GBE price reform — effects on household expenditure

Industry Commission Staff Information Paper

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Forming the Productivity Commission

The Commonwealth Government, as part of its broader microeconomic reform agenda, is merging the Bureau of Industry Economics, the Economic Planning Advisory Commission and the Industry Commission to form the Productivity Commission. The three agencies are now co-located in the Treasurer's portfolio and amalgamation has begun on an administrative basis. While appropriate arrangements are being finalised, the work program of each of the agencies will continue. The relevant legislation will be introduced soon. This report has been produced by the Industry Commission.

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October 1996

Companion publications

Annual Report 1995-96

The Commission's Annual Report outlines the importance of a broad-based microeconomic reform program in raising productivity and improving living standards. The reform program includes areas with obvious social and equity considerations. The report explores what productivity gains through broad-based microeconomic reform mean for equity in our society.

Regulation and its Review: 1995–96

This publication discusses issues and developments in regulation. It also covers developments in regulatory review policies and practices and the operations of the Office of Regulation Review.

Reform and the Distribution of Income — An Economy-wide Approach

This Staff Information Paper illustrates the effects on the distribution of household income caused by industry structural change arising from a set of reforms, relating to tariffs, contracting out by government, electricity and telecommunications.

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Abbreviations

ABS	Australian Bureau of Statistics
CPI	Consumer price index
GBE	Government business enterprise (includes government trading and government financial enterprises)
HES	Household Expenditure Survey
IC	Industry Commission
WSD	Water, sewerage and drainage

GBE price reform — effects on household expenditure

This paper examines direct and indirect expenditure by households on electricity and water, sewerage and drainage services. Indirect expenditure arises because firms include the expenditure on these services in the prices of the goods and services they sell to households. Price reforms in electricity and water, sewerage and drainage that reduce cross-subsidies from firms to households cut the cost of producing the other goods and services that households buy. In part, this offsets any direct price increases that households experience. Average national price changes from 1990–91 to 1994–95 are used to illustrate these effects. For electricity, the overall effect is a reduction in total household expenditure. For water, sewerage and drainage, it is an increase. These effects also vary with the level of income. The results of this study illustrate how considering only the direct effects of GBE price reform may overstate any negative impacts on household expenditure.

INTRODUCTION

Many studies assess the impacts of price reform by government business enterprises (GBEs) on household expenditure by focussing solely on the change in the price charged to the households for the service. Largely neglected are the effects of changes in GBE prices on the prices of the other goods and services consumed by households. These indirect effects become more important as GBE reform spreads throughout Australia.

This paper illustrates both the short-run direct and indirect effects on household expenditure of price changes in the electricity and water, sewerage and drainage (WSD) sectors. These sectors were chosen because:

- electricity and WSD are important services to both households and industries;
- reforms have been occurring in both these industries; and
- the charges for these services have high visibility to households because of the periodic way in which they are billed.

The direct and indirect price effects on expenditure are estimated using data from the ABS Household Expenditure Survey (HES) and an input–output model of the economy. The next section outlines the method used to determine the expenditure effects. The third section discusses how direct and indirect purchases of electricity and WSD vary across household income groups. The changes in household expenditure that arise from observed changes in average national electricity and WSD prices are discussed in the fourth section. The final section provides a summary of the exercise.

FRAMEWORK

GBE price reform affects household expenditure in two ways:

- directly — through the purchase of GBE services; and
- indirectly — through the purchase of goods and services from businesses which, in turn, purchased GBE services.

Figure 1 illustrates direct and indirect purchases of electricity and WSD. Direct purchases of electricity and WSD services are made by households, businesses and government.[1] Businesses then produce goods and services, which use varying amounts of electricity and WSD in their production. The output of businesses are ultimately purchased by governments and households, and used for investment and exports. Households are 'indirectly' purchasing the electricity and WSD purchased by business because business includes these costs in the price they charge.

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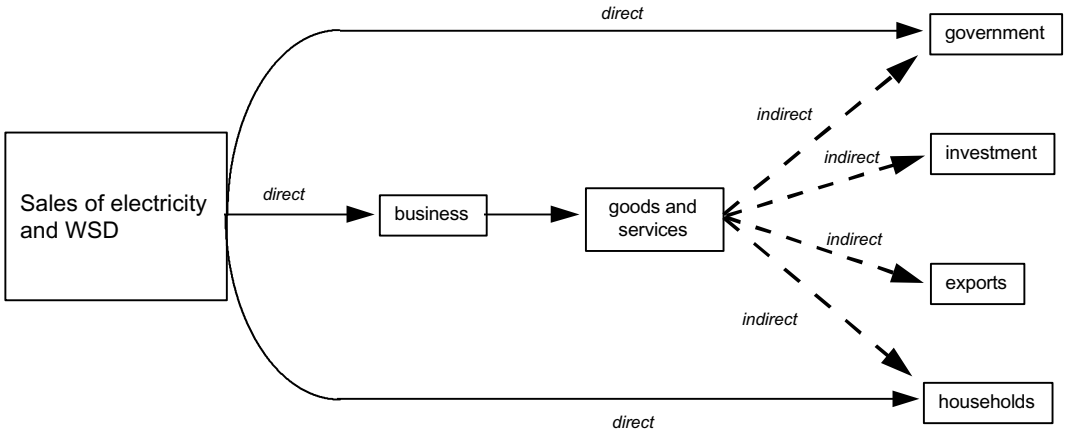
[1] Exporters and investors do make direct purchases of electricity and WSD sales, but as they account for less than 1 per cent of electricity and WSD sales, they are not illustrated.

This study concentrates solely on 'price' effects and assumes that households do not adjust their consumption of goods and services in response to changing prices. That is, a household facing a higher price for electricity does not respond by trying to use less. The model assesses how much more or less a household has to pay to buy the same quantities of goods and services as it did before the price changes.

Figure 1: Mapping direct and indirect purchases of electricity and WSD



Similarly, businesses are assumed to be unresponsive to changing prices. For example, if the price of electricity falls, the model assumes that the types of goods and services, their levels of production and the production processes used are unaffected. In addition, businesses are assumed to pass on the changes in the prices of electricity and WSD completely to their customers through changes in the prices of their goods and services.

The model also assumes that the prices and quantity of imports are unchanged and that commodity taxes are ad valorem. Further, there are no flow-on effects, such as changes in the industrial structure of the economy, employment by industry, and wages. A companion publication to this paper (IC 1996b) illustrates some of these aspects of microeconomic reform using a general equilibrium framework.

Although these assumptions are restrictive, they simplify calculations considerably and complement many of those made commonly in studies of the direct effects on households of price reform by GBEs. The analysis is a useful starting point to give an illustration of the relative magnitudes of

direct and indirect effects inherent in price changes and, in particular, to highlight how indirect effects may offset direct effects.

To calculate indirect purchases of electricity and WSD by households requires knowledge of the goods and services purchased by households and the amount of electricity and WSD that goes into producing them. These are discussed below.

CALCULATING INDIRECT PURCHASES USING AN INPUT–OUTPUT MODEL

Information on the amount of electricity and WSD embodied in the goods and services purchased by households is obtained from an input–output model of the economy. This model is based on the 1989–90 Orani database (Kenderes and Strzelecki 1995) which is a modified version of the ABS input–output tables.

In the input–output model, each industry produces only one commodity, so there are 107 commodities and 107 industries. The price of a commodity is defined as its average cost. In turn, the average cost of a commodity is the sum of its per unit requirements for each input multiplied by the price of each input.

The price of any commodity may be expressed as the sum of the value-added in Australia (including indirect taxes incurred in production), imports and commodity taxes on final demand. The contribution of a particular industry, say electricity or WSD, to the price of a commodity is then given by the percentage of the product price accounted for by value-added from that industry. This approach takes account of the complex input–output linkages present in the economy, and avoids double counting across all commodities.

To calculate the contribution of each industry to the price of each commodity, a system of 107 price determination equations is solved. [2]

To calculate the effect of changes in the real price of electricity or WSD on the price of commodities which use this GBE service, the price equation for that service is excluded from the system of price determination equations. For example, excluding the electricity price equation from the system

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[2] Methods for manipulating such systems of equations are discussed in IAC (1989).

results in the non-electricity prices being expressed as a function of the price of electricity and the value-added of non-electricity fixed factors. This system also enables different electricity prices to be faced by different categories of non-residential customers (that is, commercial, industrial and government).

Calculated in this way, the price is based on the ex-factory price of a domestically produced commodity. However, the prices faced by households include the margins and commodity taxes incurred between the factory and the final purchaser. Thus, transport costs, wholesalers' and retailers' margins, and insurance must be taken into account. [3]

Households buy both imported commodities as well as domestically produced commodities. However, price changes to WSD and electricity in Australia do not feed into the prices of imported goods. The greater the share of imported goods used to produce goods and services purchased by households, the smaller will be the proportion of electricity embodied in the good.

A summary of the resulting allocations of direct and indirect purchases of electricity and WSD are shown in figure 2. Panel A shows that business is the largest direct user of electricity and households account for the largest direct share of WSD. In panel B, the direct purchases by businesses of both electricity and WSD are allocated to households, investment, government and exports.

Panel C then combines the direct and indirect share of the purchase of electricity and WSD for households, investment, government and exports. Although households only account for 31 per cent of direct expenditure on electricity, once their indirect purchase is taken into account, this figure increases to 59 per cent. The corresponding figures for WSD are 51 and 72 per cent.

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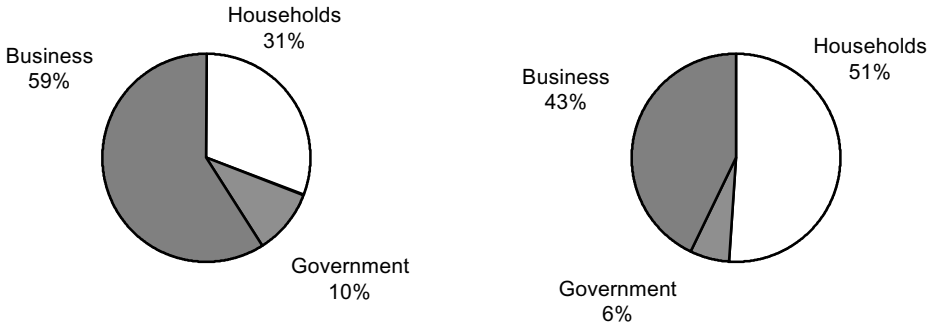
[3] The margin classifications in the input–output model are: wholesale trade; retail trade; road transport; railway transport; water transport; air transport; services to transport; insurance; and restaurants, hotels and clubs.

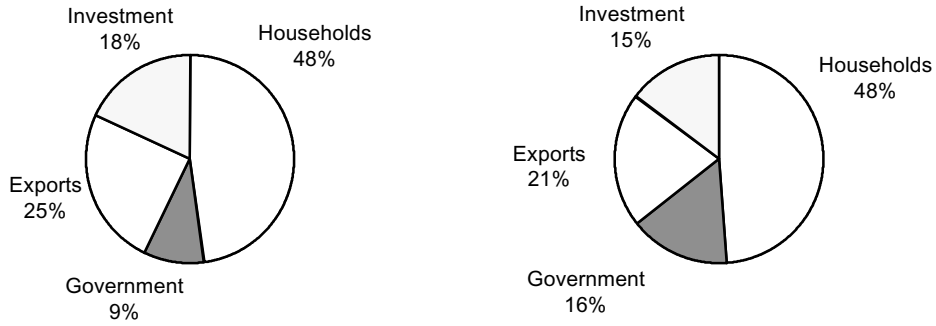
Figure 2: Direct, indirect and total purchases of electricity and WSD, 1989–90

Electricity ***WSD***

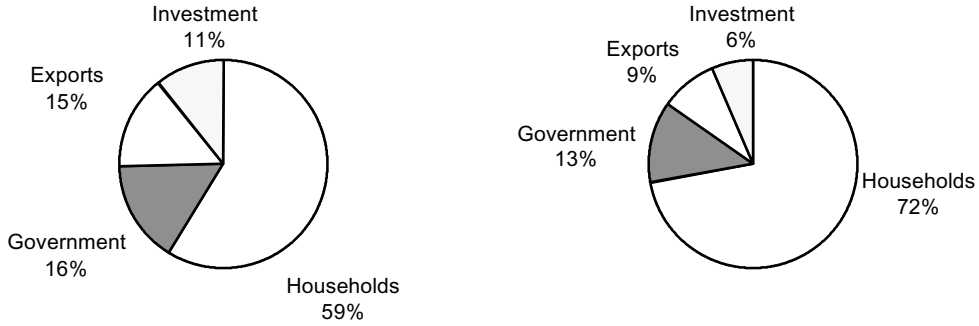
Panel A: Share of direct purchases by final user [a,b]



Panel B: Share of indirect purchases by final consumer of business's electricity and WSD



Panel C: Share of total purchases of electricity and WSD by final consumer



a Exports and investment (fixed capital expenditure) account for less than 1 per cent of electricity and WSD sales.

b Household share of WSD includes all sales to the industry Ownership of Dwellings. No distinction is made between home owners and renters.

Source: Commission estimates

CALCULATING DIRECT AND INDIRECT EXPENDITURE SHARES USING THE HOUSEHOLD EXPENDITURE SURVEY

The database on household expenditure is obtained from the unit record file of the ABS 1988–89 HES (ABS 1989). This file contains expenditure on 421 commodity groups by 7225 households selected to be representative of households in private dwellings and caravan parks across Australia.

To estimate a household's indirect purchases of electricity or WSD, the 421 HES commodity groupings were first mapped into the 107 input–output commodity groupings using an unpublished ABS concordance. For each household in the database, the share of indirect electricity and WSD in each commodity was used to scale the effects of changes in electricity and WSD expenditure on each commodity. Summing these across all commodity groups gives the change in expenditure arising from the indirect purchase of electricity and WSD.

Households were then allocated to household income equivalent deciles by dividing household incomes by household size (using an equivalent adult scale).[4] The equivalent adult weighting scheme of Agrawal (1987) was used. In this scheme, the first adult receives a weight of 1, additional adults or dependent children aged 15–20 who are studying full-time receive a weight of 0.7 and dependent children aged less than 15 years receive a weight of 0.4.

Throughout this paper income deciles are referred to as income groups. The lowest income group (decile) consists of households in the bottom 10 per cent of the ranking, the second income group is the next 10 per cent and so on.

Table 1 shows the share of electricity and WSD in the cost of a good or service, recognising that this includes both their direct use in the production of the good or service and their use in the production of other inputs, which in turn are used to produce the good or service.

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[4] Household total expenditure is interpreted as a proxy for household income because HES income estimates underestimate actual income (ABS 1989 p. 2 and Wright and Dolan 1992).

Table 1: Shares of electricity and WSD in the cost of other goods and services and the share of goods and services in household expenditure (per cent)

Commodity	*Share in the cost of other goods and services*		*Commodity share in household expenditure*
	Electricity	*WSD*	
Current housing costs excluding water and sewerage rates[a]	0.88	1.70	12.19
Water and sewerage rates	3.71	na	0.87
Fuel and power excluding electricity	0.72	0.32	0.52
Electricity	na	0.36	1.82
Food and non-alcoholic beverages	1.25	0.51	17.40
Alcoholic beverages	1.00	0.34	3.08
Tobacco	0.40	0.13	1.25
Clothing and footwear	0.86	0.26	5.57
Household furnishings and equipment	0.91	0.24	6.80
Household services and operation	1.15	0.29	4.39
Medical care and health expenses	1.08	0.54	3.96
Transport	0.72	0.22	14.69
Recreation	1.00	0.38	11.42
Personal care	1.25	0.30	1.80
Miscellaneous goods and services	0.87	0.36	7.09
Other capital housing costs	0.95	0.21	4.08
Superannuation and life insurance	0.82	0.63	3.06

na not applicable.

a Payments on mortgage principal are excluded as they reflect a change in debt–equity, not consumption.

Source: Commission estimates

Share sizes are small because the electricity and WSD sectors are small compared to the economy, but there is considerable variation across commodities and services. For example, electricity's share in personal care items (1.25 per cent) is more than three times its share in tobacco (0.40 per cent). The low shares of electricity and WSD in tobacco reflect, in part, the high level of tax on tobacco.

High shares do not necessarily correspond with high use because different user groups may pay different prices. For example, in 1989–90, WSD charges were often assessed according to property values rather than the level of WSD service provided. Melbourne Water estimated that charges assessed according to property values before WSD reform led to a residential user in a house paying an effective price of $0.66 per kilolitre of water and an office tower in the Melbourne central business district paying an effective price of $10.16 per kilolitre of water (Tasman Economic Research 1992). Thus the high cost share of WSD in superannuation and life insurance, for example, may reflect these considerations.

DIRECT AND INDIRECT PURCHASES BY HOUSEHOLD INCOME GROUP

This section discusses how direct and indirect purchases of electricity and WSD vary across household income groups.

The average expenditure shares of electricity and WSD (as a share of total expenditure) in each income group are presented in table 2.

Four features are worth noting:

- the direct and indirect expenditure shares are small for both electricity and WSD;
- the direct shares are larger than the indirect shares for both electricity and WSD, with the electricity share generally larger than that for WSD;
- the direct shares of both electricity and WSD and the indirect shares for WSD fall with income; and
- the indirect shares for electricity vary little with income — the shares of electricity in the different combinations of commodities purchased, by each income group, average out to about the same total share.

In making these observations, it is important to realise that the characteristics of households and their expenditure patterns differ between and within income groups. These are determined by a range of demographic and socio-economic factors. These factors are likely to include prices of

Table 2: Direct and indirect shares of electricity and WSD in household expenditure by household income group (per cent)

	Electricity		*WSD*		*Total*
Income group	*Direct*	*Indirect*	*Direct*	*Indirect*	
First (lowest)	2.46	0.95	0.91	0.64	4.96
Second	2.86	0.97	1.30	0.60	5.73
Third	2.38	0.97	1.07	0.56	4.97
Fourth	2.23	0.97	0.99	0.53	4.72
Fifth	1.97	0.97	1.01	0.47	4.42
Sixth	1.82	0.96	0.84	0.50	4.12
Seventh	1.66	0.96	0.87	0.48	3.97
Eighth	1.54	0.96	0.73	0.50	3.73
Ninth	1.47	0.97	0.71	0.51	3.66
Tenth (highest)	1.30	0.97	0.75	0.50	3.51
Average	**1.82**	**0.97**	**0.87**	**0.51**	**4.17**

Source: Commission estimates

commodities, source of income, family size, the age of family members, nature of housing occupancy, geographic location and climate. For example, the majority of households in the bottom three groups rely on government benefits for their principal source of income while households in the top three groups rely overwhelmingly on wage and salary income. Thus price changes will affect households differently. Further statistical work on the relative importance of different factors to household expenditure patterns (both direct and indirect) is currently being undertaken at the Commission.

COST EFFECTS OF GBE PRICE REFORM

This section considers the changes in household expenditure that arise from the observed changes in average national electricity and WSD prices from 1990–91 to 1994–95. 1990–91 is taken as a starting point because in July 1991 the Special Premiers' Conference agreed to examine a proposal to start a national electricity grid (IC 1995). The effects of price changes in electricity and WSD are considered separately and then together. In so

doing, the estimates illustrate how, from 1990–91 to 1994–95, the indirect effects on households of price reductions to business could offset direct effects of price increases to households and how the degree of offset varies across households.

Price reform — changes in residential and business prices — is a consequence of a number of aspects of GBE reform, including the elimination of cross-subsidies from business to households, the reduction of GBE costs through more productive use of labour and capital, and pricing schemes that recover the full costs of capital (IC 1995). Year–to–year movements in prices will also reflect changes in the cost of primary inputs. For instance, the cost of coal in electricity generation, and changes in the costs of other inputs. Consequently, observed price changes cannot be attributed solely to GBE reform.

Estimates of direct price changes reflect nationwide averages. Price reform across states and municipalities is more complex than the average changes used in the calculations. Indeed, significant features of electricity and WSD price reform have been the development of pricing schemes that promote efficiency and conservation, by charging consumers based on their use of, access to, and cost of service. Analysis of the effects of reform for specific states or municipalities requires specific information. Caution must be exercised in applying the estimated average effects to any individual household or business. Nevertheless, the use of nationwide averages should give approximate indications of the relative and absolute sizes of direct and indirect cost effects of electricity and WSD reform.

ELECTRICITY PRICE CHANGES

Electricity price changes from 1990–91 to 1994–95 vary across states. All states except Victoria had relatively stable residential prices over the four-year period (table 3).[5] In contrast, New South Wales, South Australia and Western Australia had significant reductions in the prices charged to business. Consequently, the average residential price increased by 3 per cent and average business price fell by 13 per cent over the four-year period. On average, cross-subsidies have been reduced by keeping

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[5] Price changes for the previous four years are given as points of comparison.

Table 3: Change in real electricity prices from 1986–87 to 1990–91 and from 1990–91 to 1994–95[a] (per cent)

	Residential		*Business*	
State	*1986–87 to 1990–91*	*1990–91 to 1994–95*	*1986–87 to 1990–91*	*1990–91 to 1994–95*
NSW	-4	-1	-5	-24
Vic	-6	18	-18	-8
Qld	-22	-4	-18	1
SA	-6	1	-14	-20
WA	-6	-4	-11	-17
Tas	1	4	-4	3
NT	-19	-1	-22	-1
ACT	-1	0	2	-5
Total	**-8**	**3**	**-12**	**-13**

a Calculated from residential, commercial and industrial prices using consumption quantities for 1990–91.

Source: ESAA (1992, 1996)

relatively stable in real terms and lowering prices to business. Victoria, in contrast, chose to pass on cost savings initially to taxpayers by increasing the return to existing capital, with consumers to benefit later as competition in electricity generation is introduced (IC 1995).

Applying the estimated price changes to household expenditure patterns, the overall effect — taking into account both direct and indirect effects — is a reduction in household expenditure of 0.14 per cent or $50 a year per household (table 4). The reduction in expenditure tends to increase in both percentage and dollar terms as income increases.

Household consumption patterns vary within income groups. Although expenditure in each income group declines on average after the electricity price changes, it increases for 5 per cent of households by an average of $9 a year per household (table 5). This compares with an average reduction of $50 a year per household for all households (table 4). In the lowest income group, household expenditure increases for 11 per cent of

households. Most households in the lower three income groups whose

Table 4: Change in household expenditure from changes in electricity prices by income group[a,b]

Income group	*Direct effects (per cent)*	*Indirect effects (per cent)*	*Total[c] (per cent)*	*1995–96 $ per year*
First (lowest)	0.07	-0.19	-0.11	-29
Second	0.09	-0.19	-0.11	-18
Third	0.07	-0.19	-0.12	-29
Fourth	0.07	-0.19	-0.13	-37
Fifth	0.06	-0.19	-0.13	-50
Sixth	0.05	-0.19	-0.14	-56
Seventh	0.05	-0.19	-0.14	-63
Eighth	0.05	-0.19	-0.14	-68
Ninth	0.04	-0.19	-0.15	-71
Tenth (highest)	0.04	-0.19	-0.15	-84
Average	0.05	-0.19	**-0.14**	**-50**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing two points are worth noting. First, changes in the CPI reflect, in part, the reform that has been introduced to date. Second, the CPI is based on the expenditure pattern of a representative household and this may not be representative for each income group.

c Totals may not add due to rounding.

Source: Commission estimates

household expenditure increases, have government payments as their principal source of income. [6]

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6 These include age, invalid or wife's pensions; sole parent or widow's pensions; unemployment benefits; sickness benefits; veterans affairs pensions; and family, student, child endowment or other government benefits.

Table 5: Share of households by income group whose expenditure increases after changes in electricity prices[a,b]

		Households whose expenditure increases		
Income group	*Share whose expenditure increases (per cent)*	*Average change in cost (per cent)*	*Average change in cost (1995–96 $ per year)*	*Proportion whose principal source of income is government payments (per cent)*
First (lowest)	11	0.09	11	74
Second	13	0.07	6	93
Third	6	0.10	11	86
Fourth	6	0.05	7	38
Fifth	3	0.05	7	10
Sixth	2	0.03	5	0
Seventh	3	0.10	15	1
Eighth	3	0.03	7	0
Ninth	1	0.06	10	0
Tenth (highest)	2	0.08	14	0
Average	**5**	**0.07**	**9**	**57**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing, two points are worth noting. First, changes in the CPI reflect, in part, the reforms that have been introduced. Second, the CPI is based on the expenditure pattern of a representative household and this may not be representative for each income group.

Source: Commission estimates

Often a household's receipt of government payments entitles it to electricity and WSD price concessions. No attempt was made to estimate changes in electricity and WSD concessions to these groups that may have occurred from 1990–91 to 1994–95. Any increased concession that offsets an average price increase would lessen the impact of residential price increases on concession groups and in such cases the estimated increase in expenditure would overstate what actually occurred. By the same token, increased concessions would also mean that households that did not receive these concessions would pay prices greater than the estimated average, although the difference is likely to be small because there are more households that do not receive concessions than households that do.

WSD PRICE CHANGES

Data were not available to assess changes in WSD prices throughout Australia. Instead data from water authorities in Sydney, Melbourne and South Australia were used to calculate the price changes. Price changes have been relatively modest for these water authorities except for those to commercial and industrial users by the Sydney Water Corporation and those to residential and other users by the Melbourne Water Industry (table 6).

Table 6: Change in real WSD prices, 1990–91 to 1994–95 (per cent)

Municipality	*Residential*	*Commercial*	*Industrial*	*Other*
Sydney Water Corporation	7	-31	-18	1
Melbourne Water Industry[a]	23	2	8	21
Engineering and Water Supply Dept (Metropolitan)[b]	2	-4	5	-2
Engineering and Water Supply Dept (Country)[b]	5	10	5	-4
Average[c]	**12**	**-15**	**-6**	**9**

a The Melbourne Water Industry is a statistical aggregation of the three retail water businesses and the wholesale water business created when Melbourne Water was disaggregated on 1 January 1995.

b The Engineering and Water Supply Department was corporatised to form the South Australian Water Corporation from 1 July 1995.

c Calculated using revenue weights from 1990–91.

Source: SCGTE (1996)

The direct effect of WSD price changes on households is an increase in their expenditure. In contrast, the indirect effect is a reduction in the cost of other goods and services to households because of the reduction in average WSD prices to commercial and industrial users. The net effect of the changes is an increase in the average household expenditure for each income group (table 7). In percentage terms, the increase in expenditure tends to decrease with income. The dollar value of the cost changes varies with income with a slight and uneven upward trend.

Table 7: Change in household expenditure due to WSD price changes by income groups[a,b]

Income group	*Direct effects (per cent)*	*Indirect effects (per cent)*	*Total[c] (per cent)*	*1995–96 $ per year*
First (lowest)	0.11	0.01	0.11	29
Second	0.15	0.00	0.15	26
Third	0.13	-0.01	0.11	27
Fourth	0.12	-0.02	0.10	30
Fifth	0.12	-0.03	0.09	35
Sixth	0.10	-0.02	0.08	32
Seventh	0.10	-0.03	0.08	34
Eighth	0.09	-0.02	0.07	31
Ninth	0.09	-0.02	0.06	30
Tenth (highest)	0.09	-0.02	0.07	36
Average	0.10	-0.02	**0.08**	**31**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing two points are worth noting. First, changes in the CPI reflect, in part, the reform that has been introduced to date. Second, the CPI is based on the expenditure pattern of a representative household and this may not be representative for each income group.

c Totals may not add due to rounding.

Source: Commission estimates

On average, most households (87 per cent), spend more after WSD price changes. However, 13 per cent of households actually spend less (table 8). For those households who do spend more, the average increase in expenditure is $37 a year compared to the average $31 a year for all households. In the lowest income group, average household expenditure decreases for 16 per cent of the households with the average increase for the remaining 84 per cent being $36 a year per household.

The principal source of income for the majority of households in the lower three income groups whose expenditure increases is government payments. As discussed above, any increase in concession tied to the receipt of a government benefit would offset the estimated increase in expenditure in these income groups, thus offsetting the effects of price reforms in WSD.

Table 8: Share of households by income group whose expenditure increases after changes in WSD prices[a,b]

		Households whose expenditure increases		
Income group	*Share whose expenditure increases (per cent)*	*Average change in cost (per cent)*	*Average change in cost (1995–96 $ per year)*	*Proportion whose principal source of income is government payments (per cent)*
First (lowest)	84	0.15	36	63
Second	90	0.18	30	81
Third	87	0.15	33	62
Fourth	87	0.13	36	31
Fifth	90	0.11	40	9
Sixth	90	0.09	37	5
Seventh	87	0.10	42	2
Eighth	84	0.09	40	0
Ninth	86	0.08	37	1
Tenth (highest)	88	0.08	44	0
Average	**87**	**0.10**	**37**	**25**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing, two points are worth noting. First, changes in the CPI reflect, in part, the reform that has been introduced to date. Second, the CPI is based on the expenditure pattern of a representative household and this may not be representative for each income group.

Source: Commission estimates

COMBINING REFORMS

In this section, electricity and WSD price changes are considered jointly to illustrate how they interact.

For most income groups, the average expenditure savings to households from electricity price reforms are larger than the average increases in expenditure from WSD price changes (table 9). Therefore for households in these groups, when the effects of the two reforms are considered together, their average expenditure decreases. For the second income group, the average savings from electricity price changes are less than the average expenditure increases from WSD price changes. Average household expenditure thus increases for households in this income group.

Table 9: Combined change in expenditure due to electricity and WSD price changes by income group[a,b,c] (per cent)

Income group	*Electricity*	*WSD*	*Total*
First (lowest)	-0.11	0.11	0.00
Second	-0.11	0.15	0.05
Third	-0.12	0.11	-0.01
Fourth	-0.13	0.10	-0.03
Fifth	-0.13	0.09	-0.04
Sixth	-0.14	0.08	-0.06
Seventh	-0.14	0.08	-0.06
Eighth	-0.14	0.07	-0.08
Ninth	-0.15	0.06	-0.09
Tenth (highest)	-0.15	0.07	-0.09
Average	**-0.14**	**0.08**	**-0.05**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing, two points are worth noting. First, changes in the CPI reflect, in part, the reform that has been introduced to date. Second, the CPI is based on the expenditure pattern of a representative household and may not be representative of the expenditure pattern of each income group.

c Totals may not add due to rounding.

Source: Commission estimates

The average reduction in expenditure for most income groups masks the variation of outcomes across income groups. For example, although average household expenditure increases for 39 per cent of all households (table 10), reductions in average expenditure occurs for more than half of the households in each of the upper seven income groups.

Table 10: Share of households by income group whose expenditure increases after combining electricity and WSD price changes[a,b]

		Households whose expenditure increases		
Income group	*Share whose expenditure increases (per cent)*	*Average change in cost (per cent)*	*Average change in cost (1995–96 $ per year)*	*Proportion whose principal source of income is government payments (per cent)*
First (lowest)	53	0.15	28	65
Second	66	0.19	25	85
Third	55	0.16	26	72
Fourth	45	0.14	27	35
Fifth	39	0.11	28	14
Sixth	32	0.10	25	9
Seventh	30	0.12	33	2
Eighth	30	0.09	27	1
Ninth	21	0.10	29	2
Tenth (highest)	24	0.11	35	0
Average	**39**	**0.13**	**28**	**39**

a Calculated assuming that the underlying quantities purchased do not change.

b Dollar values have been inflated from the 1988–89 values in the HES to aid interpretation. In so doing, two points are worth noting. First, changes in the CPI reflect, in part, the reform that has been introduced to date. Second, the CPI is based on the expenditure pattern of a representative household and may not be representative of the expenditure pattern of each income group.

Source: Commission estimates

As before, most households in the lower three income groups whose expenditure increases after combined price changes also receive some government payment as their principal source of income. Any increases in concessions in electricity and WSD charges to these groups would reduce their estimated increase in expenditure. However, it should be noted that even without allowing for compensation mechanisms related to the receipt of government benefits, average expenditure does decrease for 47 per cent of those in the lowest income group. In addition, as only two sectors are considered here, it is quite possible that the households whose expenditure increases after electricity and WSD price changes would gain in an even broader package of GBE price changes.

SUMMARY

Much of the rationale for price reforms in GBEs is to obtain a more efficient and equitable allocation of costs to users. Price reforms affect household expenditure not only through their direct effects on the prices of the products subject to reform, but through indirect effects of the reforms on the costs of other goods and services consumed by households. It is important to be aware of these distributional effects as part of understanding the overall impact of price reforms in GBEs.

Traditionally, little attempt has been made to estimate the indirect effects of price reforms on the distribution of income. In this paper, a first attempt has been made to estimate both the direct and indirect effects of price reform in electricity and water, sewerage and drainage on the distribution of income by looking at expenditure by income group.

Although the caveats attached to the models used in this exercise need to be borne in mind when interpreting the results, the analysis illustrates the importance of allowing for indirect effects when estimating distributional impacts.

In the case of electricity, the reduction in household expenditure from the indirect price effects more than offsets the increase in expenditure from the direct effects for all income groups. The price reforms therefore result in an overall decrease in household expenditure in each income group. This overall decrease in expenditure appears to increase with income, both relatively and absolutely.

In the case of WSD, the results do not exhibit the same smooth trends. Here, the direct price effects increase household expenditure in each income group. Apart from households in the lowest income group, the relative increases in expenditure appear to decrease with income. However, the change in expenditure from the indirect price effects are insufficient to offset those from the direct price effects. Therefore, the overall price effects of this reform result in an increase in expenditure for each income group. Both the relative increase in expenditure and the absolute increase tend to decrease with income.

The results illustrate how overall increases in expenditure from one reform (WSD in this case) can be partly offset by overall decreases in expenditure from another reform (electricity). Considering both reforms together, most income groups realise small expenditure decreases, although the changes

are almost totally offsetting for the lowest income group, with the second lowest income group experiencing a small increase in expenditure.

The study suggests that considering only the direct effects of GBE price reform is likely to overstate the negative impacts on household expenditure.

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