Cheaper and Easier Way of Achieving Emission Reductions - Energy demand management

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Executive Summary

This paper proposes the implementation of an environmental scheme, termed '*Energy Incentive Policy*' (EIP), in addressing an imminent energy crisis facing Australian families. Energy prices have been rising significantly in past few years and are set to soar with the introduction of emission reduction schemes; causing further worsening of social inequity. EIP is designed to address issues behind these price rises as it sets out to improve efficiency in energy consumption, reduce emissions from energy production and at the same time, ensure provisions of utilities to all members of society.

EIP is able to achieve this by varying individuals' and businesses' utility expenditure in line with their consumption habits and ability to pay. This means high income earners and profitable businesses would face higher opportunity costs in their consumption of non-renewable energy, and hence attract higher financial penalties when they over-consume. However, it does not mean EIP simply punishes the rich to subsidise consumption of the poor. In fact, because of their higher opportunity costs, EIP offers them generous financial incentives for adopting sustainable living. Hence, the scheme actually targets those that are most environmentally irresponsible to fund economic transitions to a sustainable future.

In addition, EIP is a highly efficient and low cost environmental scheme. It is built on existing progressive income tax system, and does not need new enforcement mechanisms or additional monitoring systems by authorities. Once implemented, EIP essentially lets market forces direct investments into various sources of renewable energy and influence households' and businesses' energy consumption levels.

EIP has the ability to achieve more and at a faster pace than most current environmental policies. Not only does it promote conservatism and a switch to renewable energy, the scheme has the potential to reduce emission levels at a much faster pace. Yet, all these are achieved without adversely affecting most vulnerable members of the society. EIP is the most promising scheme for all individuals to embark on a lifestyle change and contribute to the economies' social and environmental wealth.

Abbreviations list:

ABN	Australian Business Number
ABS	Australian Bureau of Statistics
AER	Australian Energy Regulator
ATO	Australian Tax Office
CPRS	Carbon Pollution Reduction Scheme
DCCEE	Department of Climate Change and Energy Efficiency
DEWHA	Department of the Environment, Water, Heritage and the Arts
EIP	Energy Incentive Policy
ETS	Emission Trading Scheme
GHG	Greenhouse Gas
ORER	Office of the Renewable Energy Regulator
R&D	Research and Development

Content page

1. Background

It is increasingly apparent that Australian families today are facing a major energy affordability crisis. One of the major causes of this growing hardship has been the sharp rises in electricity prices in recent years. Australian Industry Group in February 2011 estimated that Australian electricity retail price will increase “by at least 100% from 2008 levels by 2015”, having already risen “an average of 30% between 2006 and 2010” (Ai Group, 2011).

Most recent studies have advised government of expansions of existing utility rebate programs to low income households and/or price control through subsidisation (QCOSS, 2010), yet these are expensive measures and hence subject to budgetary constraints. Economically, these equitable subsidies are in fact inefficient. As many educational textbooks would teach new economists, subsidies lead to ‘misallocation of resources’ in an efficient market. In economic theory, subsidies to consumers encourage over-consumption and subsequently create a dead weight loss. Hence, while most energy rebates are targeted at low income families with difficulties meeting their basic utility needs, this process is nonetheless costly and inefficient. Costs to government and economy include increasing tax burdens on high income earners, setting up agencies for eligibility assessments, and organising distributions. In addition, as energy price soars, these budgetary costs continue to expand.

Unfortunately, current policies continue in the absence of more efficient solutions. In fact, they may need to be expanded as rising investment cost of energy infrastructure persists (AER, 2010) and emission reduction schemes are implemented. The cost to government will increase exponentially as more families turn to social securities for assistance. In KPMG’s 2008 study, it recommended the Australian government to provide an additional $11.2billion over 7 years in assistance to low and middle income family if a Carbon Pollution Reduction Scheme (CPRS) was implemented (KPMG, 2008).

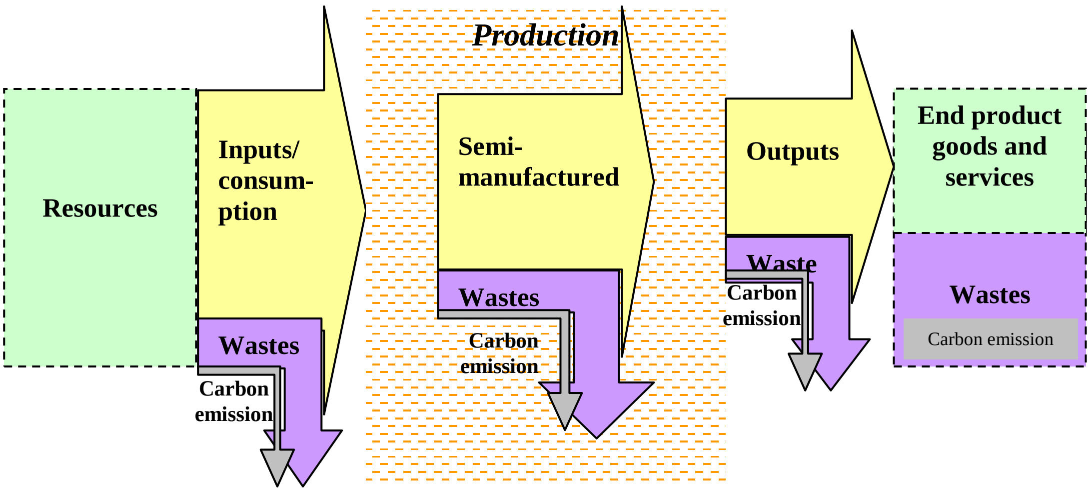
Compounding to recent rising utility costs is the looming implementation of emission reduction schemes. In 2011, Australian government announced the introduction of a temporary carbon tax on major industry polluters to be converted into a trading scheme in later years. This will certainly increase the cost of electricity and other essential services dramatically. According to NSW Independent Pricing and Regulatory Tribunal (IPART), price of electricity would have increased by 46-60% if the CPRS was introduced (ABC News, 2010). In addition to these concerns, most emission policies are being criticised for difficulties in accurate measurements, high cost of policing, and being incomplete in addressing environmental degradations (Productivity Commission, 2007; Humphreys, J. and Malpass, L., 2009; Gittins, R., 2011).

In economic studies, efficiency in production can be divided into two separated but interrelated categories: efficiency in the use of input resources and efficiency in maximising outputs to reduce waste. This applies to both households and businesses alike.

For households, an example of input efficiency is purchasing a water-saving showerhead, while output efficiency is collecting grey water for gardening use. The two are implemented for different intentions but their impacts are interrelated. Water-saving showerheads directly reduce the use of water, and indirectly reduce the amount of sewage created from showering. On the other hand, recycling grey water for gardening directly reduces the amount of waste entering into sewage system, and indirectly reduces water demand required for gardening. Yet only partial offsets are possible as grey water is usually contaminated with grease and harmful chemicals.

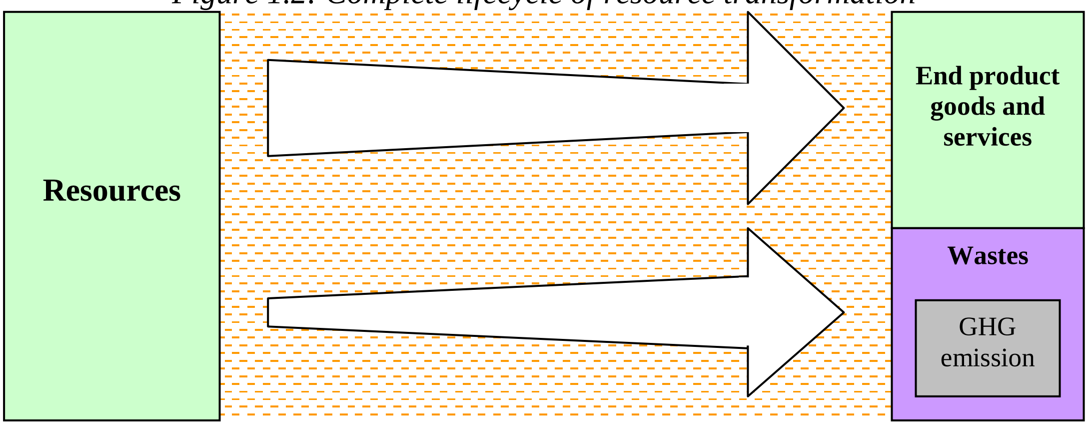
The above example highlights a major concern of Carbon Pollution Reduction Scheme as it targets efficiency in minimising outputs of greenhouse gas (GHG) emissions only. The scheme is built upon reducing wastes and *not* necessarily reducing consumption of limited resources. Professor Paul Ekins went further and argued in his 2009 paper, "a focus only on greenhouse gas emissions reduction runs the risk of increasing unsustainable use of raw materials" (Ekins, P. et al, 2009). Figures 1.1 and 1.2 show that carbon emission only represents a fraction of total wastage from production, which in turn represents a small part of total resources consumed. In fact, it is possible that in order to reduce carbon emissions, more energy may need to be put into the production process.

Figure 1.1: deficiencies in emission-targeted policy



Following Figure 1.2 is a simplification of Figure 1.1:

Figure 1.2: Complete lifecycle of resource transformation



From above Figures 1.1 and 1.2, it is clear that GHG emissions represent only a part of wastes during the transformation of input resources. Focusing on this may reduce the emission, but may not necessarily reduce consumption of limited resources. Worse, wastes are estimated by corporations themselves, who have little incentives in measuring accurately. Comprehensive and costly audits are required or the system will be rendered useless. If the focus is on *input efficiency*, not only it encourages investments in technologies that consume less resources, it also reduces in GHG emissions and *all* other wastes. Professor Paul Ekins agrees: "emissions will fall… (when these) policies reduce extractions, but there is no guarantee that reducing emissions will reduce extractions… (in fact) may increase them" (Ekins, P. et al, 2009). In the paper, he gave an example where more energy is used to power transformation of wastes from one form to another. On the other hand, policies to reduce consumption will promote resource productivity through all stages of production, reduce extractions of limited resources and potentially have more substantial impacts on emission reduction.

In consequence, this paper seeks to introduce a market mechanism whereby households and businesses in various economic circumstances are presented with financial incentives to control their consumption of limited, environmentally damaging, yet highly essential resources. Through this mechanism, not only will the economy improves efficiency in resource utilisation, it will encourage investments in the development of renewable resources.

2. Introduction

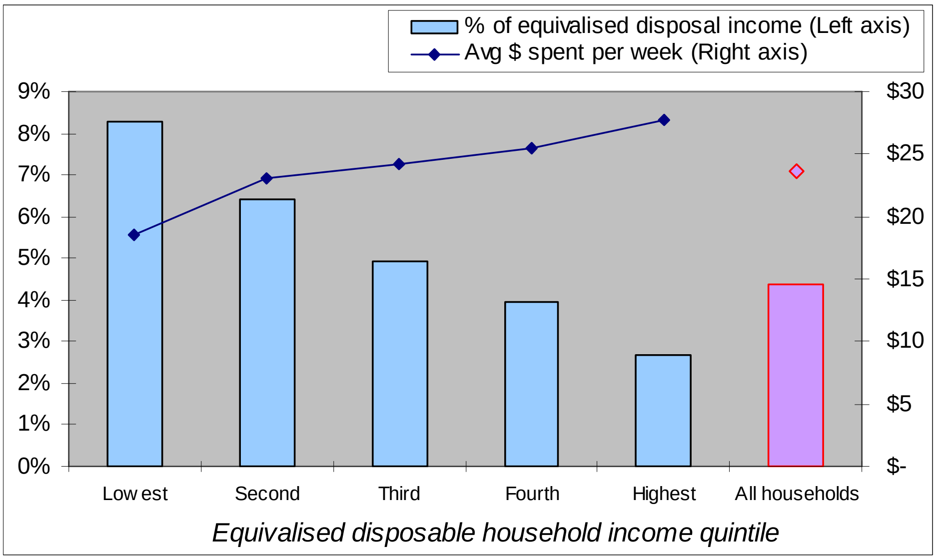
This paper proposes the use of a hybrid scheme, termed *'Energy Incentive Policy'* (EIP), in addressing an imminent energy crisis facing Australian families. In essence, this policy varies individuals' and businesses' utility expense in encouraging them to reduce energy consumption and indirectly, greenhouse gas emissions. This scheme is set out to address three main economic, environmental and social issues confronting the current government:

1. improving efficiency in energy consumption
2. reducing emissions from energy production
3. ensuring provisions of basic energy supplies to all members of society

EIP achieves these goals by imposing comparable opportunity costs to different income groups. Understandably, to be an effective system, a higher income earner would have to face a higher opportunity cost in order to be discouraged from same amount of consumption as a low income earner would. Yet, utility prices have never been set up this way. Despite provisions of electricity, gas and water being recognised as basic human needs and its affordability being used by ABS as a measure of financial stress (ABS, 2006a), utility prices have always been charged at flat rate per consumption unit. As a result of this, those with little or no support may not be able to afford basic living standards; while on other extreme, those with plenty wastefully consume vast amount of these services. This problem has been confronting governments around the world as essential utilities need to be low enough so not to exclude poorest in the society and yet high enough to discourage wastage and sustain investments in the utility industry.

As electricity is by far the most concerning utility costs for Australian families, this paper will concentrate on implementing Energy Incentive Policy on households' electricity consumption. In a survey conducted by Morgan Research in 2008 on Victorian utility consumption, electricity expense ranked fourth as the perceived items households spend most on (Morgan Research, 2008, p.287). In addition, electricity cost is most unfairly burdened on Australia's lowest income quintile households, who spent over 8.28% of their equivalised disposable income on domestic power, compared to 2.68% for highest income quintile households in 2003-04 (Figure 2.1 and Appendix 2.1). Similar result data has also been presented by South Australian Council of Social Service (SACOSS) in their *Cost of Living Biannual Update* report (SACOSS, 2009). Australia's leading science research institution, CSIRO reinforces this disparity by stating that the share of income spent on energy products ranges from "around 15 percent in low-income households to around 5 percent in the high-income households" (Hatfield-Dodds, S. and R. Denniss, 2008). This disparity is set to have worsened over the years as electricity prices rose sharply and low income earners' income growth stagnated.

Figure 2.1: Household expenditure on domestic power by income quintile in 2003-04



Source: see Appendix 2.1
Note: above graph is similar to that presented by SACOSS (2009) for South Australian households as provided in Appendix 2.2. Additional difference is that SACOSS uses "% of total disposal income" for their data, whereas "% of equivalised disposal income" is used here.

It is apparent that another alternative pricing scheme is required to reverse current situation, which is set to worsen after the proposed introduction of an emission reduction scheme. Some countries have already taken action against this problem and implemented block tariffs system basing on electricity consumption levels. Tokyo and California, for example, have both successfully implemented progressive tariffs for electricity. However, it can be argued that this may disadvantage some of the poor even more. Low income earners may consume more energy for numerous reasons. They may not be able to afford energy efficient appliances, and they are also more likely to be renters who have little control over the appliances they use (QCOSS, 2010). In addition, this system does not take in account of numbers of people in a household.

Energy Incentive Policy offers these corrections. When applying to households, it accounts for household size and individuals' income. Under these two combinations, individual taxpayers will be subjected to a special additional rate (or rebate rate) for coal-fired electricity consumption above (or below) the national benchmark average up to a certain limit. National benchmark will be the average of last year's consumption levels for each category. By offering economic incentives that are aligned to individuals in different financial positions, EIP is able to simultaneously reduce consumption of environmentally damaging resources and increase demand for renewable energy. Hence, by embracing conservation or choosing environmental alternatives, high income earners will receive more economic benefits. Conversely, if they stay with coal-fired electricity and consume more than their fair share, they will pay a higher penalty. The scheme offers more direct and stronger incentive for households to embark on a lifestyle change than any program thus far. EIP is also applied in a similar fashion on businesses, where numbers of employees, business revenues, and industry types are the factors determining their special rate of coal-fired electricity consumption. In summary, all current economic incentives of rate payment will remain in place, but ultimate households' or businesses' electricity expenditures will vary because of financial implications of their ‘relative’ consumption to national benchmarks.

EIP is to be administered by the government which is responsible for collecting penalties and paying rebates. If total penalties are larger than total rebates, meaning the scheme generates positive cashflow, then perspective electricity suppliers will be entitled to extra revenues generated under EIP from their customers. On the other hand, if total penalties are smaller than total rebates, meaning the scheme generates negative cashflow, then government will pay the difference and leave no financial implications on electricity suppliers. Hence, the only negative effect of EIP on electricity suppliers is the potential loss earnings from their customers’ reduction in energy consumption.

There are two ways for which individuals and businesses can be rewarded under this scheme. First is conservation of energy, by reducing wastage and eliminating unnecessary consumption. According to NSW Department of Environment, Climate Change and Water, appliances on standby mode contribute up to 10% of household electricity consumption (Save Power, 2011a). This adds up to significant wastage and pollution with 92% of household electricity coming from burning fossil fuels such as coal (Australian Conservation Foundation, 2007) which has a conversion factor of 1.07 kg of CO_2 equivalent greenhouse gas per kWh generated (DCCEE, 2010; Integral Energy, 2011). This means a considerable amount of carbon emissions can be prevented by practicing conservation.

Second way is for households and businesses to take up renewable energy alternatives. At the moment, prices of renewable energy are still comparably higher than conventional coal, however price gaps have been closing over recent years as technology improves (See Appendix 2.3 for cost comparisons). In 2007, electricity suppliers were charging households around six cents per kWh for green energy certifications (Australian Conservation Foundation, 2007; Energy Australia, 2011). However, at the moment, there are little or no financial incentives for families or businesses to take up this initiative, except for the ‘feel-good’ effect. Energy Incentive Policy, on the other hand, will automatically make some higher income earners and profitable businesses financially better-off to choose renewable energy sources. Once they do so, annual average consumption of electricity from coal and other fossil fuels will fall significantly.

In effect, this policy simply injects capital into environmental investments directly without going through government’s reallocation of resources. Also, rather than the government directs and decides on types of investment, it only sets the framework of incentives and let market decides. This framework outlines government’s environmental goals, that is reducing emission and consumption on limited resources, while market forces decides on how this is to be achieved.

Since electricity usage is easily measurable, EIP can successfully segregate the energy market, with people who choose to consume more coal-fired electricity at a higher cost, or those who consume less and receive compensation for it. EIP is not designed to punish the rich and subsidise consumption of the poor. Rather, the scheme aims to benefit environmentally responsible people, those who are willing to change their consumption choices and habits.

With these incentives in place, national average consumption of fossil fuel electricity will continue to fall along with prices of renewable energy, and more and more households and businesses will find the switch to alternative energy source economically feasible. Ultimately, EIP has the ability to reduce consumption of emission intensive resources and encourage a shift in demand towards renewable energy without disproportionally burdening disadvantaged members of the society.

3. Mechanism of Energy Incentive Policy

Energy Incentive Policy applies to both households and industries in similar ways. First, government uses last year's average electricity consumption of households (catgorised by sizes) and businesses (categorised by industry types) as benchmark targets for this year's consumption. Individuals will then be given financial incentives to consume below such benchmark for the household size he or she belongs to. Equally, businesses are given financial incentives to consume below the benchmarks for industries they belong to. Government will maintain the discretion in adjusting these target levels in order to achieve its environmental goals. This circumstance may arise when, for example, if average consumption level unexpectedly rose in one years or reduction in annual consumption level is not enough to achieve a proposed target.

Each electricity supplier is entitled to all extra revenues, less rebate deductions, generated from their customers. This amount can be used to cover maintenance costs and investments in efficiency. In the case where this amount is negative, that is majority of electricity consumer demand below last year's average, government will fund the rebates. EIP then becomes a part of government's annual environmental expenditure and hence has a neutral effect on electricity suppliers' earnings.

3.1 For households

3.1.1 Step One:

Average annual *non-renewable electricity* consumption can be determined through "Direct Method":

1. Sum total kWh (regardless of peak or off peak) consumed by households each year in accordance with power suppliers' records
2. Deduct amount of kWh that households bought from power suppliers' 'Renewable Energy' sources
3. Match each customer's residence and household size with census, Centrelink, Australian Tax Office, Electoral Offices or other departmental information
4. Average total kWh for each household size category to form the following schedule:

Household size	Average annual consumption of *non-renewable* electricity (kWh)
1	
2	
3	
4	
Etc.	

Alternatively, above process can be simplified to "Approximate Method":

1. Sum total kWh (regardless of peak or off peak) consumed by households each year in accordance with power suppliers' records
2. Deduct amount of kWh that households bought from power suppliers' 'Renewable Energy' sources
3. Divide this reduced annual total kWh by average household sizes as measured by Australian Bureau of Statistics. This method obtains 'equivalised household electricity consumption'*[1]

4. Estimate the base electricity demand*[2] any household would need and then estimate electricity consumption of each additional person

For example, suppose average annual household electricity consumption is 6840kWh (DEWHA, 2008; Appendix 3.1.1), an estimation of base electricity demand can be 3000kWh and each person consumes an additional 1500kWh*[3]. Thus the schedule becomes:

Household size	Est. average annual consumption of *non-renewable* electricity (kWh)
1	4500
2	6000
3	7500
4	9000
5	10500

Note:
*[1] This concept is frequently used by ABS. See ABS 6530.0 for Equivalised Income Quintile; and ABS 6523.0 for equivalised disposable household income.
*[2] Base electricity demand is the amount for which individuals need in a household regardless of household size. This includes power for lighting, washing machine, TV, radio, fridge, microwaves etc.
*[3] Appendix 3.1.2 provides an example of how these values can be calculated from real data.

3.1.2 Step Two:

Once a schedule is obtained, it should be published by the government as early as possible, as it becomes the target for households to achieve for the following year. For those taxpayers whose households' electricity consumptions fall below this target average, they will be entitled to government rebates up to $1000 at a given rate. For those taxpayers whose households' electricity consumptions breach this target average, they will pay extra charges at a given rate up until it reaches 10% of the amount of income tax they've paid in that financial year. After that point, the rate reverts back to normal electricity supplier's charge.

The given rate varies depending on the amount of tax that a taxpayer pays. Hence higher income earners face higher opportunity cost for consuming more electricity. In simple terms, if they are slightly below average consumption, they will be generously compensated; but if they are slightly above average, they will be heavily penalised. Formula for working out this rate is:

$$\text{Given rate} = \frac{\text{Amount of tax paid}^{*4}}{3 \times \text{Average annual consumption}^{*5}}$$

Note: the number *3* in above formula is an arbitrary factor applied to all households
*[4] Amount of tax paid is a function of taxable income
*[5] This figure is from the schedule in Step One i.e. dependant on household size

3.1.3 Step Three:

Once a given rate is calculated, the amount of rebate or extra electricity charge can be calculated as follows:

$$(\text{Actual consumption} - \text{Average annual consumption}) \times \text{Given Rate}$$

- For this value is negative, it's a rebate; maximum rebate is set at $1000.
- For this value is positive, it's an extra charge; maximum extra amount is 10% of amount of income tax paid.

Following table gives an example of possible outcomes under EIP scheme for a taxpayer with $60,000 taxable income (i.e. $11,550 tax) in a 3-members household (estimated average consumption of 7500kWh).

Hence Given Rate = 11550 / (3x7500) = $0.51/kWh

Electricity consumed (kWh)	5500	7000	7500	8000	9800
$ rebate or extra charge	*$1000 rebate*	*$256.67 rebate*	*$0*	*$256.67 extra charge*	*$1155 extra charge*
Notes:	Rebate exceeds $1000		No effect, right on average		Amount exceeds 10% of tax

(Refer to Appendix 3.1.3 for schedules of other income groups)

3.1.4 Step Four:

Individual taxpayers declare in their tax returns on the amount of electricity consumption in the households that they lived in for majority of the year. On the tax return, they also declare number of permanent people in their household, backed by their names and either tax file number, driver licence number, Centrelink number or student number. For those family members who do not have any of these registrations, it is for Australian Taxation Office (ATO) to verify that the information is correct. People of all ages are counted as one person in order to eliminate unintentional shift of financial burdens onto young families or households with elderly members. Also, permanent members of household are defined as individuals living in one residence for more than 6 months of the financial year.

Moreover every taxpayer in the same household is subject to EIP separately. Hence, every taxpayer will need to pay extra charge as a percentage of their income tax if that household has over-consumed electricity, and conversely true for rebates. This may originally seemed illogical and unfair since households with more income earners may end up pay more in total. However, this calculation makes sense as if more adults in the household work, logically they have less time consuming electricity at home compared to those with more non-income earning people in their household.

Obtaining and verifying individuals' information on the tax return is not so difficult for ATO. First of all, ATO can check whether electricity consumption has been declared correctly simply by referring to records of electricity bills from power companies. In addition, an automatic enforcement mechanism is created when Energy Incentive Policy is applied to industries as power companies would also need to justify the amount of electricity they consume. The household that each individual belongs can also be traced through the residential address declared on the tax return. Other information such as number of household members can be verified through information collected under various schemes and programs. These include Family Tax Benefit Scheme, Baby Bonus Program and social welfare payments from Centrelink to the elderly, studying or unemployed.

3.2 For businesses

3.2.1 Step One:
Businesses are categorised into various industry types as per their ABN registrations.

Average annual *non-renewable electricity* consumption can be determined through "Direct Method":

1. Sum total kWh supplied from the power grid (regardless of peak or off peak) to all businesses of the same industry each year
2. Deduct any kWh amount that is bought from power suppliers' 'Renewable Energy' sources
3. Average total kWh for each industry

It should be noted that if year-by-year averages show persistent or increasing electricity consumption, government may need to arbitrarily set the benchmark target for the following year, rather than using last year's average. This may be the case in oligopoly markets and/or highly profitable industries where utilities charges are minimal.

3.2.2 Step Two:
Once a schedule is obtained, it should be published by the government as early as possible, as it becomes the target for businesses to achieve for the following year. For businesses whose electricity consumptions fall below this target average, they will be entitled to government rebates up to $5,000 at a given rate. For those businesses whose electricity consumptions breach this target average, they will pay extra charges at a given rate up until it reaches 10% of the amount of company tax they paid in that financial year. After that point, the rate reverts back to normal electricity supplier's charge.

The given rate varies depending on the amount of tax that a business pays and number of labour hours it uses. Hence more profitable businesses face higher opportunity cost for consuming more electricity. In simple terms, if they are slightly below average consumption, they will be generously compensated; but if they are slightly above average, they will be heavily penalised. The rate is also adjusted for labour hours so as not to punish workers under this scheme. In studies of company taxation, it has been academically and politically contentious on whether the tax burdens are in fact borne on the labour force or shareholders (Harris, B. 2009; Randolph, W. 2006; Desai, M. et al. 2007). By accounting labour hours as a factor, there will be increased pressures from shareholders to reduce companies' consumption of emission intensive resources as a way of reducing input costs rather than reducing labour hours. This can be achieved in two ways: improve efficiency and/or switching to renewable energy suppliers.

Further, the equation may need to be mathematically transformed given the possibility of great variances in company sizes, profitability and labour hours in the same industry. A log or reverse exponential function may be applied to "Amount of tax paid" and "labour hours" in the formula below. An empirical modelling is required in determining the final equation, which, owing to lack of information available, is beyond the scope of this paper.

Hence, a general formula for working out businesses' given rate is:

$$\text{Given rate} = \frac{\text{Amount of tax paid}^{*6}}{\text{Factor}^{*7} \times \text{Labour hours}^{*8} \times \text{Average industry's annual consumption}}$$

*6,8 A function needs to be applied to these inputs, which is determined through empirical modelling.
*7 An arbitrary factor is in place to adjust the "Given rate" if required.

3.2.3 Step Three:

Once given rate is calculated, amount of rebate or extra electricity charge can be calculated as follows:

(Actual consumption – Average industry's annual consumption) x Given Rate

- For this value is negative, it's a rebate; maximum rebate is set at $5000.
- For this value is positive, it's an extra charge; maximum extra amount is 10% of amount of company tax paid.

3.2.4 Step Four:

Businesses declare the amount of electricity consumption they consume along with their profits and labour hours. Australian Taxation Office and State Revenue Offices will perform their usual statutory duty in auditing this information to determine companies' tax amounts.

Applying Energy Incentive Policy on businesses is essential as it not only ensures businesses remedy their consumption habits, it provides an automatic downstream enforcement of this policy. When businesses are required to declare their energy consumption, which affects their ultimate profitability, they will need to justify whether the energy consumption is a direct resale to their customers or for their own production reasons. When EIP is applied to all utilities, this will be the case for electricity, gas, oil and water suppliers, and petrol stations.

Amount of extra revenue government collects, less rebate deductions, is then given back to businesses' various utility suppliers accordingly. These extra revenues can be used to cover their maintenance costs and invest in efficient technology. Again, if rebates are greater than penalties, government will ensure EIP do not leave any utility supplier financially worse off.

4. Results

Notes to Results Section

In this section, all terms "electricity" is assumed to be from fossil fuel power stations unless otherwise stated. Also, current electricity charge is assumed to be at $0.2/kWh excluding other fees and charges. Finally, owing to lack of companies' information available publicly and time constraint, the first issue of this paper only model results of applying Energy Incentive Policy on households.

Results Section is presented in three parts. Part One outlines actual *special given rate* faced by income earning individuals as calculated using equations shown in the last section. Part Two illustrates financial outcomes of this rate in the form of *total extra charges* and *total rebates*. Finally, Part Three summarises *financial effects* achieved by the application of EIP on different income earners.

4.1 Part One: Special Given Rates under EIP

Table 4.1 shows the special given rate, excluding normal electricity charges, that individual taxpayers would face under EIP. This rate applies in both positive and negative terms. The rate stops applying either when extra charges reach 10% of the amount of individual's tax or when rebates reach $1000.

Table 4.1: Special given rate for different taxpayers

		Household sizes with their est. average annual consumption (kWh)			
		1	2	3	4
Taxable income	Tax paid	4500	6000	7500	9000
$20,000	$ 2,100.00	$0.16	$0.12	$0.09	$0.08
$40,000	$ 5,550.00	$0.41	$0.31	$0.25	$0.21
$50,000	$ 8,550.00	$0.63	$0.48	$0.38	$0.32
$60,000	$ 11,550.00	$0.86	$0.64	$0.51	$0.43
$80,000	$ 17,550.00	$1.30	$0.98	$0.78	$0.65
$100,000	$ 24,950.00	$1.85	$1.39	$1.11	$0.92
$150,000	$ 43,450.00	$3.22	$2.41	$1.93	$1.61
$180,000	$ 54,550.00	$4.04	$3.03	$2.42	$2.02
$200,000	$ 63,550.00	$4.71	$3.53	$2.82	$2.35
$300,000	$ 108,550.00	$8.04	$6.03	$4.82	$4.02

(Note: Rates obtained from using the formula in Section 3.1.2)

Multiplication of this rate and the amount of over-consumption is added to current electricity charges when households consume more than national annual average. The additional charges are capped at 10% of the amount of tax paid. For example, suppose a taxpayer lives in a household of two people and earns $60,000 in taxable income. The household consumes 6500kWh of electricity annually, then his/her electricity charge will be:

Check if <10% of amount of tax paid:

(6500 – 6000) x 0.64 = $320 < $1,155 *Hence, ok*

Final electricity charge:

6000 x 0.2 + (6500-6000) x (0.2+0.64) = *$1,620*

(kWh) ($/kWh) (kWh) ($/kWh)

Conversely, multiplication of this rate and the amount of under-consumption is deducted from current electricity charges when households consume less than national annual average. The amount of rebate is capped at $1000. For example, suppose a taxpayer lives in a household of two people and earns $60,000 in taxable income. The household consumes 4000kWh of electricity annually, then his/her electricity charge will be:

Check if <$1,000 rebate:

(6000 – 4000) x 0.64 = $1,280 > $1,000 *Reached maximum $1000*

Final electricity charge:

4000 x 0.2 – 1000 = -*$200*

(kWh) ($/kWh) ($ rebate)

In this case, the above individual actually pays nothing for his household's 4000kWh electricity consumption, and receives additional $200 from the government. This can be the reward for being extremely energy conscious. Alternatively, this household may have bought renewable energy sources to supplement their consumption, then the $1000 rebate is used to provide them with financial compensation.

From Table 4.1, it is possible to compile an *average* electricity rate faced by individual taxpayers and compare this with current electricity charge rate of $0.2/kWh and additional $0.06/kWh for green energy certificates. Following Table 4.2 and 4.3 illustrates the average electricity rate under EIP when individuals consume 5% and 10% more than average benchmark respectively.

Table 4.2: Average electricity rate for taxpayers consuming 5% more than average

		Household sizes with their est. average annual consumption (kWh)			
		1	2	3	4
Taxable income	Tax paid	4500	6000	7500	9000
$20,000	$ 2,100.00	$0.21	$0.21	$0.20	$0.20
$40,000	$ 5,550.00	$0.22	$0.21	$0.21	$0.21
$50,000	$ 8,550.00	$0.23	$0.22	$0.22	$0.22
$60,000	$ 11,550.00	$0.24	$0.23	$0.22	$0.22
$80,000	$ 17,550.00	$0.26	$0.25	$0.24	$0.23
$100,000	$ 24,950.00	$0.29	$0.27	$0.25	$0.24
$150,000	$ 43,450.00	$0.35	$0.31	$0.29	$0.28
$180,000	$ 54,550.00	$0.39	$0.34	$0.32	$0.30
$200,000	$ 63,550.00	$0.42	$0.37	$0.33	$0.31
$300,000	$ 108,550.00	$0.58	$0.49	$0.43	$0.39

(Source: Appendix 4.1.1-4.1.4, assuming normal electricity rate of $0.2/kWh)

Table 4.3: Average electricity rate for taxpayers consuming 10% more than average

		Household sizes with their est. average annual consumption (kWh)			
		1	2	3	4
Taxable income	Tax paid	4500	6000	7500	9000
$20,000	$ 2,100.00	$0.21	$0.21	$0.21	$0.21
$40,000	$ 5,550.00	$0.24	$0.23	$0.22	$0.22
$50,000	$ 8,550.00	$0.26	$0.24	$0.23	$0.23
$60,000	$ 11,550.00	$0.28	$0.26	$0.25	$0.24
$80,000	$ 17,550.00	$0.32	$0.29	$0.27	$0.26
$100,000	$ 24,950.00	$0.37	$0.33	$0.30	$0.28
$150,000	$ 43,450.00	$0.49	$0.42	$0.38	$0.35
$180,000	$ 54,550.00	$0.57	$0.48	$0.42	$0.38
$200,000	$ 63,550.00	$0.63	$0.52	$0.46	$0.41
$300,000	$ 108,550.00	$0.93	$0.75	$0.64	$0.57

(Source: Appendix 4.1.1-4.1.4, assuming normal electricity rate of $0.2/kWh)

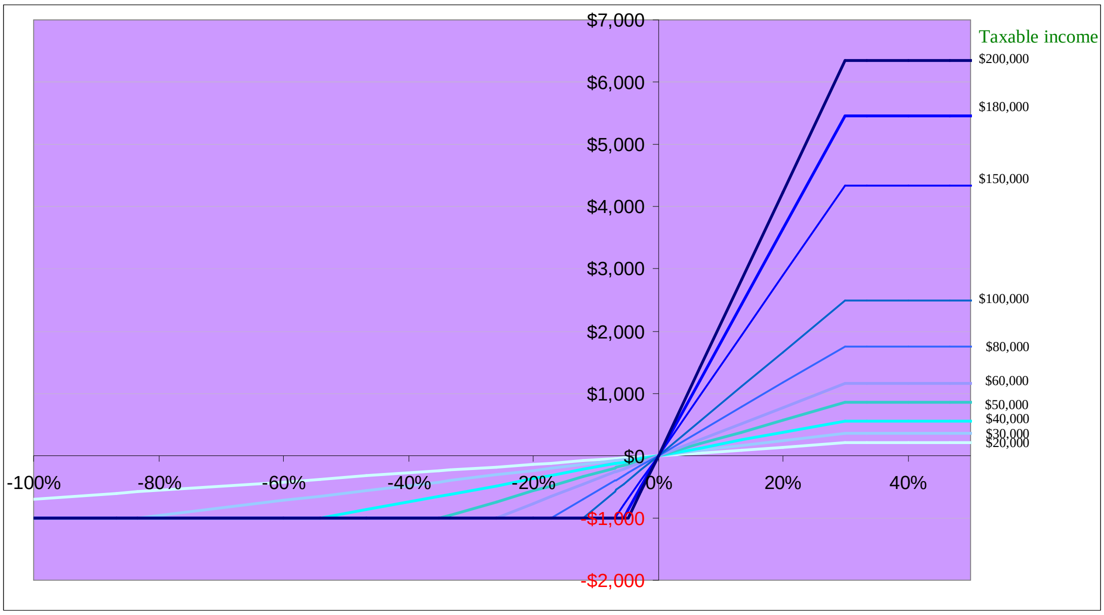
Key:
- (light grey) Households who may stay with current arrangement of coal-fired electricity
- (dark grey) Households who will be financially better off or indifferent in purchasing green energy certificates (assuming at current cost of $0.06/kWh)

From Table 4.3, it can be seen that majority of households would be better off switching to renewable energy when consuming more than 10% above last year's average. Notice that as more households switch to renewable energy, this moving average falls annually making it harder and harder for households to be reliant on coal-fired electricity. At the same time, as more investment shifts to alternative energy, prices of renewable electricity may fall overtime because of technological improvements and economies of scale.

4.2 Part Two: Consequent total charges under EIP

A schedule of actual rebates or charges when a taxpayer under or over-consumes electricity compared to the benchmark is presented in Appendices 4.2.1 and 4.2.2. Graph 4.1 summarises this data into a graphical form with x-axis as percentage under or over-consumption from the benchmark, and y-axis as the rebate or extra charge. It can be seen that higher the taxable income, steeper the graph is. In other words, their financial incentives are more sensitive to consumption levels.

Graph 4.1: Total rebates and charges for different income classes and consumption levels – in 2D

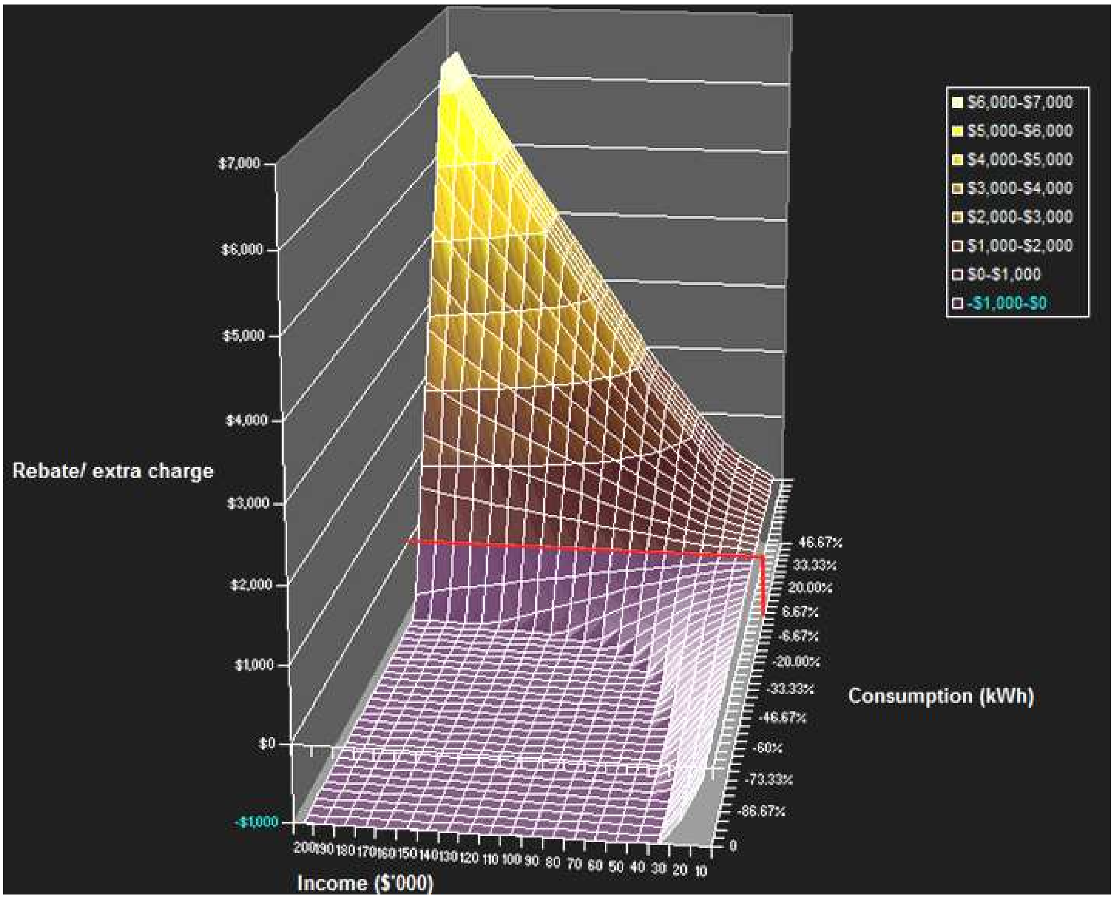


Note: x-axis is % under or over-consumption from the benchmark
y-axis is the dollar rebate (-ve) or extra charge (+ve)
Source: Appendix 4.2.2

Another observation from Graph 4.1 is that extra charges for over-consumption cease apply beyond 30% above the benchmark for all income groups. This is a mathematical coincidence resulting from capping the extra charges to 10% of taxable income and having a factor of 3 in the formula (See Section 3.1.2). Even though the cap is apparently 30% above the consumption benchmark, dollar amount of extra charges is different for different income levels. On the rebate side, it can be seen that higher income taxpayers reach the maximum $1000 rebate much earlier as their graphs are steeper.

Graph 4.1 is actually a simple representation of a three-dimensional graph. This is because under EIP, a person's eventual electricity charge depends on both their income and consumption. Graph 4.2 is a three-dimensional graph which has income and consumption levels forming the x-y plan and the resulting rebate/ extra charges forming the z-axis. It is a more complex, but complete graph where both income and consumption levels are on a continuous scale, rather than just consumption levels as shown in Graph 4.1.

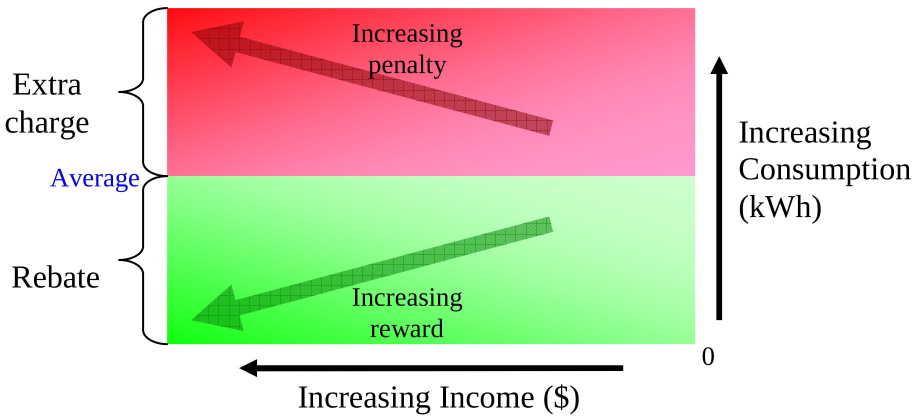
Graph 4.2: Total rebates and charges for different income classes and consumption levels – in 3D



(Source: Appendix 4.2.2)

Graph 4.2 can also be represented in a plain two-dimensional diagrammatic form, as in Diagram 4.1. This simple diagram illustrates how financial incentives interact with income and consumption levels by intensity of colour. Higher the intensity of colour, more extreme is the financial outcome.

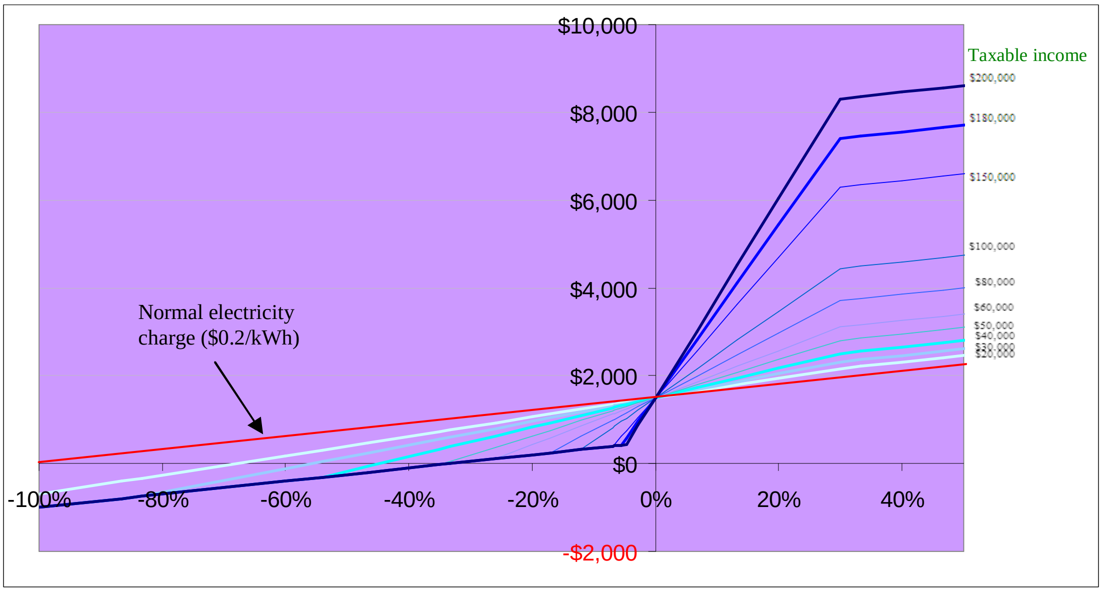
Diagram 4.1: Simple diagrammatic representation of EIP scheme



4.3 Part Three: Eventual financial effects of EIP

Once total rebates or charges under EIP are obtained, final household electricity expenditure can be calculated by accounting for normal electricity charge of \$0.2/kWh. Graph 4.3 presents the schedule of total electricity cost for individuals in a 3-members household (benchmark 7500kWh) assuming he/she is the only taxpayer in the household. It can be observed that for taxpayers with less than \$40,000 taxable income, there are very little change of slopes. This indicates that there are small adverse financial impacts of EIP on these households in dollar terms.

Graph 4.3: Final electricity expenditure for taxpayers in a 3-members household (benchmark of 7500kWh) – i.e. including EIP and normal electricity charges



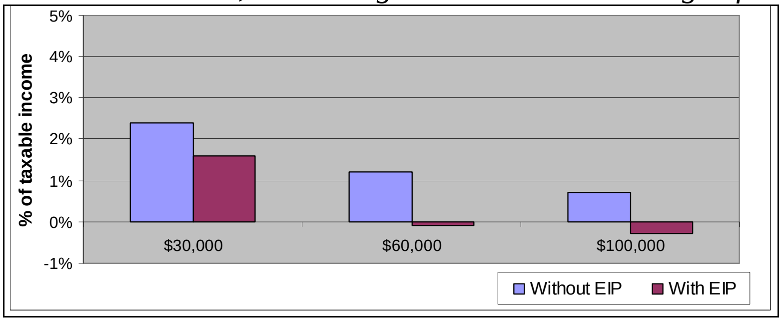
(Source: Appendix 4.3.1)

From Graph 4.3, it can be seen that it is possible for taxpayers to completely neutralise their electricity expense, or, in fact, make financial gains from EIP. For taxpayers with \$60,000 of taxable income or above, this neutral point sets in at 33.33% below the benchmark. This means if these taxpayers have been conserving and consumed 33.33% less electricity than the benchmark in a single year, they pay nothing for their electricity consumption. However, it is more likely that these taxpayers have chosen more expensive renewable energy source to subsidise their consumption, and hence their actual electricity bill shall remain positive.

It is also possible to evaluate overall financial effects of EIP on individuals by calculating total electricity expenditure as a percentage of taxable income. Since EIP provides higher opportunity costs for higher income earners, it is expected that if they consume less than the benchmark they will pay a lot less (or even receive financial reward), and if they consume more than the benchmark they will pay a lot more for their electricity.

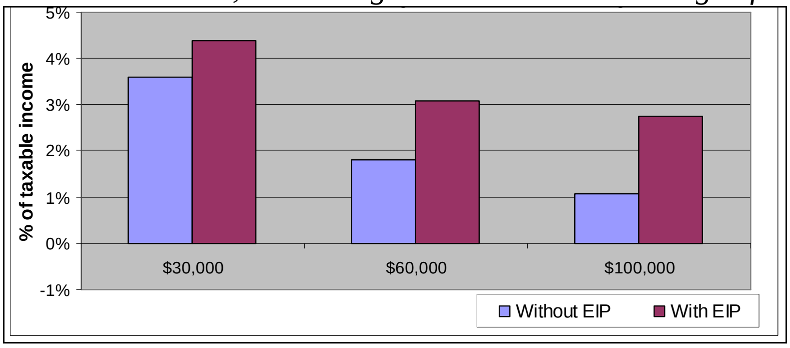
Following Graphs 4.4 - 4.11 depict eventual impact of EIP on 3 different taxpayers whose taxable incomes are \$30,000, \$60,000 and \$100,000. Comparisons of the percentage of taxable income spent on electricity are made assuming they are in one to four member households.

Graph 4.4: Electricity expenditure as a % of taxable income for taxpayers in household with 1 member, consuming 20% LESS than average of 4500kWh



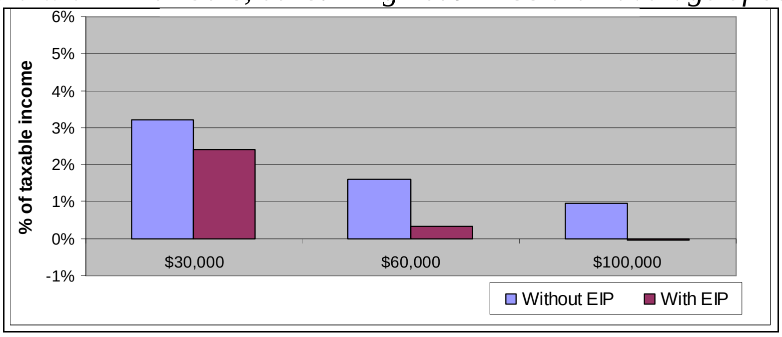
(Source: Appendix 4.3.2)

Graph 4.5: Electricity expenditure as a % of taxable income for taxpayers in household with 1 member, consuming 20% MORE than average of 4500kWh



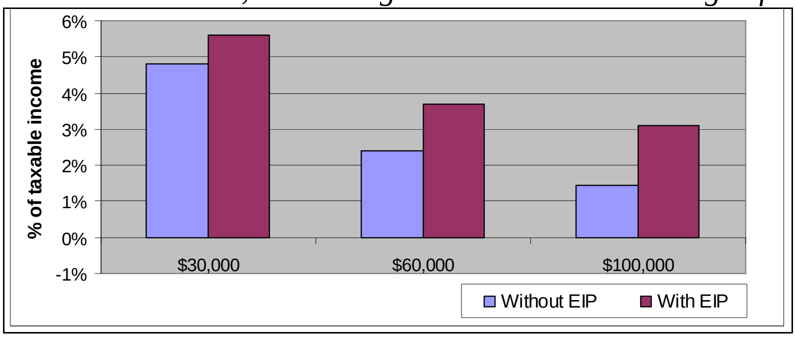
(Source: Appendix 4.3.2)

Graph 4.6: Electricity expenditure as a % of taxable income for taxpayers in household with 2 members, consuming 20% LESS than average of 6000kWh



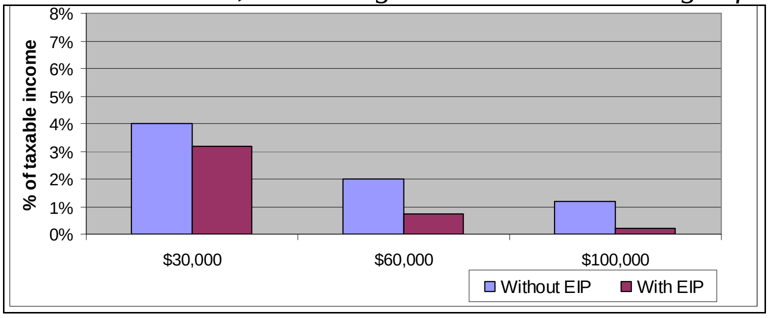
(Source: Appendix 4.3.3)

Graph 4.7: Electricity expenditure as a % of taxable income for taxpayers in household with 2 members, consuming 20% MORE than average of 6000kWh



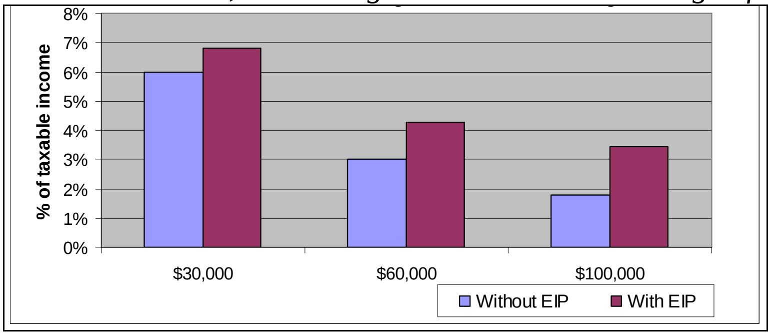
(Source: Appendix 4.3.3)

Graph 4.8: Electricity expenditure as a % of taxable income for taxpayers in household with 3 members, consuming 20% LESS than average of 7500kWh



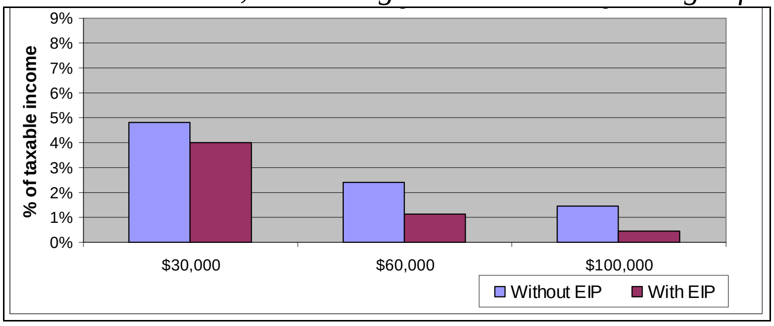
(Source: Appendix 4.3.4)

Graph 4.9: Electricity expenditure as a % of taxable income for taxpayers in household with 3 members, consuming 20% MORE than average of 7500kWh



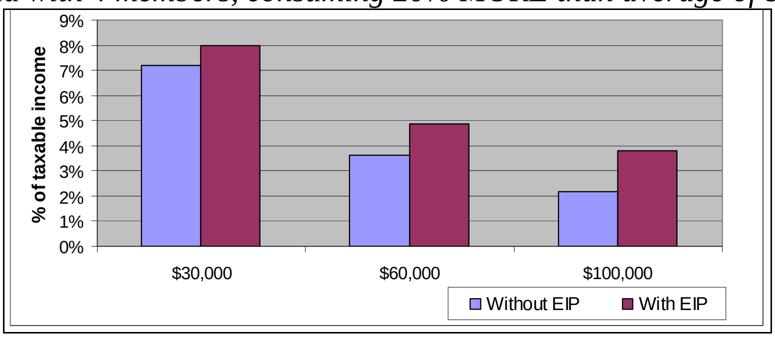
(Source: Appendix 4.3.4)

Graph 4.10: Electricity expenditure as a % of taxable income for taxpayers in household with 4 members, consuming 20% LESS than average of 9000kWh



(Source: Appendix 4.3.5)

Graph 4.11: Electricity expenditure as a % of taxable income for taxpayers in household with 4 members, consuming 20% MORE than average of 9000kWh



(Source: Appendix 4.3.5)

From Graphs 4.4 - 4.11, it can be observed that EIP worsens inequity in electricity expenditure when households consume *less* energy than the benchmark. This inequity is limited though, as there is a maximum rebate of $1000 and high income earners will reach this maximum first. This effect can be clearly observed from Graph 4.4, where taxpayers with $60,000 taxable income appear to benefit most out of the three income groups.

On the other hand, when households *over-consume*, EIP dramatically reduces inequity in electricity expenditure. For example, for a 4-members household consuming 20% more electricity than average, if the taxpayer earns $30,000, he/she faces an increase in electricity bill from 7.2% to 8.0% of his/her taxable income; comparing this to the taxpayer earning $100,000, he/she faces an increase in electricity bill from 2.16% to 3.82% of his/her taxable income. This means an increase of 0.8 percentage points for low income earners compared to 1.66 percentage points for high income earners. It should be noted that a one percentage point for high and low income earners is greatly different in actual dollar amounts. A $100,000 taxable income, for example, attracts $24,950 in income tax, where a $30,000 taxable income attracts $3,600 in income tax. Hence, not only EIP makes electricity expenditure more equitable in percentage terms, it also ensures high income earners face high financial discouragements when they consume more than the benchmark average.

5. Discussions

5.1 Expanding Energy Incentive Policy to cover other utilities

One downside of applying Energy Incentive Policy only on electricity from power grid, as covered in this paper, is the fact that electricity can be generated from other more inefficient private means. However, given that most households nowadays do not have fossil fuel generators, and the inconvenience in obtaining these generators and their fuel supplies, it should not constitute a major shortfall of this scheme. Also, given the high prices of some of these fuels in recent years, if individuals bother to generate their own electricity, they would most probably be better off purchasing electricity from renewable energy sources or installing solar panels.

Nonetheless, basic utility consumption of limited resources such as coal, gas, oil and water all have detrimental environmental implications. Pollutions and emissions, not just limited to carbon, from using these resources condone restrictions on wasteful activities. As a consequence, this paper further proposes Energy Incentive Policy be implemented to cover all these resources. Coal can be directly measured by consumers' choice of their electricity supplies, as outlined in this paper; whereas gas and water consumptions are readily measured by their respective suppliers. The only difficulty lies with measuring oil consumption.

Currently, there are no mechanisms in registering who or how much one consumes oil or petroleum. A system will need to be setup such as a new personal petrol card, or petrol station requiring to record driver licence number or ABN when petrol is purchased. No extravagant scheme needs to be setup, and there is no expensive policing mechanism required as registering petrol consumption will be automatically enforced by petroleum suppliers. As outlined in *Section 3 Mechanism of Energy Incentive Policy* for industries, when government requires oil companies to declare amount of petroleum consumption under the EIP scheme (being their oil input minus oil sales plus additional oil purchases), they will supply evidence of registered sales in order to obtain their actual consumption. Hence, they will automatically enforce the scheme by requiring households and businesses to be registered when purchasing oil or petroleum.

A holistic and equitable approach to address environmental degradations is to implement Energy Incentive Policy on all essential yet non-renewable resources, namely coal, gas, oil and water. Households and businesses with similar attributes will be "judged-by-their-peers" when comparing their consumption levels. With suitable financial incentives, this system will drive conservation and innovation in limiting exploitation of these depleting resources, without overbearing the most vulnerable members of the society. Individuals' and businesses' final reward or penalty will be the summation of comparable financial outcomes of each resource type.

5.2 Main benefits of Energy Incentive Policy

Followings are eleven main economic and environmental benefits of EIP.

1. *Reducing over-consumption of limited and emission intensive resources*

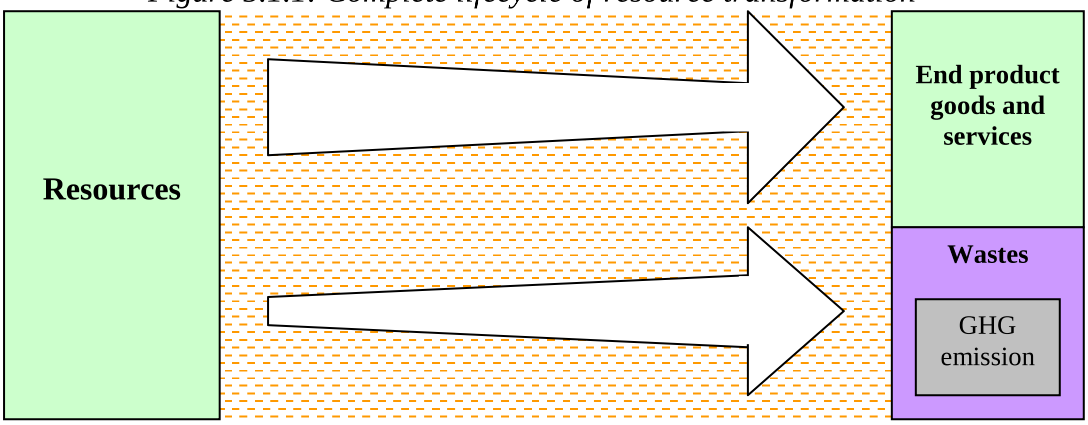
Most overwhelming reason behind Energy Incentive Policy is to reduce consumption of limited resources. It targets over-consumption and wastage of some higher income individuals and businesses to which current cost of utilities is insignificant. Yet at the same time, these individuals are most financially equipped to embrace latest energy saving technologies and support renewable energy investments. Energy Incentive Policy further accounts for existing economic inequity by lowering the financial penalties of over-consuming individuals who are on low incomes. Different scales of reward and penalty rates for different income groups are designed to match each individual's consumption choice in maximising his or her own utility. In this way, *all* individuals will face similar incentives in reducing consumption of limited resources; and not one group is specifically worse off. This is also the case for businesses.

In fact, EIP can be implemented regardless of whether or not greenhouse gas emissions cause global warming. Its aim is to reduce consumption on certain targeted resources such as coal because of their potential depletion and the environmental degradations they cause during their production, transportation, and consumption. These adverse impacts include destruction of habitat, water contamination, loss of biodiversity, desertification, soil degradation, and, of course, atmospheric pollution. Consequently, it is impossible to rely on them as the basis of modern economy forever. EIP can be implemented to control their consumption and delay such economic and environmental crisis.

2. *Reducing emission and wastage*

As Figure 5.1.1 shows, greenhouse gas emissions only make up a small part of overall wastes from human consumption. Other pressing environmental issues outlined in Point 1 are as much detrimental to planet Earth. Reducing consumption is the key to resolve not only extraction of limited resources (as in Point 1), but also reduction in pollution. In simple terms, if less resource is demanded, then less resource is transformed to waste through production (Ekins, P. 2009).

Figure 5.1.1: Complete lifecycle of resource transformation



Moreover, further environmental savings will occur because of reduction in transmission of energy. In the case of electricity for example, there will be less voltage drop in power lines, energy used in coal mining activities and electricity consumed by power plants themselves. According to NSW Department of Environment, Climate Change and Water, this loss is so significant that it accounts for about 70% of energy released from burning coal (Save Power, 2011).

In addition, rather than the economy confronting a choice between building a coal-fired or renewable power plant to meet future demand, now there is a possibility of not building one at all. Conservation of current energy use will supplement increasing consumption stemming from population growth and other factors. By not building a power plant, not only are there financial savings for taxpayers, there are also social benefit in terms of land use, and environmental welfare in terms of pollution during construction and maintenance of the plant.

3. Increasing productivity

Following on from Point 2, Energy Incentive Policy promotes improvements in productivity. As individuals and businesses face potentially higher energy rates for higher consumption levels, their opportunity costs rise and hence they become better off adopting more efficient lifestyles or business activities. Indeed, the very definition of increasing productivity is having less input for same amount of useful output. The main purpose of Energy Incentive Policy is to reduce consumption of limited resources, which will improve productivity overtime as the economy adjusts. On the other hand, carbon emission scheme does not necessarily lead down this track. As evident in Figure 5.1.1, it is possible to invest in technology that reduces GHG emission, but has no or even an increased demand on non-renewable resources (Ekins, P. et al, 2009).

4. Increasing capital investment in renewable energy

Further expanding on benefits outlined in Point 1, under Energy Incentive Policy high income earners and profitable businesses are tremendously encouraged to move away from consuming coal-fired electricity in the power grid. This means the policy creates incentives for investments to be directed into renewable energy market from those with most capital. One of the reasons why renewable energy is a lot more expensive than conventional power supplies is because of its high initial fixed cost, and yet fossil fuel power plants have already been built and well established. Some commentators argue that overtime costs of alternative energy production are likely to fall to comparable levels because of economies of scale and investment in technological improvements (ORER, 2002; DCCEE, 2010; Haluzan, N., 2010). Consequently, Energy Incentive Policy is critical in providing this initial investment required to hasten the reduction in renewable energy prices.

In addition to amending shortage of capital funding, Energy Incentive Policy improves efficient allocation of resources. Rather than government reallocating funds and pick and choose between environmental or social initiatives like various existing programs, EIP directly funds the renewable energy through market forces. This direct method negates the growing problem of ever increasing government handouts, uncertainty arising from economic conditions and wastage in bureaucracy.

5. Acting as an automatic stabiliser in the economy

As EIP is built on income and corporate tax systems, it inherits their characteristics to act as an automatic stabiliser in the economy. As income rises, potential for more EIP revenue rises in both absolute terms and proportionate terms to the national income. Conversely, as income falls, EIP may automatically lower the utility costs of households and businesses. When there is a shortfall of funds, that is if a great majority of households and businesses is below the benchmark average due to falls in production, government will inject funds into the system. This serves a dual purpose of increasing government spending to stimulate the economy, and maintaining funding in renewable energy.

As a result, EIP is more equitable and persistent than an emission scheme where large businesses are able to request for leniency and threaten jobs during economic slowdowns or adverse conditions in their industries. The scheme assists households and businesses during tough times, and at the same time continues maintaining incentives to reduce consumption of emission intensive resources. When economy improves, EIP draws more investments into renewable energy from taxpayers' rising incomes and improving corporate profits.

6. Reducing trade offs between economic and environmental priorities

As discussed in Point 5, financial burdens of emission schemes encourage businesses to lobby government for subsidies, or termed 'rent-seeking' activities. This means the whole system can be manipulated to serve as a mechanism for a trade off between economic and environmental priorities. In Sandbag Climate Campaign's 2010 publication, *Cap or trap? How the EU ETS risks locking-in carbon emissions*, the authors suggested that the "cap was almost immediately blindsided by the recession (in Europe)", which causes a policy change to increase permit allocations (Morris, D and Worthington, B, 2010). This means the state is essentially sponsoring an increase in pollution levels. As a result, the carbon price tumbled from €30 to around €10 in 2009, and carbon emission level was expected to reduce by only 0.3% between 2008 and 2012. The report even suggested European companies have been stocking up permits for extra revenues. This further suggests the potential financial exploitations of emission schemes.

EIP is more independent from business lobbies and political pressures. The system is designed so that it is difficult for governments to change benchmarks resulting from market forces. The incentive scheme built in also provides the drive to reduce pollution during both economic boom and downturn. Since it acts similar to an automatic stabiliser, there is little case for businesses to ask authorities to overlook environmental priorities in lieu of economic priorities.

7. Lowering costs of operating an environmental initiative

One of the most attractive parts of applying EIP on electricity is that this scheme is based on existing mechanisms, which are already well established. There is no need to create new markets, setup mechanisms for trading and monitoring, establish new governing regulations, and compensate companies in attempts to preserve business activities and stave off inflation. All mechanisms and information required for EIP are readily available. From tax collection to information on energy usage, residence of the energy consumers, business registrations and labour employment, can all be obtained from relevant State and Federal governmental departments.

For those who don't declare any tax, including pensioners, they will not participate under this scheme. Hence, they continue paying normal electricity rates for their consumption with no rebates or penalties. Nonetheless, it is under the same statutory responsibility of ATO to investigate cases of tax evasion or avoidance; there will not be a need for extra policing mechanisms. In addition, by applying EIP on all industries, the scheme is actually automatically enforced between businesses and on households. Those businesses engaging in direct utilities on-sale, for example energy suppliers, petrol stations and water suppliers, will need to justify their utilities consumption, and hence assist government's information collection for EIP.

On the other hand, emissions restriction policies are difficult to measure and costly to police. Continuous audits are required to keep companies honest in their declarations and even then, these figures are estimations only. Additional costs for these exercises will inevitably fall upon all taxpayers. Moreover, cost of higher utility prices is most likely to dramatically reduce living standards of the poorest in the society. As a consequence, recent Carbon Tax proposal by the Gillard Labour Government intends to give financial assistance to low and middle income earners. It is likely that, after accounting for all the taxations and compensations, the Carbon Tax will emerge as simply an inefficient form of Energy Incentive Policy.

EIP is arguably the least costly, most efficient and most direct scheme with highest impact on the environment. In addition, the EIP scheme is designed to pay for itself. In the case where additional revenues are raised, they are returned to energy suppliers to maintain their assets and invest in R&D. In the case of deficits, financial support is supplied from the government. However, it is more likely that EIP returns a positive cashflow because while rebates mirror penalties rate for each category, maximum rebate caps of $1000 are reached much earlier than maximum penalty caps for all income groups.

Note: whilst this paper states that excess revenue from EIP be returned to utilities suppliers accordingly, it is assuming that general public is responsive to their new utility costs. If however, this is not the case, and EIP returns huge revenues, government may cap the amount returned to utilities suppliers and invest the rest in environmental initiatives, or let utilities suppliers compete for funds by requiring them to achieve certain emission reduction levels.

8. Accounting for positive externalities in reducing consumption and pollution

Currently, social benefits of reducing consumption of emission intensive energy are not captured by economic incentives in the market. In fact, financial savings are mediocre; usually the only saving households receive is paying less for their utility bills. However, this saving is small compared to the initial financial outlay required to make such saving. As Figure 2.1 of Section 2 shows, households in highest income quintile spend just over 2.5% of their equivalised disposable income on domestic power. A reduction in their power consumption, while beneficial to the environment, has little effect on their family budgets. Indeed, most households that are adopting sustainable living strategies are doing it for the ‘feel-good’ effect, rather than for financial reasons. While these are good intentions, it will not ensure practice of sustainable living proliferating into day-to-day lives of general public.

EIP, on the other hand, will now compensate those with lower consumption levels or carbon footprints. In fact, the scheme serves as additional benefits to those who have already chosen to go with green energy. Their contributions create positive externality to the society and future generations.

9. Maintaining the price of utilities at an affordable level

EIP can be used to offset future utility price rises that are not due to inflation or cost of production. Utility price rises are unfair to poor members of the society and that’s why most states have their own price regulators. Utility services are becoming basic human needs or “minimum standard of living” of modern society (Monash Law, 2009). Many energy authorities and social groups, such as QCOSS, have found that lower incomes families have been paying “disproportionally more for essential services such as energy and water” (QCOSS, 2010).

By implementing EIP, excess revenues can be raised from richer taxpayers and businesses, which in turn stabilises retail prices of utility. In addition, those households that are completely not in the current income tax system, such as pensioners and other welfare recipients, can then switch to renewable energy when its price falls over time. EIP is designed to ensure these basic human needs are available to all equally, while leaving those who desire to consume more to face exponentially increasing costs. Hence EIP is not directly inflationary, where a emission reduction scheme is. Carbon tax will be passed on to consumers and will inadvertently hurt low income earners who may try to be energy efficient but is limited by their financial ability (Stanley, J., 2011).

10. Advantageous features of both income and consumption tax

Energy Incentive Policy imitates a form of hybrid regime which maintains the progressivity of income tax and yet inherits beneficial feature of consumption tax in encouraging savings and investments. In this case, individuals and businesses are making environmental savings by reducing consumption and making capital investments in renewable energy sources. These savings are more significant because, especially for high income earners, there are more incentives to save under EIP than the current flat consumption tax. In addition, not only does EIP deliver more equitable outcomes because of the progressivity of income tax system, it does not discourage to people from working harder. This is because for high income earners, financial incentives of conserving energy kick in at a faster rate.

EIP, however, can be criticised for using the same limited tax base as income tax system. While the claim is fundamentally true, EIP has potential to increase this tax base. Under the hybrid regime, individuals may be more willing to declare correct taxable income when they are consuming less and hence be eligible for rebates. With these financial incentives, taxpayers' payoffs in taking the risk of tax evasion are reduced.

Not only so, EIP is essentially redirecting funds and subsidising energy efficient innovations, and yet it does not have dead weight loss associated with the traditional form of government subsidies. This is because EIP is a market-based system, where individuals and businesses make their own investment decisions under the EIP framework. Government indirectly assists renewable industries by setting up the framework, but eventual funding amount will depend on market forces.

11. Raising awareness and encouraging individual monitoring

Basis behind Energy Incentive Policy's increasing opportunity cost for higher income individuals or businesses is to ensure all members of the society are equally affected by their consumption levels. Current utility rates, or even the rate under a carbon reduction scheme, are insignificant to some individuals or businesses. Research published by Australian Industry Group in February 2011, showed that over 85% of companies surveyed paid less than 5% of sales on electricity, and about half of them paid less than 1%. In addition, around 73% of businesses made no improvements or have deteriorated in their electricity efficiency over the past 5 years, "despite the substantial increase in electricity prices" (Ai Group, 2011).

Consequently, flat costs of utility have failed to change the behaviours of many well-to-do individuals and businesses. Anna-Lisa Linden's 2006 research offered an explanation to this phenomenon. Featuring in the European Commission's Science for Environment Policy News Alert, the paper surveyed 600 households in a Sweden found that "many households are *energy-unaware* and (in fact) several energy efficient behaviours are motivated not by energy conservation concern but of a perceived lack of time" (Lindén, AL et al., 2006). Sarah Darby further supports this view in her 2006 paper published by the Environmental Change Institute, where she argued direct feedbacks can lead to a saving of 5-15% in domestic energy consumption (Darby, S., 2006).

EIP is specific to each person's and company's financial situations, it is designed to promote efficient use of utility to the top of their priorities. Once households and businesses realise importance of conservation, they will implement means to promote energy savings. Their methods will be determined by market decisions; government is simply raising awareness through financial incentives. This mechanism also encourages individual monitoring as many people are unaware of wastage in their lifestyle. As Lester Brown wrote in his 2011 book, *WORLD ON THE EDGE: How to Prevent Environmental and Economic Collapse,* radical lifestyle changes are required now in order to prevent an imminent catastrophic crisis.

Moreover, EIP offers a clear benchmark for different household and business categories by using last year's national average figures. This allows everyone to plan and prepare their own consumption schedules. By setting a target, there is a clear goal to be achieved, which underpins the success of EIP.

5.3 Integrating Energy Incentive Policy with existing programs

Whilst Energy Incentive Policy plays an important role in guiding environmental policies, it is necessary that it works in conjunction with other exiting programs. Some rebate policies that are financially inefficient may be removed if EIP can easily achieve their goals, while others may not. For example, it is arguable whether EIP can replace current government's subsidy in supply and installation of solar panels and solar hot water systems. These products are far too expensive for most households to take-up even with EIP in place. The question now is how much can the government scale back its subsidisation and still encourage households to install solar panels under EIP.

In addition, other constraints need to be considered. For example, current NSW government' Solar Bonus Scheme of $0.2/kWh for families putting solar electricity back into the power grid may need to continue because of political and contractual reasons. This is despite that under EIP, these households will receive further financial benefits as they are likely to consume less than average amount of electricity.

Finally, EIP is nonetheless a direct *consumption* reduction scheme, rather than a direct *emission* reduction scheme. This means emission reduction policies still has a role in minimising emissions from necessary consumptions. Even though this paper maintains that current form of emission reduction schemes is likely to be inefficient and leading to financial exploitation or 'rent seeking' activities, EIP will nonetheless need to work in conjunction with an emission reduction scheme in order to achieve further sustainability goals.

5.4 Caveat

While Part Two of the Results Section shows significant high penalties for over-consuming high income earners, it is unlikely that EIP will collect this amount in reality. If an individual with $200,000 taxable income consumes 9750kWh of electricity rather than the 7500kWh benchmark, he/she will pay $8,305 on electricity rather than $1,950 under current electricity retail prices (Appendix 4.3.1b). It is more likely, and financially sensible, that he/she will choose to abate this consumption by purchasing green energy certificate or install solar panels. This is an extreme case example.

Consequently, it makes the task of budgeting for EIP difficult for the government. In some cases, it is not possible to know whether households and businesses will take up energy efficient measures or simply pay the price under EIP. Nonetheless, this paper maintains that EIP is likely to be financially neutral overall as it can be observed from the schedules in Appendix 4.2.2, financial rewards and penalties mirror each other for each income group, and rebate caps are reached much earlier than penalty caps. In addition, if EIP does result in a loss, it means that average consumption levels have fallen significantly. This has dual beneficial effects where not only following year's consumption benchmark is lowered, environmental objectives of conservatism have also been achieved.

6. Conclusion

Energy Incentive Policy provides a solution to many environmental and social problems confronting modern economies around the world. Its main goal is to achieve resource conservatism; and by doing so, it also promotes investment in renewable energy and reduces pollution associated with conventional energy production. These outcomes are achieved by imposing higher opportunity costs on high income individuals or businesses which ensure all members of the society are equally affected by their own consumption levels.

In simple terms, under EIP, those with the ability to pay and being most environmentally irresponsible, bear the cost of transition to a sustainable economy. As investment in renewable energy grows, its price is likely to fall and become comparable, because of technological improvements and economies of scale. It is important to note that EIP is not designed to punish higher earning individuals or businesses. Indeed, only those that over-consume emission intensive resources attract high financial penalties; while others may not be affected or may even receive generous incentives for embracing sustainable living.

Benchmarks for households and businesses are set as the average of last year's energy consumption level, giving everyone a target for planning the year ahead. Also, in the long run, there will be a continuous downward average trend as households and businesses are both enticed by the rebates to consume less and discouraged by the extra charges to consume above the benchmark. This benchmark average can be further manipulated by the government if need be in order to achieve desirable environmental goals for the following year. It is especially helpful in an oligopoly market where collusions are possible and government needs to achieve a targeted reduction.

EIP is a powerful market-based mechanism because it lets individuals and businesses make their own decisions on how to save energy or use it more efficiently. Sometimes with only government supporting environmental initiatives, changes can be too slow and effects too small or inefficient. EIP offers strong financial incentives in reducing consumption of emission intensive resources. This reduction in consumption is also a form of saving for the economy as a whole, building up social and environmental wealth for the future.

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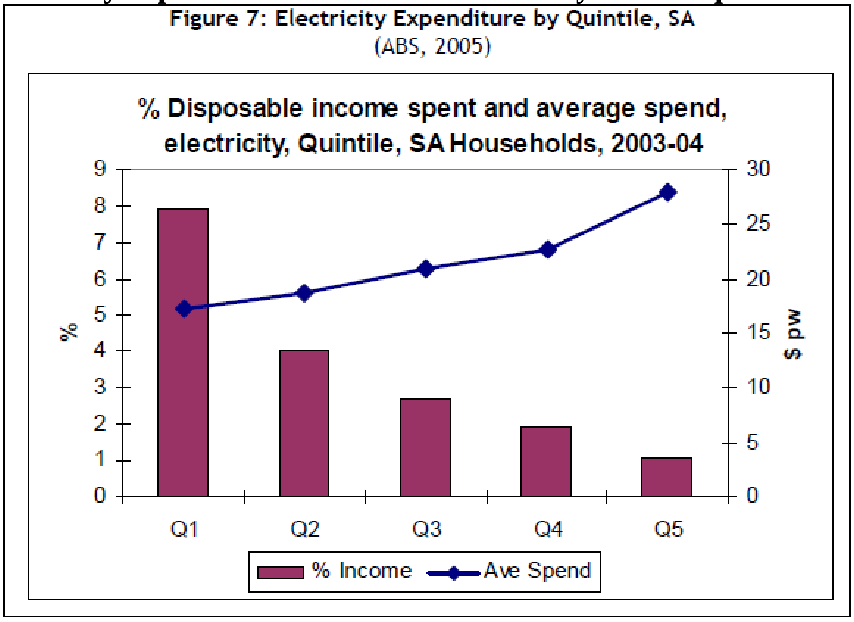
Appendices

Appendix 2.1: **Average Australian household's expenditure on domestic fuel and power, categorised by equivalised disposable household income quintile in 2003-04**

	Equivalised disposable household income quintile					
	Lowest	Second	Third	Fourth	Highest	All households
Domestic fuel and power [1]	$ 18.55	$ 23.04	$ 24.25	$ 25.52	$ 27.70	$ 23.59
Equivalised disposable household income (household weighted) [2]	$ 224.10	$ 359.17	$ 491.84	$ 643.47	$1,034.74	$ 540.80
% of equivalised disposable household income spent on domestic fuel and power	8.28%	6.41%	4.93%	3.97%	2.68%	4.36%

Source: [1]: ABS, 2006. *Household expenditure Survey, 2003-04 (reissued)*
[2]: ABS, 2005. *Household Income and Income Distribution*

Appendix 2.2: **Electricity expenditure in South Australia by income quintile**

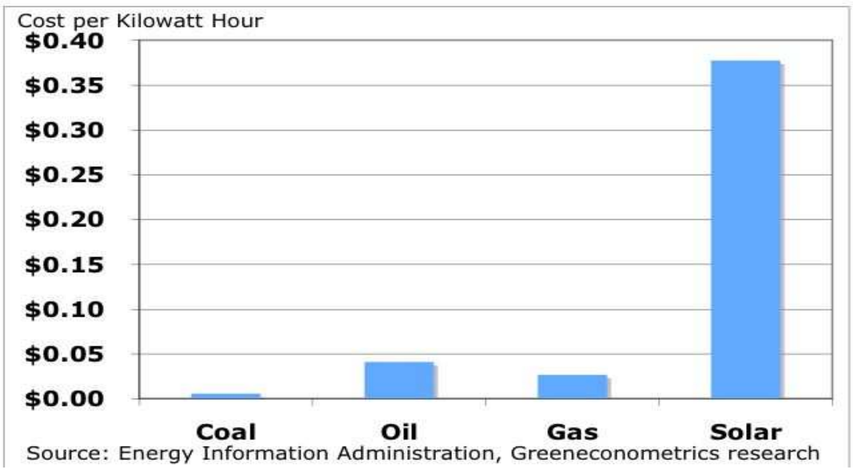


Source: SACOSS (2009)

Appendix 2.3:

1. Cost comparison of various energy sources obtained from Green Econometrics website: http://greenecon.net/understanding-the-cost-of-solar-energy/energy_economics.html

Energy Cost per Kilowatt Hour



2. Price gap between various energy sources obtained from Breakthrough Institute website:
http://thebreakthrough.org/blog/2010/10/friday_factoids_the_clean_ener.shtml

Price gap between...

Onshore wind and...	Gap in $/MWh	Percent higher
Coal-fired:		
Conventional	$48.9	49%
Advanced	$38.8	35%
Advanced w/CCS	$20.0	15%
Natural gas-fired		
Conventional combined cycle	$66.2	80%
Advanced combined cycle	$70.0	88%
Advanced combined cycle w/CCS	$36.0	32%
Conventional combustion turbine	$9.8	7%
Advanced combustion turbine	$25.8	21%
Offshore wind and...	Gap in $/MWh	Percent higher
Coal-fired:		
Conventional	$90.7	90%
Advanced	$80.6	73%
Advanced w/CCS	$61.8	48%
Natural gas-fired		
Conventional combined cycle	$108.0	130%
Advanced combined cycle	$111.8	141%
Advanced combined cycle w/CCS	$77.8	69%
Conventional combustion turbine	$51.6	37%
Advanced combustion turbine	$67.6	55%
Solar PV and...	Gap in $/MWh	Percent higher
Coal-fired:		
Conventional	$295.7	295%
Advanced	$285.6	258%
Advanced w/CCS	$266.8	206%
Natural gas-fired		
Conventional combined cycle	$313.0	377%
Advanced combined cycle	$316.8	399%
Advanced combined cycle w/CCS	$282.8	250%
Conventional combustion turbine	$256.6	184%
Advanced combustion turbine	$272.6	221%
Solar thermal and...	Gap in $/MWh	Percent higher
Coal-fired:		
Conventional	$156.2	156%
Advanced	$146.1	132%
Advanced w/CCS	$127.3	98%
Natural gas-fired		
Conventional combined cycle	$173.5	209%
Advanced combined cycle	$177.3	224%
Advanced combined cycle w/CCS	$143.3	126%
Conventional combustion turbine	$117.1	84%
Advanced combustion turbine	$133.1	108%

Source: US Energy Information Administration
http://www.eia.doe.gov/oiaf/aeo/electricity_generation.html

3. In McLennan Magasanik Associates' 2008 report to Australian Federal Treasury, *Impacts of the Carbon Pollution Reduction Scheme on Australia's Electricity Markets*, Table 2-1 breakdown costs of coal, natural gas and renewable energy in 2007 dollar terms (McLennan, 2008).

4. In CSIRO's 2011 paper: *Projections of the future costs of electricity generation technologies*, Appendix B, Table 8 and Table 9 offer comprehensive costing of fossil fuel based and renewable energy source (Hayward, J. et al. 2011).

Appendix 3.1.1

Current industry standards indicate average household consumption to be approximately 7,000 kWh per year (Energy Australia, 2011; Integral Energy, 2011); while Origin Energy takes its figure from DEWHA's 2008 report, *Energy Use in the Australian Residential Sector Report 1986-2020*, to be 6,840 kWh annually (DEWHA, 2008; Origin Energy, 2011). In 2006, IPART estimated Sydney households consume 7654kWh of electricity annually (IPART, 2008). Finally, on NSW government Save Power website, it states "average NSW home uses 7,300 kWh of electricity a year" (Save Power, 2011).

Comparatively, the U.S. Energy Information Administration (eia) estimates the "average annual electricity consumption for a U.S. residential utility customer (to be) 11,040 kWh" in 2008 (U.S. Energy Information Administration, 2010). This is approximately equivalent to electricity consumption of a standard house with 3 bedrooms, 2 bathrooms and a garage in Australia, according to Integral Energy's online calculator (Integral Energy, 2011).

Appendix 3.1.2

Following is a table obtained from Victorian Utility Consumption Survey conducted in 2007 by Morgan Research (Table 4.2.1.2 of Morgan Research, 2008).

	Total consumption (kWh)		
Household size	**2007**	**2001**	**1996**
1 person	3,487	3,395	2,946
2 persons	5,163	4,937	4,116
3 persons	5,795	5,727	5,137
4 or more persons	7,368	6,361	5,576
Total Households	**5,533**	**5,190**	**4,529**

From above, we can use the equation $F + nC_n = TC$ to form a matrix; where F is fixed base electricity demand, n is number of person/s in a household, and C_n is electricity consumption per person for that household group. Hence, for year 2007 we obtain:

$$F + 1C_1 = 3,487$$
$$F + 2C_2 = 5,163$$
$$F + 3C_3 = 5,795$$
$$F + 4C_4 = 7,368$$

Note: Households with 4 or more persons is simplified as 4-persons households here.

Through iterations process, we can obtain an approximate solution to the above matrix such that $C_1 \cong C_2 \cong C_3 \cong C_4 \cong C$. One way is through 'least difference' method, where iteration changes F until the largest difference between any two C_n is minimised. Then, we average all the C_n to obtain the final estimated C. Using this process, we obtain the following:

	Household size	2007	2001	1996
Fixed units (*F*)		*2,333*	*2,409*	*2,109*
Consumption per person (C_n)	1	1154	986	837
	2	1415	1264	1003.5
	3	1154	1106	1009.333
	4	1258.75	988	866.75
	Mean of C_n = *C*	*1245.44*	*1086*	*929.146*

From *F* and *C* above, we can then construct following approximate total electricity consumption for different household sizes.

	Total consumption (kWh)		
Household size	**2007**	**2001**	**1996**
1 person	3578.44	3495	3038.15
2 persons	4823.88	4581	3967.29
3 persons	6069.31	5667	4896.44
4 persons	7314.75	6753	5825.58

The above table will then be used as the benchmark average for the following year.

Appendix 3.1.3

Following table gives an example of possible outcomes under this scheme for a taxpayer with $40,000 taxable income (i.e. $5,550 tax) in a 3-members household (estimated average consumption of 7500kWh).
Hence Given Rate = 5550 / (3x7500) = $0.25/kWh

Electricity consumed (kWh)	5500	7000	7500	8000	9800
$ rebate or extra charge	*$493.33 rebate*	*$123.33 rebate*	*$0*	*$123.33 extra charge*	*$555 extra charge*
Notes:			No effect, right on average		Amount exceeds 10% of tax

Following table gives an example of possible outcomes under this scheme for a taxpayer with $100,000 taxable income (i.e. $24,950 tax) in a 3-members household (estimated average consumption of 7500kWh).
Hence Given Rate = 24950 / (3x7500) = $1.11/kWh

Electricity consumed (kWh)	5500	7000	7500	8000	9800
$ rebate or extra charge	*$1000 rebate*	*$554.44 rebate*	*$0*	*$554.44 extra charge*	*$2495 extra charge*
Notes:	Rebate exceeds $1000		No effect, right on average		Amount exceeds 10% of tax

Appendix 4.1.1 Average electricity rate under EIP for 1-person household

		Household consumption levels (% deviation from average)								
		3600	3825	4050	4275	4500	4725	4950	5175	5400
Taxable income	Tax paid	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
$20,000	$ 2,100.00	*$0.16*	*$0.17*	*$0.18*	*$0.19*	*$0.20*	*$0.21*	*$0.21*	*$0.22*	*$0.23*
$40,000	$ 5,550.00	*$0.10*	*$0.13*	*$0.15*	*$0.18*	*$0.20*	*$0.22*	*$0.24*	*$0.25*	*$0.27*
$50,000	$ 8,550.00	*$0.04*	*$0.09*	*$0.13*	*$0.17*	*$0.20*	*$0.23*	*$0.26*	*$0.28*	*$0.31*
$60,000	$ 11,550.00	*-$0.01*	*$0.05*	*$0.10*	*$0.15*	*$0.20*	*$0.24*	*$0.28*	*$0.31*	*$0.34*
$80,000	$ 17,550.00	*-$0.08*	*-$0.03*	*$0.06*	*$0.13*	*$0.20*	*$0.26*	*$0.32*	*$0.37*	*$0.42*
$100,000	$ 24,950.00	*-$0.08*	*-$0.06*	*-$0.01*	*$0.10*	*$0.20*	*$0.29*	*$0.37*	*$0.44*	*$0.51*
$150,000	$ 43,450.00	*-$0.08*	*-$0.06*	*-$0.05*	*$0.03*	*$0.20*	*$0.35*	*$0.49*	*$0.62*	*$0.74*
$180,000	$ 54,550.00	*-$0.08*	*-$0.06*	*-$0.05*	*-$0.01*	*$0.20*	*$0.39*	*$0.57*	*$0.73*	*$0.87*
$200,000	$ 63,550.00	*-$0.08*	*-$0.06*	*-$0.05*	*-$0.03*	*$0.20*	*$0.42*	*$0.63*	*$0.81*	*$0.98*
$300,000	$ 108,550.00	*-$0.08*	*-$0.06*	*-$0.05*	*-$0.03*	*$0.20*	*$0.58*	*$0.93*	*$1.25*	*$1.54*

Note: EIP special rate only applies up to 30% above national benchmark, hence average electricity rate peaks at +30% and falls thereafter.
Rebate from EIP is only up to a maximum of $1000.

Appendix 4.1.2 Average electricity rate under EIP for 2-persons household

		Household consumption levels (% deviation from average)								
		4800	5100	5400	5700	6000	6300	6600	6900	7200
Taxable income	Tax paid	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
$20,000	$ 2,100.00	*$0.17*	*$0.18*	*$0.19*	*$0.19*	*$0.20*	*$0.21*	*$0.21*	*$0.22*	*$0.22*
$40,000	$ 5,550.00	*$0.12*	*$0.15*	*$0.17*	*$0.18*	*$0.20*	*$0.21*	*$0.23*	*$0.24*	*$0.25*
$50,000	$ 8,550.00	*$0.08*	*$0.12*	*$0.15*	*$0.18*	*$0.20*	*$0.22*	*$0.24*	*$0.26*	*$0.28*
$60,000	$ 11,550.00	*$0.04*	*$0.09*	*$0.13*	*$0.17*	*$0.20*	*$0.23*	*$0.26*	*$0.28*	*$0.31*
$80,000	$ 17,550.00	*-$0.01*	*$0.03*	*$0.09*	*$0.15*	*$0.20*	*$0.25*	*$0.29*	*$0.33*	*$0.36*
$100,000	$ 24,950.00	*-$0.01*	*$0.00*	*$0.05*	*$0.13*	*$0.20*	*$0.27*	*$0.33*	*$0.38*	*$0.43*
$150,000	$ 43,450.00	*-$0.01*	*$0.00*	*$0.01*	*$0.07*	*$0.20*	*$0.31*	*$0.42*	*$0.51*	*$0.60*
$180,000	$ 54,550.00	*-$0.01*	*$0.00*	*$0.01*	*$0.04*	*$0.20*	*$0.34*	*$0.48*	*$0.60*	*$0.71*
$200,000	$ 63,550.00	*-$0.01*	*$0.00*	*$0.01*	*$0.02*	*$0.20*	*$0.37*	*$0.52*	*$0.66*	*$0.79*
$300,000	$ 108,550.00	*-$0.01*	*$0.00*	*$0.01*	*$0.02*	*$0.20*	*$0.49*	*$0.75*	*$0.99*	*$1.21*

Note: EIP special rate only applies up to 30% above national benchmark, hence average electricity rate peaks at +30% and falls thereafter.
Rebate from EIP is only up to a maximum of $1000.

Appendix 4.1.3 Average electricity rate under EIP for 3-persons household

		Household consumption levels (% deviation from average)								
		6000	6375	6750	7125	7500	7875	8250	8625	9000
Taxable income	Tax paid	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
$20,000	$ 2,100.00	*$0.18*	*$0.18*	*$0.19*	*$0.20*	*$0.20*	*$0.20*	*$0.21*	*$0.21*	*$0.22*
$40,000	$ 5,550.00	*$0.14*	*$0.16*	*$0.17*	*$0.19*	*$0.20*	*$0.21*	*$0.22*	*$0.23*	*$0.24*
$50,000	$ 8,550.00	*$0.11*	*$0.13*	*$0.16*	*$0.18*	*$0.20*	*$0.22*	*$0.23*	*$0.25*	*$0.26*
$60,000	$ 11,550.00	*$0.07*	*$0.11*	*$0.14*	*$0.17*	*$0.20*	*$0.22*	*$0.25*	*$0.27*	*$0.29*
$80,000	$ 17,550.00	*$0.03*	*$0.06*	*$0.11*	*$0.16*	*$0.20*	*$0.24*	*$0.27*	*$0.30*	*$0.33*
$100,000	$ 24,950.00	*$0.03*	*$0.04*	*$0.08*	*$0.14*	*$0.20*	*$0.25*	*$0.30*	*$0.34*	*$0.38*
$150,000	$ 43,450.00	*$0.03*	*$0.04*	*$0.05*	*$0.10*	*$0.20*	*$0.29*	*$0.38*	*$0.45*	*$0.52*
$180,000	$ 54,550.00	*$0.03*	*$0.04*	*$0.05*	*$0.07*	*$0.20*	*$0.32*	*$0.42*	*$0.52*	*$0.60*
$200,000	$ 63,550.00	*$0.03*	*$0.04*	*$0.05*	*$0.06*	*$0.20*	*$0.33*	*$0.46*	*$0.57*	*$0.67*
$300,000	$ 108,550.00	*$0.03*	*$0.04*	*$0.05*	*$0.06*	*$0.20*	*$0.43*	*$0.64*	*$0.83*	*$1.00*

Note: EIP special rate only applies up to 30% above national benchmark, hence average electricity rate peaks at +30% and falls thereafter.
Rebate from EIP is only up to a maximum of $1000.

Appendix 4.1.4 Average electricity rate under EIP for 4-persons household

		Household consumption levels (% deviation from average)								
		7200	7650	8100	8550	9000	9450	9900	10350	10800
Taxable income	Tax paid	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
$20,000	$ 2,100.00	*$0.18*	*$0.19*	*$0.19*	*$0.20*	*$0.20*	*$0.20*	*$0.21*	*$0.21*	*$0.21*
$40,000	$ 5,550.00	*$0.15*	*$0.16*	*$0.18*	*$0.19*	*$0.20*	*$0.21*	*$0.22*	*$0.23*	*$0.23*
$50,000	$ 8,550.00	*$0.12*	*$0.14*	*$0.16*	*$0.18*	*$0.20*	*$0.22*	*$0.23*	*$0.24*	*$0.25*
$60,000	$ 11,550.00	*$0.09*	*$0.12*	*$0.15*	*$0.18*	*$0.20*	*$0.22*	*$0.24*	*$0.26*	*$0.27*
$80,000	$ 17,550.00	*$0.06*	*$0.09*	*$0.13*	*$0.17*	*$0.20*	*$0.23*	*$0.26*	*$0.28*	*$0.31*
$100,000	$ 24,950.00	*$0.06*	*$0.07*	*$0.10*	*$0.15*	*$0.20*	*$0.24*	*$0.28*	*$0.32*	*$0.35*
$150,000	$ 43,450.00	*$0.06*	*$0.07*	*$0.08*	*$0.12*	*$0.20*	*$0.28*	*$0.35*	*$0.41*	*$0.47*
$180,000	$ 54,550.00	*$0.06*	*$0.07*	*$0.08*	*$0.09*	*$0.20*	*$0.30*	*$0.38*	*$0.46*	*$0.54*
$200,000	$ 63,550.00	*$0.06*	*$0.07*	*$0.08*	*$0.08*	*$0.20*	*$0.31*	*$0.41*	*$0.51*	*$0.59*
$300,000	$ 108,550.00	*$0.06*	*$0.07*	*$0.08*	*$0.08*	*$0.20*	*$0.39*	*$0.57*	*$0.72*	*$0.87*

Note: EIP special rate only applies up to 30% above national benchmark, hence average electricity rate peaks at +30% and falls thereafter.
Rebate from EIP is only up to a maximum of $1000.

Appendix 4.2.1 A summary of electricity cost schedule with EIP only

		Household consumption levels **(% deviation from average)**						
	Household size				Average			
	1	3150	3600	4050	4500	4950	5400	5850
	2	4200	4800	5400	6000	6600	7200	7800
	3	5250	6000	6750	7500	8250	9000	9750
	4	6300	7200	8100	9000	9900	10800	11700
Taxable income	Tax paid	**-30.00%**	**-20.00%**	**-10.00%**	**0.00%**	**10.00%**	**20.00%**	**30.00%**
$ 20,000.00	$ 2,100.00	-$210.00	-$140.00	-$70.00	$0.00	$70.00	$140.00	$210.00
$ 30,000.00	$ 3,600.00	-$360.00	-$240.00	-$120.00	$0.00	$120.00	$240.00	$360.00
$ 40,000.00	$ 5,550.00	-$555.00	-$370.00	-$185.00	$0.00	$185.00	$370.00	$555.00
$ 50,000.00	$ 8,550.00	-$855.00	-$570.00	-$285.00	$0.00	$285.00	$570.00	$855.00
$ 55,000.00	$ 10,050.00	-$1,000.00	-$670.00	-$335.00	$0.00	$335.00	$670.00	$1,005.00
$ 60,000.00	$ 11,550.00	-$1,000.00	-$770.00	-$385.00	$0.00	$385.00	$770.00	$1,155.00
$ 70,000.00	$ 14,550.00	-$1,000.00	-$970.00	-$485.00	$0.00	$485.00	$970.00	$1,455.00
$ 80,000.00	$ 17,550.00	-$1,000.00	-$1,000.00	-$585.00	$0.00	$585.00	$1,170.00	$1,755.00
$ 100,000.00	$ 24,950.00	-$1,000.00	-$1,000.00	-$831.67	$0.00	$831.67	$1,663.33	$2,495.00
$ 150,000.00	$ 43,450.00	-$1,000.00	-$1,000.00	-$1,000.00	$0.00	$1,448.33	$2,896.67	$4,345.00
$ 180,000.00	$ 54,550.00	-$1,000.00	-$1,000.00	-$1,000.00	$0.00	$1,818.33	$3,636.67	$5,455.00
$ 200,000.00	$ 63,550.00	-$1,000.00	-$1,000.00	-$1,000.00	$0.00	$2,118.33	$4,236.67	$6,355.00
$ 300,000.00	$ 108,550.00	-$1,000.00	-$1,000.00	-$1,000.00	$0.00	$3,618.33	$7,236.67	$10,855.00

<u>Appendix 4.2.2a Detailed electricity cost schedule with EIP only</u>
<u>(Part a: For households consuming less than benchmark average)</u>

		% difference in household electricity consumption compared to benchmark average															
Taxable Income	Tax paid	**-50.00%**	**-46.67%**	**-43.33%**	**-40.00%**	**-36.67%**	**-33.33%**	**-30.00%**	**-26.67%**	**-23.33%**	**-20.00%**	**-16.67%**	**-13.33%**	**-10.00%**	**-6.67%**	**-3.33%**	**0.00%**
$10000	$ 600	-$100	-$93	-$87	-$80	-$73	-$67	-$60	-$53	-$47	-$40	-$33	-$27	-$20	-$13	-$7	$0
$20000	$ 2,100	-$350	-$327	-$303	-$280	-$257	-$233	-$210	-$187	-$163	-$140	-$117	-$93	-$70	-$47	-$23	$0
$30000	$ 3,600	-$600	-$560	-$520	-$480	-$440	-$400	-$360	-$320	-$280	-$240	-$200	-$160	-$120	-$80	-$40	$0
$40000	$ 5,550	-$925	-$863	-$802	-$740	-$678	-$617	-$555	-$493	-$432	-$370	-$308	-$247	-$185	-$123	-$62	$0
$50000	$ 8,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$950	-$855	-$760	-$665	-$570	-$475	-$380	-$285	-$190	-$95	$0
$60000	$ 11,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$898	-$770	-$642	-$513	-$385	-$257	-$128	$0
$70000	$ 14,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$970	-$808	-$647	-$485	-$323	-$162	$0
$80000	$ 17,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$975	-$780	-$585	-$390	-$195	$0
$90000	$ 21,250	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$944	-$708	-$472	-$236	$0
$100000	$ 24,950	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$832	-$554	-$277	$0
$110000	$ 28,650	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$955	-$637	-$318	$0
$120000	$ 32,350	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$719	-$359	$0
$130000	$ 36,050	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$801	-$401	$0
$140000	$ 39,750	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$883	-$442	$0
$150000	$ 43,450	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$966	-$483	$0
$160000	$ 47,150	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$524	$0
$170000	$ 50,850	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$565	$0
$180000	$ 54,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$606	$0
$190000	$ 59,050	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$656	$0
$200000	$ 63,550	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$1,000	-$706	$0

Appendix 4.2.2b Detailed electricity cost schedule with EIP only

(Part b: For households consuming more than benchmark average)

		% difference in household electricity consumption compared to benchmark average												
Taxable Income	Tax paid	**0.00%**	**3.33%**	**6.67 %**	**10.00%**	**13.33%**	**16.67%**	**20.00%**	**23.33%**	**26.67%**	**30.00%**	**33.33%**	**36.67%**	**40.00%**
$10000	$ 600	*$0*	*$7*	*$13*	*$20*	*$27*	*$33*	*$40*	*$47*	*$53*	*$60*	*$60*	*$60*	*$60*
$20000	$ 2,100	*$0*	*$23*	*$47*	*$70*	*$93*	*$117*	*$140*	*$163*	*$187*	*$210*	*$210*	*$210*	*$210*
$30000	$ 3,600	*$0*	*$40*	*$80*	*$120*	*$160*	*$200*	*$240*	*$280*	*$320*	*$360*	*$360*	*$360*	*$360*
$40000	$ 5,550	*$0*	*$62*	*$123*	*$185*	*$247*	*$308*	*$370*	*$432*	*$493*	*$555*	*$555*	*$555*	*$555*
$50000	$ 8,550	*$0*	*$95*	*$190*	*$285*	*$380*	*$475*	*$570*	*$665*	*$760*	*$855*	*$855*	*$855*	*$855*
$60000	$ 11,550	*$0*	*$128*	*$257*	*$385*	*$513*	*$642*	*$770*	*$898*	*$1,027*	*$1,155*	*$1,155*	*$1,155*	*$1,155*
$70000	$ 14,550	*$0*	*$162*	*$323*	*$485*	*$647*	*$808*	*$970*	*$1,132*	*$1,293*	*$1,455*	*$1,455*	*$1,455*	*$1,455*
$80000	$ 17,550	*$0*	*$195*	*$390*	*$585*	*$780*	*$975*	*$1,170*	*$1,365*	*$1,560*	*$1,755*	*$1,755*	*$1,755*	*$1,755*
$90000	$ 21,250	*$0*	*$236*	*$472*	*$708*	*$944*	*$1,181*	*$1,417*	*$1,653*	*$1,889*	*$2,125*	*$2,125*	*$2,125*	*$2,125*
$100000	$ 24,950	*$0*	*$277*	*$554*	*$832*	*$1,109*	*$1,386*	*$1,663*	*$1,941*	*$2,218*	*$2,495*	*$2,495*	*$2,495*	*$2,495*
$110000	$ 28,650	*$0*	*$318*	*$637*	*$955*	*$1,273*	*$1,592*	*$1,910*	*$2,228*	*$2,547*	*$2,865*	*$2,865*	*$2,865*	*$2,865*
$120000	$ 32,350	*$0*	*$359*	*$719*	*$1,078*	*$1,438*	*$1,797*	*$2,157*	*$2,516*	*$2,876*	*$3,235*	*$3,235*	*$3,235*	*$3,235*
$130000	$ 36,050	*$0*	*$401*	*$801*	*$1,202*	*$1,602*	*$2,003*	*$2,403*	*$2,804*	*$3,204*	*$3,605*	*$3,605*	*$3,605*	*$3,605*
$140000	$ 39,750	*$0*	*$442*	*$883*	*$1,325*	*$1,767*	*$2,208*	*$2,650*	*$3,092*	*$3,533*	*$3,975*	*$3,975*	*$3,975*	*$3,975*
$150000	$ 43,450	*$0*	*$483*	*$966*	*$1,448*	*$1,931*	*$2,414*	*$2,897*	*$3,379*	*$3,862*	*$4,345*	*$4,345*	*$4,345*	*$4,345*
$160000	$ 47,150	*$0*	*$524*	*$1,048*	*$1,572*	*$2,096*	*$2,619*	*$3,143*	*$3,667*	*$4,191*	*$4,715*	*$4,715*	*$4,715*	*$4,715*
$170000	$ 50,850	*$0*	*$565*	*$1,130*	*$1,695*	*$2,260*	*$2,825*	*$3,390*	*$3,955*	*$4,520*	*$5,085*	*$5,085*	*$5,085*	*$5,085*
$180000	$ 54,550	*$0*	*$606*	*$1,212*	*$1,818*	*$2,424*	*$3,031*	*$3,637*	*$4,243*	*$4,849*	*$5,455*	*$5,455*	*$5,455*	*$5,455*
$190000	$ 59,050	*$0*	*$656*	*$1,312*	*$1,968*	*$2,624*	*$3,281*	*$3,937*	*$4,593*	*$5,249*	*$5,905*	*$5,905*	*$5,905*	*$5,905*
$200000	$ 63,550	*$0*	*$706*	*$1,412*	*$2,118*	*$2,824*	*$3,531*	*$4,237*	*$4,943*	*$5,649*	*$6,355*	*$6,355*	*$6,355*	*$6,355*

<u>Appendix 4.3.1a Detailed electricity cost schedule of EIP including normal electricity rate of $0.2/kWh for 3 members household (assuming benchmark of 7500kWh and 1 taxpayer)</u>
<u>(Part a: For households consuming less than benchmark average)</u>

		% difference in household electricity consumption compared to benchmark average															
Taxable Income	Tax paid	**-50.00%**	**-46.67%**	**-43.33%**	**-40.00%**	**-36.67%**	**-33.33%**	**-30.00%**	**-26.67%**	**-23.33%**	**-20.00%**	**-16.67%**	**-13.33%**	**-10.00%**	**-6.67%**	**-3.33%**	**0.00%**
$10000	$ 600	*$650*	*$707*	*$763*	*$820*	*$877*	*$933*	*$990*	*$1,047*	*$1,103*	*$1,160*	*$1,217*	*$1,273*	*$1,330*	*$1,387*	*$1,443*	*$1,500*
$20000	$ 2,100	*$400*	*$473*	*$547*	*$620*	*$693*	*$767*	*$840*	*$913*	*$987*	*$1,060*	*$1,133*	*$1,207*	*$1,280*	*$1,353*	*$1,427*	*$1,500*
$30000	$ 3,600	*$150*	*$240*	*$330*	*$420*	*$510*	*$600*	*$690*	*$780*	*$870*	*$960*	*$1,050*	*$1,140*	*$1,230*	*$1,320*	*$1,410*	*$1,500*
$40000	$ 5,550	*-$175*	*-$63*	*$48*	*$160*	*$272*	*$383*	*$495*	*$607*	*$718*	*$830*	*$942*	*$1,053*	*$1,165*	*$1,277*	*$1,388*	*$1,500*
$50000	$ 8,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$50*	*$195*	*$340*	*$485*	*$630*	*$775*	*$920*	*$1,065*	*$1,210*	*$1,355*	*$1,500*
$60000	$ 11,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$252*	*$430*	*$608*	*$787*	*$965*	*$1,143*	*$1,322*	*$1,500*
$70000	$ 14,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$230*	*$442*	*$653*	*$865*	*$1,077*	*$1,288*	*$1,500*
$80000	$ 17,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$275*	*$520*	*$765*	*$1,010*	*$1,255*	*$1,500*
$90000	$ 21,250	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$356*	*$642*	*$928*	*$1,214*	*$1,500*
$100000	$ 24,950	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$518*	*$846*	*$1,173*	*$1,500*
$110000	$ 28,650	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$395*	*$763*	*$1,132*	*$1,500*
$120000	$ 32,350	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$681*	*$1,091*	*$1,500*
$130000	$ 36,050	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$599*	*$1,049*	*$1,500*
$140000	$ 39,750	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$517*	*$1,008*	*$1,500*
$150000	$ 43,450	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$434*	*$967*	*$1,500*
$160000	$ 47,150	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$400*	*$926*	*$1,500*
$170000	$ 50,850	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$400*	*$885*	*$1,500*
$180000	$ 54,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$400*	*$844*	*$1,500*
$190000	$ 59,050	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$400*	*$794*	*$1,500*
$200000	$ 63,550	*-$250*	*-$200*	*-$150*	*-$100*	*-$50*	*$0*	*$50*	*$100*	*$150*	*$200*	*$250*	*$300*	*$350*	*$400*	*$744*	*$1,500*

<u>Appendix 4.3.1b Detailed electricity cost schedule of EIP including normal electricity rate of $0.2/kWh for 3 members household (assuming benchmark of 7500kWh and 1 taxpayer)</u>
<u>(Part b: For households consuming more than benchmark average)</u>

		% difference in household electricity consumption compared to benchmark average												
Taxable Income	Tax paid	**0.00%**	**3.33%**	**6.67 %**	**10.00%**	**13.33%**	**16.67%**	**20.00%**	**23.33%**	**26.67%**	**30.00%**	**33.33%**	**36.67%**	**40.00%**
$10000	$ 600	*$1,500*	*$1,557*	*$1,613*	*$1,670*	*$1,727*	*$1,783*	*$1,840*	*$1,897*	*$1,953*	*$2,010*	*$2,060*	*$2,110*	*$2,160*
$20000	$ 2,100	*$1,500*	*$1,573*	*$1,647*	*$1,720*	*$1,793*	*$1,867*	*$1,940*	*$2,013*	*$2,087*	*$2,160*	*$2,210*	*$2,260*	*$2,310*
$30000	$ 3,600	*$1,500*	*$1,590*	*$1,680*	*$1,770*	*$1,860*	*$1,950*	*$2,040*	*$2,130*	*$2,220*	*$2,310*	*$2,360*	*$2,410*	*$2,460*
$40000	$ 5,550	*$1,500*	*$1,612*	*$1,723*	*$1,835*	*$1,947*	*$2,058*	*$2,170*	*$2,282*	*$2,393*	*$2,505*	*$2,555*	*$2,605*	*$2,655*
$50000	$ 8,550	*$1,500*	*$1,645*	*$1,790*	*$1,935*	*$2,080*	*$2,225*	*$2,370*	*$2,515*	*$2,660*	*$2,805*	*$2,855*	*$2,905*	*$2,955*
$60000	$ 11,550	*$1,500*	*$1,678*	*$1,857*	*$2,035*	*$2,213*	*$2,392*	*$2,570*	*$2,748*	*$2,927*	*$3,105*	*$3,155*	*$3,205*	*$3,255*
$70000	$ 14,550	*$1,500*	*$1,712*	*$1,923*	*$2,135*	*$2,347*	*$2,558*	*$2,770*	*$2,982*	*$3,193*	*$3,405*	*$3,455*	*$3,505*	*$3,555*
$80000	$ 17,550	*$1,500*	*$1,745*	*$1,990*	*$2,235*	*$2,480*	*$2,725*	*$2,970*	*$3,215*	*$3,460*	*$3,705*	*$3,755*	*$3,805*	*$3,855*
$90000	$ 21,250	*$1,500*	*$1,786*	*$2,072*	*$2,358*	*$2,644*	*$2,931*	*$3,217*	*$3,503*	*$3,789*	*$4,075*	*$4,125*	*$4,175*	*$4,225*
$100000	$ 24,950	*$1,500*	*$1,827*	*$2,154*	*$2,482*	*$2,809*	*$3,136*	*$3,463*	*$3,791*	*$4,118*	*$4,445*	*$4,495*	*$4,545*	*$4,595*
$110000	$ 28,650	*$1,500*	*$1,868*	*$2,237*	*$2,605*	*$2,973*	*$3,342*	*$3,710*	*$4,078*	*$4,447*	*$4,815*	*$4,865*	*$4,915*	*$4,965*
$120000	$ 32,350	*$1,500*	*$1,909*	*$2,319*	*$2,728*	*$3,138*	*$3,547*	*$3,957*	*$4,366*	*$4,776*	*$5,185*	*$5,235*	*$5,285*	*$5,335*
$130000	$ 36,050	*$1,500*	*$1,951*	*$2,401*	*$2,852*	*$3,302*	*$3,753*	*$4,203*	*$4,654*	*$5,104*	*$5,555*	*$5,605*	*$5,655*	*$5,705*
$140000	$ 39,750	*$1,500*	*$1,992*	*$2,483*	*$2,975*	*$3,467*	*$3,958*	*$4,450*	*$4,942*	*$5,433*	*$5,925*	*$5,975*	*$6,025*	*$6,075*
$150000	$ 43,450	*$1,500*	*$2,033*	*$2,566*	*$3,098*	*$3,631*	*$4,164*	*$4,697*	*$5,229*	*$5,762*	*$6,295*	*$6,345*	*$6,395*	*$6,445*
$160000	$ 47,150	*$1,500*	*$2,074*	*$2,648*	*$3,222*	*$3,796*	*$4,369*	*$4,943*	*$5,517*	*$6,091*	*$6,665*	*$6,715*	*$6,765*	*$6,815*
$170000	$ 50,850	*$1,500*	*$2,115*	*$2,730*	*$3,345*	*$3,960*	*$4,575*	*$5,190*	*$5,805*	*$6,420*	*$7,035*	*$7,085*	*$7,135*	*$7,185*
$180000	$ 54,550	*$1,500*	*$2,156*	*$2,812*	*$3,468*	*$4,124*	*$4,781*	*$5,437*	*$6,093*	*$6,749*	*$7,405*	*$7,455*	*$7,505*	*$7,555*
$190000	$ 59,050	*$1,500*	*$2,206*	*$2,912*	*$3,618*	*$4,324*	*$5,031*	*$5,737*	*$6,443*	*$7,149*	*$7,855*	*$7,905*	*$7,955*	*$8,005*
$200000	$ 63,550	*$1,500*	*$2,256*	*$3,012*	*$3,768*	*$4,524*	*$5,281*	*$6,037*	*$6,793*	*$7,549*	*$8,305*	*$8,355*	*$8,405*	*$8,455*

Appendix 4.3.2 Calculations of electricity expenditure as a % of taxable income in a 1-member household

Under normal electricity charges ($0.2/kWh):

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		3600	4500	5400		3600	4500	5400
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$720.00	$900.00	$1,080.00		2.40%	3.00%	3.60%
$ 60,000.00	$ 11,550.00	$720.00	$900.00	$1,080.00		1.20%	1.50%	1.80%
$ 100,000.00	$ 24,950.00	$720.00	$900.00	$1,080.00		0.72%	0.90%	1.08%

Under EIP including normal electricity charges:

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		3600	4500	5400		3600	4500	5400
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$480.00	$900.00	$1,320.00		1.60%	3.00%	4.40%
$ 60,000.00	$ 11,550.00	-$50.00	$900.00	$1,850.00		-0.08%	1.50%	3.08%
$ 100,000.00	$ 24,950.00	-$280.00	$900.00	$2,743.33		-0.28%	0.90%	2.74%

<u>**Appendix 4.3.3 Calculations of electricity expenditure as a % of taxable income in a 2-members household**</u>

Under normal electricity charges ($0.2/kWh):

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		4800	6000	7200		4800	6000	7200
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$960.00	$1,200.00	$1,440.00		3.20%	4.00%	4.80%
$ 60,000.00	$ 11,550.00	$960.00	$1,200.00	$1,440.00		1.60%	2.00%	2.40%
$ 100,000.00	$ 24,950.00	$960.00	$1,200.00	$1,440.00		0.96%	1.20%	1.44%

Under EIP including normal electricity charges:

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		4800	6000	7200		4800	6000	7200
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$720.00	$1,200.00	$1,680.00		2.40%	4.00%	5.60%
$ 60,000.00	$ 11,550.00	$190.00	$1,200.00	$2,210.00		0.32%	2.00%	3.68%
$ 100,000.00	$ 24,950.00	-$40.00	$1,200.00	$3,103.33		-0.04%	1.20%	3.10%

Appendix 4.3.4 Calculations of electricity expenditure as a % of taxable income in a 3-members household

Under normal electricity charges ($0.2/kWh):

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		6000	7500	9000		6000	7500	9000
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$1,200.00	$1,500.00	$1,800.00		4.00%	5.00%	6.00%
$ 60,000.00	$ 11,550.00	$1,200.00	$1,500.00	$1,800.00		2.00%	2.50%	3.00%
$ 100,000.00	$ 24,950.00	$1,200.00	$1,500.00	$1,800.00		1.20%	1.50%	1.80%

Under EIP including normal electricity charges:

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		6000	7500	9000		6000	7500	9000
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$960.00	$1,500.00	$2,040.00		3.20%	5.00%	6.80%
$ 60,000.00	$ 11,550.00	$430.00	$1,500.00	$2,570.00		0.72%	2.50%	4.28%
$ 100,000.00	$ 24,950.00	$200.00	$1,500.00	$3,463.33		0.20%	1.50%	3.46%

Appendix 4.3.5 Calculations of electricity expenditure as a % of taxable income in a 4-members household

Under normal electricity charges ($0.2/kWh):

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		7200	9000	10800		7200	9000	10800
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$1,440.00	$1,800.00	$2,160.00		4.80%	6.00%	7.20%
$ 60,000.00	$ 11,550.00	$1,440.00	$1,800.00	$2,160.00		2.40%	3.00%	3.60%
$ 100,000.00	$ 24,950.00	$1,440.00	$1,800.00	$2,160.00		1.44%	1.80%	2.16%

Under EIP including normal electricity charges:

		Electricity consumption kWh (%)				Electricity consumption kWh (%)		
		7200	9000	10800		7200	9000	10800
taxable income	Tax amount	-20.00%	0.00%	20.00%		-20.00%	0.00%	20.00%
$ 30,000.00	$ 3,600.00	$1,200.00	$1,800.00	$2,400.00		4.00%	6.00%	8.00%
$ 60,000.00	$ 11,550.00	$670.00	$1,800.00	$2,930.00		1.12%	3.00%	4.88%
$ 100,000.00	$ 24,950.00	$440.00	$1,800.00	$3,823.33		0.44%	1.80%	3.82%