

The Carbon Price and the Cost of Living





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Prepared for

The Climate Institute

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Key findings

The key findings of this study are:

- The proposed carbon price, starting at \$23 per tonne, could result in an increase in consumer prices of 0.6% in 2012/13, and a second impact of up to 0.1% in 2015/16, assuming full cost pass through of the carbon price liability. These results are slightly lower than the impacts of 0.7% and 0.2% estimated by Treasury (2011a).
 - These results are considered 'upper bound' estimates, implying actual impacts on prices could be smaller than 0.6-0.7%, with actual impacts depending on the degree to which costs are passed through to prices over time.
- The impact of the carbon price on consumer prices is around one quarter of the 2.5% impact on consumer prices of introducing the GST and is smaller than the impact of drivers of other major events that led to an increase of consumer prices over the last two decades, such as the trade and exchange rate impacts of the mining boom (2007/08) which had a 1.6% impact on consumer prices.
 - Unlike most major recent consumer price impacts, other than the GST, the introduction of a carbon price will be accompanied by assistance to households through tax cuts and increases in government benefit payments.
- Estimated impacts on electricity prices are similar to other studies. While the carbon price impact on electricity prices is smaller than the impact of recent increases in network costs, the carbon price adds to these, continuing recent trend price increases. This highlights the potential importance to households (and others) of achieving greater energy efficiency, and of minimising increases in network costs.
 - The impacts on food prices are likely to be small (around 0.5% on average), and less than historical variability in food prices over time.
- We estimate that the carbon price will result in an overall increase in expenditure of \$9.10 per week in 2012-13 by an average household: this is less than the Treasury estimate of \$9.90 per week. This estimate is based on applying the price changes to the latest household expenditure data. Price impacts are made up of increases of \$3.20 in electricity and gas costs, \$1.20 in food costs, and \$4.70 in other costs (such as clothing, recreation costs).
- Households with higher incomes and expenditure are estimated to face higher dollar increases in costs, but lower impacts as a share of their expenditure. This is because low income households spend a larger share of their income on electricity and gas, which have larger price impacts from the carbon price.
 - The carbon price impact on low income households is equivalent to 0.8% to 0.9% of expenditure across all low income households, ranging from \$4.30 per week for a single adult to \$8.60 per week for couples with dependent children (reflecting different expenditure levels).
 - For high income households, the carbon price impact is equivalent to 0.6% to 0.8% of expenditure, ranging from \$6.60 per week for a high income single adult to \$17.90 per week for a high income couple with dependents.
- Household assistance is focused on households at the lower end of the income scale (defined as low and moderate income households). Middle income households typically receive assistance that offsets most but not all of the impact of the carbon price, while high income households typically receive only limited assistance under the government's policy.
 - Low and moderate income households receive significant assistance, generally outweighing the average price impact for these households by a significant margin.
 - The balance between impacts and assistance for middle income households is sensitive to the specific circumstances of households. In most of the cases examined, middle income households receive assistance that is larger than the average impact for that household type. However, in some cases, middle income households examined are eligible to receive assistance equivalent to 60-95 per cent of the carbon price impact.
- Overall, the analysis suggests that the projected impacts of the carbon price fall well within the range of recent historical experience of changes in consumer prices and household cost of living, and that most households will receive assistance that offsets all or a significant portion of the cost impact of the carbon price.

Executive Summary

This study provides an independent analysis of the impacts of the Government's proposed carbon price on the cost of living for Australian households. The main goals of the report are:

- to provide an independent analysis of the economic impacts of the introduction of a carbon price;
- to outline the methods and assumptions used in the analysis;
- to bring together estimates of price impacts and announced government assistance to households; and
- to put the projected impacts into historical context, so that readers are able to better evaluate their significance.

The project provides an in-depth and transparent analysis of one aspect of the economic analysis undertaken by Treasury (2011a, 2011b) with other government agencies. While the broad approach is similar, some data and assumptions are likely to differ, and so results are also likely to be different – particularly for specific sectors. The study does not take account of any benefits that might arise from reducing greenhouse gas emissions, such as avoided likely or potential storm damages, lost agricultural production, or increases in food prices caused by more extreme weather events.

The study uses a price impact model based on an input-output framework to estimate the increase in prices associated with the introduction of the carbon price, and applies these price increases to the latest available expenditure data from the Household Expenditure Survey conducted by the Australian Bureau of Statistics (ABS 2011).

Assessing the impact of the carbon price on inflation and consumer prices

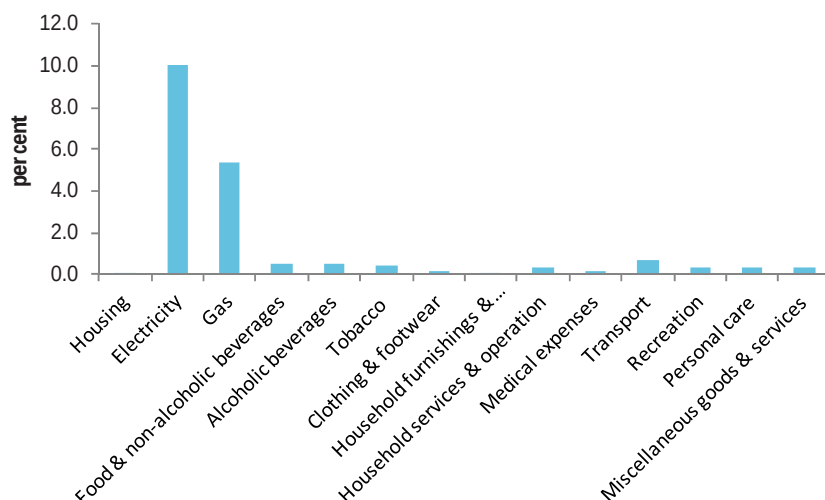
To assess the impact of the carbon price, the study calculates the economy-wide carbon price liability, models how this flows through to different sectors, and calculates how this will increase consumer prices.

The Government's carbon price package would impose a \$23 price per tonne of carbon across a wide range of energy sources and industrial emissions. The carbon price does not apply to passenger vehicles and light transport vehicles, or to off-road fuel use by the agriculture, forestry and fishing industries. While the carbon price is applied only to around 500 large carbon emitting firms, the analysis assumes this cost is passed through to their customers (i.e. other firms), and through the economy to consumers.

The analysis finds that the impact on prices in most sectors will be small, even assuming 100% pass through of the carbon price to final consumers. This is because the economic value of the carbon price is very small in relation to the economy as a whole: total value of carbon permits is estimated at around \$8.5 billion in the first year, less than 0.6% of the \$1,550 billion projected value of the economy in 2012-13.

- Electricity and gas prices rise the most because these products are highly emissions intensive. Electricity prices rise by around 10%, and gas prices by around 5%, relative to what they would be without a carbon price.
- Prices in all other sectors rise by around one third of a per cent (0.3%), on average, as shown in **Figure ES 1**.

Figure ES 1: Estimated increases in the prices of consumer goods and services



Note: Assumes full cost pass through to prices. Source: AECOM and CSIRO calculations.

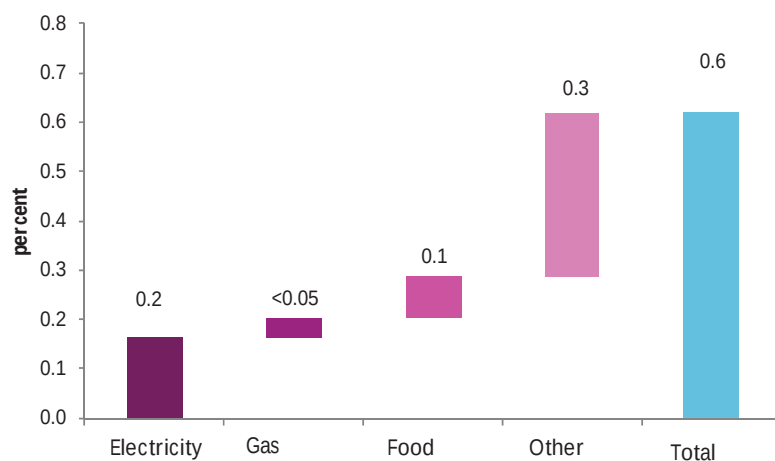
Other economic modeling suggests the revenue from a carbon price will remain small relative to the economy over time, with increases in carbon prices being offset by reductions in emissions. Related economic analysis also suggests that global action to retain temperature increases to 2°C or less would provide net economic benefits (see Stern 2008, Nordhaus 2010, Garnaut 2011).

Overall, the carbon price is not anticipated to affect the rate of inflation permanently. It is estimated to increase consumer prices by 0.6% in 2012-13, with a potential second impact of 0.1% in 2015-16 (including the impact of the proposed extension the carbon price to trucks and heavy transport in this year).

- These estimates are slightly lower than the official Australian Government estimate of 0.7% and 0.2% in 2012-13 and 2015-16.
- Actual impacts could be lower than these estimates, in the same way that the estimated impact of the GST was 2.75% before it was introduced, but analysis afterwards found the impact was 2.5%.

This overall impact is made up of the effect of different price rises, as shown in **Figure ES 2** and **Table ES 1**.

Figure ES 2: Components of the price rise from the carbon price, 2012-13



Note: Assumes full cost pass through to prices. Source: AECOM and CSIRO calculations.

- Electricity and gas price increases account for around one third of the impact on consumer prices. This reflects the combined impact of the price increase for electricity and gas, multiplied by their share of total household expenditure. (Average expenditure on electricity and gas is \$36 per week, equal to 2.5% of total projected household expenditure of \$1,422 per week in 2012-13).
- Food prices rise by around half a per cent (0.5%), accounting for one sixth of the effect on consumer prices, because food accounts for around 15% of total expenditure.
- Other prices rise by a third of one per cent (0.3%), on average, but make up around half the total impact on the consumer price index (representing the average household consumption bundle). This is because this small price increase applies to expenditure of around \$1,150 per week, accounting for more than 90% of average household spending on goods and services

Table ES 1: Estimated household expenditures and price increases, 2012-13

	Household expenditure (before the carbon price)	Price increase	Contribution to increased prices
Electricity	\$27.90	10.0%	0.2%
Gas	\$7.60	5.3%	< 0.05%
Food	\$234.90	0.5%	0.1%
Other	\$1,151.60	0.3%	0.3%
Total impact	\$1,421.90	0.6%	0.6%

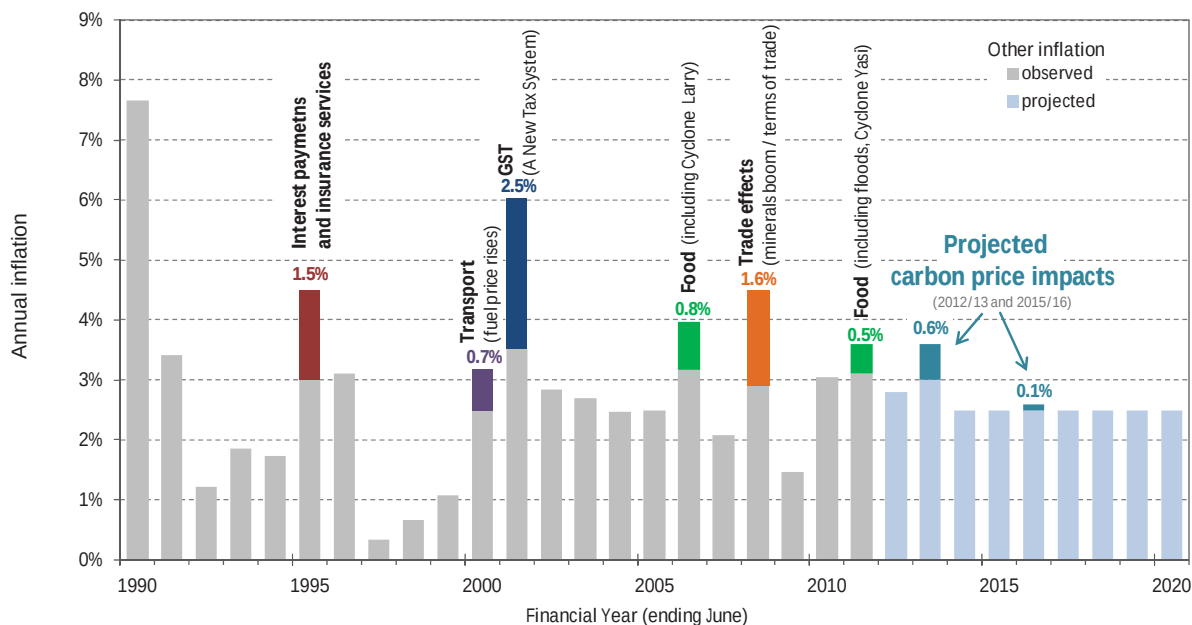
Notes: Assumes full cost pass through to prices. Source: AECOM and CSIRO calculations

Putting these impacts in historical context

Comparing the projected overall impact on consumer prices to other inflation events that have contributed to annual inflation outcomes suggests that the carbon price impact is likely to be smaller than the drivers of other major events that affected consumer prices over the last two decades, including the introduction of the GST, the trade and exchange rate effects associated with the mining boom before the GFC (2007/08) and higher food prices associated with floods and storm damage in 2005/06 and 2010/11.

The carbon price impact on retail electricity prices is noticeable, continuing recent trend increases in electricity prices, but the size of the impact is not as large as recent increases in network costs. The projected carbon price impact is around half to two thirds of the anticipated increase in network costs from 2010-11. Nevertheless, the carbon price will add to electricity prices, highlighting the potential importance to households (and others) of achieving greater energy efficiency, and of minimising increases in network costs.

Figure ES 3: Projected price impacts in historical context, 1990-2020



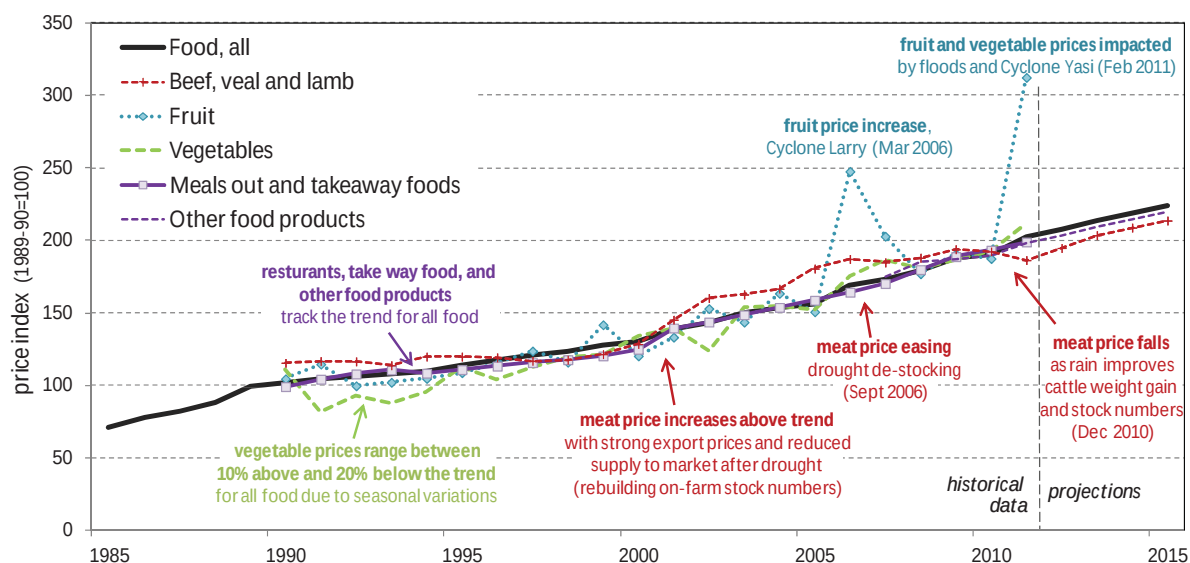
Notes: Analysis of detailed ABS inflation data identifies the major expenditure categories that have driven inflation in each year with inflation of 3.5% or more since 1991. This identifies five primary contributions to inflation, ranging from 0.5% to 2.5%, with impacts of 1.5% or more occurring every five to seven years over the period. The analysis also identifies a 'secondary contribution' to inflation from increases in petrol prices, and includes one of these years as an additional comparison, although it was not a primary inflation driver and occurred in a year where inflation was below 3.5%.

In this report the term inflation is used to include a one off impact on the price level but does not necessarily imply a change in the overall rate of inflation. The findings of the study suggest there will be no impact on the overall rate of inflation apart from the one off impacts identified in 2012/13 and 2015/16.

Source: Calculated from ABS 2011a, with CSIRO and AECOM carbon price impacts, and GST impact from Treasury (2001)

The impact of the carbon price on food prices is also smaller than historical variations in food prices, particularly the prices of meat, fruit and vegetables, which are influenced by weather events such as floods, storms and droughts – as shown in **Figure ES 4** below.

Figure ES 4: Historical and projected food prices, including carbon price impact, 1985-2015



Source: Calculated from ABS (2011a), Adams (2011), and sources for Figure 10 in the main report.

Impacts on household cost of living

Applying these price changes to the latest household expenditure data, from 2009-10, we estimate that the carbon price will result in an increase in expenditure of \$9.10 per week in 2012-13 for an average Australian household. This is made up of increases of \$3.20 in electricity and gas costs, \$1.20 in food costs, and \$4.70 in other costs. This overall impact is less than the official Government estimate of \$9.90 per week, but a little more than the \$8.90 per week estimated by NATSEM, as shown in **Table ES 2** (The official Government estimates are based on 2003-04 expenditure data, which was the most recent available at the time and therefore may not fully reflect structural changes in household spending patterns since 2003-04.)

Table ES 2: Summary of estimated average household impacts and assistance

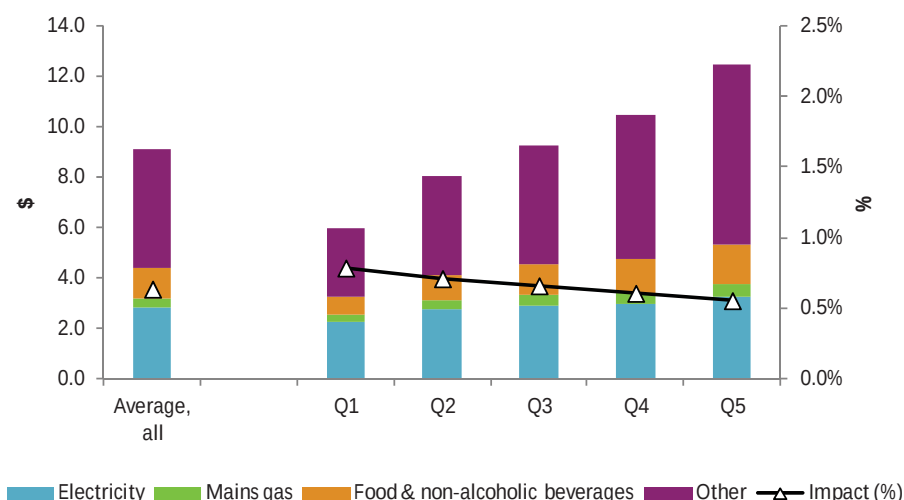
\$ per week, 2012-13	AECOM and CSIRO	Australian Government	Phillips and Taylor (NATSEM)
Electricity	\$2.80	\$3.30	<i>not reported</i>
Gas	\$0.40	\$1.50	<i>not reported</i>
Food	\$1.20	\$0.80	<i>not reported</i>
Other	\$4.70	\$4.30	<i>not reported</i>
Total impact	\$9.10	\$9.90	\$8.50
Financial assistance	<i>not estimated</i>	\$10.10	\$10.90

Source: AECOM and CSIRO calculations, Australian Government (2011a), Philips and Taylor (2011).

The full report calculates impacts for low, moderate, middle and high income levels across four main household types: couples with dependent children, single parent families, couples without dependents, and single adults. Results are also presented for senior couples and senior singles, and for all household types by area. Areas are defined as capital cities and non capital cities (referred to as balance of Australia).

Households with higher incomes and expenditure are estimated to face higher dollar increases in living costs, but lower impacts as a share of expenditure. This is because high income households spend a smaller share of their income on electricity and gas, while low income households spend a larger share of their income on electricity and gas, which have larger direct price impacts from the carbon price. Low income households also receive proportionally more assistance under the Government's policy package, as discussed below.

Figure ES 5: Impact of a carbon price on weekly expenditure (dollars) and impact as a share of expenditure (%), all households and relative income quintiles, 2012-13



Notes: Quintiles divide households into five equal groups by equivalised income levels, with Q1 the 20% of households with the lowest household income, and Q5 the 20% with the highest income. Source: AECOM and CSIRO calculations.

The carbon price impact (pre-assistance) on low income households is equivalent to 0.8% to 0.9% of expenditure across all low income households, ranging from \$4.30 per week for a single adult to \$8.60 per week for couples with dependent children across the households examined (reflecting different expenditure levels).

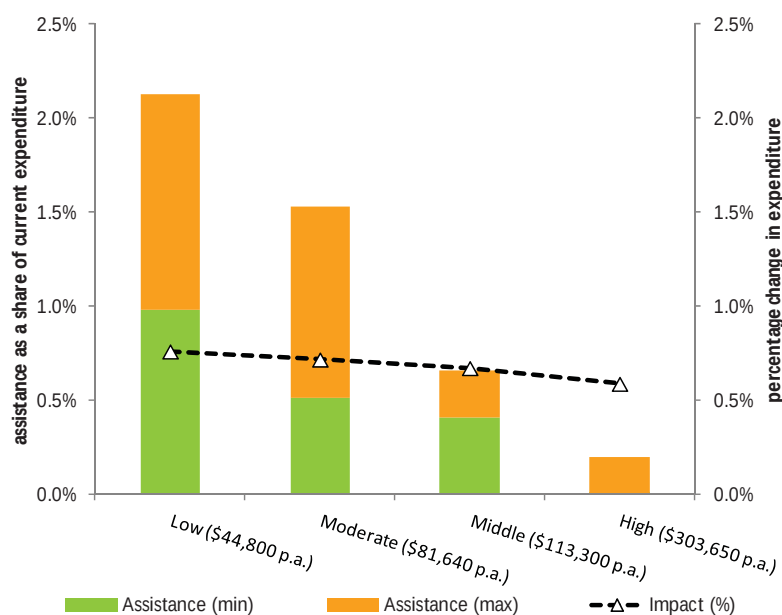
For high income households the carbon price impact is equivalent to 0.6% to 0.8% of expenditure, ranging from \$6.60 per week for a high income single adult to \$17.90 per week for a high income couple with dependents.

Assistance to households

The Clean Energy Future package also includes assistance to households delivered mainly through increases in benefit payments and reductions in personal income rates. This assistance is focused on low and moderate income households, with middle income households typically receiving assistance that offsets most but not all of the impact of the carbon price. This 'assistance gradient' is shown in **Figure ES 6** below for couple with dependent children households, along with the impact of the carbon price.

- Low and moderate income households receive a level of financial assistance that generally outweighs the average price impact for these households by a significant margin.
- For middle income households, the balance between impacts and assistance is sensitive to their specific circumstances. In most of the cases examined, these households receive more assistance than the average impact on middle income households. In some cases, the middle income households examined would receive assistance equivalent to 60-95 per cent of the carbon price impact.
- Under the Government's policy, high income households typically receive limited assistance and therefore will experience a net increase in living costs.

Figure ES 6: Impacts and assistance as a share of expenditure, couple family with dependent children 2012-13



Source: AECOM and CSIRO calculations (2011). Note p.a. refers to per annum.

In addition, households can reduce the impact of the carbon price by reducing their energy consumption, and by buying goods and services that are less emissions intensive. These actions will not reduce the assistance received by households, as assistance is based on income and household characteristics (such as the age and number of children, and eligibility for benefit payments such as the age pension). The potential for changes in energy use and expenditure patterns is not taken into account in the estimates of impacts.

Overall conclusions

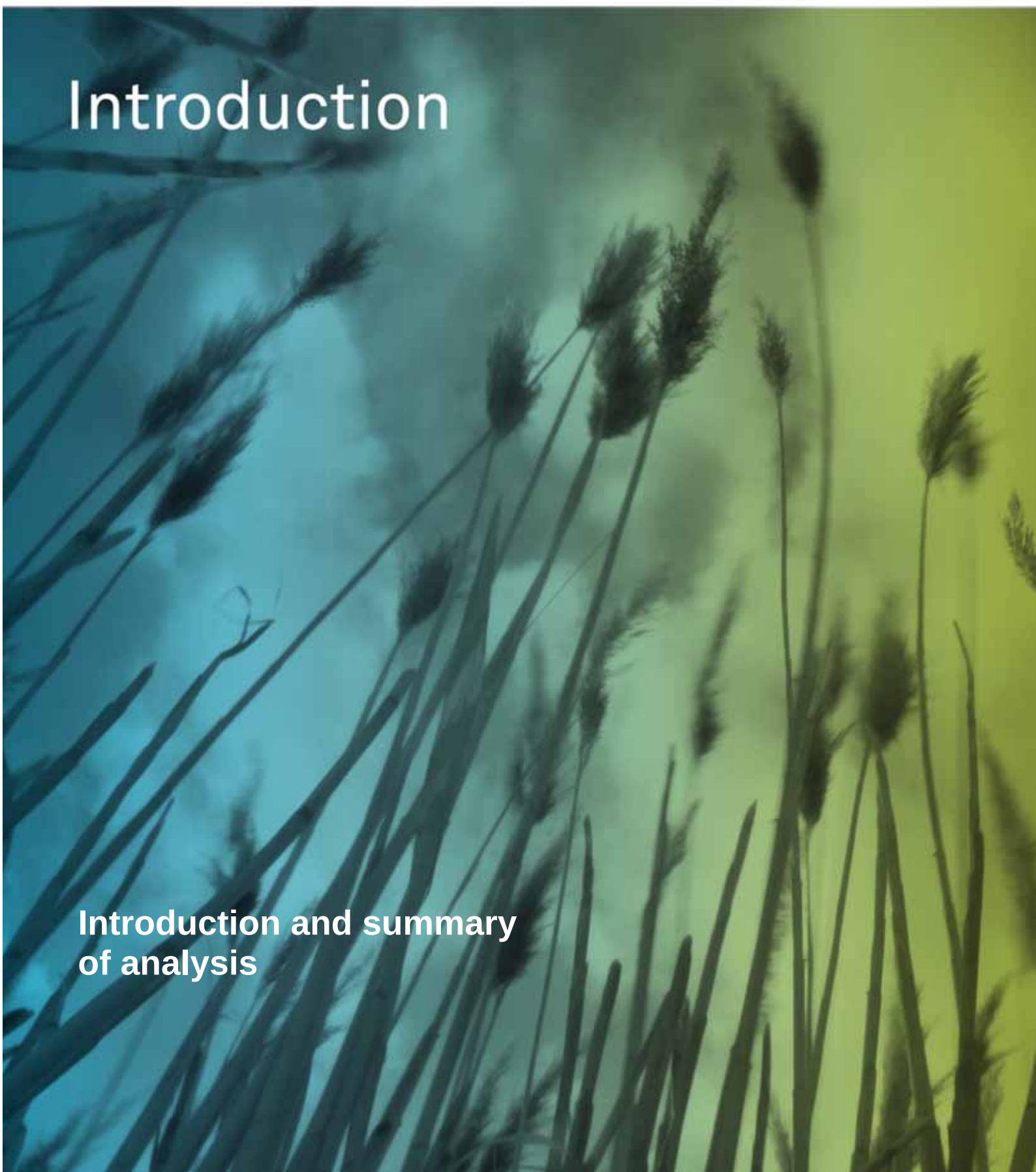
Overall, the analysis suggests that:

- the projected impacts of the carbon price are relatively modest, and fall well within the range of recent historical experience of changes in consumer prices and household living costs; and
- most households will receive assistance that offsets all or a significant portion of the cost impact of the carbon price.

1.0

Introduction

Introduction and summary
of analysis



1.0 Introduction

1.1 Purpose of the project

The main purpose of this study is to provide an independent analysis of the impacts of the Government's proposed carbon price on household cost of living and compare this impact with other factors that affect the cost of living. The specific goals of the project are to:

- provide an independent analysis of the economic impacts of the introduction of a carbon price;
- explain the methods used and set out the results for key steps along the way;
- provide more detailed information on impacts for different household types;
- put the projected impacts into context, so that readers are better able to evaluate their significance, and
- bring together estimates of price impacts and announced government assistance to households.

The impact of the carbon price on issues such as trend national growth rates, employment impacts, or relative growth of different economic sectors has been the subject of extensive study (PMTGET 2007, Fisher et al 2007, Hatfield-Dodds 2007, Stern 2008, Garnaut 2011, Treasury 2011a/b), and is beyond the terms of reference for this study.

The study does not take account of any benefits that might arise from reducing greenhouse gas emissions, such as avoided likely or potential storm damages, lost agricultural production, or increases in food prices.

1.2 Overview of the analytical approach

A diagrammatic **representation of the process** is shown in **Figure 1**. The approach and findings are set out in four sections that follow this introduction (Section 1):

Section 2

- Calculating the carbon price liability (Step One);
- Using economic information and an Input-Output model to assess how the carbon price feeds through to all industries (Step Two);
- Estimating increases in the prices of household goods and services (Step Three), and in inflation², as measured by the Consumer Price Index (CPI) (Step Four).

Section 3

- Putting these estimated price impacts in context.

Section 4

- Selecting a broadly representative set of households and source detailed data from the ABS Household Expenditure Survey.

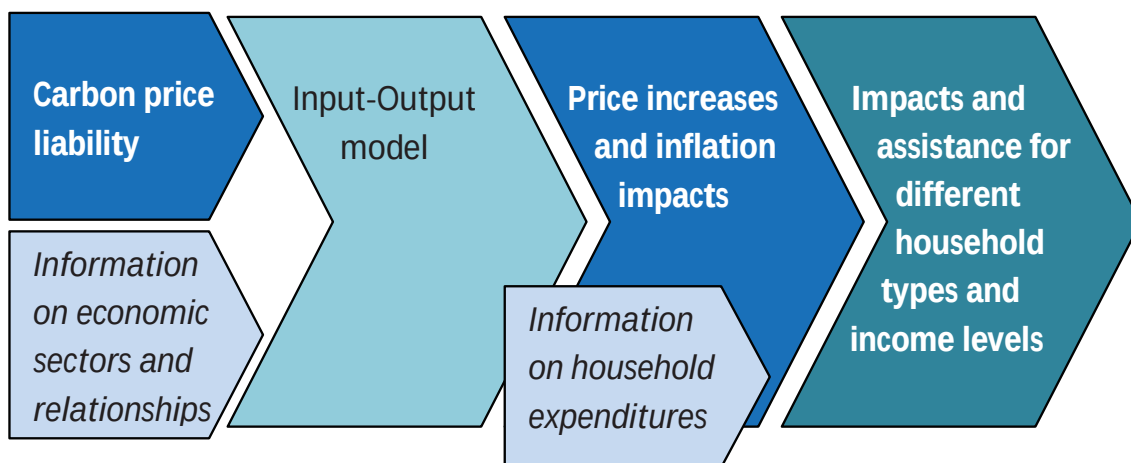
Section 5

- Applying the price impacts to the detailed household expenditure data to assess impacts on the cost of living for different types of households.

A diagrammatic representation of the process is shown overleaf.

² In this report the term inflation is used to include a one off impact on the price level but does not necessarily imply a change in the overall rate of inflation. The findings of the study suggest there will be no impact on the rate of inflation apart from the one off impacts identified in 2012/13 and 2015/16

Figure 1: Overview of approach



Details on each of these tasks are described in more detail in the Technical Note in **Error! Reference source not found..**

1.2.1 Choice of analytical methods

There are two well established methods for assessing the economic impacts of policy changes such as the introduction of a carbon price.

Input-output analysis provides a detailed but static analysis of how costs flow through existing buying and selling relationships between sectors of the economy. This reflects the extent to which each economic sector purchases (intermediate) inputs from other sectors, and sells outputs that are used by other sectors and or by consumers, or are exported.

- The standard analysis assumes no response or changes as a result of the policy (such as changes in industrial processes, or a shift to more energy efficient appliances, or to less emissions intensive goods and services);
- The relationships between inputs of resources and outputs are assumed fixed and are not subject to increasing or decreasing returns to the scale of outputs;
- Costs are assumed to be passed through in prices to consumers, or borne by producers in proportion to the values of transactions recorded (including employees and shareholders, such as through slower wages growth or reduced dividends).

As a result, input-output analysis is likely to overestimate the impact of the carbon price in practice, as it does not allow for responses such as adopting more energy efficient processes: this will tend to bias results towards an 'upper bound' assessment.

Computable General Equilibrium (CGE) models are designed specifically to address these shortcomings, and provide a coherent and internally consistent analysis of dynamic adjustment of the economy over time.

- These models are not primarily intended for use in exploring very short run impacts, however, such as price or employment changes in the first year or two of a policy change. Rather, their focus is on medium to long term impacts.
- These models of the Australian economy focus on trend behaviour of the 'real economy', rather than inflation and short run business cycle effects.

For these reasons, an input-output based analytical framework is best suited for assessing potential short run impacts on prices and the cost of living. CGE modelling can play a valuable complementary role, providing insights into changes in relative prices over time, and to impacts that arise due to changes in economic behaviour (at the sector level) in response to the policy change.

This study therefore used input-output analysis and data to estimate changes in prices for the main results, complemented by CGE analysis of relative price changes over time, adjusted for trend inflation. The study also uses historical data to provide context and comparisons, so that projected future impacts can be understood against past experience. The study then applies these price changes to data from the ABS Household Expenditure Survey (2009-10).

1.3 Overview of the carbon price package

1.3.1 Clean Energy Future package

The report analyses the Government's proposed 'Clean Energy Future' package (Australian Government 2011a), involving the introduction of a set carbon price for three years from 2012/13, transitioning to a flexible market based price and allowing use of international carbon credits (often referred to as 'offsets').

The policy will require businesses to surrender permits for greenhouse gas emissions from stationary energy (mainly electricity and gas), industrial processes, non-legacy waste, and fugitive emissions (released as part of the extraction of coal, oil and gas).

Permits will be sold at auction by the Government, with some permits effectively provided free of charge to assist emissions intensive trade exposed activities. Following the transition to a market based price, firms may purchase and use recognised international carbon credits. Potential future emissions that are 'embodied' in exported fossil fuels, such as coal or natural gas, are not covered (as the emissions do not occur in Australia).

Transport fuels are not covered directly under the scheme, but an equivalent carbon price will be applied through changes in fuel tax credits or excise for domestic aviation, domestic shipping, rail transport, and non-transport use of fuels. The Government will seek to establish an effective carbon price for heavy on-road liquid fuel use (including heavy trucks and buses) from 1 July 2014.

A carbon price will not apply directly or indirectly to household transport fuels, light vehicle business transport and off-road fuel use by the agriculture, forestry and fishing industries.

Table 1 summarises the key features of the proposed carbon price.

Table 1: Key features of the carbon price proposed under the Clean Energy Future policy

Price	A two-stage approach: - Fixed price period: The carbon price will commence in 1 July 2012, with a fixed price starting at \$23 per tonne, rising at 2.5% per annum in real terms. - Emissions trading scheme: From 1 July 2015, the carbon price will transition to a fully flexible price under an emissions trading scheme, with the price determined by the market.
Coverage	The scheme will cover emissions from the following sectors: - stationary energy sector - industrial processes - non-legacy waste - fugitive emissions; and - transport (as set out below) <i>Treatment of transport emissions</i> Transport fuels will be excluded from the carbon pricing mechanism. However, where applicable, an equivalent carbon price will be applied through changes in fuel tax credits or excise. - A carbon price will be applied to domestic aviation, domestic shipping, rail transport, and non-transport use of fuels. - A carbon price will not apply to household transport fuels, light vehicle business transport and off-road fuel use by the agriculture, forestry and fishing industries. - In addition, at a later date, the Government will seek to establish an effective carbon price for heavy on-road liquid fuel use from 1 July 2014.

Box 1: The logic of a carbon price and how it reduces emissions**Achieving emissions reductions through a carbon price**

There are a number of policy approaches to reducing emissions of greenhouse gases, including carbon dioxide. Regulations can be used to mandate minimum energy efficiency standards for buildings, business equipment (such as electric motors), and consumer appliances. Specific activities can also be prohibited (such as release of synthetic gases used in refrigeration or vehicle air conditioning systems). A wide range of regulations have been introduced over the last decade, which are estimated to have achieved cumulative emissions reductions of 56Mt CO₂e per year, equivalent to 10% of current emissions (DCCEE 2010). While these reductions are significant, it is not possible for regulations to achieve the additional reductions required for the national emissions target supported by the Government and the Opposition without incurring significant economic costs.

The Government's Clean Energy Future package proposes to put a price on pollution through a carbon price. This is achieved by requiring all major polluters to buy emissions permits and surrender these for each tonne of carbon pollution they emit into the atmosphere. Some polluters producing internationally traded emissions intensive goods (such as aluminum) will receive a share of the permits they require for free. The way this assistance is calculated provides strong incentives for them to reduce their emissions per unit of production, but little incentive to reduce production levels of these internationally traded goods (as global demand is determined outside Australia).

The introduction of a carbon price provides incentives across the whole economy so each business and household can decide what actions to take to reduce their direct and indirect emissions, including through reducing energy use.

Businesses that are liable for their pollution will have a greater incentive to seek out ways of reducing their emissions and energy use. The introduction of emissions trading in the European Union, for example, drove widespread improvements in industrial energy efficiency, which resulted in cement manufacturers significantly reducing emissions per tonne of cement through changes to chemical processes and the mix of ingredients used (Ellerman et al 2010, WBCSD CSI 2009). The world's first emissions trading system, addressing acid rain in the USA, reduced sulfur dioxide pollution from power plants by over 40% while electricity supply increased (US EPA 2010).

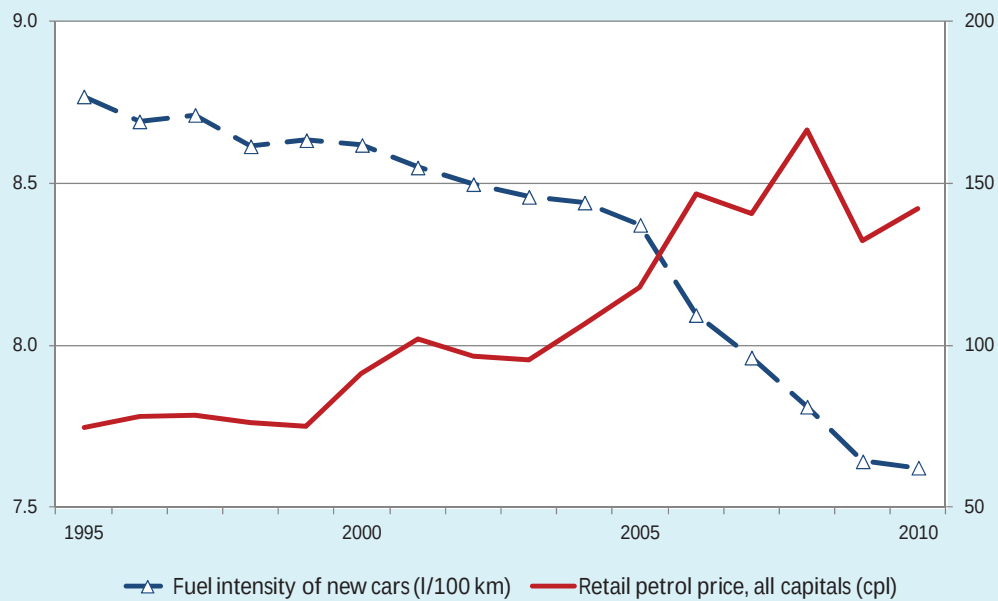
Downstream consumers (including households and other businesses) will look for more efficient ways of using emissions intensive products, such as electricity generated from coal. An energy audit for manufacturing potato crisps, for example, found that a significant share of the total energy budget was accounted for by suppliers hydrating potatoes before sale (to make them heavier) and the manufacturer dehydrating them before cooking (Grubb 2011, Carbon Trust 2008). Switching to purchase the potatoes on a 'dry weight equivalent' basis saved the manufacturer time as well as energy, while providing a fair price for suppliers.

Downstream consumers also have the option to choose more energy efficient appliances and equipment, reducing energy use while maintaining comfort or production levels. For example, a series of increases in world oil prices and retail petrol price over the last decade appears to have triggered a sharp reduction in the average fuel intensity of new vehicle purchases, driven primarily through changes in the mix of vehicle size – as shown in **Figure 2**. (Higher petrol prices have also encouraged reductions in kilometers travelled, falling by around 2% per year from a peak in 2005).

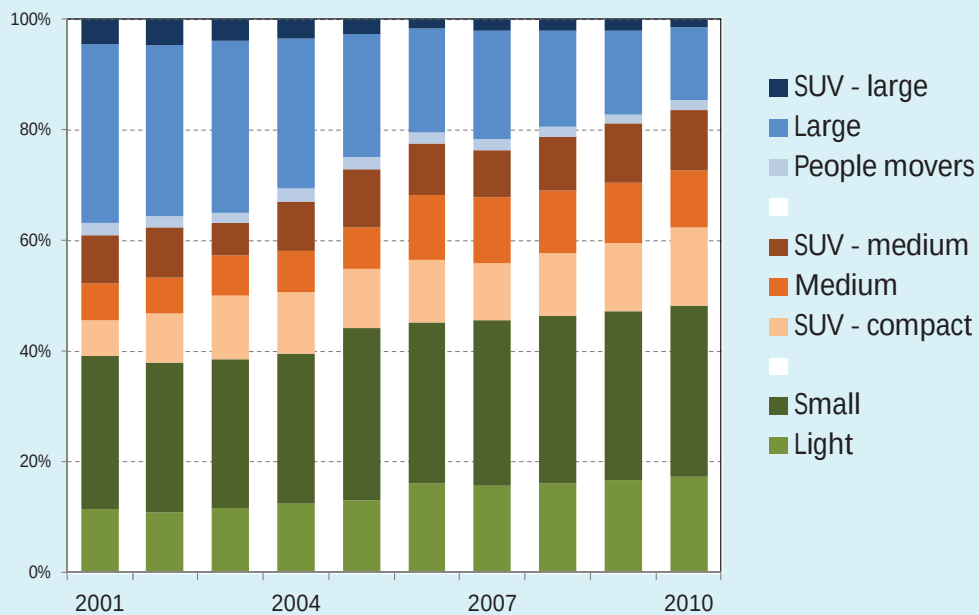
A final feature of introducing a price on pollution through an emissions tax or the sale of emission permits is that it can provide revenue to assist households and businesses to adjust, rather than requiring additional tax revenues to pay for grants or potential uncompensated costs associated with regulation.

Figure 2: Increased fuel prices encourage the purchase of more fuel efficient vehicles

(a) Fuel prices and the fuel intensity of new cars, 1995-2010



(b) New cars by size, 2001-2010



Source: BITRE (2011), ABS (2011a), FCAI (2001-2011)

1.3.2 Carbon price trajectory

The analysis focuses primarily on the impact in 2012/13, based on the announced set carbon price. Analysis of impacts over time, such as a potential second inflation impact in 2015/16 is based on projections of the carbon price suggesting a carbon price of \$29 per tonne in 2015/16 (based on Treasury 2011a). This is consistent with current price trajectories (see Jotzo and Hatfield-Dodds, 2011), and with global action on track to achieve the national pledges contained in the Cancun Agreement (formalising the Copenhagen Accord) which represents around 5-9GT of abatement, but falls short of being confidently on track to limiting global warming to no less than 2 degrees Celsius (UNEP, 2010)

1.3.3 Cost pass through and Industry Assistance

The Clean Energy Future package provides assistance to support Australian businesses transition to a clean energy future. This includes a Jobs and Competitiveness Program to assist emissions-intensive, trade exposed industries. This study does not account for the industry assistance and as such may over-estimate the impacts on households.

Due to data limitations, the analysis also assumes that small facilities (that are not liable for the carbon price) are 'price takers' and pass through the value of the carbon price as if they were liable. This may overstate the impact of the carbon price, but the effect of this assumption is likely to be small.

Assumptions about cost pass through are discussed in Section 2.1 below

2.0

Estimating impacts on consumer prices



2.0 Estimating impacts on consumer prices

This Section summarises the core analysis undertaken in this study. Further details on each of these steps are available in the Technical Note in **Error! Reference source not found.**

2.1 Step 1: Calculate the economy-wide value of the carbon price

The first step in the analysis is to decide the basic approach to calculating the economy-wide value of the carbon price that is passed through to households. This value is equivalent to the revenue that would be raised if permits were sold at the full carbon price for all emissions covered under the policy, with no exemptions or free allocations of permits.

- Firms will seek to pass through full value of the carbon price, even if permits are allocated to them free of charge. Competitive pressures make it very unlikely that firms will pass through 100% of the economic value of the carbon price, in aggregate, as increased prices.
- Costs can be passed through to households in a number of ways, including higher prices (the main focus of this study), slower wages growth, and reduced returns to shareholders.

This study calculates the economic value of the carbon price liability to be passed through as higher prices in two ways, reflecting different assumptions about competitive pressures and cost pass through. Both estimates assume that emissions in covered sectors are around 390 Mt CO₂e in 2012/13, consistent with DCCEE (2010) and Treasury (2011a). This is 2% higher than in 2010 but 3% lower than projected emissions in this year without a carbon price. More details are provided in the technical notes (**Error! Reference source not found.**).

As shown in **Figure 3**, assuming a *full cost pass through* approach we estimate an economy wide carbon price liability of \$8.5 billion in the first year of the carbon price. This estimate represents an 'upper bound' or 'worst case' estimate, as it assumes that businesses pass through 100% of the costs as higher prices, which is unlikely in practice.

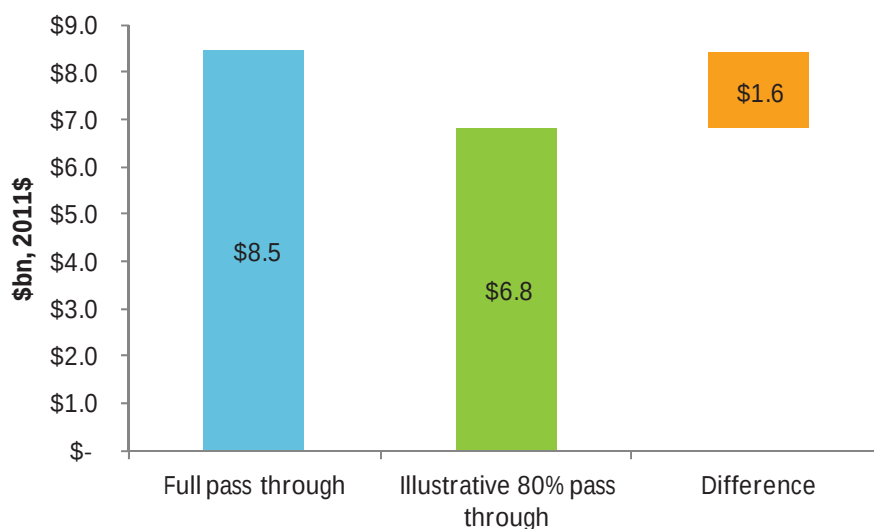
We also estimate an *illustrative domestic pass through* approach that assumes less than 100% pass through in sectors where prices may be influenced by import competition (see Technical Note for further details). This approach assumes an average 80% rate of pass through for the economy as a whole, with a total value of \$6.8 billion being passed through as higher prices for businesses and consumers.

In both cases we focus on the carbon price impact in the first year, and assume very little change in economic behaviour as a result of the carbon price. This also biases the results towards an 'upper bound' or 'worst case' assessment. While this assumption may be reasonable in the first year or two, the results are likely to overstate actual impacts over time, as business and households respond.

It is most likely that the actual rate of pass through to consumers as higher prices will fall between these two estimates. Using a similar approach, before the introduction of the GST, Treasury estimated there would be a one-off consumer price impact of around 2.75%. Analysis of data after the introduction found the actual impact was 2.5% (Treasury 2000, 2001).

Because of limited data on pass through across different industry sectors, this report focuses primarily on the upper bound estimate of impacts provided by the full cost pass through approach, even though actual impacts are expected to be lower.

Figure 3: Economy wide value of the carbon price in 2012/13



Source: AECOM and CSIRO calculations, as set out in technical notes.

2.2 Step 2: Allocate the carbon price liability to industry sectors

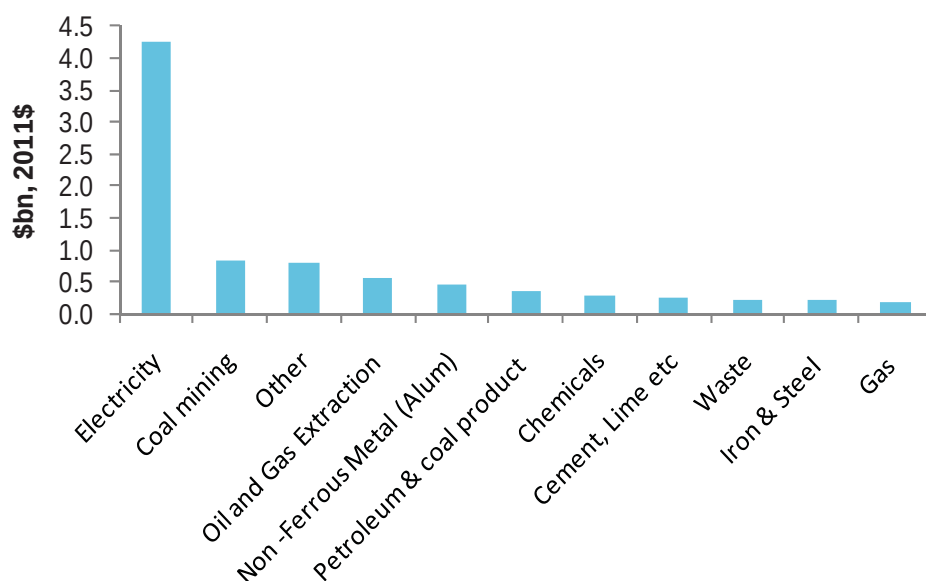
The second step in the method is to allocate the economy wide (total) value of the carbon price across specific sectors. The allocation of the carbon price liability has been undertaken on the basis of projected emissions in the first year of the policy, attributed to sectors on the basis of the National Greenhouse Gas Inventory data for 2009.

Transport fuels are not covered under the Emissions Trading Scheme, but an equivalent carbon price will be applied through changes in fuel tax credits or excise for domestic aviation, domestic shipping, rail transport, and non-transport use of fuels. Fuel used in passenger vehicles and light commercial vehicles is not covered by the policy. The proportion of transport emissions that are subject to a carbon price has been estimated on the basis of AECOM and CSIRO projections of future transport emissions by transport mode (such as air, road and rail) and by vehicle type within road transport.

Figure 4 summarises the allocated value of the carbon price across the main sectors. The total economic value of the carbon price allocated across the sectors matches the total value shown in **Figure 3**, assuming full cost pass through. The figure shows:

- Ten industries account for over 90% of the economic value of the carbon price.
- Electricity generation accounts for around a third of national emissions, and around half of emissions subject to a carbon price. It also accounts for the largest share of the gross cost of the carbon price, at \$4.3 billion in 2012/13.
- Non-ferrous metals (including aluminium), coal mining, and oil and gas extraction (including LNG) each account for between \$0.5 billion to \$1 billion in carbon price liability in 2012/13. All of these sectors receive significant production based assistance.
- A further six sectors each account for \$0.2 billion to \$0.5 billion in gross carbon liabilities. These receive various rates of assistance.

Figure 4: Carbon price value passed through by major sector, assuming full cost pass through (2012/13)



Source: AECOM and CSIRO calculations.

2.3 Step 3: Calculate price increases for household consumer goods and services

The third step in the method is to calculate how these increased input costs flow through the economy to result in higher prices for household goods and services, and other economic output. In this report the term inflation is used to include a one off impact on the price level but does not necessarily imply a change in the overall rate of inflation. (As discussed in Section 3.1. the findings of the study suggest there will be no impact on the rate of inflation apart from the one off impacts identified in 2012/13 and 2015/16.)

This calculation is based on detailed economic data that captures the buying and selling relationships between all the economic sectors as defined in the national input-output tables. This study used the input-output tables as the base as these divide the economy into one hundred and eleven industries and seven end use categories, including household expenditure, and provide data on transactions between these. This allows us to trace the indirect impacts of the direct cost increases across thousands of supply chains throughout the economy. For example, the retail trade sector purchases 1.4% of electricity generation and 2.4% of gas supply. This means that a share of the direct carbon price impacts on electricity and gas flows through to retail trade, and then through to the final price of goods like clothing and footwear. The analysis aggregates all of these flows from direct emitting sectors and allocates them across end-use sectors. Costs will flow through to clothing and footwear, for example, from chemical manufacturing (producing nylon or synthetic soles), and iron and steel (zips, studs and reinforced parts for boots), as well as from electricity (used directly in clothing manufacturing), and indirect cost pass through from other sectors.

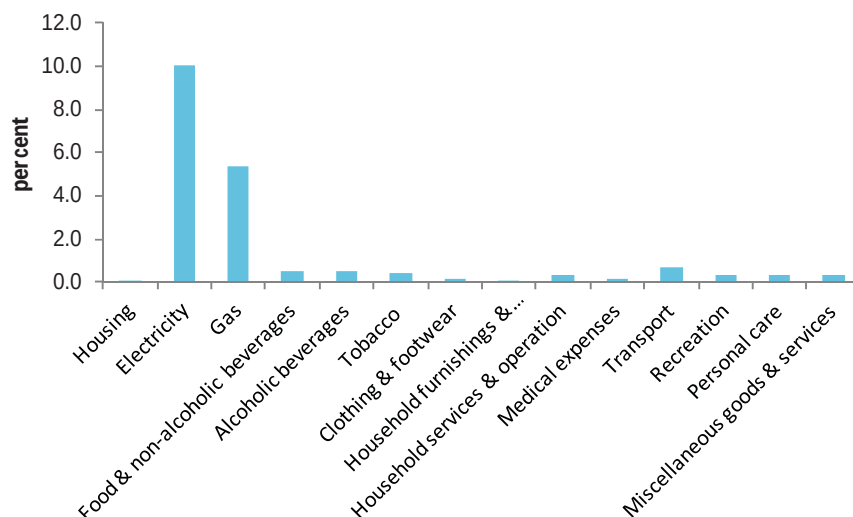
The analysis adjusts the input-output data for price changes from the base year data (2006/07) to 2012/13, based on historical inflation data to 2011 and projections to 2012/13. The resulting estimated price changes for different goods and services are then weighted to reflect domestic consumption patterns (rather than production).

The results are shown in **Figure 5**. Key insights from the analysis include:

- Retail electricity prices are estimated to increase by 10% due to the introduction of a carbon price, assuming full cost pass through. This is consistent with estimates published by Treasury (2011a, 2011b).

- Gas prices are estimated to increase by 5% due to the introduction of a carbon price, assuming full cost pass through. The estimated price increase is lower than the 9% price increase estimated by Treasury (2011a).
- Food prices are estimated to increase by 0.5% overall due to the introduction of a carbon price, with prices for different types of food estimated to rise by 0.5% to 0.8%. (More details are provided in **Section 3.3**)

Figure 5: Estimated price increases for different household goods and services, assuming full cost pass through (2012/13)



Source: AECOM and CSIRO calculations.

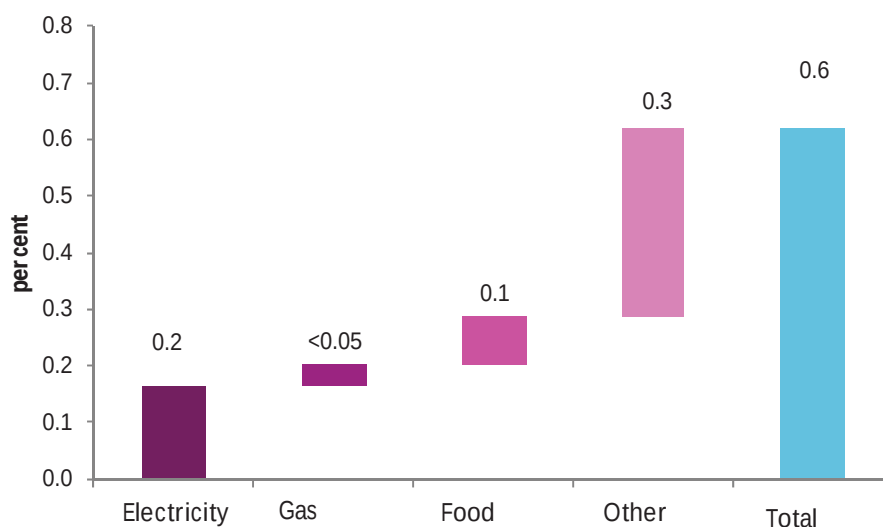
The analysis suggests the price impact on most sectors is likely to be small – even assuming 100% pass through. This is because the economic value of the carbon price is very small in relation to the economy as a whole: total value of carbon permits is estimated at around \$8.5 billion in the first year, less than 0.6% of the \$1,550 billion value of the economy in that year (before accounting for production based industry assistance). Other economic modelling suggests the revenue from a carbon price will remain small relative to the economy over time, with increases in carbon prices being offset by reductions in emissions. Economic analysis also suggests that global action to retain temperature increases to 2°C or less would provide net economic benefits (Stern 2008, Nordhaus 2010, and Garnaut 2011).

2.4 Step 4: Calculate the impact on consumer prices and overall household expenditure

The fourth step is to weight the increases in the prices of different household goods and services to calculate the overall impact on consumer prices and household expenditure.

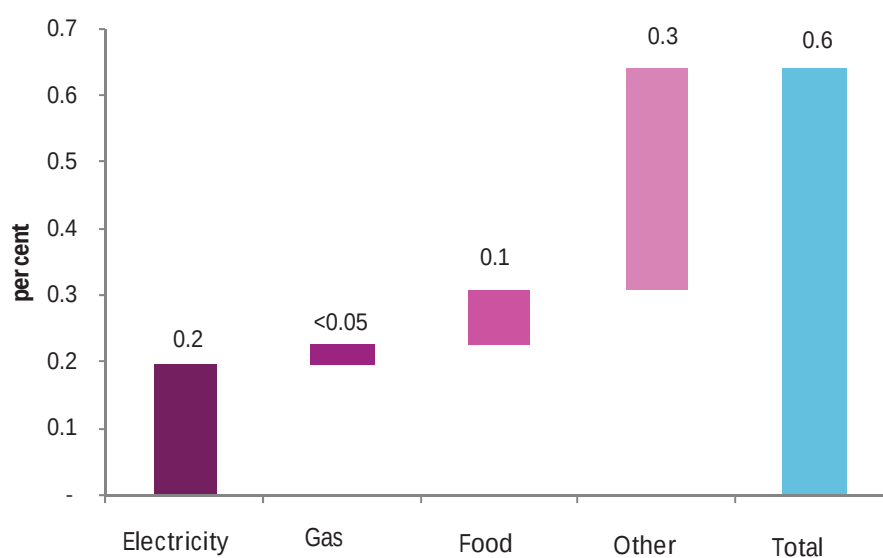
This calculation uses the weights published by the Australian Bureau of Statistics (ABS) for the Consumer Price Index (CPI) (ABS 2005), and the most recent available data on household expenditures, from the 2009/10 Household Expenditure Survey (ABS 2011b).

As shown in **Figure 6**, the introduction of the carbon price is estimated to increase general consumer prices by 0.6% in 2012/13. These results are similar to the Treasury estimates of 0.7% in 2012/13 expenditure. The implications for inflation over time are discussed in **Section 3.0**. The increase in household expenditure for the average Australian household shows a similar impact as shown in **Figure 7**.

Figure 6: Estimated impact on consumer prices in 2012/13, assuming full cost pass through

Source: AECOM and CSIRO calculations.

Energy price increases account for around a third of the impact on living costs (contributing 0.2% of the 0.6% total), while food price increases account for one sixth of total impact on living costs (contributing 0.1%). The rest of the overall increase is accounted for by very small price increases over a large number of goods and services such as clothing, alcoholic drinks, household furnishings, recreation, medical, transport, and tobacco.

Figure 7: Estimated impact on average household expenditure in 2012/13, assuming full cost pass through

Source: AECOM and CSIRO calculations.

3.0

Putting the carbon price in context



3.0 Putting the carbon price in context

It is valuable to put these estimated impacts in context to help people better evaluate their significance. This section examines the size of the carbon price impact on inflation relative to other inflationary impacts; the significance of the carbon price relative to other factors underlying electricity price rises; and impacts on food prices relative to food-price volatility; and potential impacts of climate change.

3.1 Carbon price impacts on inflation over time

The introduction of a carbon price is expected to have a short term impact on the consumer price index in the year of introduction, but subsequent trend changes in carbon prices are unlikely to impact on inflation rates. This is because the inflation rate is largely determined by the economy-wide balance between supply and demand, along with unanticipated changes in input costs or household prices, and inflationary expectations. A one-off impact on consumer prices is also consistent with the policy settings that will see the carbon price increase from \$0/t to \$23/t in the first year, adding around \$9 billion to the cost structure of the economy³, while in later years the typical price increase is around \$1/t, adding a little under \$0.5 billion. These later incremental increases in costs are expected to be absorbed by wider changes in relative prices within the economy, rather than presenting unanticipated 'surprises'.

As discussed above, our analysis suggests an initial impact on consumer prices of 0.6% in 2012/13 (see **Section 2.4**), slightly less than projected by Treasury.

This broad approach is consistent with Australia's experience of the GST, where the Reserve Bank decisions 'looked through' the impacts of the tax change on headline measures of inflation to focus on underlying inflationary pressures – an approach it has stated that it will also follow with the carbon price (RBA 2009, 2011).

The inflationary impact of the shift from an administratively determined (or 'set') carbon price to a floating carbon price is less clear. It is possible that this shift could have no impact on inflation, particularly if the world carbon price is close to the set Australian price at the time. Alternatively, the shift could result in a modest increase in prices, either proportional to the amount of the increase above the trend increase in previous years, or proportional to the total increase from the previous year.

Consistent with our emphasis on reporting upper bound estimates, we have calculated a second step in consumer prices based on the entire increase from the previous year. Assuming a continuation of current levels of global action on climate change⁶, and associated use of global carbon markets, we estimate there could be a second step up in consumer prices of up to 0.1% in 2015/16. This is considered an upper bound estimate, assuming continuation of current emissions targets and efforts internationally.

Actual impacts will depend on the effective international carbon price in 2015-16, which will in turn be influenced by global economic conditions and action by developed countries to reduce emissions over the next few years. Weaker global economic conditions would tend to reduce the carbon price, while stronger global action on climate change would put upward pressure on the international carbon price, increasing the likely cost of living impacts in 2015-16. For example, several years of lower economic growth in Europe and North America could result in low demand for international carbon permits, in which case the carbon price could be below the \$29 projected by Treasury in 2015-16. Alternatively, a step change in global ambition to reduce emissions by significantly more than current commitments for 2020 could result in a higher international carbon price in the next few years. Sensitivity analysis indicates that a 2015-16 carbon price of \$27 or less, such as the \$16 projected by Bloomberg New Energy Finance (2011), would result in there being no second impact on consumer prices. To illustrate the impact of higher potential prices, international carbon prices of \$38 or \$45 would see consumer prices rising by up

³ Equivalent to \$8.5 billion in 2011 prices.

⁶ The analysis of the potential secondary inflation spike assumes a carbon price of \$29 per tonne in 2015/16, based on Treasury (2011a). This is consistent with current price trajectories (such as Jotzo and Hatfield-Dodds, 2011). This price trajectory is also consistent with global action on track to achieve the national pledges contained in the Cancun Agreement (formalising the Copenhagen Accord) which represents around 5-9GT of abatement, but falls short of being confidently on track to limiting global warming to no less than 2 °C (UNEP, 2010)

to 0.3% or up to 0.5% in 2015-16. (Carbon prices of \$16-27/tCO₂e price would be 7-45% below the Treasury projection. Carbon prices of \$38-45/tCO₂e would involve a one year increase of \$12-20/tCO₂e above the previous year, and are around 30-55% above the carbon price projected for 2015-16 by Treasury.)

3.2 Putting inflation impact in historical context

Figure 8 and **Figure 9** presents these results in the context of historical inflation rates, and trend future inflation of 2.5% per year. Comparing the projected carbon price impact to other inflation outcomes suggests that the carbon price impact is likely to be smaller than the drivers of other events that affected consumer prices over the last two decades.

We used detailed inflation data (ABS 2011a) to identify the major expenditure categories that have driven inflation in each year with inflation of 3.5% or more since 1991. As shown in and **Figure 9**, this approach identifies five primary inflation spikes, with different underlying drivers: price increases in financial services associated with increased mortgage interest rates and vehicle insurance (1994-95); the introduction of the GST (2000/01);⁷ the trade and exchange rate effects associated with the mining boom before the GFC (2007/08); and higher food prices associated with storm damage and Cyclones Larry (2005/06) and Yasi (2010/11).⁸ Increases in transport prices have been a secondary contributor to inflation three times since 1991, but were not the primary driver of inflation in these three years.⁹ In each case, retail fuel prices increased by 18-25% (measured over the year to June), resulting in potential contributions to inflation of 0.4-0.7% from increased transport prices. We include the largest of these potential contributions as a sixth inflation spike (1999/2000) to provide an additional comparison, even though it did not contribute to an inflation outcome above 3.5%.

- The impacts of the different inflation drivers range from 0.5% to 2.5%, with impacts of 1.5% or more occurring every five to seven years over the period.
- The projected carbon price impacts of 0.6% and 0.1% are modest when compared with historical drivers of inflation spikes and accelerated inflation rates over the period.
- The carbon price is anticipated to have a one off increase in consumer prices and not contribute to the ongoing rate of inflation.

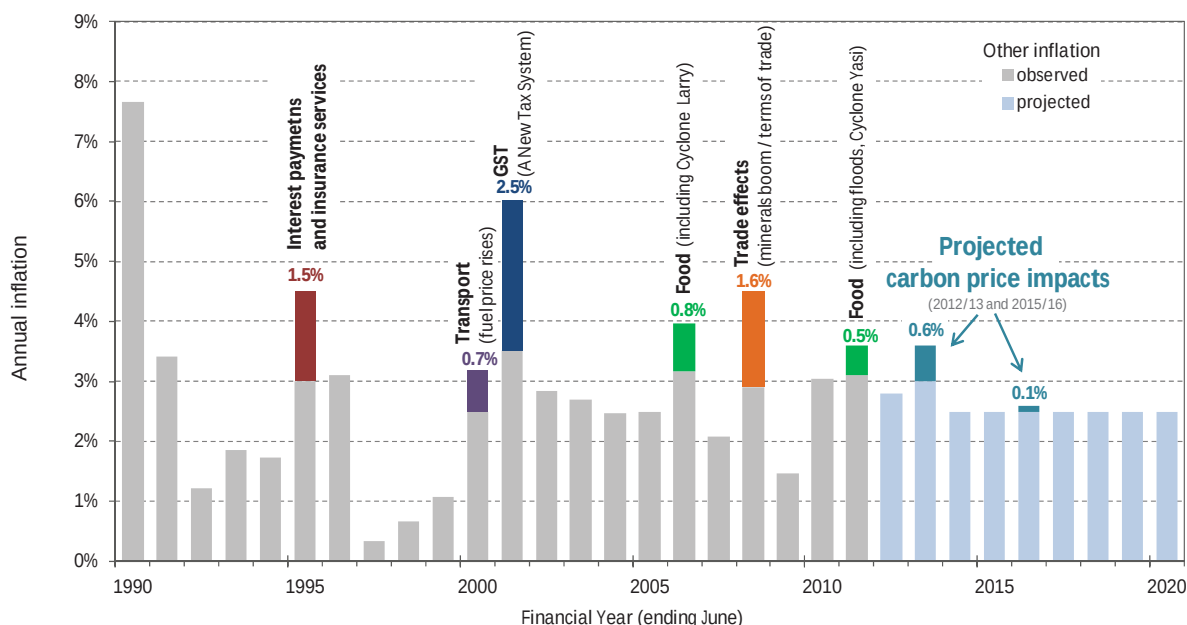
This analysis also indicates that the rate of inflation varies considerably from year to year, reflecting the variations in economic growth, international economic conditions, and other factors including one-off specific events.

⁷ This method is not well suited to precisely identify the impact of the GST, which appears in the ABS data as an increase in non-traded prices, with an average impact in the years to September and December of 2.4%. We thus use the Treasury (2001) estimate of 2.5% here.

⁸ Other interpretative information from ABS (1995, 2006b, 2011a), ACCC (2007), McRae (2011).

⁹ Secondary contributions to inflation from transport prices were 0.7% in 1999/2000, 0.6% in 2005/06 and 0.4% in 2007/08 – around one quarter to one half the size of the primary contributions in those years. Primary and secondary contributions are not additive.

Figure 8: Projected inflation impacts in historical context, 1990-2020

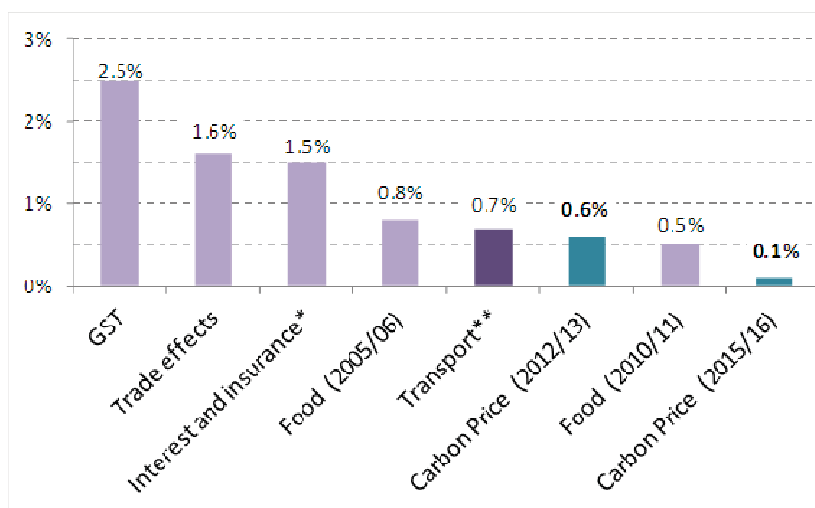


Notes: See Figure 9. Source: Calculated from ABS 2011a, with CSIRO and AECOM carbon price impacts, and GST impact from Treasury (2001).

It is important to note that, with the exception of the GST package, households received little or no specific assistance to deal with most of these high inflation outcomes. The Government's proposed carbon price package also includes assistance to households, including personal income tax reductions and increases in benefit payments, using similar mechanisms to the GST assistance.

Overall, the analysis suggests that the projected impacts of the carbon price on inflation fall well within the range of recent historical experience.

Figure 9: Carbon price impacts on consumer prices in the context of other inflation drivers, 1995-2011



*Since 1997 the CPI measurement methodology has shifted to focus on changes in the price of houses and housing services (such as rates and maintenance), and to exclude mortgage interest payments (see Woolford 2005).

**Transport price increases were only a secondary contributor to inflation in 2011, when the overall CPI was 3.2%

Source: Data from Figure 8.

3.3 Carbon price impacts on food

Food is a major expenditure item for all households and it is important to understand how the carbon price could impact on the prices of food and groceries.

The input-output analysis finds that the increase in average food prices attributed to a carbon price in 2012/13 is likely to be around 0.5%, with full pass through. While there is some uncertainty about price rises for specific types of food¹⁰, we estimate the impact on the prices of different types of food items varies between 0.5% and 0.8%. Highlights include:

- Prices for fast food and meals out of home increase by 0.5%, and make up more than one third of the total increase in food costs.
- Average food prices excluding fast food and meals out of home increase by 0.6%, in line with the overall price rise.
- Within these categories there are some differences. For example, whilst overall the price of vegetables increases by 0.6%, within this category fresh vegetable prices increase by 0.7% and frozen vegetable prices increase by 0.4%.

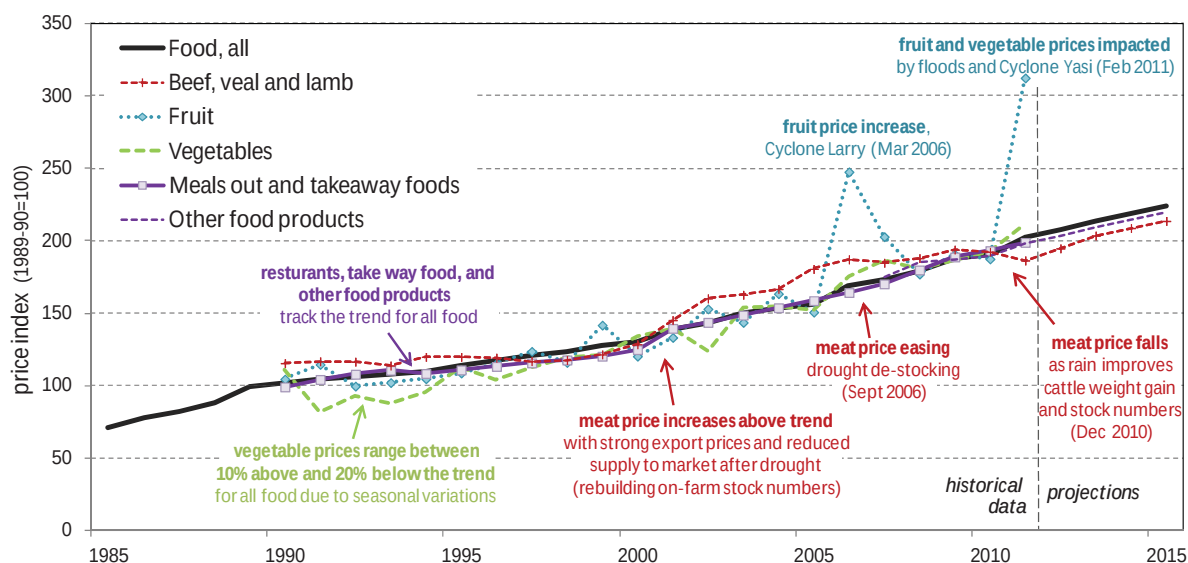
A recent report by the Australian Food and Grocery Council (2011) suggests that, given the increasing level of international competition and the heavily concentrated and competitive retail landscape, it will be difficult to pass-through cost increases from the carbon price to the supermarket retailers. This suggests that our estimates, which assume 100% pass-through, are higher than what is actually likely to occur.

Figure 10 shows detailed historical price data with projections of trend food prices under a carbon price (Food prices shown include the impact of the carbon price from 2012/13).

The figure highlights the volatility of food prices, particularly fruit and vegetable prices, and their vulnerability to weather events. These variations have been driven by climate and weather events including reductions in the supply of fruit and vegetables following cyclone or storm damage, the impacts of droughts and world demand on meat prices, and other factors.

¹⁰ Due to data limitations, the carbon price associated with direct emissions from industrial processes and stationary energy in the food industry were allocated to specific food sub-sectors in proportion to the value of production in these sectors. This is considered appropriate and unlikely to have a material impact on estimates of consumer price impacts on food as a whole, but may reduce the reliability of estimates for specific sub-sectors, as it does not take account of differences in direct emission intensity or of the size of enterprises (which impacts on liabilities). In aggregate, direct emissions from food account for around 0.1% of the projected average price rise for food (assuming full cost pass through), with indirect costs passed through from electricity and other sources accounting for the remaining price rise of around 0.4-0.5% (depending on the pass through assumptions). Direct emissions from food account for less than 0.1% of total emissions in Australia.

Figure 10: Historical and projected food prices, including carbon price impact, 1985-2015

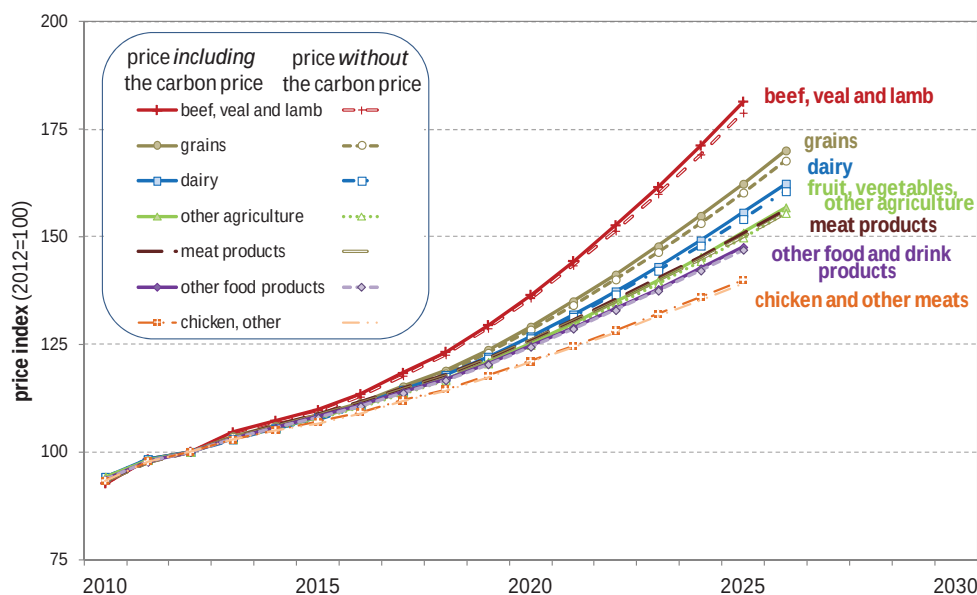


Source: Historical food prices ABS (2011a), projections calculated from Adams (2011). Additional information from ABS (2006b, 2011b), ACCC (2007), McRae (2011).

The impacts estimated by the input-output analysis are somewhat larger than, but broadly consistent with, economic modelling of the impact of the carbon price on food prices over time (Adams 2011). **Figure 11** shows the impacts of the carbon price as estimated by an economy wide computable general equilibrium model, assuming trend inflation of 2.5% per annum.

- This analysis suggests smaller initial impacts on prices than our upper bound estimates (assuming full cost pass through) across all food sectors before 2015. Impacts increase gradually over time, but remain minimal, with impacts on food prices around the levels estimated by the input-output approach from around 2020.
- These model results are consistent with the full cost pass through approach providing an upper bound estimate of price impacts.

Figure 11: Projected food prices, with and without a carbon price, 2010-2025



Note: nominal prices including inflation.

Source: AECOM and CSIRO calculations based on Adams (2011).

A final consideration in interpreting food price impacts is that studies have found that climate change is already impacting on food production and prices (Lobell et al 2011). Some studies, such as Nelson et al. (2010), find that in the absence of global emissions reductions, climate change could significantly increase the price of basic food staples by 2050 (such as the price of rice by at least 10%, and wheat by at least 20%). Assessing future impacts is complex however, as price changes will be shaped by changes in agricultural productivity trends, temperature, rainfall and water management, incomes (influencing food demand), international trade, and national policies (see Hertel et al. 2010). This makes it difficult to estimate likely impacts on world prices with confidence, although it is clear that climate change risks amplifying existing threats to food security among vulnerable groups in developing countries (see Turrall et al. 2011).

3.4 The contribution of the carbon price to future electricity prices

The impact of the carbon price on household electricity bills is a key issue. Here we examine impacts on retail electricity prices in the context of recent price trends.

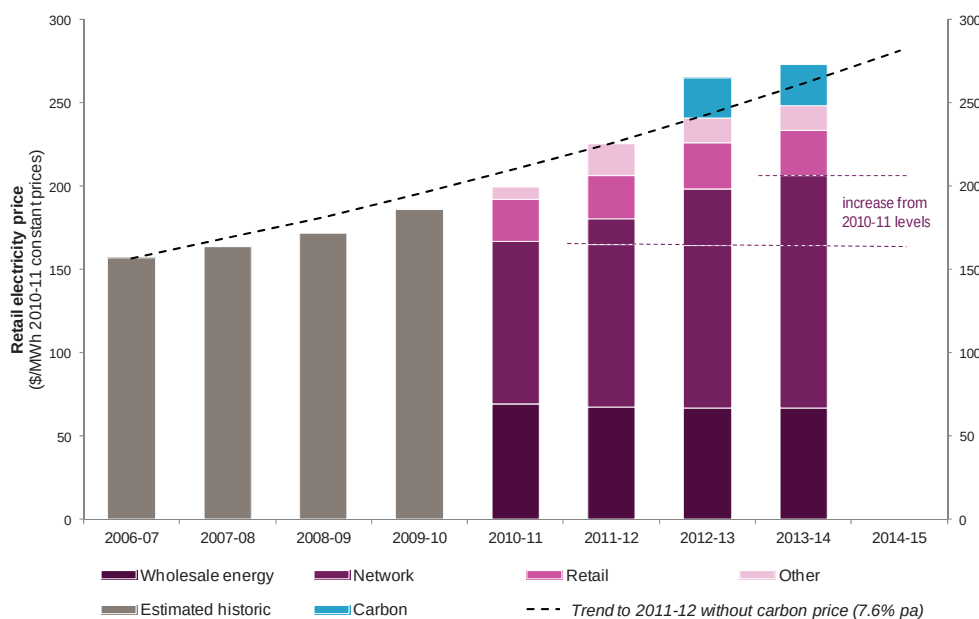
The analysis presented earlier, and in other recent reports (Treasury, 2011b, Nelson et al. 2010, ROAM Consulting 2011, SKM MMA 2011), suggests that household electricity prices could rise by approximately 10% in 2012/13 as a result of the carbon price, assuming full cost pass through to final prices.

The most recent official projections forecast a 19% increase above inflation in national residential electricity prices between 2009/10 and 2012/13 (AEMC 2010), before accounting for the carbon price. The projected increases in residential electricity prices vary across different states and territories, ranging between 20% and 40% including underlying inflation.

These increases are predominantly driven by increases in network and distribution costs as a result of growing peak demand for electricity (which results in increasing network costs per unit of electricity), and the need to replace ageing assets. Although all jurisdictions face similar issues, the relative contribution of generation, network, and the carbon price varies significantly.

Figure 12 shows the estimated average impact on electricity prices in historical context. The figure is based on regulated retail electricity prices in Sydney from 2005/06 to 2012/13, as set by the independent regulator IPART¹¹. As shown, retail electricity prices grew by just under 20% between 2005/06 to 2009/10, and this growth is anticipated to continue with electricity prices set to rise by over 20% between 2010/11 and 2012/13 without the carbon price. This is primarily driven by a 35% increase in network costs to replace ageing infrastructure to meet increasing peak electricity demand.

Figure 12: Regulated retail electricity price increases in Sydney, including carbon price impacts, 2006-2014



Source: IPART (2011) and AECOM and CSIRO estimates of carbon price impacts.

As can be seen in **Figure 12**, there is a trend increase in electricity prices (driven primarily by increased network costs) and the introduction of the carbon price, whilst modest compared to increases in network costs, effectively continues previous trend increases in electricity prices.

- The projected carbon price impact is around half to two thirds of the anticipated increase in network costs from 2010-11, and adds to these costs.
- This highlights the importance of supporting improved household energy efficiency, where required, and of managing peak demand and network expansion to minimise avoidable network costs (see Garnaut 2011).
- While retail electricity price increases can be offset to some extent by improved energy efficiency, it is important to consider the interaction between energy prices and household circumstances – such as households with low incomes or with high energy needs. The section below examines the impacts on different household types in more detail.

Overall, the carbon price has a noticeable impact, maintaining recent trend increases in retail electricity prices.

¹¹ The data from 2010/11 to 2013/14 are based on IPART (2011). The data from 2005/06 to 2009/10 are based on previous price determinations rather than actual tariffs. The increase in network costs in 2013/14 is based on the AER TransGrid transmission determination 2009–10 to 2013–14.

3.5 Opportunities for Energy Efficiency

A final issue in understanding the impact of the carbon price is that the policy is intended to change behavior over time (see **Box 1**). Businesses that are liable to purchase emissions permits will have a greater incentive to reduce their emissions. Similarly, households and other businesses will have more incentives to use less energy, and to switch to products that involve fewer emissions, such as green power.

These potential responses and changes are ignored by this study, which applies price changes to historical expenditure patterns with no adjustments to account for likely improvements in energy efficiency, or other reductions in emissions.

Most households will have a range of options for improving their energy efficiency in ways that reduce their total energy bills while maintaining or improving existing levels of comfort and services. Some energy efficiency options can involve small changes to everyday activities, such as washing clothes in cold water. Others can provide wider benefits, such as the health benefits of walking to the local shop for milk and bread, or using window shades and natural ventilation. The CSIRO estimates that the combination of energy saving behavior and more efficient equipment could halve the energy use of many households that have no existing energy efficiency practices (Wright et al 2009, page 13).

The Prime Minister's Task Group on Energy Efficiency also found that there is huge potential for reducing energy costs through energy efficiency, estimating that a national energy savings initiative could save households up to \$296 per year by 2020, with most households saving \$87 to \$180 per year by 2020 (PMTGEE 2010, page 65)

Examples of changes to household activities that can save energy include the following:¹²

- Washing clothes in cold water: this can save 50-80% of the electricity used relative to washing in warm or hot water;
- Turning off the spare (usually older and less efficient) fridge in the garage, or only using it for special events: this can save significant energy over the year;
- Reducing the running time for pool pumps: this can save \$500-1000 a year in electricity bills, while maintaining pool water quality (with cost savings influenced by current running times, the size of the pump and the climate zone);
- Repairing drips or leaks from hot water taps can save money and up to 100-400kg of CO₂ a year, per tap, with a gas or electric hot water service.

Considering energy efficiency when buying new appliances or household fittings can also save money and energy.

- Installing a gas or solar hot water service can save \$300-650 dollars a year, depending on the climate zone and option chosen, with a typical payback period of 4.0 - 4.5 years in most areas;
- Replacing an average 15 year old fridge with a new average efficiency fridge can save \$600 or more over ten years in electricity costs. Choosing a high efficiency new fridge can save more money, but lower operating costs need to be weighed against higher purchase price.
- Replacing electric heaters with natural gas or reverse cycle electric air conditioning can reduce energy costs and avoid emissions of 7,000-8,000kg of CO₂ per year;
- Installing LED down lights rather than halogen can save more than \$50 per year in running costs, for each room with four down lights. The dramatically longer operating life of LED lights also results in lower capital costs over the long run.
- Although passenger fuel is not subject to the carbon price, switching to a smaller fuel efficient vehicle can reduce fuel costs by 20-40%, which often translates to more than \$1,000 a year.

It is important to note that the impacts on households estimated in Section 5 of this report do not account for any potential savings from energy efficiency. In practice, any energy savings achieved by households will reduce the

¹² The examples in this section are taken from Wright et al. (2009), Chapter 10, and Sustainability Advice Team and Pitt and Sherry (forthcoming 2011). The vehicle cost saving example is calculated from the Australian Government *Green Vehicle Guide* (<http://www.greenvehicleguide.gov.au/GVGPublicUI/Home.aspx>)

impact of the carbon price, while not affecting the amount of assistance provided through tax cuts or increases to government benefit payments.

In addition to providing direct savings to households through reduced energy use and lower energy bills, widespread adoption of energy efficiency would reduce the need for increased investment in distribution networks, which are currently the major driver of increasing electricity prices (as discussed in Section 3.4 above).

Other resources and ideas for energy efficiency can be found at:

The Climate Institute: www.climateinstitute.org.au

CHOICE: www.choice.com.au/energychoice

CSIRO Energymark program: www.csiro.au/science/Energymark

CSIRO energy savings book: www.csiro.au/Energy-Saving-Handbook

4.0

Selecting a representative
set of household types
for estimating cost of
living impacts

Estimating carbon price impacts
on different household types

4.0 Selecting a representative set of household types for estimating cost of living impacts

The analysis presented so far has:

- Calculated the carbon price liability, and allocated this liability to different industries across the economy (Steps One and Two in Section Two above);
- Estimated increases in the prices of different household goods and services, and the overall increase in household prices, as measured by the Consumer Price Index (CPI) (Steps Three and Four in Section Two);
- Put these estimated price impacts in context (**Section 3.0**).

This section discusses issues in selecting a broadly representative set of households, taking account of household type, income levels, and expenditure patterns. Data for these households is drawn from the Household Expenditure Survey conducted in 2009-10, and published in September 2011.

The next section (**Section 5.0**) will apply the price impacts from in Section Two to this set of households to calculate the dollar impacts of the carbon price on different households, and also compare these impacts to the level of government assistance provided, as a share of expenditure.

4.1 Household expenditure patterns

The impact of a carbon price on the cost of living will vary with the income and expenditure patterns of different households. Excluding the beneficial effects of assistance, the greater the proportion of post-tax income spent on domestic energy, the greater the financial impact of increases in domestic energy costs. To account for these differences, this section sets out the expenditure patterns of different types of households, and how they vary with income and household composition.

Figure 13 provides an overview of energy expenditure and disposable income by relative income level, for all households.¹³ Differences in household income reflect the number of working adults per household as well as differences in income per adult (including income from wages and salaries, government benefits, and other sources).

- The data shows a strong income¹⁴ gradient, with the lowest income quintile receiving \$459 per week, equivalent to around one quarter (27%) of the average household disposable income of \$1,427 per week, while the highest income quintile receives \$3,581 per week, more than twice the average household income. Examining the data for specific household types shows similar income ratios.
- Household expenditure on domestic energy is only weakly related to income, with expenditure increasing an average of 35-65 cents for every additional \$1 of income. Households in the lowest two income quintiles spend, on average, \$26 to \$32 per week, while households in the highest two income quintiles spend \$35 to \$38 per week.

This combination of strong income gradient and modest expenditure gradient results in very large differences in domestic energy expenditure as a share of income. The lowest income quintile spends, on average, 5.5% of their gross income on domestic energy, almost three times the share of income spent by the average household (1.9%) and five times the share of income spent by high income households (1.1%). Energy expenditure as a share of total expenditure on goods and services also declines with income.

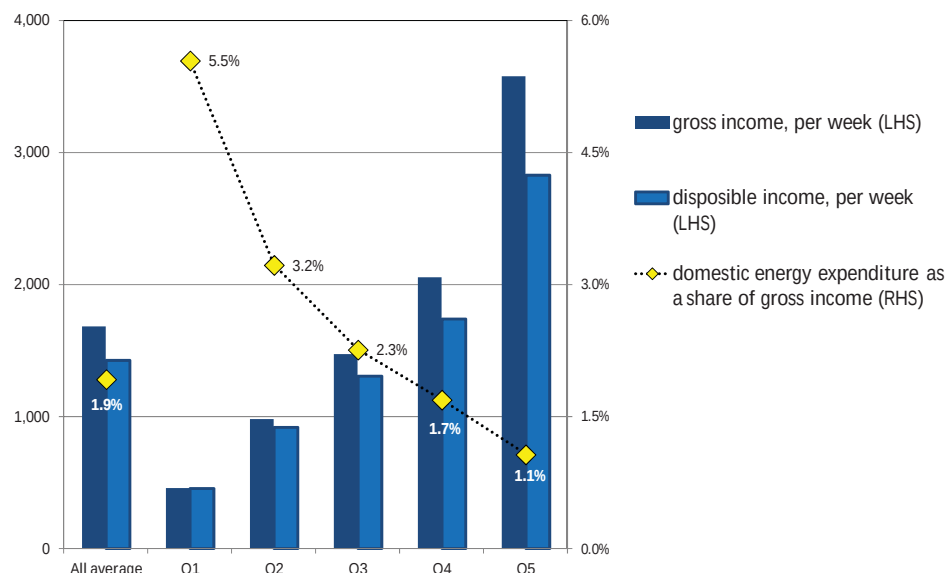
Income and the share of expenditure spent on energy also vary with household type, as shown in **Figure 14**. Average incomes for couples with and without dependent children are above the average for the population as a whole, but are very close to average income when household size is taken into account (using income adjusted

¹³ Consistent with normal practice, the classification of households as 'low' or 'high' income takes account of the number of adults and children in the household, using 'adjusted' or 'equivalised' income. This reflects that a single adult household with an income of \$90,000 per year is clearly better off than a couple family with four children with the same income of \$90,000 per year. Details on how adjusted income is calculated are provided in the notes to Figure 14. Adjusted income is only used to categorize and describe households. It is not used to calculate the impact of the carbon price or the assistance provided to different households.

¹⁴ These are actual (not equivalised) mean gross weekly incomes for these quintiles. **Figure 13** also shows actual mean gross weekly incomes for each quintile.

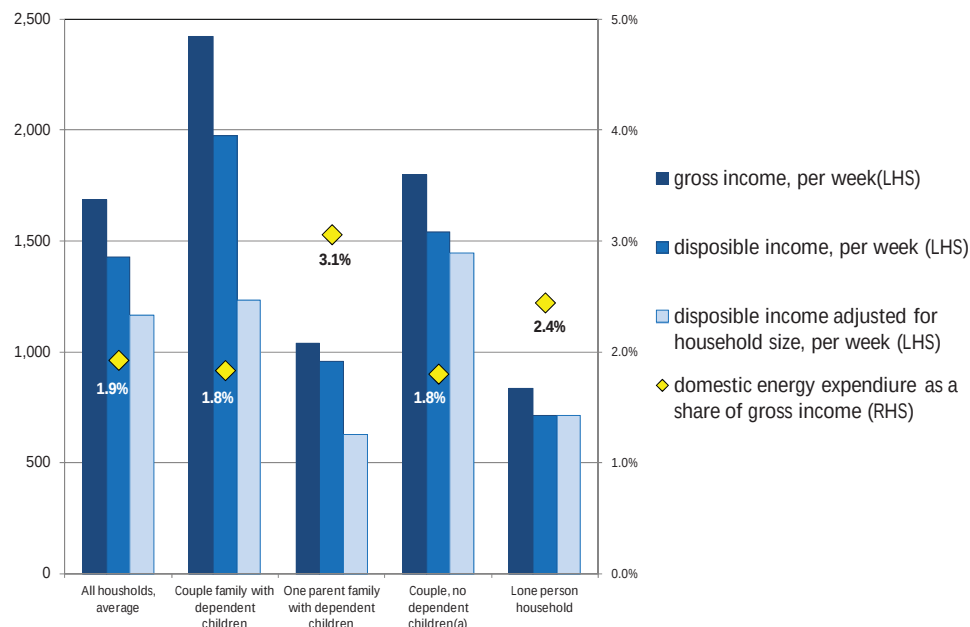
for household size). Lone adult households and single parent households have incomes below the average, and spend more than the average on energy as a share of income.

Figure 13: Income and domestic energy expenditure by equivalised income quintile (2009-10)



Notes: Domestic energy expenditure includes electricity and gas, but not transport fuel or other transport costs. Disposable income is gross income less income tax. Source: ABS (2011b, 2011c)

Figure 14: Energy expenditure and disposable income by household type, relative to the all household average



Notes: Domestic energy expenditure includes electricity and gas, but not transport fuel or other transport costs. Disposable income is gross income less income tax. Disposable income adjusted for household size adjusts household income for the number of adults and children, to give a clearer picture of the relative resource of households with different compositions. It is calculated by dividing household income by a weighting factor, where the first adult in the household has a weight of 1.0 points, each additional adult 0.5 points, and each child 0.3 points. In the modified OECD equivalence scale, children are defined as age 15 or under. Here children are defined as under 18 years, due to data limitations. The adjusted income of a lone person household is the same as its unadjusted income. The adjusted income of a household comprising more than one person lies between the total value and the per capita value of its unadjusted income. Adjusted income is only used to categorize and describe households. It is not used to calculate the impact of the carbon price or the assistance provided to different households. Source: Calculated from ABS (2011c)

4.2 Defining focal household types for detailed analysis

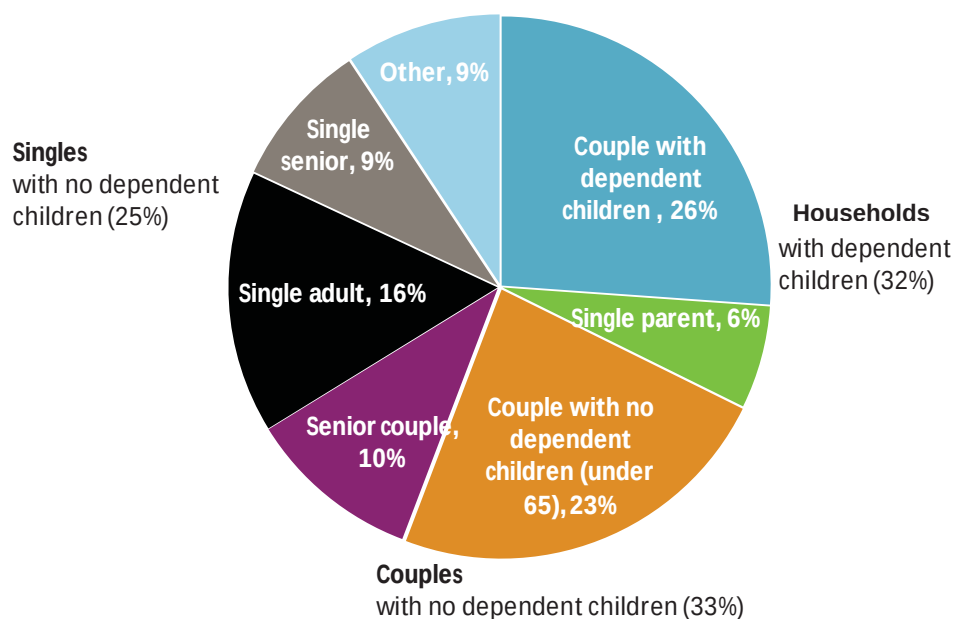
To provide a representative picture of the cost of living impact of a carbon price, this report provides information on a broad cross section of households and income levels.

The analysis focuses on four main types of household: couples with dependent children, single parents with dependent children, couples with no dependent children (including older couples with children who are no longer dependents), and single adults. Together these four household types make up around 90% of all households: the remaining 10% comprises other household types including group households and households with more than one family. **Figure 14** provides an overview of average (mean) disposable income and domestic energy expenditure for these household types.

- Households that comprise couples with dependent children account for 26% of households, and 42% of the population lives in households that comprise couples with dependent children. Their average energy expenditure and disposable income are 35-40% higher than the average for all households. Two thirds of households (67%) are in the middle three income quintiles, with 14% in the lowest income quintile and 20% in the highest income quintile.
- Households that comprise single parents with dependent children account for 6% of households, and 7% of the population lives in households that comprise single parents with dependent children. Their average energy expenditure is just below the average for all households, while their disposable income is one third below the average. More than two thirds of single parents with dependent children are low income (in the first two income quintiles, adjusted for household size and age composition).
- Households that comprise couples with no dependent children account for 34% of households and 30% of the population lives in households that comprise couples with no dependent children. Their average energy expenditure is close to the average for all households, while their disposable income is around 10% above the average for all households. Around a third (38%) of couples with no dependent children are low income, in the first two income quintiles, with an average age of 64 years, while 29% are in the highest income quintile with an average age of 46 years.
- Households that comprise single adults account for 24% of households and 10% of the population live in households that comprise single adults. Their average energy expenditure is a little under a third below the average for all households, while their disposable income is half the average for all households. Almost half of all single adults are very low income (in the first income quintile), with an average income of \$303 per week and an average age of 64 years.

Figure 15 shows the relative shares of these four household types, which together account for around 90% of all Australian households. The remaining households include multi-family households and group households.

Figure 15: Shares of different household types relative to total Australian households (2009-10)



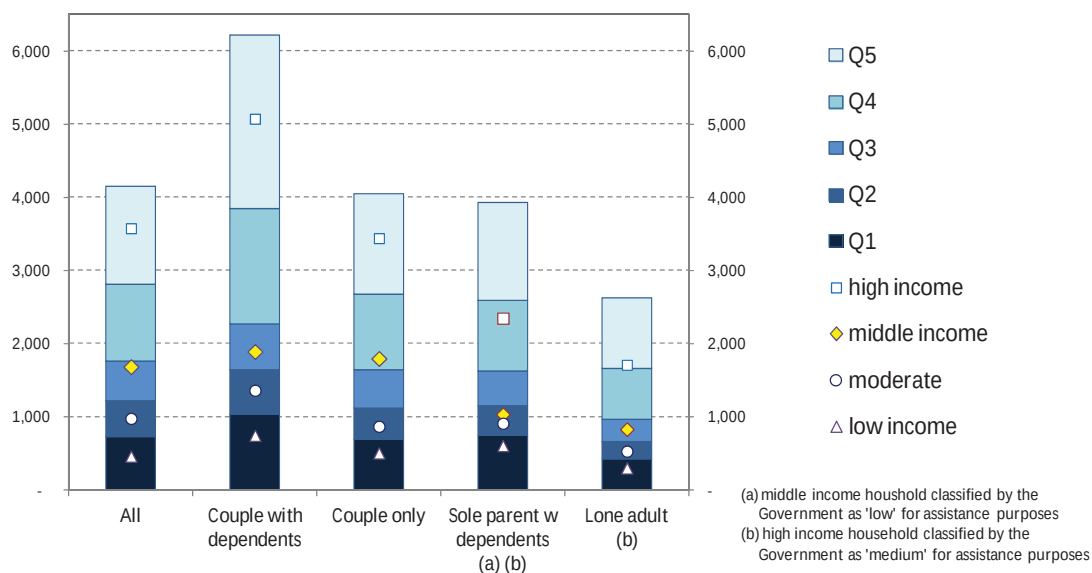
Source: ABS (2011b, 2011c).

The analysis of cost impacts is based on data from the most recent ABS Household Expenditure Survey, conducted in 2009-10 and published in September 2011. The data represents aggregate information on average expenditures and income for defined groups or classes of households, and have been chosen to provide a broadly representative selection of household types that cover most of the population. The low income couple family with children, for example, is defined as couple families receiving more than 50% of their income from government. The cross section of household by relative income level and household type provides a detailed set of bottom-up estimates of cost of living impacts, based on the average actual expenditures of each of these focal households as recorded in the ABS survey data. To put the set of household chosen in context, the study also obtained summary data on all households by relative income levels (provided in Tables 7 to 11 in the Technical Appendix).

The analysis then examines cost of living impacts across four income levels, defined as: low, moderate, middle, and high income households for each of the four household types.

Figure 16 provides an overview of the four main household types. The figure shows total (gross) household income before tax, which is higher for couples as they typically include two people earning income.

Figure 16: Overview of focal household types, gross income per week (2009-10)



Source: Data from **Table 2** and ABS 2011d.

For all household types other than couples with dependent children, the middle income household is based on the average (mean) income for that household type. For couples with dependent children, mean income is projected to be \$145,000 in 2012-13 (up from \$126,000 in 2009-10), well above average income of \$114,600 for the middle income quintile for this household type in 2012-13. Because of concerns that this level of income would not be generally considered to be 'middle income', the study uses projected income and expenditure for the median income couple family household, which closely matches the middle income quintile for this household type. Income and expenditure details for each focal household type are provided in **Table 2**, along with definitions of how the income levels were defined for data collection purposes.

In addition, the report provides information on households by age (below 65 years, and 65 years and older) and location (capital cities and balance of nation). An overview is provided in **Table 2**, with details in the following sections.

Table 2: Summary of focal household types, and gross income

	All	Couple with dependent children	Single parent with dependent children	Couple with no dependent children	Single adult
Low income					
Income per week, 2012-13	533	862	699	584	349
Annual income, 2012-13	27,738	44,800	36,359	30,383	18,122
Annual expenditure, 2012-13	39,320	58,880	42,982	42,841	24,295
definition	Q1	(a)	(b)	Q1	Q1
Moderate income					
Income per week, 2012-13	1127	1570	1051	1003	612
Annual income, 2012-13	58,583	81,640	54,666	52,154	31,818
Annual expenditure, 2012-13	58,563	80,239	54,325	53,978	31,863
definition	Q2	Q2	Q2	Q2	Q2
Middle income					
Income per week, 2012-13	1941	2179	1194	2070	958
Annual income, 2012-13	100,930	113,308	62,082	107,646	49,819
Annual expenditure, 2012-13	73,941	92,387.24	57,459	76,878	38,628
definition	(c)	(d)	(c)	(c)	(c)
High income					
Income per week, 2012-13	4119	5839	2703	3962	1970
Annual income, 2012-13	214,183	303,651	140,552	206,043	102,453
Annual expenditure, 2012-13	115,882	157,808	92,070	114,525	60,759
definition	Q5	Q5	Q4&5 (e)	Q5	Q4&5
Other households, income per week, 2012-13					
Under 65	-	-	-	2455	1164
Age 65+	-	-	-	1203	587
Average, capital cities	2122	3011*	1292*	2271*	1052*
Average, balance of nation	1623	2367*	1059*	1747*	796*
Number of focal households analysed	6	4	4	6	6

Notes: (a) >50% of income from government (Q1 income \$706 pw); (b) >90% of income from government (Q1 income \$591 pw); (c) mean income for household type; (d) median income for household type; (e) small sample size results in low confidence in estimated impacts; * not focal household types, detailed results provided in supplementary tables. Source ABS (2011b) Income is gross income.

4.3 Assistance calculations

The Clean Energy Future policy includes a household assistance package to help households adjust to the introduction of the carbon price. The assistance will predominantly be delivered through increases in pensions and allowances, and personal income tax cuts. The increase in benefit payments is provided through a special supplement equal to 1.7% of maximum payment rates, designed to ensure households on benefits are fully compensated (Phillips and Taylor 2011). The tax cuts are focused on taxable incomes up to \$80,000, and structured so that reductions in tax rates and thresholds do not result in net gains for individuals with a income over \$80,000 per year.

The amount of assistance provided to a specific household depends on a number of factors, including household income, the number of adults receiving taxable income and the division of income between them, the number of dependent children and their age, and whether the adults qualify for the age pension. For example, analysis of the Government assistance tables (Australian Government 2011b) indicates that while the minimum level of assistance for couples with and without dependent children with a given household income does not vary dramatically with these household characteristics, the maximum assistance level for a couple varies with the division of income between the couple, due to pre-existing features of the income tax system. For couples with dependent children, this effect appears more significant, in general, than the number or age of children.

For this reason our analysis presents a range of potential assistance and should be considered a guide to the range of assistance available to a household with these general characteristics and income level, and not the actual amount of assistance. The Government provides a household assistance estimator that provides detailed

estimates of assistance depending on individual circumstances¹⁵. This should be used to calculate actual assistance for a specific household.

For the purpose of this study, the amount of assistance received is based on the average income for each household type (couples with dependent children, couples with no dependent children, single parent with dependent children and single adult) for different income level groups (low, moderate, middle and high). Assistance has been calculated based on tables prepared by the Government¹⁶. Where income falls between two income groups reported in the Government assistance tables, the assistance was assumed to be placed in the lower income bracket. For more details on how assistance is calculated see the **Error! Reference source not found.**

- The report provides a point estimate of assistance for a household with the income and expenditure shown. While these households are considered representative of different types of households, the estimates do not represent 'average impacts' or 'average assistance' for these groups of households.

The study also calculates impacts and assistance as a share of total expenditure. For low income households it is important to note that reported expenditure in the Household Expenditure Survey is 20-40% more than reported income. For example, reported expenditure by low income couples with dependent children is around a third more than their income. This difference between income and expenditure could reflect 'negative saving' (or running down investments), or discrepancies between income and expenditure estimates by respondents.

¹⁵ <https://www.cleanenergyfuture.gov.au/helping-households/household-assistance-estimator/>

¹⁶ Tables are available on the following link: <http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/supporting-australian-households.pdf>

5.0

Results for price impacts
and Australian Government
financial assistance for
different household types

5.0 Results for price impacts and Australian Government financial assistance for different household types

5.1 Overview of methods and results

This section applies the changes in prices calculated and presented in Section Two and applies them to the expenditure for each of the households set out in Section Four. The expenditure data is based on the latest ABS Household Expenditure Survey (ABS 2011c), with values projected forward from 2009-10 to 2012-13. This gives the impact of the carbon price in dollars and as a share of total household expenditure. The study also provides an indication of the potential assistance provided to each of these households, allowing a comparison of assistance and impacts as a share of total expenditure. More details on methods and assumptions are provided in the Technical Appendix.

- Applying the price changes discussed in **Sections 2.3** and **2.4** to the latest ABS household expenditure data, we estimate that the carbon price results in weekly expenditure increasing by an estimated 0.6%, or just over \$9.10 per week in 2012-13, on average across all households. This is made up of increases of \$3.20 in electricity and gas costs, \$1.20 in food costs, and \$4.70 in other costs (such as clothing, recreation, medical services).

Few if any real households will match the details of the national 'average household' (which has 2.6 people, including 0.6 children and 0.3 adults over 65 years). Therefore this study examines impacts for a wide range of different household types: these types have been chosen to be broadly representative across four income groups and four different categories based on household size and composition.

- Households with higher incomes and expenditure are estimated to face higher dollar increases in costs, but lower impacts as a share of expenditure. This is because low income households spend a larger share of their income on electricity and gas, which have larger price impacts from the carbon price.
- The estimated cost of living impacts also vary across locations. Households living outside capital cities tend to have lower incomes and expenditures, and spend a slightly higher share of their incomes on electricity and a smaller share on gas than other households. These expenditure patterns result in the carbon price having a smaller average dollar impact on households outside the capitals (\$8.70 per week) than for the nation as a whole (\$9.10 per week) and households in capital cities (\$9.40 per week).

The design of Government assistance is targeted to providing most support to low and moderate income households, and covering some or all of the impacts on middle income households. As will be discussed later, low and moderate income households receive an amount of financial assistance that generally outweighs the average price impact for these households by a significant margin¹⁷.

5.2 Results for all households and by income group

Different levels and patterns of expenditure result in the carbon price having slightly different relative impacts on households with different levels of income.

As shown in **Table 3**, the impact on the average household comprises the following main components:

- Expenditure is expected to increase by \$2.80 per week due to higher electricity prices and by \$0.40 per week due to higher gas prices, with a combined impact of \$3.20 per week.
- Expenditure on food is expected to increase by \$1.20 per week. However, as noted in **Section 3.3**, the Australian Food and Grocery Council (2011) suggest that actual amount passed through to supermarket retailers will be lower than this.
- The rest of the total increase (\$4.70 per week) is accounted for by very small price increases over a large number of goods and services, such as clothing, alcoholic drinks, household furnishings, recreation, medical, transport, and tobacco.

The overall impact of \$9.10 per week is less than the official Government estimate of \$9.90 per week, but a little more than the \$8.90 estimated by NATSEM, as shown **Table 3**. The official Government estimates are based on

¹⁷ This is despite the analysis being based on data where the total expenditure for low income households is 20% to 40% more than their income (and so estimated impacts are significantly higher than they would be if expenditure matched income).

2003-04 expenditure data, which was the most recent available at the time. The most recent ABS data (released in September 2011) shows that some structural changes in expenditure patterns have taken place since 2003-04, which could have reduced the overall carbon intensity of households' expenditures.

Table 3: Average impacts on household cost of living per week, all households (2012-13)

Item	AECOM CSIRO	Australian Government	Phillips and Taylor (NATSEM)
Electricity	\$2.80	\$3.30	<i>not reported</i>
Gas	\$0.40	\$1.50	<i>not reported</i>
Food	\$1.20	\$0.80	<i>not reported</i>
Other	\$4.70	\$4.30	<i>not reported</i>
Total	\$9.10	\$9.90	\$8.50
Financial assistance	<i>not estimated</i>	\$10.10	\$10.90

Source: AECOM and CSIRO calculations, Australian Government (2011a), Philips and Taylor (2011).

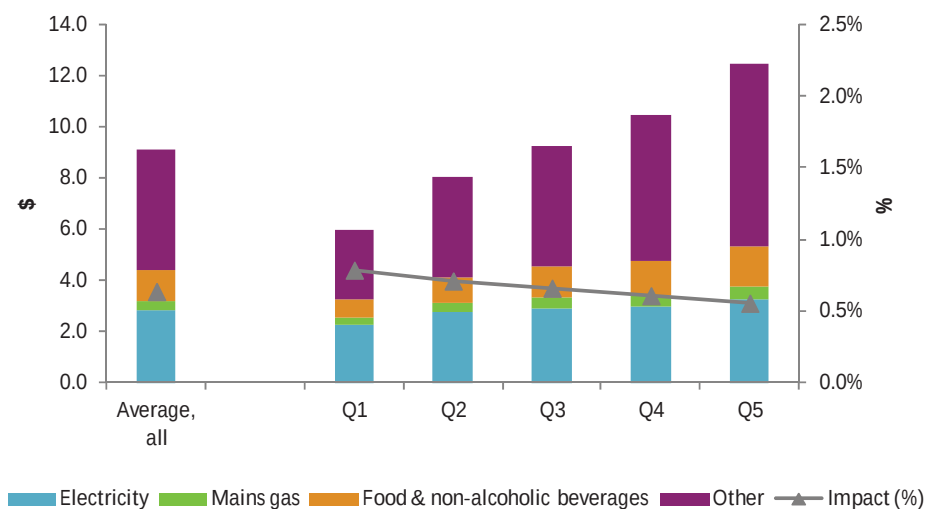
As can be seen from **Figure 17**, households with higher incomes are estimated to face higher dollar increases in costs, but lower impacts as a share of expenditure. This is because low income households spend a larger share of their income on electricity and gas, which have larger price impacts from the carbon price.

- Impacts in dollar terms range from \$6.00 per week for low income households up to \$12.50 per week for high income households: this reflects that high income households have an average total expenditure that is around twice as much per week as total expenditure by low income households, and therefore bear a larger dollar impact.
- Impacts as a share of expenditure range from 0.8% for the lowest income group to 0.6% for households in the highest income group: this is primarily because lower income households typically spend a larger share of their income on electricity and gas, which face the largest carbon price impacts. As a result, electricity and gas price impacts account for half the total impact on low income households, but only a third of the impact on high income households.
- There is also a modest secondary effect associated with lower average emissions intensity of 'other' goods and services consumed by higher income households¹⁸.

Error! Reference source not found. provides detailed tables of impacts for each household type, along with information on income, expenditure and household composition.

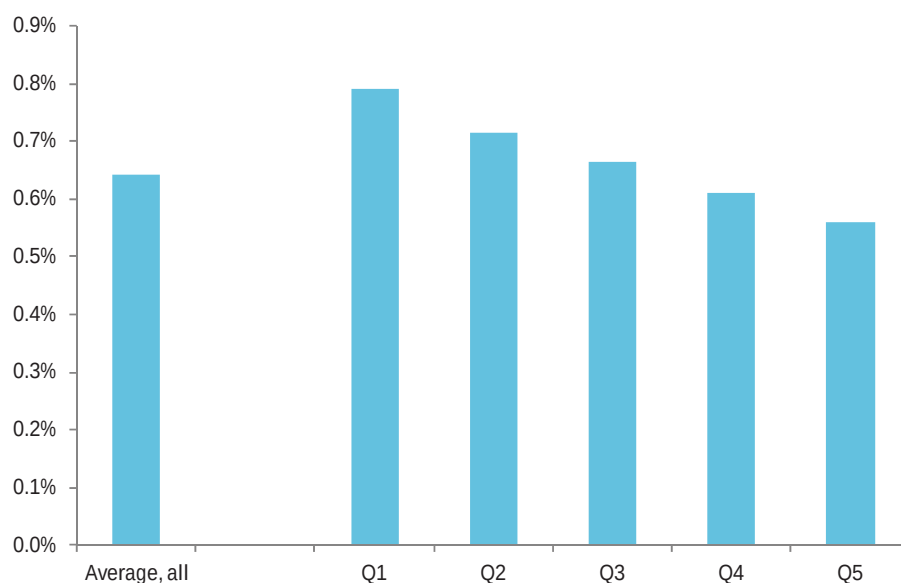
¹⁸ If the emission intensity of other goods and services purchased was constant across households, the impact on low income households would be around 15 cents less per week, and the impact on high income households would be around 35 cents more per week.

Figure 17: impact of carbon price on Australian households (dollars per week) and total impact as a share of expenditure (%), all households and by income quintile (2012-13)



Source: AECOM and CSIRO calculations.

Figure 18: Impact of carbon price on Australian households, as a share of expenditure, all households and by income quintile (2012-13)



Source: AECOM and CSIRO calculations.

5.2.1 Assistance

The offsetting impacts of the assistance measures are discussed in more detail in the following sections, where impacts are examined for different household types.

In general, for low income households the financial assistance measures in the Clean Energy Future package outweigh the price impacts noted above. Because the level of financial assistance provided varies not only with income but also with the division of income between couples, their ages and the number and ages of children, we do not estimate financial assistance levels for 'all households', as use of a single household would not represent the wide variations in assistance. Instead, we present information on the minimum and maximum financial assistance available for each combination of household type and income level. The report provides a point estimate of assistance for a household with the income and expenditure shown. While these households are considered representative of different types of households, the estimates do not represent 'average impacts' or 'average assistance' for these groups of households.

5.3 Couples with dependent children

5.3.1 Summary

Couples with dependent children comprise 26% of all households. The average household (based on the median income for this household type¹⁹), spends around an estimated \$47 on electricity and gas, and around \$1,750 per week on goods and services in total (projected for 2012-13 from 2009-10 data). Within this group, the predominant sub-group is the middle income group, which reflects the fact that a high proportion of households that comprise couples with dependent children have two incomes.

Table 4 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure, and **Figure 19** shows this information in graphical form.

Table 4: couples with dependent children - impacts by income group (2012-13)

	Item	Unit	Income group			
			Low	Moderate	Middle	High
Couples with dependents	Electricity	\$	3.2	3.6	3.7	4.5
	Mains gas	\$	0.6	0.5	0.6	0.7
	Food	\$	1.2	1.4	1.6	2.3
	Other goods and services	\$	3.7	5.5	6.1	10.4
	Total impact	\$	8.6	11.1	11.9	17.9
	Increase in expenditure	%	0.8%	0.7%	0.7%	0.6%
	% of All households	%	1.8%	5.2%	6.2%	5.1%

Notes: This household type accounts for 26.1% of all households. Middle income households as a share of total is based on number of households in middle income quintile. High income household based on Q5.

Source: AECOM and CSIRO calculations, ABS 2011c, 2011d.

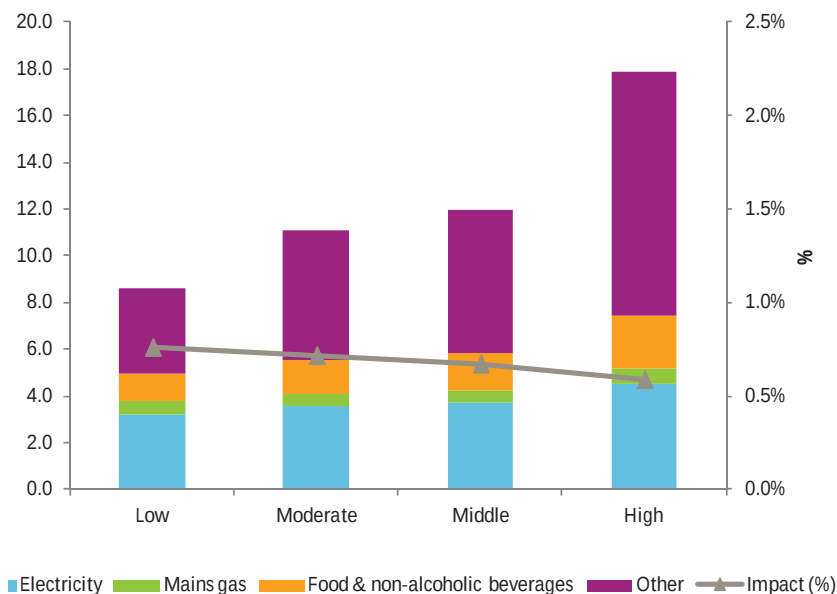
The following are the principal findings for couples with dependent children:

- For a high income couple with dependent children, the carbon price is expected to increase household expenditure by 0.6%. The absolute impact is an increase of \$17.90 per week in 2012-13: electricity and gas price changes account for 29% of the total impact on expenditure.
- For a middle income couple with dependent children, the carbon price is expected to increase household expenditure by 0.7%. The absolute impact is an increase of \$11.90 per week in 2012-13: electricity and gas price changes account for 36% of the total impact on expenditure.
- For moderate income couple with dependent children, the carbon price is expected to increase household expenditure by 0.7%. The absolute impact is an increase of \$11.10 per week in 2012-13: electricity and gas price changes account for 37% of the total impact on expenditure.
- For a low income couple with dependent children, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$8.60 per week in 2012-13: electricity and gas price changes account for 44% of the total impact on expenditure.

This shows how changes in electricity and gas prices affect different income groups within this household type: it highlights the point that electricity and gas expenditure accounts for a higher proportion of expenditure within low income households compared with high income households (3.8% in low income and 1.9% in high income households comprising couples with dependent children).

¹⁹ As discussed above, for all household types other than couples with dependent children, the middle income household is based on the average (mean) income for that household type. For couples with dependent children, mean income is projected to be \$145,000 in 2012-13 (up from \$126,000 in 2009-10), well above average income of \$114,600 for the middle income quintile for this household type in 2012-13. Because of concerns that this level of income would not be generally considered to be 'middle income', the study uses projected income and expenditure for the median income couple family household, which closely matches the middle income quintile for this household type.

Figure 19: Couples with dependent children, impact of carbon price (dollars per week) and total impact as a share of expenditure (%), selected households (2012-13)



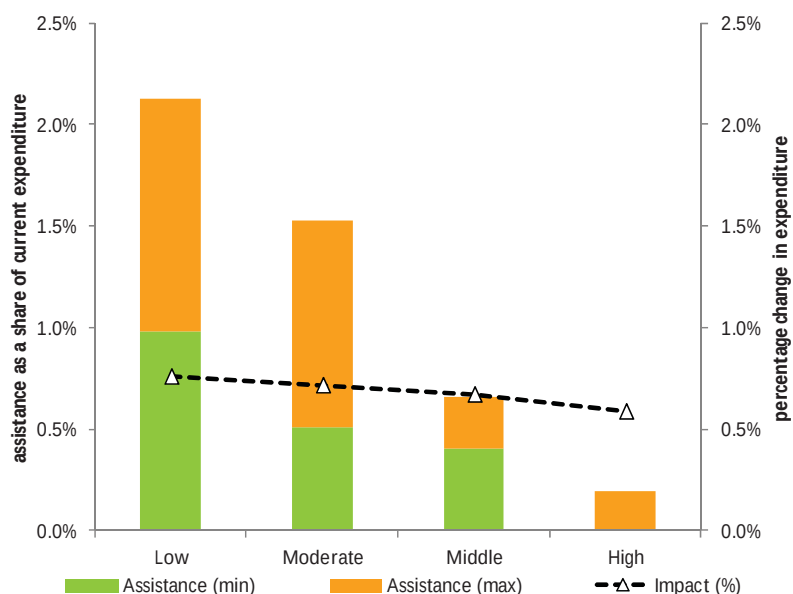
Source: AECOM and CSIRO calculations.

5.3.2 Assistance

The impacts on living costs will be offset to varying degrees by Australian Government financial assistance, depending on income levels and other household characteristics. As shown in **Figure 20**, this financial assistance is substantially higher than estimated cost impacts for low income households, and provides some financial assistance to the middle income household shown, but provides little financial assistance to high income households.

- A couple with dependent children receiving the illustrative high income (\$303,651) is eligible for financial assistance of between \$0.1 and \$5.90 a week which will not cover the average cost impact for this household.
- A couple with dependent children receiving the illustrative middle income (\$113,308) is eligible for financial assistance of between \$7.20 and \$11.70 a week which will cover most of the average cost impact for this household.
- A couple with dependent children receiving the illustrative moderate income (\$81,640) is eligible for financial assistance of between \$7.90 and \$23.60 a week which will more than offset the average cost impact for this household.
- A couple with dependent children receiving the illustrative low income (\$44,800) is eligible for financial assistance of between \$11.10 and \$24.10 a week, equivalent to at least 30% more than the average cost impact.

Figure 20: Couples with dependent children, financial assistance and carbon price impacts as a share of expenditure, selected households (2012-13)



Note: Assistance has been calculated as a proportion of expenditure which allows direct comparison with the impact of the carbon price. For example, a middle income couple, earning around \$113,308 typically spend around \$92,400 per year. Assistance of around \$375 per year represents around 0.4% of their annual expenditure. Source: AECOM and CSIRO calculations.

5.3.3 Detailed results

A more detailed analysis of household information and impacts is provided in **Table 5** below. **Error! Reference source not found.** provides further more detailed tables of impacts for each household type, along with information on income, expenditure and household composition.

Table 5: Summary of household information and impacts for couples with dependent children (2012-13)

	Low	Moderate	Middle	High
HOUSEHOLD INFORMATION				
Gross income per annum	\$44,800	\$81,640	\$113,308	\$303,651
Expenditure per annum	\$58,880	\$80,239	\$92,388	\$157,808
Domestic energy as a share of total expenditure	3.8%	3.0%	2.7%	1.9%
Number of persons	4.7	4.3	4.2	3.9
Share of all households	1.8%	5.2%	6.2%	5.1%
IMPACTS AND FINANCIAL ASSISTANCE				
Total impact (\$) per week	8.6	11.1	11.9	17.9
Total impact as a share of expenditure	0.8%	0.7%	0.7%	0.6%
Financial assistance, minimum identified \$ per week	\$11.1	\$7.9	\$7.2	\$0.1
Financial assistance, maximum identified \$ per week	\$24.1	\$23.6	\$11.7	\$5.9
Minimum financial assistance as a share of expenditure	1.0%	0.5%	0.4%	0.0%
Maximum financial assistance as a share of expenditure	2.1%	1.5%	0.7%	0.2%

Source: AECOM and CSIRO calculations.

5.4 Single parents with dependent children

Single parents with dependent children represent 6% of all households. The average household (with mean income for this household type) spends around an estimated \$36 per week on electricity and gas, and around \$1,100 per week on goods and services in total (projected for 2012-13 from 2009-10 data).

Table 6 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure and **Figure 21** shows this information in graphical form.

Table 6: single parents with dependent children - impacts by income group (2013-13)

	Item	Unit	Income group			
			Low	Moderate	Middle	High
Single parents with dependent children	Electricity	\$	2.7	2.8	2.9	2.9
	Mains gas	\$	0.3	0.4	0.4	0.6
	Food	\$	0.7	0.9	1.0	1.3
	Other goods and services	\$	2.4	3.7	4.0	9.7
	Total impact	\$	6.2	7.8	8.3	14.5
	Increase in expenditure	%	0.8%	0.8%	0.8%	0.8%
	% of All households	%	1.7%	2.0%	1.3%	0.6%

Notes: This household type accounts for 6.2% of all households. Middle income households as a share of total is based on number of households in middle income quintile. High income household based on Q4 and Q5.

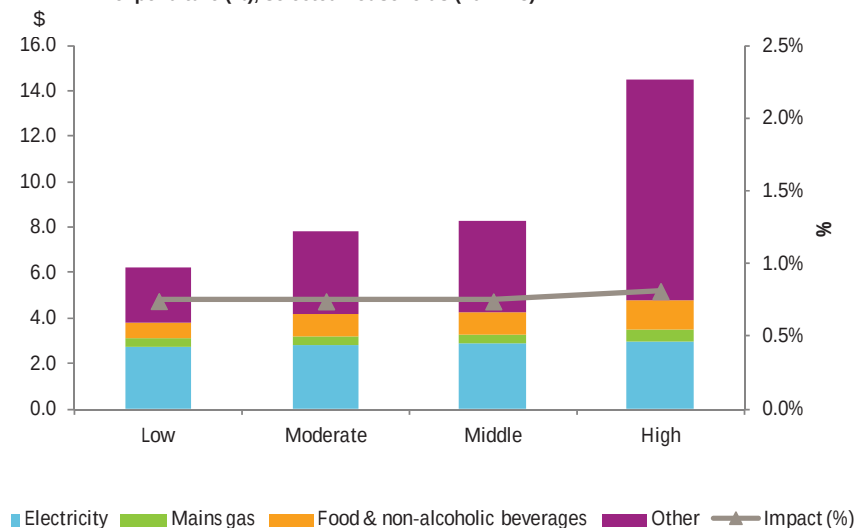
Source: AECOM and CSIRO calculations, ABS 2011c, 2011d.

The following are the principal findings for single parents with dependent children:

- For a high income single parent with dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$14.50 per week in 2012-13: electricity and gas price changes account for 24% of the total impact on expenditure.
- For a middle income single parent with dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$8.30 per week in 2012-13: electricity and gas price changes account for 40% of the total impact on expenditure.
- For moderate income single parent with dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$7.80 per week in 2012-13: electricity and gas price changes account for 41% of the total impact on expenditure.
- For a low income single parent with dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$6.20 per week in 2012-13: electricity and gas price changes account for 48% of the total impact on expenditure.

As with couples with dependent children, this also shows how changes in electricity and gas prices affect different income groups within this household type: it highlights the point that electricity and gas expenditure accounts for a higher proportion of expenditure within low income households compared with high income households (4.1% in low income and 2.3% in high income households comprising single parents with dependent children).

Figure 21: Single parents with dependent children, impact of carbon price (dollars per week) and total impact as a share of expenditure (%), selected households (2012-13)



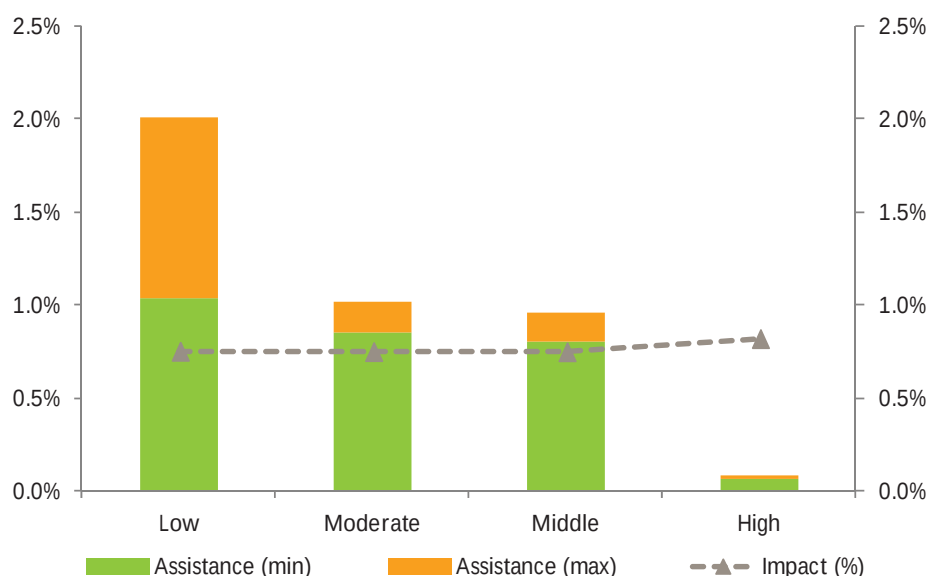
Source: AECOM and CSIRO calculations.

5.4.1 Assistance

The impacts on living costs are offset to varying degrees by financial assistance for most single parents with dependent children: the offset depends upon income levels and other household characteristics. As shown in **Figure 22**, this financial assistance is substantially higher than estimated cost impacts for low, moderate, and middle income households, but provides only modest financial assistance to high income single parent households.

- A single parent with dependent children receiving the illustrative high income (\$140,552) is eligible for financial assistance of between \$1.10 and \$1.50 a week which will not cover the average cost impact for this household.
- A single parent with dependent children receiving the illustrative middle income (\$62,082) is eligible for financial assistance of between \$8.80 and \$10.60 a week which will cover the average cost impact for this household.
- A single parent with dependent children receiving the illustrative moderate income (\$54,666) is eligible for financial assistance of between \$8.80 and \$10.60 a week which will cover the average cost impact for this household.
- A single parent with dependent children receiving the illustrative low income (\$36,359) is eligible for financial assistance of between \$8.60 and \$16.60 a week, equivalent to at least 38% more than the average cost impact for this household.

Figure 22: Single parents with dependent children, financial assistance and carbon price impacts as a share of expenditure, selected households (2012-13)



Source: AECOM and CSIRO calculations.

5.4.2 Detailed results

A more detailed analysis of household information and impacts is provided in **Table 7** below. **Error! Reference source not found.** provides detailed tables of impacts for each household type along with information on income, expenditure and household composition.

Table 7: Summary of household information and impacts for single parents with dependent children (2012-13)

	Low	Moderate	Middle	High
HOUSEHOLD INFORMATION				
Gross income per annum	36,359	54,666	62,082	140,552
Expenditure per annum	42,982	54,325	57,459	92,070
Domestic energy as a share of total expenditure	4.1%	3.4%	3.2%	2.3%
Number of persons	3.2	3	3.1	2.7
Share of all households	1.7%	2.0%	1.3%	0.6%
IMPACTS AND FINANCIAL ASSISTANCE				
Total impact (\$) per week	6.2	7.8	8.3	14.5
Total impact as a share of expenditure	0.8%	0.8%	0.8%	0.8%
Financial assistance, minimum identified \$ per week	8.6	8.8	8.8	1.1
Financial assistance, maximum identified \$ per week	16.6	10.6	10.6	1.5
Minimum financial assistance as a share of expenditure	1.0%	0.8%	0.8%	0.1%
Maximum financial assistance as a share of expenditure	2.0%	1.0%	1.0%	0.1%

Source: AECOM and CSIRO calculations.

5.5 Couples with no dependent children

Couples with no dependent children represent 33% of all households. This group includes couples with no children and (usually older) couples with children who are no longer dependent. The average couple household (with mean income for this household type), spends around an estimated \$35 per week on electricity and gas, and around \$1,500 per week on goods and services in total (projected for 2012-13 from 2009-10 data).

Table 8 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure and **Figure 23** shows this information in graphical form.

Table 8: Couples with no dependent children - impacts by income group (2012-13)

	Item	Unit	Income group			
			Low	Moderate	Middle	High
Single parents with dependent children	Electricity	\$	2.4	2.5	2.8	3.2
	Mains gas	\$	0.3	0.3	0.4	0.5
	Food	\$	0.9	1.0	1.2	1.6
	Other goods and services	\$	3.5	4.0	5.1	7.2
	Total impact	\$	7.1	7.9	9.5	12.4
	Increase in expenditure	%	0.9%	0.8%	0.6%	0.6%
	% of All households	%	7.0%	5.9%	5.0%	9.7%

Notes: This household type accounts for 33.9% of all households. Middle income households as a share of total is based on number of households in middle income quintile (Q3). High income households based on Q5.

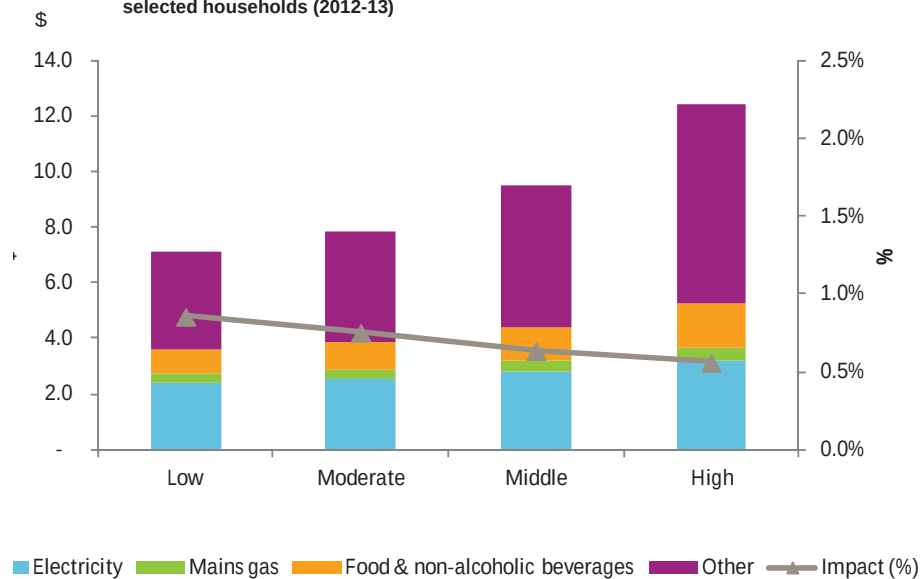
Source: AECOM and CSIRO calculations, ABS 2011c, 2011d.

The following are the principal findings for couples with no dependent children:

- For a high income couple with no dependent children household, the carbon price is expected to increase household expenditure by 0.6%. The absolute impact is an increase of \$12.40 per week in 2012-13: electricity and gas price changes account for 30% of the total impact on expenditure.
- For a middle income couple with no dependent children household, the carbon price is expected to increase household expenditure by 0.6%. The absolute impact is an increase of \$9.50 per week in 2012-13: electricity and gas price changes account for 34% of the total impact on expenditure.
- For moderate income couple with no dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$7.90 per week in 2012-13: electricity and gas price changes account for 35% of the total impact on expenditure.
- For a low income couple with no dependent children household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$7.10 per week in 2012-13: electricity and gas price changes account for 38% of the total impact on expenditure.

As with the previous households, this highlights that electricity and gas expenditure accounts for a higher proportion of expenditure within low income households compared with high income households (3.6% in low income and 1.8% in high income households comprising couple with no dependent children).

Figure 23: Couples with no dependent children, impact of carbon price (dollars per week) and total impact as a share of expenditure, selected households (2012-13)



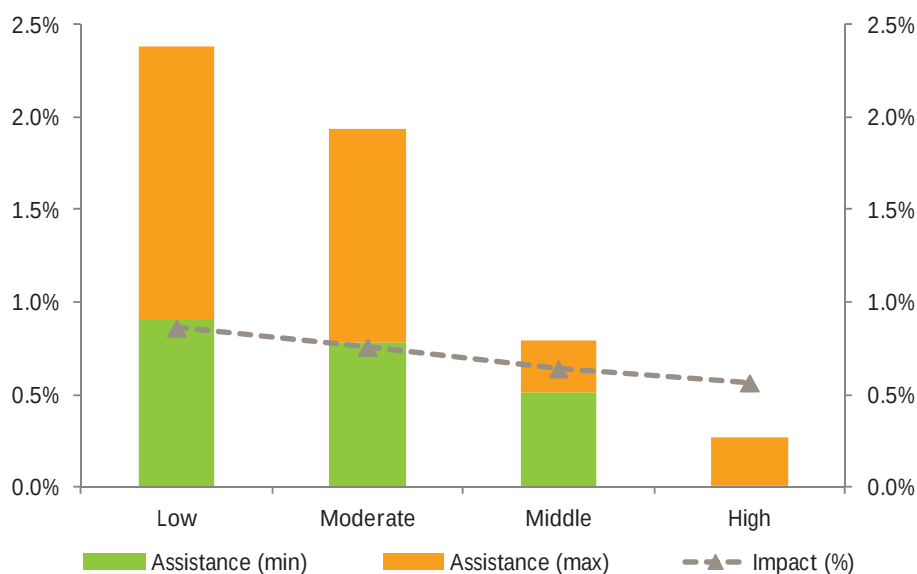
Source: AECOM and CSIRO calculations.

5.5.1 Assistance

The impacts on living costs are offset to varying degrees by financial assistance for most couples with no dependent children: the offset depends upon income levels and other household characteristics. As shown in **Figure 24**, this financial assistance is substantially higher than estimated cost impacts for low, moderate, and middle income households, but provides only modest financial assistance to high income couple with no dependent children households.

- A couple with no dependent children receiving the illustrative high income (\$206,043) is eligible for financial assistance of between \$0.10 and \$5.90 a week which will not cover the average cost impact for this household.
- A couple with no dependent children receiving the illustrative middle income (\$107,646) is eligible for financial assistance of between \$7.60 and \$11.70 a week which will cover the majority of the average cost impact for this household.
- A couple with no dependent children receiving the illustrative moderate income (\$52,154) is eligible for financial assistance of between \$8.10 and \$20.10 a week which will cover most of the average cost impact for this household.
- A couple with no dependent children receiving the illustrative low income (\$30,383) is eligible for financial assistance of between \$7.50 and \$19.60 a week, equivalent to at least 5% more than the average cost impact for this household.

Figure 24: Couples with no dependent children, financial assistance and carbon price impacts as a share of expenditure, selected households (2012-13)



Source: AECOM and CSIRO calculations.

5.5.2 Detailed results

A more detailed analysis of household information and impacts is provided in **Table 9** below. **Error! Reference source not found.** provides detailed tables of impacts for each household type along with information on income, expenditure and household composition.

Table 9: Summary of household information and impacts for couples with no dependent children (2012-13)

	Low	Moderate	Middle	High
HOUSEHOLD INFORMATION				
Gross income per annum	30,383	52,154	107,646	206,042
Expenditure per annum	42,841	53,978	76,878	114,525
Domestic energy as a share of total expenditure	3.6%	3.0%	2.4%	1.8%
Number of persons	2.1	2.3	2.3	2.3
Share of all households	7.0%	5.9%	5.0%	9.7%
IMPACTS AND FINANCIAL ASSISTANCE				
Total impact (\$) per week	7.1	7.9	9.5	12.4
Total impact as a share of expenditure	0.86%	0.76%	0.64%	0.57%
Financial assistance, minimum identified \$ per week	7.5	8.1	7.6	0.1
Financial assistance, maximum identified \$ per week	19.6	20.1	11.7	5.9
Minimum financial assistance as a share of expenditure	0.9%	0.8%	0.5%	0.0%
Maximum financial assistance as a share of expenditure	2.4%	1.9%	0.8%	0.3%

Source: AECOM and CSIRO calculations.

5.6 Single adult households

Single adult households represent 25% of all households. The average household (with mean income for this household type) spends around an estimated \$22 per week on electricity and gas, and around \$740 per week on goods and services in total (projected for 2012-13 from 2009-10 data). Almost half of all single adults are very low income (in the first income quintile), with an average income of \$349 per week.

Table 10 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure and **Figure 25** shows this information in graphical form.

Table 10: Single adults - impacts by income group (2012-13)

	Item	Unit	Income group			
			Low	Moderate	Middle	High
Single parents with dependent children	Electricity	\$	1.6	1.7	1.7	1.8
	Mains gas	\$	0.2	0.2	0.3	0.3
	Food	\$	0.4	0.5	0.5	0.7
	Other goods and services	\$	2.1	2.3	2.5	3.7
	Total impact	\$	4.3	4.7	5.0	6.6
	Increase in expenditure	%	0.9%	0.8%	0.7%	0.6%
	% of All households	%	10.2%	3.4%	3.4%	7.5%

Notes: This household type accounts for 24.5% of all households. Middle income households as a share of total is based on number of households in middle income quintile (Q3). High income households based on Q4 and Q5.

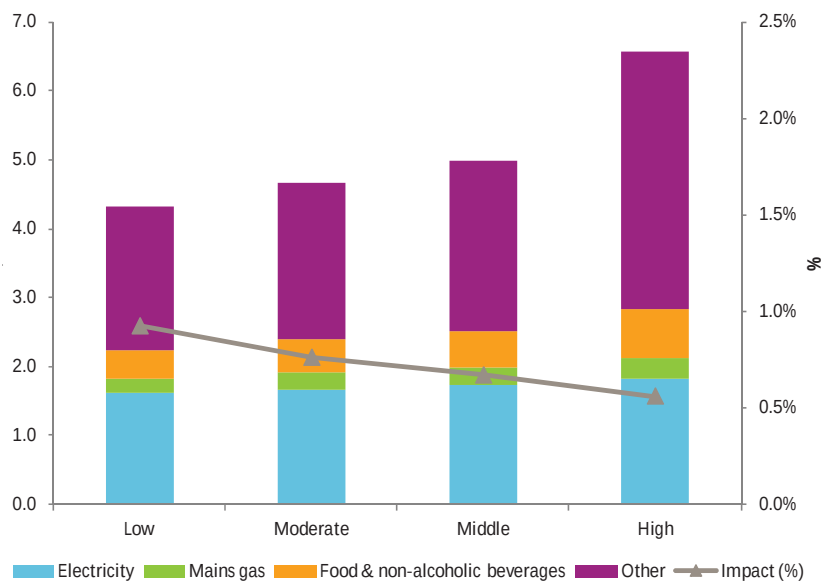
Source: AECOM and CSIRO calculations, ABS 2011c, 2011d.

The following are the principal findings for single adults:

- For a high income single adult household, the carbon price is expected to increase household expenditure by 0.6%. The absolute impact is an increase of \$6.60 per week in 2012-13: electricity and gas price changes account for 32% of the total impact on expenditure.
- For a middle income single adult household, the carbon price is expected to increase household expenditure by 0.7%. The absolute impact is an increase of \$5.00 per week in 2012-13: electricity and gas price changes account for 40% of the total impact on expenditure.
- For moderate income single adult household, the carbon price is expected to increase household expenditure by 0.8%. The absolute impact is an increase of \$4.70 per week in 2012-13: electricity and gas price changes account for 40% of the total impact on expenditure.
- For a low income single adult household, the carbon price is expected to increase household expenditure by 0.9%. The absolute impact is an increase of \$4.30 per week in 2012-13: electricity and gas price changes account for 42% of the total impact on expenditure.

As with the previous households, this highlights that electricity and gas expenditure accounts for a higher proportion of expenditure within low income households compared with high income households (4.3% in low income and 2.0% in high income households comprising single adults).

Figure 25: Single adults, impact of carbon price (dollars per week) and total impact as a share of expenditure (%), selected households (2012-13)



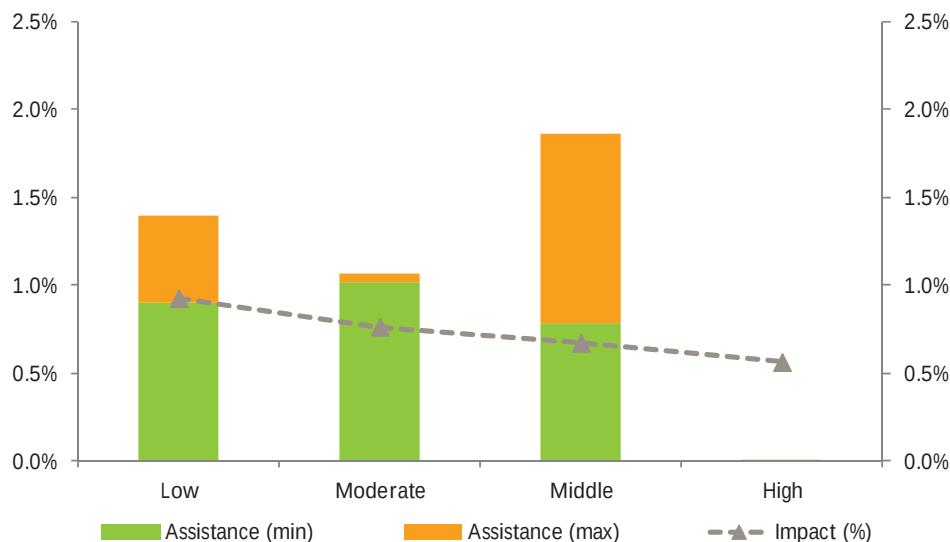
Source: AECOM and CSIRO calculations.

5.6.1 Assistance

The impacts on living costs are offset to varying degrees by financial assistance for single adults: the offset depends upon income levels and age. As shown in **Figure 26**, this financial assistance is substantially higher than the estimated cost impacts for low, moderate, and middle income households, but provides only modest financial assistance to single adult households.

- A single adult receiving the illustrative high income (\$102,453) is eligible for financial assistance of \$0.10 a week which will not cover the average cost impact for this household.
- A single adult receiving the illustrative middle income (\$49,818) is eligible for financial assistance of between \$5.80 and \$13.80 a week, equivalent to at least 15% more than the average cost impact for this household.
- A single adult receiving the illustrative moderate income (\$31,818) is eligible for financial assistance of between \$6.20 and \$6.50 a week, equivalent to at least 30% more than the average cost impact for this household.
- A single adult receiving the illustrative low income (\$18,122) is eligible for financial assistance of between \$4.20 and \$6.50 a week, which covers most of the average cost impact for this household.

Figure 26: Single person, financial assistance and carbon price impacts as a share of expenditure, selected households (2012-13)



Source: AECOM and CSIRO calculations.

5.6.2 Detailed analysis

A more detailed analysis of household information and impacts is provided in **Table 11** below. **Error! Reference source not found.** provides detailed tables of impacts for each household type along with information on income, expenditure and household composition.

Table 11: Summary of household information and impacts for single adult (2012-13)

	Low	Moderate	Middle	High
HOUSEHOLD INFORMATION				
Gross income per annum	18,122	31,818	49,818	102,453
Expenditure per annum	24,295	31,863	38,628	60,759
Domestic energy as a share of total expenditure	4.3%	3.4%	3.0%	2.0%
Number of persons	1.0	1.0	1.0	1.0
Share of all households	10.2%	3.4%	3.4%	7.5%
IMPACTS AND FINANCIAL ASSISTANCE				
Total impact (\$) per week	4.3	4.7	5.0	6.6
Total impact as a share of expenditure	0.93%	0.76%	0.67%	0.56%
Financial assistance, minimum identified \$ per week	4.2	6.2	5.8	0.1
Financial assistance, maximum identified \$ per week	6.5	6.5	13.8	0.1
Minimum financial assistance as a share of expenditure	0.9%	1.0%	0.8%	0.0%
Maximum financial assistance as a share of expenditure	1.4%	1.1%	1.9%	0.0%

Source: AECOM and CSIRO calculations.

5.7 Single and couple households with no dependent children – analysis by age

Income and expenditure also vary with age. Around one third of couples and single adults with no dependent children are over the age of 65. Households aged over 65 tend have lower incomes and spend less per week than households aged under 65.

- Low income single adult and couple households tend to be older (with average age of 64 and 67 for singles and couples respective) while high income households are younger (with average age of around 45).
- The average age for senior single adults and couple households is 76 and 73 respectively.
- The average age for single and couple households under 65 is around 45 years.

Table 12 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure and **Figure 27** shows this information in graphical form.

Table 12: Single and couple households by age (2012-13)

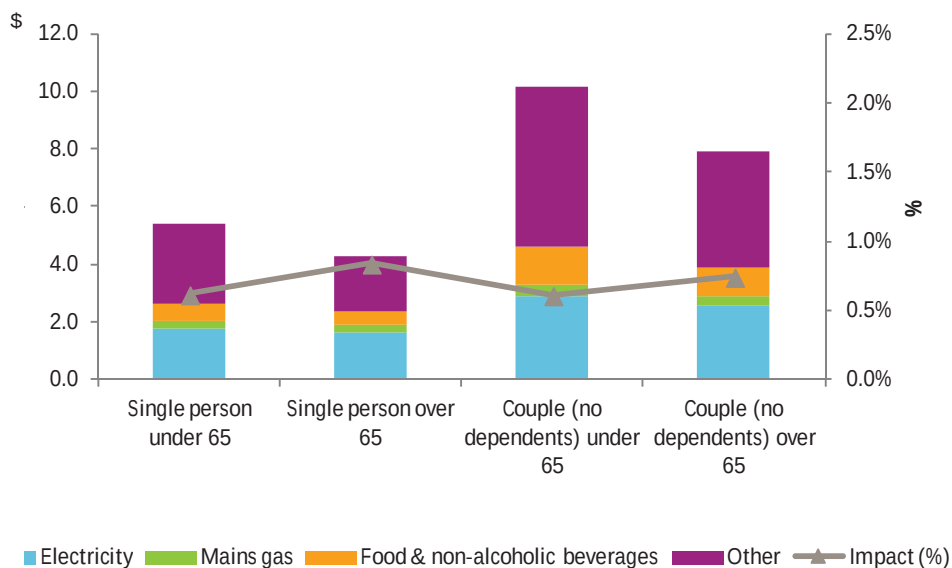
	Item	Unit	Group			
			Couple under 65	Couple 65 years and over	Single adult under 65	Single adult 65 years and over
Households without dependent children	Electricity	\$	2.9	2.5	1.8	1.6
	Mains gas	\$	0.4	0.3	0.3	0.2
	Food	\$	1.3	1.0	0.6	0.5
	Other goods and services	\$	5.5	4.0	2.8	2.0
	Total impact	\$	10.2	7.9	5.4	4.3
	Increase in expenditure	%	0.6%	0.7%	0.6%	0.8%
	% of All households	%	23.5%	10.4%	15.7%	8.7%

Source: AECOM and CSIRO calculations, ABS 2011c, 2011d.

The following are the principal findings:

- The impact of the carbon price on senior single adults and couples with no dependent children is 0.7-0.8% increase in expenditure, equivalent to \$4.30 to \$7.90 per week for singles and couples respectively.
- The impact of the carbon price on singles and couples with no dependent children under 65 years of age is slightly smaller at 0.6% of expenditure, but the dollar impact is larger, at \$5.40 and \$10.20 per week respectively.

Figure 27: Single adults and couples with no dependent children by age (average), impact of carbon price (dollars per week) and total impact as a share of expenditure (2012-13)



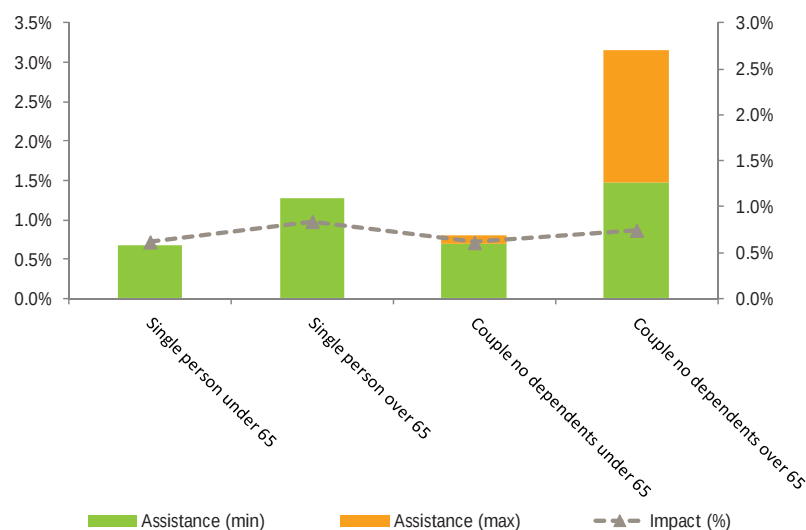
Source: AECOM and CSIRO calculations.

5.7.1 Assistance

The impacts on living costs are offset to varying degrees by financial assistance. As shown in **Figure 28**, this financial assistance is substantially higher than estimated cost impacts for couples with no dependents over 65, but provides only modest financial assistance to single adult households.

- A couple with no dependent children under 65 receiving the illustrative income (\$127,684) is eligible for financial assistance of between \$11.70 and \$13.50 per week, which covers the average cost impact for this household.
- A couple with no dependent children over 65 receiving the illustrative income (\$62,567) is eligible for financial assistance of between \$15.60 and \$33.70 per week, equivalent to at least 100% more than the average cost impact for this household.
- A single adult under 65 receiving the illustrative income (\$60,519) is eligible for financial assistance of around \$5.80 which covers the average cost impact for this household.
- A single adult over 65 receiving the illustrative income (\$30,549) is eligible for financial assistance of around \$6.50 which covers the average cost impact for this household.

Figure 28: Single and couple households by age (average), impact and financial assistance as a share of expenditure (2012-13)



Source: AECOM and CSIRO calculations.

5.7.2 Detailed analysis

A more detailed analysis of household information and impacts is provided in **Table 13** below. **Error! Reference source not found.** provides detailed tables of impacts for each household type along with information on income, expenditure and household composition.

Table 13: Summary of household information and impacts for single and couple households by age (2012-13)

	Couple Family no dependent children		Lone Person	
	Under 65	Over 65	Under 65	Over 65
HOUSEHOLD INFORMATION				
Gross income per annum	127,684	62,567	60,519	30,549
Expenditure per annum	86,422	55,405	45,281	26,650
Domestic energy as a share of total expenditure	2.2%	3.0%	2.6%	4.1%
Number of persons	2.3	2.2	1.0	1.0
Share of all households	23.5%	10.4%	15.7%	8.7%
IMPACTS AND FINANCIAL ASSISTANCE				
Total impact (\$) per week	10.2	7.9	5.4	4.3
Total impact as a share of expenditure	0.6%	0.7%	0.6%	0.8%
Financial assistance, minimum identified \$ per week	11.7	15.6	5.8	6.5
Financial assistance, maximum identified \$ per week	13.5	33.7	5.8	6.5
Minimum financial assistance as a share of expenditure	0.7%	1.5%	0.7%	1.3%
Maximum financial assistance as a share of expenditure	0.8%	3.2%	0.7%	1.3%

Source: AECOM and CSIRO calculations.

5.8 Impacts of the carbon price by region

Household income and expenditure also vary with the location of households. Households living in capital cities account for around two thirds (64%) of all households, and households outside the capitals around one third (36%). The average income of households in Australian capital cities is estimated to be around \$2,120 per week (9% above the average for all households), and \$1,620 per week for households outside the capitals (16% below the average for all households).

Households in the capital cities spend \$37 per week on electricity and gas (\$1.70 more than the average), while households outside the capitals spend \$32 per week (\$3 less than the average). Electricity and gas account for 2.5% of the total expenditure of both groups. Gas is less common outside the capitals, however, and so electricity expenditure is similar for households in each location, at \$28 per week.

Table 14 shows the absolute dollar impacts by expenditure components and the percentage increase in expenditure and **Figure 29** shows this information in graphical form.

Table 14: Regions (2012-13)

	Item	Unit	Regions		
			Australia	Capital Cities	Balance of State
Single parents with dependent children	Electricity	\$	2.8	2.8	2.8
	Mains gas	\$	0.4	0.5	0.2
	Food	\$	1.2	1.2	1.0
	Other goods and services	\$	4.7	4.8	4.6
	Total impact	\$	9.1	9.4	8.7
	Increase in expenditure	%	0.6%	0.6%	0.7%
	% of All households	%	100.0%	63.7%	36.3%

Source: AECOM and CSIRO calculations.

The following are the principal findings:

- The impact of the carbon price across average households for different regions is similar, with lower total expenditure outside the capitals being partly offset by higher reliance on electricity instead of gas.
- The impact of the carbon price on households in capital cities is \$9.40 per week, equivalent to 0.6% of their expenditure.
- The impact on other households (balance of state) is \$8.70 per week, equivalent to 0.7% of their expenditure. This compares to an average impact of \$9.10 per week for all households.
- These differences in impact are driven by differences in the level and pattern of expenditure by these groups of households, rather than directly by location. In practice, the carbon price is likely to result in different price changes in different regions around Australia, particularly in relation to electricity (which involves different levels of emissions per unit of electricity across different states and territories).

Figure 29: Increase in expenditure by region (dollars per week) – (2012-13)



Source: AECOM and CSIRO calculations.

5.8.1 Assistance

Because the level of financial assistance provided varies with income, the division of income between couples, age, and the number and ages of children, we do not estimate financial assistance levels for aggregate households by region.

Error! Reference source not found. provides detailed tables of impacts for all the major household types for Australia all, capital cities, and balance of nation (described by the ABS as 'Balance of State'). These tables also include information on income, expenditure and household composition.

In general, households living in capital cities have higher income and expenditure than households outside the capitals, and rely more on electricity for domestic energy (and less on gas). Low income households have very similar incomes, but higher expenditures in capital cities. Because the level of assistance provided varies with income, the division of income between couples, age, and the number and ages of children, we do not estimate assistance levels for aggregate 'all households' by region.

5.8.2 Detailed analysis

Error! Reference source not found. provides detailed tables of impacts for each household type along with information on income, expenditure and household composition.

6.0

Conclusions



6.0 Conclusions

6.1 Overview

This report provides an independent analysis of the impacts of the Government's proposed carbon price on the cost of living for Australian households.

The purpose of the report is to:

- provide an independent assessment of the impacts on the cost of living;
- explain the methods used and set out the key steps and results;
- calculate impacts on inflation (as discussed in footnote 2) and consumer prices;
- provide detailed estimates of impacts for different household types;
- bring together estimates of household impacts and announced Australian Government financial assistance; and
- put these results in context so that readers are better able to evaluate the potential impacts for households.

The project provides an in-depth and transparent analysis of one aspect of the Australian Government's analysis (2011a, 2011b), undertaken by Treasury with other government agencies. While the broad approach is similar, some data and assumptions are likely to differ, and so results are also likely to be different – particularly for price rises of specific goods or services. The estimated price rises are also applied to more recent household expenditure data, for 2009-10, that was published in September 2011 after the Treasury analysis was undertaken. Household expenditure on domestic energy in 2009-10 is around 4% lower (as a share of income) than it was in 2003-04, which would tend to reduce the estimated impact on households' cost of living.

The results are broadly similar to those of the Australian Government (2011a) and Philips and Taylor (2011)

- Overall price and household cost of living impacts are slightly lower than the official Australian Government estimates, with some differences in the patterns of impacts across energy, food and other goods and services. (Philips and Taylor (2011) do not estimate price changes, and instead apply Treasury estimates to the 2009-10 expenditure data).
- Estimated dollar impacts on low income households are somewhat higher than Australian Government estimates. This appears to reflect the fact that the Government estimates are based on average impacts as a proportion of income (see Philips and Taylor 2011), whereas the illustrative low income households used in this study report expenditures that are 20-40% higher than their reported income. Even with these very high expenditure levels, assistance to low income households generally outweighs the cost of living impact of the carbon price by a significant margin, consistent with Philips and Taylor's (2011) finding that the vast majority of low income households are better off after accounting for assistance.

6.2 Impacts on consumer prices

The key findings of the report on consumer prices include:

- The introduction of the carbon price is unlikely to impact on the inflation rate but is estimated to result in one off increases in consumer prices of 0.6% in 2012/13, and a second impact of up to 0.1% in 2015/16 with the shift from a set price to a market determined carbon price.
 - This is an 'upper bound' estimate assuming full cost pass through to consumers.
 - These results are slightly lower than the official estimates of 0.7% and 0.2% by Treasury (2011a).
 - The actual impacts on prices are expected to be smaller, and will depend on the degree to which costs are passed through over time²⁰.

²⁰ The early announcement of the measure might also stimulate investment in energy reducing measures by industries and also by households.

- This impact on consumer prices is noticeable but smaller than the drivers of major inflation events over the past two decades.
 - The impact on consumer prices of a carbon price is around one quarter of the estimated 2.5% impact of introducing the GST (2001). Like the GST, the introduction of a carbon price will be accompanied by financial assistance to households through tax cuts and increases in benefit payments.
 - The carbon price impact is equivalent to around half the inflation impact of 'one off' inflation contributions from financial services and the effects of the pre-GFC mining boom (2007/08).
 - The carbon price impact is similar to the contribution of food to annual inflation in 2005/06 (0.8%) and 2010/11 (0.5%) due to floods and extreme weather.
- The impact of the carbon price will vary across different goods and services.
 - Retail electricity prices are projected to increase by up to 10% in 2012/13 due to the introduction of a carbon price. This is in addition to the impact of network costs which are projected to significantly increase retail electricity prices over the same period. This draws attention to the importance of household energy efficiency, and to minimising growth in peak demand and increases in network costs.
 - Gas prices are projected to increase by around 5% in 2012/13.
 - Food prices are projected to increase by around 0.5%. This impact is smaller than seasonal variations in food prices, and the impacts of weather related events such as droughts (on meat prices) and floods and storms (on fruit and vegetable prices).
- Together increases in electricity and gas prices account for almost a third of the impact on living costs (together contributing 0.2% of the 0.6% total), while food price increases account for one seventh of total impact on living costs (contributing 0.1%). The rest of the inflation impact is accounted for by very small price increases over a large number of goods and services.

6.3 Impacts on household cost of living

Applying these price changes to the latest household expenditure data, we estimate that the carbon price will result in an increase of \$9.10 per week in 2012-13.

- This is made up of increases of \$3.20 in electricity and gas costs, \$1.20 in food costs, and \$4.70 in other costs.
- This overall impact is less than the official Government estimate of \$9.90 per week, but a little more than the \$8.90 estimated by NATSEM, as shown in **Table 15** (The official Government estimates are based on 2003-04 expenditure data, which was the most recent available at the time.)

Table 15: Average impacts on household cost of living per week, all households (2012-13)

\$ per week, 2012-13	AECOM and CSIRO	Australian Government	Phillips and Taylor (NATSEM)
Electricity	\$2.80	\$3.30	<i>not reported</i>
Gas	\$0.40	\$1.50	<i>not reported</i>
Food	\$1.20	\$0.80	<i>not reported</i>
Other	\$4.70	\$4.30	<i>not reported</i>
Total impact	\$9.10	\$9.90	\$8.50
Financial assistance	<i>not estimated</i>	\$10.10	\$10.90

Source: AECOM and CSIRO calculations, Australian Government (2011a), Phillips and Taylor (2011).

- Households with higher incomes and expenditure are estimated to face higher dollar increases in costs, but lower impacts as a share of expenditure. This is because low income households spend a larger share of their income on electricity and gas, which have larger price impacts from the carbon price.
 - The carbon price impact on low income households is equivalent to 0.8% to 0.9% across all low income households, ranging from \$4.30 per week for a single adult to \$8.60 per week for couples with dependent children (reflecting different expenditure patterns).
 - For high income households the carbon price impact is typically equivalent to 0.6% to 0.8% of expenditure, ranging from \$6.60 per week for a high income single adult to \$17.90 per week for a high income couple with dependents.
- Average impacts also vary across household types due to differences in income and expenditure patterns.
 - For middle income households the carbon price results in cost increases of \$11.90 for couples with dependent children and \$8.30 per week for single parent families, equivalent to 0.7% and 0.8% of their expenditure respectively.
 - For middle income couples with no dependent children the average impact of the carbon price is \$9.50 across all couples, and \$10.20 per week for couples under 65 years (who have higher incomes on average). For couples over 65 years the average impact is 7.90 per week.
 - For middle income single adults, the average impact of the carbon price is \$5.00 per week, and \$5.40 per week for single adults who are under 65 years, equivalent to around 0.6% of their expenditure. For senior singles the average impact is \$4.30 per week, equivalent to 0.8% of their expenditure.
- Cost of living impacts also vary across locations. Households outside capital cities tend to have lower incomes and expenditures, and spend a slightly higher share of their incomes on electricity and a smaller share on gas than other households. These expenditure patterns result in the carbon price having a smaller average dollar impact on households outside the capitals (\$8.70 per week) than for the nation as a whole (\$9.10 per week) and households in capital cities (\$9.40 per week).

The Government has announced targeted assistance measures alongside the carbon price.

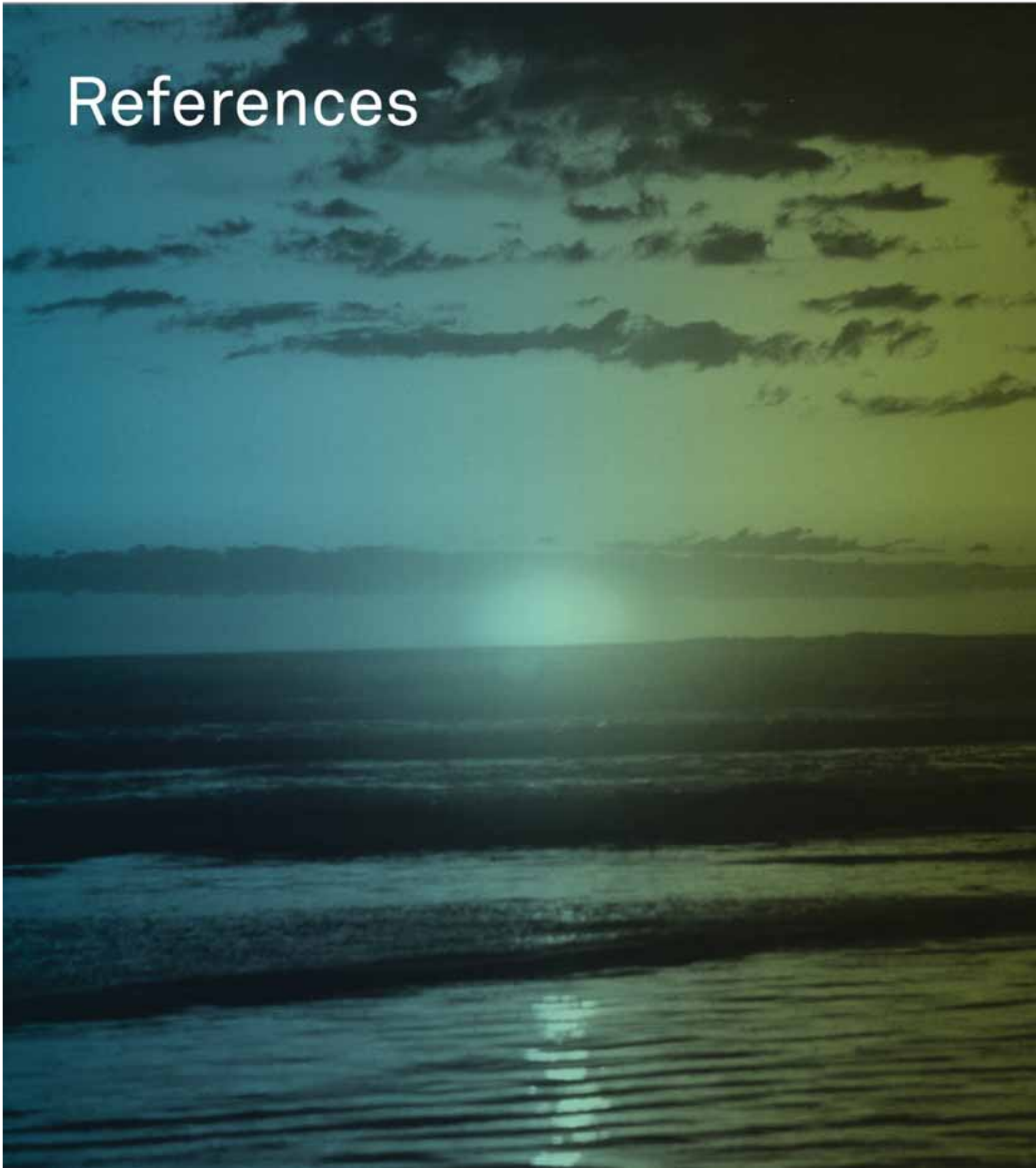
- The design of Government assistance is targeted to providing most support to low and moderate income households, and covering some or all of the impacts on middle income households.
 - Low and moderate income households receive an amount of financial assistance that generally outweighs the average price impact for these households by a significant margin²².
 - For middle income households, the balance between impacts and assistance is sensitive to their specific circumstances. In most of the cases examined, these households receive more assistance than the average impact on middle income households. In some cases, the middle income households examined would receive assistance equivalent to 60-95 per cent of the carbon price impact.
 - Under the Government's policy, high income households typically receive limited assistance and therefore will experience a net increase in living costs.

Overall, the analysis suggests that the projected impacts of the carbon price are relatively modest, and fall well within the range of recent changes in consumer prices and household living costs, and that most households will receive assistance that offsets all or a significant portion of the cost impact of the carbon price.

²² This is despite the analysis being based on data where the total expenditure for low income households is 20% to 40% more than their income (and so estimated impacts are significantly higher than they would be if expenditure matched income).

7.0

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7.0 References

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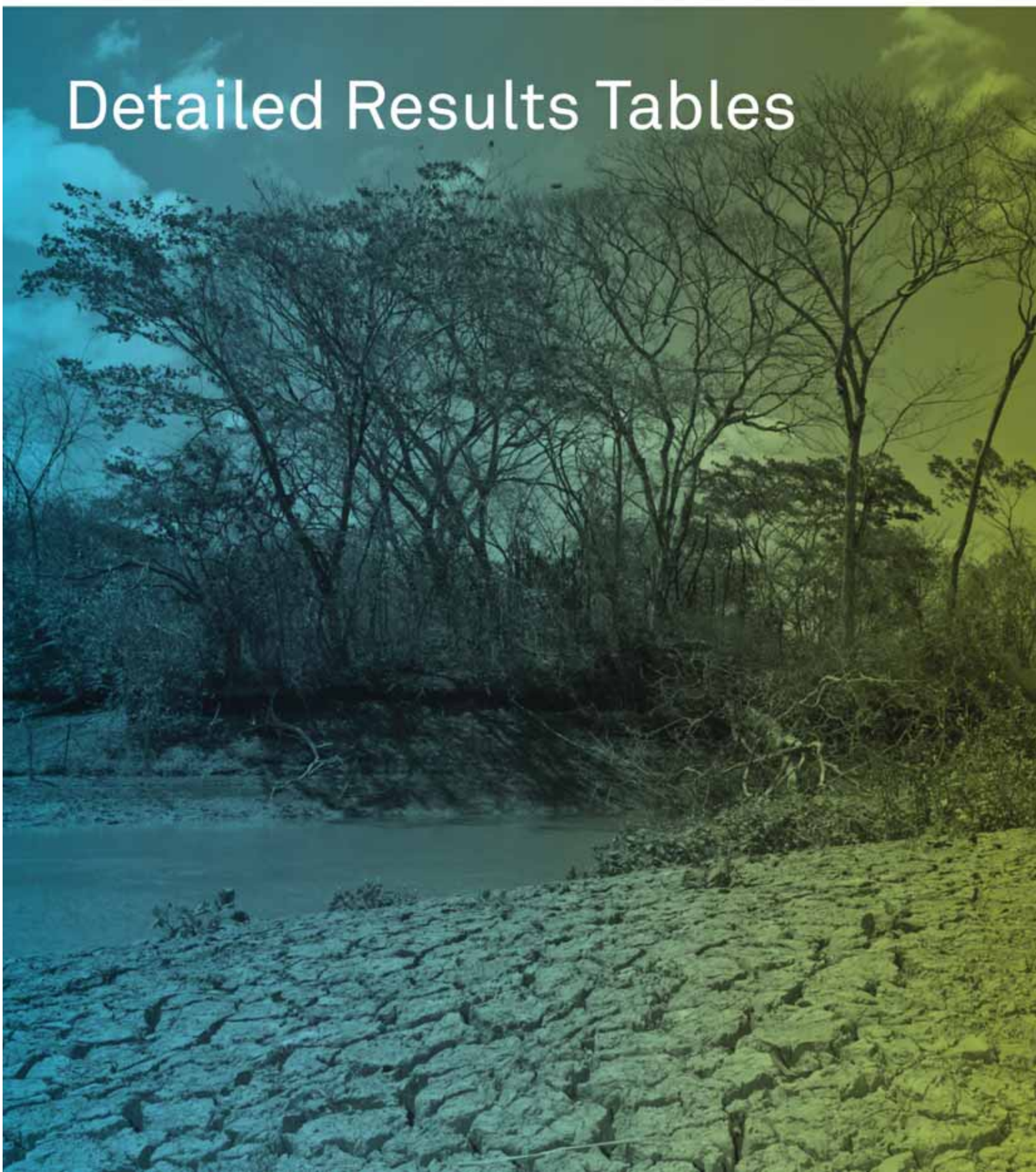
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Appendix

A

Detailed Results Tables



Appendix A Detailed Results Tables

2012/13		All households average		
		Australia	Capital Cities	Balance of Nation
HOUSEHOLD EXPENDITURE				
Electricity	\$	27.9	27.6	28.3
Mains gas	\$	7.6	9.5	4.2
Food	\$	234.9	250.1	208.0
Other goods and services	\$	1,151.6	1,219.2	1,033.0
Total expenditure on goods and services	\$	1,421.9	1,506.5	1,273.5
CARBON PRICE IMPACT (weekly)				
Electricity	\$	2.8	2.8	2.8
Mains gas	\$	0.4	0.5	0.2
Food	\$	1.2	1.2	1.0
Other goods and services	\$	4.7	4.8	4.6
Total impact	\$	9.1	9.4	8.7
Increase in expenditure	%	0.64%	0.62%	0.68%
HOUSEHOLD INFORMATION				
Share of total households	%	100.0%	63.7%	36.3%
Average income for this household type (weekly)	\$	1,941	2,122	1,623
Average income for this household type (annual)	\$	100,930	110,344	84,401
Average age of reference person		50.0	49.1	51.5
Average number of children under 18 years		0.6	0.6	0.7
Average number of adults 18-64 years		1.6	1.7	1.5
Average number of adults 65 years or older		0.3	0.3	0.4
Average number of people		2.6	2.6	2.5

2012/13		All households					All households					All households				
		Australia					Capital Cities					Balance of Nation				
		Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
HOUSEHOLD EXPENDITURE (weekly)																
Electricity	\$	22.2	27.4	28.8	29.5	32.6	22.2	26.5	27.9	28.3	32.2	22.2	28.5	30.1	32.0	34.1
Mains gas	\$	5.8	6.8	8.0	8.6	9.0	8.3	8.7	10.2	9.9	10.3	2.7	4.2	4.3	5.9	4.8
Food	\$	146.4	207.2	244.7	268.3	323.6	155.1	218.0	252.6	270.9	333.7	135.4	192.1	231.8	263.2	289.7
Other goods and services	\$	581.8	884.8	1,110.0	1,398.4	1,863.2	598.6	880.4	1,116.0	1,423.8	1,881.4	560.7	891.0	1,100.3	1,348.8	1,802.5
Total expenditure on goods and services	\$	756.1	1,126.2	1,391.4	1,704.8	2,228.5	784.1	1,133.6	1,406.6	1,732.9	2,257.6	721.0	1,115.8	1,366.5	1,649.9	2,131.1
CARBON PRICE IMPACT (weekly)																
Electricity	\$	2.2	2.7	2.9	3.0	3.3	2.2	2.7	2.8	2.8	3.2	2.2	2.9	3.0	3.2	3.4
Mains gas	\$	0.3	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.1	0.2	0.2	0.3	0.3
Food	\$	0.7	1.0	1.2	1.3	1.6	0.8	1.1	1.3	1.3	1.6	0.7	1.0	1.2	1.3	1.4
Other goods and services	\$	2.7	3.9	4.7	5.7	7.1	2.7	3.8	4.6	5.6	7.0	2.7	4.1	4.9	5.8	7.4
Total impact	\$	6.0	8.1	9.2	10.4	12.5	6.1	8.0	9.2	10.3	12.4	5.8	8.1	9.3	10.6	12.6
Increase in expenditure	%	0.79%	0.72%	0.66%	0.61%	0.56%	0.78%	0.71%	0.66%	0.60%	0.55%	0.80%	0.73%	0.68%	0.64%	0.59%
HOUSEHOLD INFORMATION																
Share of total households		24.2%	18.5%	17.8%	18.6%	20.9%	13.5%	10.8%	11.0%	12.3%	16.1%	10.7%	7.7%	6.8%	6.3%	4.8%
Average income for this household type (weekly)	\$	533	1,127	1,698	2,366	4,119	531	1,166	1,736	2,372	4,171	537	1,071	1,636	2,356	3,945
Average income for this household type (annual)	\$	27,738	58,583	88,299	123,056	214,183	27,597	60,649	90,279	123,328	216,882	27,915	55,685	85,065	122,525	205,161
Average age of reference person		58.6	52.5	47.2	44.7	44.8	58.0	52.2	47.1	44.9	44.3	59.4	52.8	47.4	44.3	46.8
Average number of children under 18 years		0.5	0.8	0.8	0.6	0.4	0.5	0.8	0.8	0.6	0.3	0.5	0.8	0.8	0.6	0.4
Average number of adults 18-64 years		1.0	1.5	1.9	2.0	2.0	1.0	1.6	1.9	2.1	2.0	0.9	1.3	1.8	2.0	1.9
Average number of adults 65 years or older		0.6	0.5	0.2	0.1	0.1	0.6	0.5	0.2	0.1	0.1	0.6	0.5	0.2	0.1	0.1
Average number of people		2.1	2.8	2.9	2.8	2.5	2.2	2.8	2.9	2.8	2.5	2.1	2.7	2.8	2.8	2.4

2012/13	Couple with dependents					Couple with dependents				Couple with dependents			
	Australia				Capital Cities				Balance of Nation				
	Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income	
HOUSEHOLD EXPENDITURE (weekly)													
Electricity	\$	31.7	35.4	36.7	45.1	33.5	34.4	35.3	44.5	29.1	34.1	39.2	47.7
Mains gas	\$	11.2	10.1	10.4	12.5	17.9	15.3	12.8	13.9	1.0	2.1	3.2	-
Food	\$	232.6	284.0	310.2	459.6	255.3	288.1	320.9	469.7	198.4	244.7	291.0	419.4
Other goods and services	\$	856.8	1,213.5	1,419.3	2,517.5	813.8	1,143.0	1,472.1	2,544.3	921.7	1,119.0	1,316.3	1,051.9
Total expenditure on goods and services	\$	1,132.3	1,543.1	1,776.7	3,034.8	1,120.4	1,480.7	1,841.0	3,072.4	1,150.2	1,399.9	1,649.7	1,519.0
CARBON PRICE IMPACT (weekly)													
Electricity	\$	3.2	3.6	3.7	4.5	3.4	3.5	3.5	4.5	2.9	3.4	3.9	4.8
Mains gas	\$	0.6	0.5	0.6	0.7	1.0	0.8	0.7	0.7	0.1	0.1	0.2	-
Food	\$	1.2	1.4	1.6	2.3	1.3	1.4	1.6	2.3	1.0	1.2	1.4	2.0
Other goods and services	\$	3.7	5.5	6.1	10.4	3.6	4.9	6.2	9.9	3.7	5.2	6.6	11.0
Total impact	\$	8.6	11.1	11.9	17.9	9.2	10.6	12.1	17.4	7.7	9.9	12.1	17.7
Increase in expenditure	%	0.76%	0.72%	0.67%	0.59%	0.82%	0.72%	0.66%	0.57%	0.67%	0.71%	0.74%	1.17%
HOUSEHOLD INFORMATION													
Share of total households	%	1.8%	5.2%	6.2%	5.1%	1.1%	3.0%*	3.8%*	4.1%	0.7%	2.2%*	2.4%*	1.0%
Average income for this household type (weekly)	\$	862	1,570	2,179	5,839	915	1,607	2,300	5,899	781	1,367	1,953	5,601
Average income for this household type (annual)		44,800	81,640	113,308	303,651	47,567	83,578	119,588	306,761	40,627	71,091	101,556	291,271
Average age of reference person		41.1	40.4	41.3	44.8	42.8	42.5	42.1	45.2	38.6	39.2	39.8	43.1
Average number of children under 18 years		2.5	2.0	1.9	1.4	2.6	2.2	1.8	1.3	2.3	2.2	2.1	1.7
Average number of adults 18-64 years		2.2	2.2	2.3	2.5	2.2	2.3	2.4	2.5	2.1	2.1	2.2	2.3
Average number of adults 65 years or older		0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	-	-	-
Average number of people		4.7	4.3	4.2	3.9	4.9	4.6	4.2	3.8	4.4	4.4	4.3	4.0

*Estimated.

2012/13	Couples only				Couples only				Couples only			
	Australia				Capital Cities				Balance of Nation			
	Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income
HOUSEHOLD EXPENDITURE (weekly)												
Electricity	\$ 24.1	25.3	27.8	31.9	23.9	25.2	28.0	31.7	24.3	25.3	27.4	32.2
Mains gas	\$ 6.0	6.4	7.2	8.7	8.9	9.1	9.6	10.2	2.6	2.9	3.5	4.5
Food	\$ 174.0	197.3	245.4	316.4	188.1	213.6	266.0	328.6	157.3	175.2	212.2	283.5
Other goods and services	\$ 619.9	809.1	1,198.1	1,845.5	649.5	853.2	1,272.2	1,859.5	584.8	746.4	1,078.8	1,797.6
Total expenditure on goods and services	\$ 823.9	1,038.0	1,478.4	2,202.4	870.3	1,101.1	1,575.7	2,230.1	768.8	949.8	1,321.9	2,117.8
CARBON PRICE IMPACT (weekly)												
Electricity	\$ 2.4	2.5	2.8	3.2	2.4	2.5	2.8	3.2	2.4	2.5	2.8	3.2
Mains gas	\$ 0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.1	0.2	0.2	0.2
Food	\$ 0.9	1.0	1.2	1.6	0.9	1.1	1.3	1.6	0.8	0.9	1.1	1.4
Other goods and services	\$ 3.5	4.0	5.1	7.2	3.9	4.4	5.2	7.0	3.9	4.2	4.8	7.6
Total impact	\$ 7.1	7.9	9.5	12.4	7.7	8.4	9.9	12.4	7.3	7.8	8.8	12.5
Increase in expenditure	% 0.86%	0.76%	0.64%	0.57%	0.89%	0.77%	0.63%	0.56%	0.95%	0.82%	0.67%	0.59%
HOUSEHOLD INFORMATION												
Share of total households	% 7.0%	5.9%	5.0%	9.7%	3.8%	3.4%*	3.1%*	7.1%	3.2%	2.5%*	1.9%*	2.6%
Average income for this household type (weekly)	\$ 584	1,003	2,070	3,962	590	1,140	2,271	4,012	579	961	1,747	3,830
Average income for this household type (annual)	30,383	52,154	107,646	206,043	30,682	59,281	118,086	208,614	30,084	49,967	90,851	199,165
Average age of reference person	66.7	61.5	54.5	45.8	65.9	61.6	52.9	44.9	67.8	64.3	57.1	48.2
Average number of children under 18 years	0.0	0	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Average number of adults 18-64 years	0.9	1.3	1.7	2.1	0.9	1.2	1.8	2.1	0.9	1.1	1.5	2.1
Average number of adults 65 years or older	1.2	1	0.6	0.2	1.2	1.0	0.5	0.2	1.2	1.0	0.7	0.2
Average number of people	2.1	2.3	2.3	2.3	2.1	2.2	2.3	2.3	2.1	2.1	2.2	2.3

2012/13		Single parent with dependents				Single parent with dependents				Single parent with dependents			
		Australia				Capital Cities				Balance of Nation			
		Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income	Low income	Moderate income	Middle income	High income
HOUSEHOLD EXPENDITURE (weekly)													
Electricity	\$	27.4	28.2	28.4	29.2	26.3	27.4	27.7	28.8	28.7	29.4	29.5	
Mains gas	\$	6.4	6.9	7.1	11.0	8.3	9.3	9.6	11.9	3.7	3.8	3.8	
Food	\$	149.5	193.2	205.3	278.3	157.7	200.3	212.0	260.5	138.6	183.6	196.0	
Other goods and services	\$	643.3	816.3	864.2	1,452.1	578.6	871.2	952.1	1,481.5	729.9	768.2	778.8	
Total expenditure on goods and services	\$	826.6	1,044.7	1,105.0	1,770.6	770.9	1,108.2	1,201.4	1,782.7	900.9	984.9	1,008.2	
CARBON PRICE IMPACT (weekly)													
Electricity	\$	2.7	2.8	2.9	2.9	2.6	2.7	2.8	2.9	2.9	2.9	3.0	-
Mains gas	\$	0.3	0.4	0.4	0.6	0.4	0.5	0.5	0.6	0.2	0.2	0.2	-
Food	\$	0.7	0.9	1.0	1.3	0.8	1.0	1.0	1.2	0.7	0.9	1.0	-
Other goods and services	\$	2.4	3.7	4.0	9.7	2.3	3.6	4.0	10.5	2.4	4.2	4.7	-
Total impact	\$	6.2	7.8	8.3	14.5	6.2	7.9	8.3	15.2	6.2	8.2	8.8	-
Increase in expenditure	%	0.75%	0.75%	0.75%	0.82%	0.80%	0.71%	0.69%	0.85%	0.69%	0.84%	0.87%	
HOUSEHOLD INFORMATION													
Share of total households	%	1.7%	2.0%	1.3%	0.6%	1.0%	1.2%*	0.8%*	0.5%	0.7%	0.8%*	0.5%*	
Average income for this household type (weekly)	\$	699	1,051	1,194	2,703	692	1,162	1,292	2,832	709	983	1,059	-
Average income for this household type (annual)		36,359	54,325	62,082	140,552	35,996	60,417	67,166	147,250	36,843	51,135	55,084	
Average age of reference person		36.5	40.8	40.9	44.6	37.2	41.0	42.1	44.6	35.6	38.4	39.2	-
Average number of children under 18 years		2.1	1.7	1.7	1.1	2.1	1.8	1.7	1.2	2.0	1.8	1.8	-
Average number of adults 18-64 years		1.1	1.3	1.4	1.6	1.2	1.4	1.4	1.6	1.0	1.2	1.3	-
Average number of adults 65 years or older		0.0	0.1	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
Average number of people		3.2	3	3.1	2.7	3.3	3.1	3.1	2.8	3.1	3.1	3.1	-

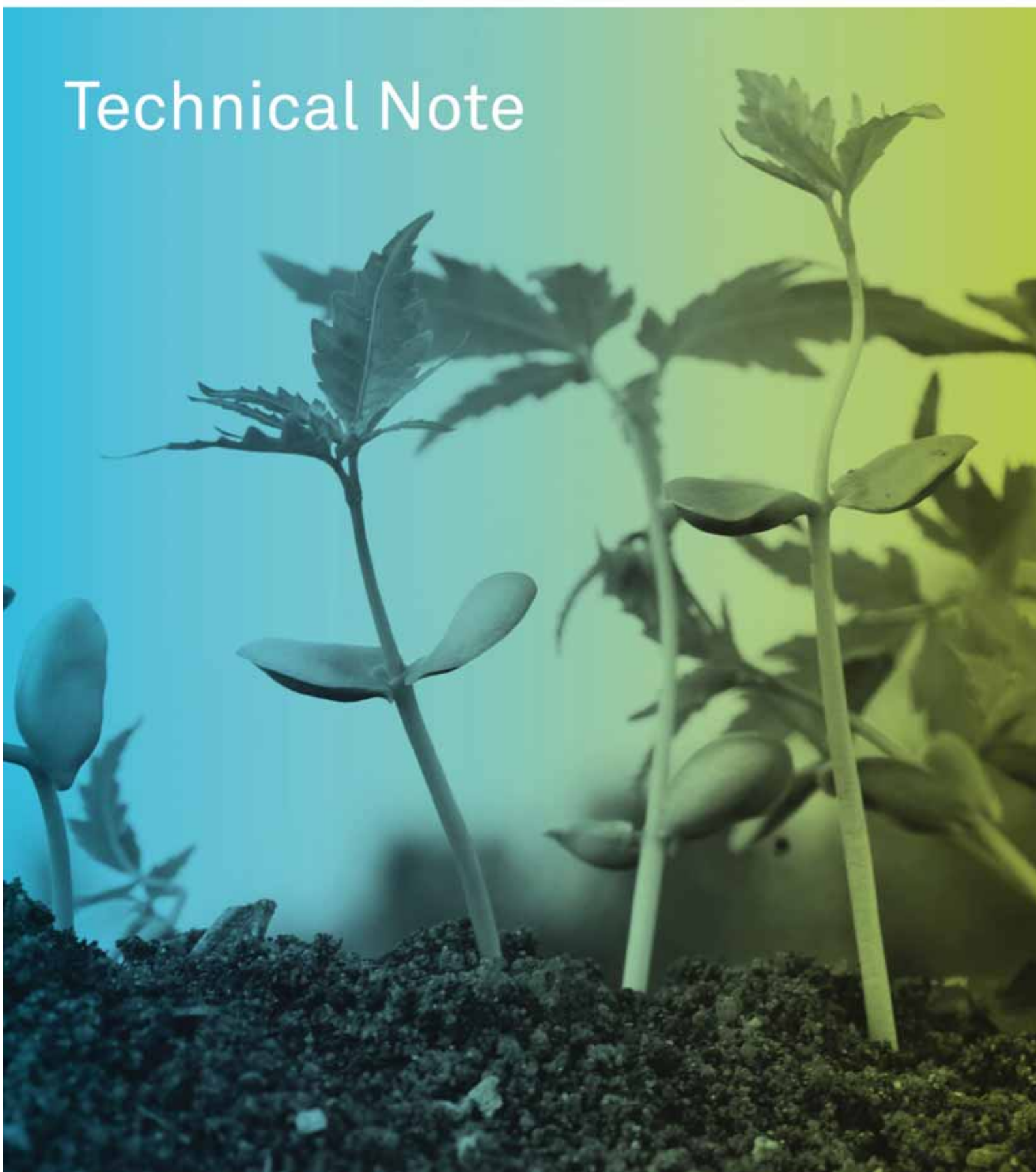
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2012/13		Households without dependent children				Households without dependent children				Households without dependent children				
		Australia				Capital Cities				Balance of Nation				
		Couple under 65	Couple 65 years and over	Single adult under 65	Single adult 65 years and over	Couple under 65	Couple 65 years and over	Single adult under 65	Single adult 65 years and over	Couple under 65	Couple 65 years and over	Single adult under 65	Single adult 65 years and over	
HOUSEHOLD EXPENDITURE (weekly)														
Electricity	\$	28.8	25.3	17.7	16.1	28.7	26.2	17.7	16.0	29.2	24.1	17.6	16.3	
Mains gas	\$	7.6	6.4	4.9	4.7	9.7	9.2	5.9	6.2	3.8	2.9	3.0	2.6	
Food	\$	265.7	199.5	116.8	93.0	284.4	218.6	122.1	100.4	232.4	175.0	106.2	83.1	
Other goods and services	\$	1,359.8	834.3	731.4	398.7	1,427.9	871.8	772.0	413.1	1,237.8	786.3	651.3	379.2	
Total expenditure on goods and services		\$	1,662.0	1,065.5	870.8	512.5	1,750.8	1,125.8	917.8	535.6	1,503.2	988.3	778.0	481.1
CARBON PRICE IMPACT (weekly)														
Electricity	\$	2.9	2.5	1.8	1.6	2.9	2.6	1.8	1.6	2.9	2.4	1.8	1.6	
Mains gas	\$	0.4	0.3	0.3	0.2	0.5	0.5	0.3	0.3	0.2	0.2	0.2	0.1	
Food	\$	1.3	1.0	0.6	0.5	1.4	1.1	0.6	0.5	1.2	0.9	0.5	0.4	
Other goods and services	\$	5.5	4.0	2.8	2.0	5.6	4.2	2.7	1.9	5.4	3.8	2.8	2.0	
Total impact		\$	10.2	7.9	5.4	4.3	10.4	8.4	5.4	4.4	9.7	7.3	5.3	4.2
Increase in expenditure		%	0.61%	0.74%	0.62%	0.84%	0.60%	0.75%	0.59%	0.82%	0.65%	0.74%	0.68%	0.87%
HOUSEHOLD INFORMATION														
Share of total households	%	23.5%	10.4%	15.7%	8.7%	15.1%	5.9%	10.4%	5.0%	8.4%	4.6%	5.3%	3.7%	
Average income for this household type (weekly)	\$	2,455	1,203	1,164	587	2,640	1,321	1,262	617	2,125	1,052	971	547	
Average income for this household type (annual)		127,684	62,568	60,519	30,549	137,294	68,715	65,603	32,107	110,503	54,700	50,489	28,436	
Average age of reference person		46.2	73.1	45.3	75.7	45.1	72.9	44.5	76.2	48.2	73.4	46.9	74.9	
Average number of children under 18 years		0.0	0.0	-	-	0.0	0.0	-	-	0.0	-	-	-	
Average number of adults 18-64 years		2.2	0.4	1.0	-	2.3	0.4	1.0	-	2.2	0.3	1.0	-	
Average number of adults 65 years or older		0.1	1.8	-	1.0	0.1	1.8	-	1.0	0.1	1.8	-	1.0	
Average number of people		2.3	2.2	1.0	1.0	2.3	2.2	1.0	1.0	2.3	2.1	1.0	1.0	

Appendix

B

Technical Note



Appendix B Technical Note (See separate Technical Note)

