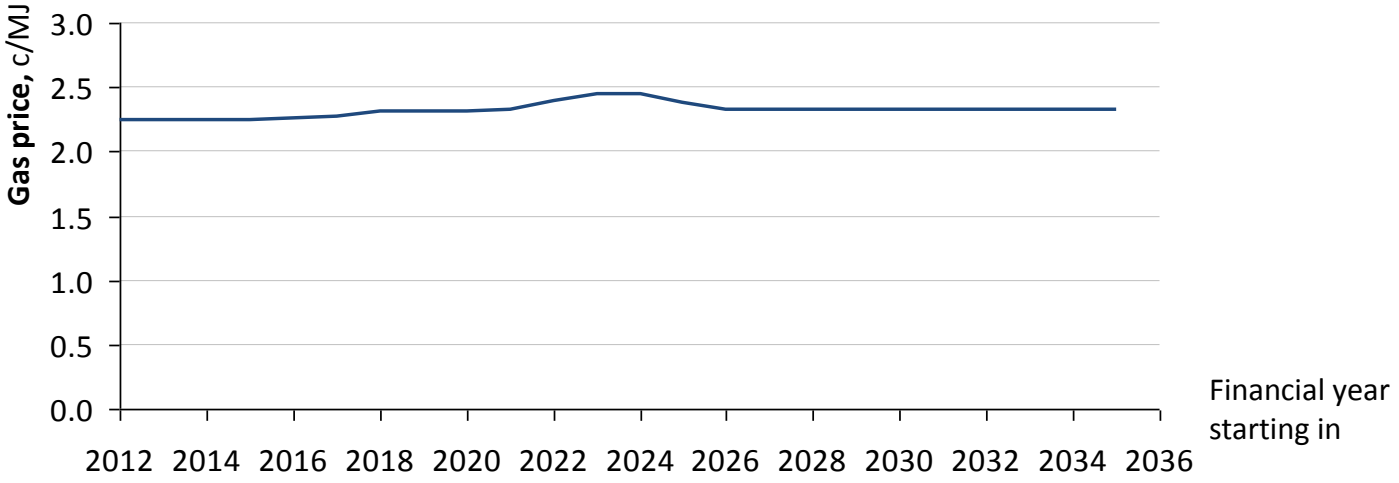
[2] http://www.greenfleet.com.au/Global/Researchers/Technical_information/index.aspx
[3] ABS, Survey of motor vehicle use, August 2011
[4] DCCEE, National Greenhouse Accounts (NGA) Factors, July 2011
[5] DCCEE, National Greenhouse Accounts (NGA) Factors, July 2011
[6] AEMC, Possible Future Retail Electricity Price Movements: 1 July 2011 to 30 June 2014, November 2011
[7] Australian Treasury, Strong growth, low pollution - Modelling a carbon price, 2011
[8] ACIL Tasman, Modelling greenhouse gas emissions from stationary energy sources, January 2011

Figure 1 - Electricity price assumptions for Victoria



The gas price assumptions used in the modelling were based on Origin's retail prices for 2012 and projected to 2035 assuming that retail costs would remain stable over time, and that the wholesale gas price would follow SKM MMA's projections of new contract gas prices for Victorian electricity generators[9].

Figure 2 - Gas price assumptions for Victoria



4. DESCRIPTION OF THE EXAMPLE HOUSES MODELLED

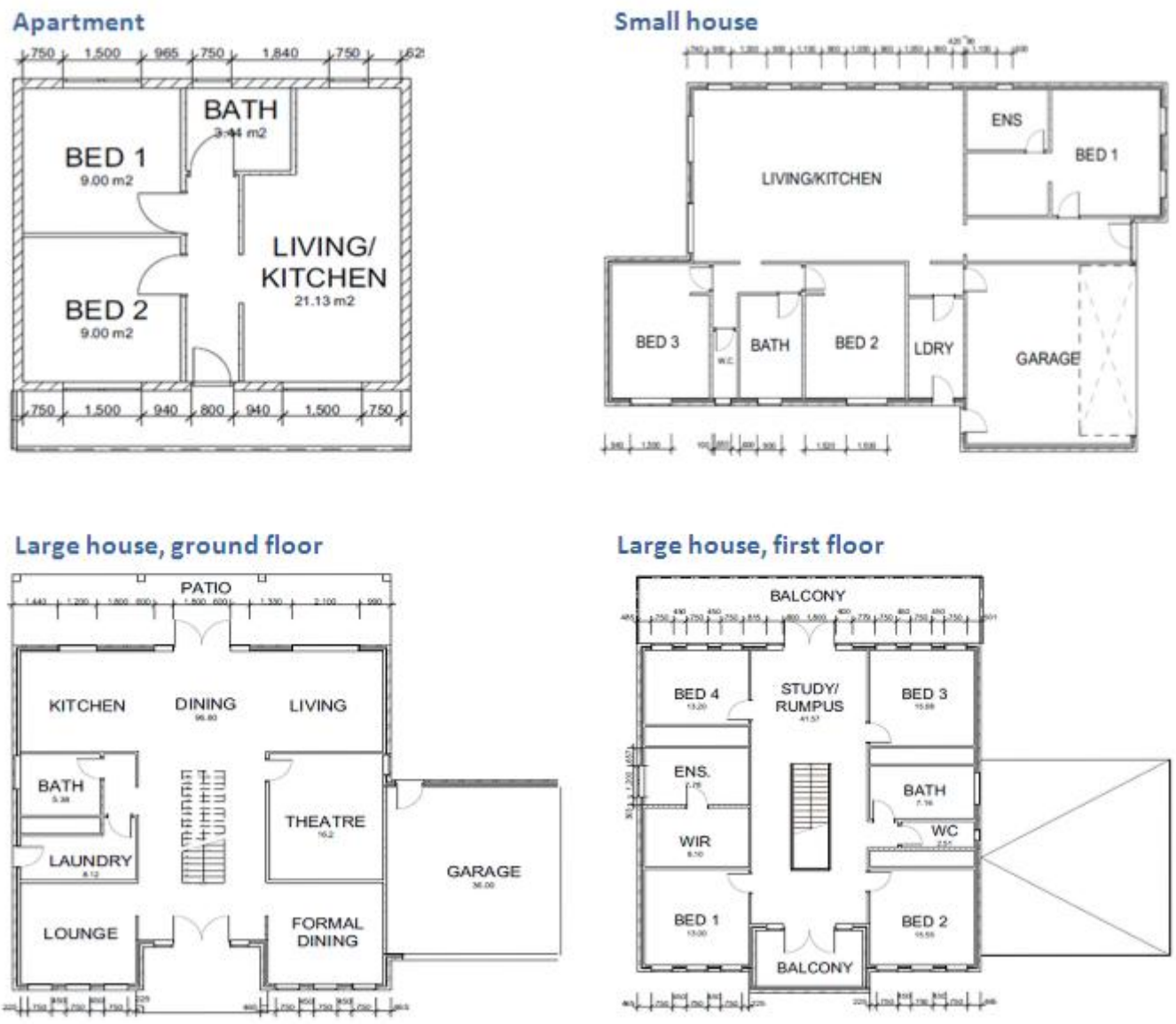
We have modelled three houses, which represent a "typical" apartment, small or large house. These houses cannot be interpreted as representing an "average" of all houses in those categories, as there is no such thing as an "average" house. Every house is unique, based on its construction, its occupancy and the equipment it holds.

[9] SKM MMA, Projections of greenhouse gas emissions for the stationary energy sector, January 2011

4.1. Key characteristics

Investment/Action Description	Apartment	Small house	Large house
Floor area (m^2)	47.7	205	330
Description	Ground floor unit (with 3 external walls and 1 adjacent apartment)	Single storey brick veneer construction	Two storey brick veneer construction
Occupancy	2 occupants Unoccupied 9am-5pm	Family of 3 Unoccupied 9am-3:30pm	Family of 4 Occupied all the time
Climate zone modelled	Melbourne		
NatHERS star rating	3.4	3.6	2.9
Fuel(s) used	Electricity and gas (gas used for heating and hot water system)		
Baseline electricity consumption (kWh/yr)	2,898	3,931	5,602
Baseline gas consumption (MJ/yr)	30,984	78,356	133,877

Figure 3 - Floor plan of the three house types



4.2. Appliances and equipment

Table 4 - Appliances and equipment included in each home type

Product	Apartment (Apt)	Small house (SH)	Large house (LH)
Heating/cooling	• *Living/Kitchen*: 2 Star gas space heater + pre 2000 3.5 Star cooling only split system • *Bedrooms*: Fans	• *Heating*: 2 Star gas ducted central heating system • *Living/Kitchen cooling*: pre 2000 3.5 Star cooling only split system • *Bedrooms cooling*: Fans	
Hot water	Old gas storage hot water heater		
Lighting	• 50% standard 60 W incandescent lighting • 50% 12 W compact florescent lighting (CFL)		
Dishwasher	X (20% smaller than SH)	X	X (20% larger than SH)
Washing machine	X (20% smaller than SH)	X	X (20% larger than SH)
Clothes dryer	X (20% smaller than SH)	X	X (20% larger than SH)
Refrigerator	X (20% smaller than SH)	X	X (20% larger than SH)
Freezer	X (20% smaller than SH)	X	X (20% larger than SH)
TV	X (1 TV, 20% smaller than SH)	X (1 TV)	X (2 TVs, main TV 20% larger than SH)
Electric cooktop	X (20% smaller than SH)	X	X (20% larger than SH)
Electric oven	X	X	X
Microwave oven	X	X	X
Computer – desktop, monitor, laptop, IT equipment	X	X	X
DVD	X	X	X
VCR	X	X	X
Set-top box	X	X	X
Games console	X	X	X
Home entertainment – radio, surround sound etc	X	X	X
Other appliances	allowance of 530 kWh/yr	allowance of 625 kWh/yr	allowance of 950 kWh/yr
Pool pump		X	X (20% larger than SH)

5. DETAILED ASSUMPTIONS FOR EACH ACTION

Calculation of emissions reduction achieved through each action

For energy efficiency actions, the emissions reduction was calculated as the product of the energy savings in kWh or MJ and the emissions intensity of the fuel saved. The emission intensities used for electricity and gas in Victoria are listed in section 3.

Calculation of net cost of each action

The net cost of each action was calculated as the upfront cost of implementing the action, annualised over the life of the asset, minus the time-averaged energy cost savings delivered by the action over its life.

The annualisation and time-average calculations were computed using a discount rate of 12.7% for all actions except the installation of solar panels and solar hot water systems, for which a 7% rate was used. The energy prices which were used to calculate the energy cost savings are explained in section 3 of the Methodology.

For appliances and equipment replacement, it was assumed that the action would only be taken at the end of the life of the existing product (e.g. either broken down completely and no longer capable of performing their intended function) –so that the existing products are assumed to have no residual value.

An incremental cost, or upfront cost, was therefore established as the difference between the cost of a new average appliance (entry to mid-level of the product range) and that of a new high efficiency appliance. The insulation packages and PV panels were not replacing any previously installed item, so their total cost was used as the upfront cost.

Source of equipment costing

When available, Origin's product offer was used as a reference for products costs. Otherwise, costs were sourced either from CSIRO's database (especially for insulation packages), or from a review of a sample of major online appliances and equipment retailers.

Table 5 lists the upfront costs which were assumed for each action, as well as the lifespan which was used for the annualisation and time-average calculations.

Table 5 - Assumptions for each of the actions included in the modelling

Action name	Description and assumptions	Upfront cost ($)	Lifespan (years)
ENERGY EFFICIENCY			
Small equipment and behaviour change			

Upgrade to efficient light bulbs	• Switch incandescent lighting to compact fluorescent (CFL) equivalents
	• Estimated baseline lighting consumption:
	  ○ 157 kWh/yr for apartment
	  ○ 354 kWh/yr for small house
	  ○ 591 kWh/yr for large house
	• Assumes 50% Incandescent bulbs and 50% CFL spread evenly over high and low use areas in baseline
	• Number of light bulbs replaced:
	  ○ Apartment 4 bulbs
	  ○ Small house 9 bulbs
	  ○ Large house 15 bulbs
		$0
		(CFL bulbs given for free by retailers through VEET scheme)
			3 years

Action name	Description and assumptions	Upfront cost ($)	Lifespan (years)
Upgrade to water efficient shower heads	• Upgrade average (2 star) shower heads to 3 star shower heads • Assumes 2 Star shower head as base • 2 shower heads in small house and large house, 1 shower head in apartment	$0 (same as above)	7 years

Eliminate standby power	• Estimated baseline standby power consumption:
	  ○ 310 kWh/yr for small house
	  ○ x 1.2 for large house and x 0.80 for apartment to adjust for occupancy
	• Assume 80% can be reasonably eliminated by occupant behaviour or electronic devices. Broadcast recording and difficult to access switches for example is estimated to result in 20% of standby consuming energy 24 hrs/day
	• Assumes that one 8-plug switch powerboard is installed in the kitchen to help achieve the savings, and that one or more Standby Power Management Devices are installed in the living area (provided for free by retailers through VEET scheme)
		$30	3 years

Reduce clothes dryer use	• Reduce use from 5 to 2 loads per week
	• Estimated baseline clothes dryer consumption:
	  ○ 2.5 kWh/cycle (2 star) for small house
	  ○ x 1.2 for large house and x 0.80 for apartment to adjust for occupancy
	• These consumption rates/cycle are lower (about 1/2) than indicated on energy labels due to dryers being loaded to 1/2 capacity
	• Usage assumed to be 5 times per week for 15 weeks centred around winter
		$0	N/A

Appliances and electronics			

Upgrade to an efficient dishwasher	• Upgrade average (2 star) dishwasher to a 3.5 star dishwasher
	• Estimated baseline dishwasher consumption:
	  ○ 1.2 kWh/cycle (2 star, 4 star in old system) for small house
	  ○ x 1.2 for large house and x 0.80 for apartment to adjust for occupancy
	• Estimated reduced dishwasher consumption:
	  ○ 0.71 kWh/cycle 3.5 star for small house
	  ○ x 1.2 for large house and x 0.80 for apartment to adjust for occupancy
	• Assumes 175 cycles/yr
	• Cold water connection only (dishwasher heats the water itself if relevant)
		$310	10 years

Action name	Description and assumptions	Upfront cost ($)	Lifespan (years)

Upgrade to an efficient washing machine	• Upgrade from a 2 star top loader to a 4 star front loader washing machine
	• Estimated baseline washing machine consumption:
	  ○ 0.75 kWh/cycle 2 star (including allowance for water heating) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated reduced washing machine consumption:
	  ○ 0.40 kWh/cycle 4 star (water heating included) for small house,
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Assumed to be used 6 days a week on average
	• Water connection:
	  ○ Hot and Cold water connection for top loader
	  ○ Cold water connection for front loader
	  ○ Note: Most loads are currently only heated to 30 degrees C, so hot water energy consumption is not as significant as in past
	• Equivalent Water Efficiency Labelling and Standards (WELS) ratings:
	  ○ for 2 star top loader: 1 star
	  ○ for 4 star front loader: 4.5 star
		$260	10 years

Upgrade to an efficient fridge	• Upgrade from a 2 star to a 3.5 star fridge
	• Estimated baseline fridge consumption:
	  ○ 432 kWh/yr (2 star) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated reduced fridge consumption:
	  ○ 297 kWh/yr (3.5 star) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
		$950 (Apt & SH)
		$1030 (LH)
			10 years

Upgrade to an efficient freezer	• Upgrade from a 2.5 star to a 4.5 star freezer
	• Estimated baseline freezer consumption:
	  ○ 340 kWh/yr (2.5 star) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated reduced freezer consumption:
	  ○ 205 kWh/yr (4.5 star) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
		$40	10 years

Upgrade to an efficient TV (main TV)	• Upgrade from a 2 star plasma to a 5 star plasma TV
	• Estimated baseline TV consumption:
	  ○ 567 kWh/yr (2 star) for small house based on 2600 h/yr
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated reduced TV consumption:
	  ○ 279 kWh/yr (5 star) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Both 2 star and 5 star TVs are assumed to be 42" plasma
		$0	10 years

Action name	Description and assumptions	Upfront cost ($)	Lifespan (years)

Upgrade to an efficient TV (secondary TV)	• Upgrade the secondary TV from a 5 star plasma to a 7 star LCD (LED) TV – only applicable to the large house which has 2 TVs
	• Estimated baseline TV consumption:
	  ○ 140 kWh/yr (5 star plasma) for small house based on 1300 h/yr
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated reduced TV consumption:
	  ○ 93 kWh/yr (7 star LED) for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Both 2 star and 5 star TVs are assumed to be 42" plasma
		$70	10 years

Upgrade to an efficient pool pump	• Upgrade from an old pool pump (equivalent 2 star) to an 8 star pool pump – only applicable to the small and large houses
	• Estimated baseline pool pump consumption:
	  ○ 1473 kWh/yr (2 star) for small house based on 1300 h/yr
	  ○ x 1.2 for large house to adjust for occupancy
	• Estimated reduced pool pump consumption:
	  ○ 414 kWh/yr (8 star) for small house
	  ○ x 1.2 for large house to adjust for occupancy
		$250	10 years

Heating, cooling and hot water			

Upgrade to an efficient air conditioner	• Upgrade the efficiency of your reverse cycle air conditioner from 3.5 star (Pre 2000 rating system on cooling cycle) to 3 star (2010 rating system on cooling cycle)
	• Area of application of split system:
	  ○ Living/Kitchen in small house and apartment
	  ○ Living/kitchen/dining and study/rumpus in the large house
	• Baseline system performance:
	  ○ Pre 2000 3.5 star cooling corresponds to an Energy Efficiency Ratio (EER) of 2.45 (original EER of 2.75 at time of purchase)
	  ○ 4 star heating corresponds to a Coefficient Of Performance (COP) of 2.73 (original EER of 3.03 at time of purchase)
	• New system performance:
	  ○ Post 2010 3 star cooling corresponds to an EER of 3.87
	  ○ 3.5 star heating corresponds to a COP of 4.12
		$250 (Apt & SH)
		$400 (LH)
			10 years

Upgrade to an efficient heater	• Upgrade the efficiency of your gas heater from 2 star to 4 star
	• System performance:
	  ○ Baseline 2 star corresponds to a COP of 60%
	  ○ New 4 star corresponds to a COP of 80%
		$350 (Apt)
		$700 (SH & LH)
			20 years

Action name	Description and assumptions	Upfront cost ($)	Lifespan (years)

Upgrade to an efficient hot water system	• Replace 3 star storage gas hot water system (HWS) with 5 star storage HWS
	• Size of system:
	  ○ Apartment 150 L tank
	  ○ Small house 200 L tank
	  ○ Large house 300 L tank
		$1,340	20 years

Switch to a solar hot water system	• Replace 3 star storage gas hot water system (HWS) with continuous flow gas boosted solar HWS
	• Size of system:
	  ○ 2 flat panels (4 m^2 total)
	  ○ Apartment 150 L tank
	  ○ Small house 200 L tank
	  ○ Large house 300 L tank
		$3,840	20 years

Insulation packages			
Insulation package 1	• Upgrade your ceiling insulation from R1.5 to R4	$1000 (SH) $880 (LH)	40 years
Insulation package 2	• Upgrade your ceiling insulation from R1.5 to R4 (SH and LH) • Draught-proof your home with door and window seals and exhaust fan dampers	Additional to package 1: $390 (Apt) $1,340 (SH) $2,320 (LH)	15 years
Insulation package 3	• Upgrade your ceiling insulation from R1.5 to R4 • Draught-proof your home with door and window seals and exhaust fan dampers • Improve window efficiency - provide heavy drapes and pelmets • Improve external shading - 60% shadecloth	Additional to package 2: 1170 (Apt) 3490 (SH) 6380 (LH)	15 years (windows) 10 years (shading)
Insulation package 4	• Upgrade your ceiling insulation from R1.5 to R4 • Draught-proof your home with door and window seals and exhaust fan dampers • Improve window efficiency - provide heavy drapes and pelmets • Improve external shading - 60% shadecloth • Install wall insulation to R value of 1.5	Additional to package 3: 1080 (Apt) 2930 (SH) 4680 (LH)	40 years
CLEANER ENERGY			
Fuel switch			

Change to a gas cooktop	• Change cooktop from elecricity to gas
	• Estimated baseline electricity cooktop consumption:
	  ○ 279 kWh/yr for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
	• Estimated gas cooktop consumption after change:
	  ○ 1552 MJ/yr for small house
	  ○ x 1.2 for large house x 0.80 for apartment to adjust for occupancy
		$200	10 years

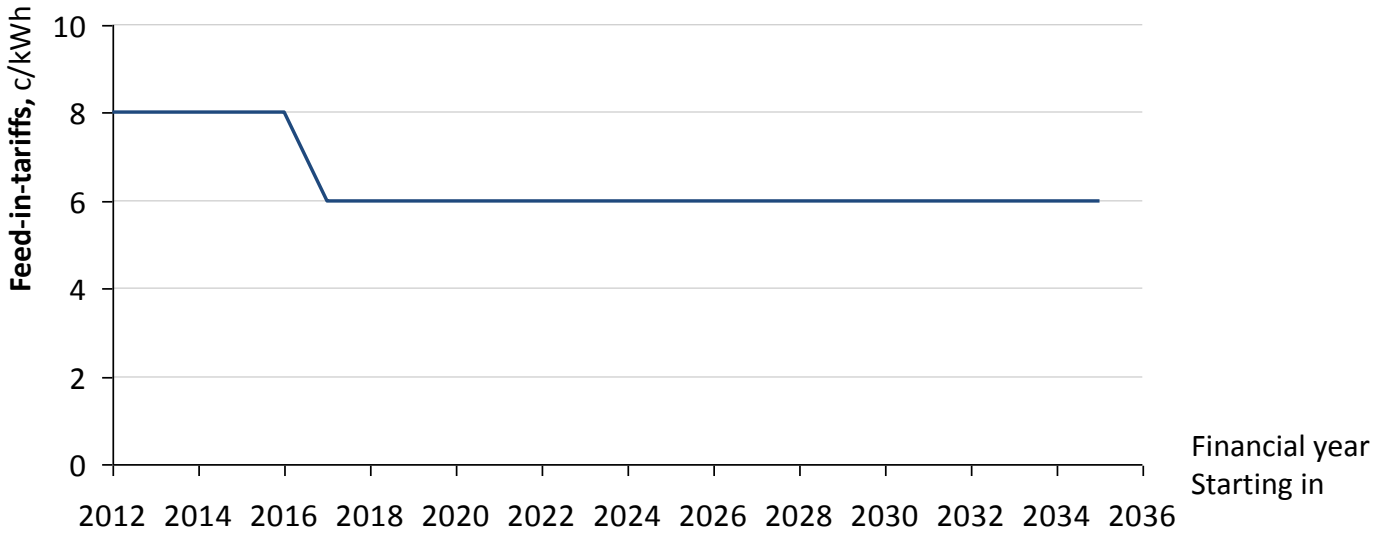
Solar panels			
Install 1.5 kW solar electricity panels	• Assumes that all panels are ideally located, facing due north with no shading. • Note, this is likely to be the largest system size available to apartment dwellers (share of roof space is 1/2 size of apartment assuming only 1 apartment above) • See next section for more detail on assumptions	$2,990	23 years
Install 2.0 kW solar electricity panels	• Assumes that all panels are ideally located, facing due north with no shading • See next section for more detail on assumptions	$4,240	23 years
Install 3.0 kW solar electricity panels	• Assumes that all panels are ideally located, facing due north with no shading • See next section for more detail on assumptions	$6,490	23 years
Install 4.5 kW solar electricity panels	• Assumes that all panels are ideally located, facing due north with no shading • See next section for more detail on assumptions	$9,990	23 years
GreenGas and GreenPower			
Buy GreenGas	• Based on Origin's Green Gas offer • 100% offset of the greenhouse gas emissions generated from your household's natural gas consumption with National Carbon Offset Scheme accredited carbon offsets	$52 per year	N/A
Buy Green Power 10%	• Based on Origin GreenPower's offer • 10% of a household's electricity consumption will be matched into the grid with electricity from Government accredited GreenPower sources like: - Wind generation, using the energy from the wind to turn blades on wind turbines to produce electricity - Hydro generation, using power that is derived from the force or energy of moving water to produce electricity - Solar generation, using solar cells (photovoltaic cells) to convert the sun's rays into electricity - Biomass and biogas, this involves using organic sources such as plant material or methane gas from rubbish tips to generate electricity	-	N/A
Buy Green Power 25%	• Same as above, with 25% of a household's electricity consumption matched	$52 per year	N/A
Buy Green Power 50%	• Same as above, with 50% of a household's electricity consumption matched	1.54 c/kWh consumed	N/A
Buy Green Power 100%	• Same as above, with 100% of a household's electricity consumption matched	3.08 c/kWh consumed	N/A

6. SOLAR PV ASSUMPTIONS

Solar energy production from the photovoltaic (PV) panels was determined using the Clean Energy Council Consumer guide to buying household solar panels[10].

PV panels were assumed to have feed-in tariffs as shown in Figure 4. After the end of the current policy, we have assumed that only the standard retailer component remains.

Figure 4- Assumed feed-in-tariffs for Victoria



The assumptions regarding the share of electricity generated which is used in the house (as opposed to exported to the electricity grid) are shown in Table 9. We have assessed what the likely peak load would be for each house type at the time of peak generation (around 1pm), based on the occupancy profile and fuel mix.

The useful generation capacity (maximum of the generation curve) is assumed to be 70% of the system capacity –e.g. useful capacity of 1.4kW for a 2kW system[11].

The share of electricity generated which is assumed to be consumed in the house is then calculated as the ratio of the load at peak generation over the useful capacity, multiplied by 1.2 to account for the shape of the generation curve[12]. Table 6 shows the results of this analysis for Victoria. For example, for a small house, we have assumed a load at peak generation of 0.5 kW. The useful capacity of a 2 kW system is 1.4 kW, so the share of the electricity generated by a 2kW system that is expected to be consumed in-house is 0.5 / 1.4 * 1.2 = 43%.

Table 6 - Assumptions on the consumption of the electricity generated by solar panels

Dimension	Apartment	Small house	Large house
Load at peak generation time (1pm)	0.3 kW	0.5 kW	0.8 kW
Share of electricity consumed in-house for 1.5 kW system	34%	57%	91%
Share of electricity consumed in-house for 2.0 kW system	26%	43%	69%
Share of electricity consumed in-house for 3.0 kW system	17%	29%	46%
Share of electricity consumed in-house for 4.5 kW system	11%	19%	30%

[10] Clean Energy Council, Consumer guide to buying household solar panels (photovoltaic panels), Vol 15: 8 November 2011
[11] AEMO, Rooftop PV Information Paper, 2012
[12] Solar choice website, "How much electricity will my cells feed into the grid?", February 2010

7. COST CURVE CALCULATIONS

Table 7 - Assumptions used to build the cost curve

Action name	Assumptions for cost curve calculations
ENERGY EFFICIENCY	
Small equipment and behaviour change	
Upgrade to efficient light bulbs	• Given the small costs involved, it was assumed that 100% of the households considered can consider implementing those actions
Upgrade to water efficient shower heads	
Eliminate standby power	
Reduce clothes dryer use	
Appliances and electronics	
Upgrade to an efficient dishwasher	• Given that significant upfront costs are involved, it was assumed that only the households that are ready to change the relevant piece of equipment would consider implementing those actions • It was assumed that on average 10% of the households considered would be ready to change the relevant equipment
Upgrade to an efficient washing machine	
Upgrade to an efficient fridge	
Upgrade to an efficient freezer	
Upgrade to an efficient TV (main TV)	
Upgrade to an efficient TV (secondary TV)	
Upgrade to an efficient pool pump	
Heating, cooling and hot water	
Upgrade to an efficient air conditioner	• Given that significant upfront costs are involved, it was assumed that only the households that are ready to change the relevant piece of equipment would consider implementing those actions • It was assumed that on average 10% of the households considered would be ready to change the relevant equipment
Upgrade to an efficient heater	
Upgrade to an efficient hot water system	
Switch to a solar hot water system	
Insulation packages	
Insulation package 1	• Insulation improvements do not relate to replacing current equipment, so every household can implement those actions • However, only one of the 4 packages could be implemented by a given household, so we modelled that 25% of the households considered would consider implementing each of the packages
Insulation package 2	
Insulation package 3	
Insulation package 4	
CLEANER ENERGY	
Fuel switch	
Change to a gas cooktop	• It was assumed that on average 10% of the households considered would be ready to change the relevant equipment
Solar panels, GreenGas and GreenPower	
Install 1.5 kW solar electricity panels	• Installing solar panels or buying GreenPower do not relate to replacing current equipment, so every household can implement those actions • However, only one of the 8 options would likely be considered by a given household as they relate to the same outcome (have cleaner electricity supply), so we modelled that 12.5% of the households considered would consider implementing each of those actions
Install 2.0 kW solar electricity panels	
Install 3.0 kW solar electricity panels	
Install 4.5 kW solar electricity panels	
Buy Green Power 10%	
Buy Green Power 25%	
Buy Green Power 50%	
Buy Green Power 100%	
Buy GreenGas	• It was assumed that 100% of the households considered can consider implementing those actions

8. DETAILED RESULTS

Table 8 - Detailed results of the modelling for each house type

		Apartment		Small house		Large house	
Category	Actions	Emissions reduction - kgCO2e	Net cost savings - $ p.a.	Emissions reduction - kgCO2e	Net cost savings - $ p.a.	Emissions reduction - kgCO2e	Net cost savings - $ p.a.
Small equipment and behaviour change	Upgrade to efficient light bulbs	142	-35	319	-78	532	-131
	Upgrade to water efficient shower heads	137	-56	205	-84	292	-119
	Eliminate standby power	267	-53	335	-70	402	-86
	Reduce clothes dryer use	122	-29	151	-37	182	-44
Appliances and electronics (if you're ready to buy new equipment)	Upgrade to an efficient dishwasher	93	33	116	27	139	21
	Upgrade to an efficient washing machine	117	17	147	10	177	2
	Upgrade to an efficient fridge	146	136	182	127	219	132
	Upgrade to an efficient freezer	146	-30	182	-39	219	-48
	Upgrade to an efficient TV (main TV)	311	-79	389	-98	467	-118
	Upgrade to an efficient TV (secondary TV)					63	-3
	Upgrade to an efficient pool pump			1,430	-316	1,716	-388
Heating, cooling and hot water (if you're ready to buy new equipment)	Upgrade to an efficient air conditioner	26	39	48	33	249	10
	Upgrade to an efficient heater	133	-6	714	-198	1,344	-460
	Replace portable heater & fan with efficient air conditioner						
	Upgrade to an efficient hot water system	117	139	164	119	225	94
	Switch to a solar hot water system	898	-10	971	-40	1,218	-142
Insulation package	Insulation package 1			360	-15	416	-51
	Insulation package 2	167	-8	784	16	1,691	-217
	Insulation package 3	225	154	1,104	446	2,362	515
	Insulation package 4	488	187	1,548	643	3,219	764
Fuel switch	Change to a gas cooktop	232	-12	291	-24	360	-38
Solar panels	Install solar power 1.5 kW system	2,661	-66	2,661	-199	2,661	-398
	Install solar power 2.0 kW system			3,548	-133	3,548	-332
	Install solar power 3.0 kW system			5,322	-21	5,322	-220
	Install solar power 4.5 kW system			7,983	157	7,983	-43
GreenGas and GreenPower	Buy GreenGas	1,713	52	4,333	52	7,403	52
	Buy GreenPower 10%	391	0	531	0	756	0
	Buy GreenPower 25%	978	52	1,327	52	1,891	52
	Buy GreenPower 50%	1,956	45	2,654	61	3,781	86
	Buy GreenPower 100%	3,912	89	5,307	121	7,563	173

This report can be accessed at www.climateworksaustralia.org/publications.html
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