Which Australian Households Spend the Most on Electricity Households

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Abstract

In the literature survey of electricity usage, the references included in this paper have explored the variation of electricity consumption by household characteristics like household size, age, IT appliances usage, working from home etc. The goal of this project is to find the Australian households that spend the most on electricity. This project will use variables that are financial year wages and salaries, home repairs, physical functioning, physical activity, outdoor tasks, and unpaid work from the HILDA survey to explore the households that spent the most on electricity usage. The Household, Income and Labour Dynamics in Australia (HILDA) survey is a large, longitudinal survey that is the only survey of its kind that is nationally representative. This survey has followed approximately 17,000 people since 2001, with 15-time points of data released to date. This project uses regression analysis to analyze data from the HILDA survey.

1   Literature Review

Matthies et al. [3] used hierarchical regression analysis to systematically investigate the household engagement in electricity saving along with a wide range of other measures in some sample households. The researchers suggest that the use of behavioral information provides a more detailed information on the condition of electricity usage [3]. In today's culture, the electricity consumption is dependent on the household size, activities of the household, and the age of the person (for example teenagers, kid's etc.) [3]. Speidel et al. [4] say that in households 55% of electric vehicles are charged. If a household resident uses a vehicle for long distances, then the person must charge several times which results in higher electricity bills [4].

Lenzen et al. [5] describe strategies to reduce the household electricity usage for that he has calculated the Sydney household's electricity consumption for that he has considered household size, age, income, and degree of urbanity, lifestyle. All the above-mentioned household characteristics vary significantly from one household to another [5]. Matthies et al. [3] examined the impact of determinants such as income of adolescents on electricity usage. Location is an important factor in analyzing the Australian household's electricity consumption. Based on the location electricity bills will be higher or lower (For instance, Queensland electricity bills are higher compared to New South Wales electricity bills [2]). South Australia has the highest annual electricity bills compared to New South Wales, Victoria, and Queensland states in Australia [2].

To effectively target marketing campaigns, it is important to cluster the households into a manageable number of groupings so that each group can be presented differently [1]. Currently, the utility companies use demographic data that is house size, family size, location etc. as the basis for clustering [1]. Dent et al make use of electricity meter data to explore whether useful clusters can be achieved based on the household's behavior [1].

2   Methods

The HILDA dataset [6] is publicly available de-identified data. As such privacy and confidentiality of all survey participants will be respected. This project will use data from the HILDA survey to explore the reasons for variation in household expenses. The Household, Income and Labour Dynamics in Australia (HILDA) survey is a large, longitudinal survey that is the only survey of its kind that is nationally representative. This survey has followed approximately 17,000 people since 2001, with 15-time points of data released to date. The following are the variables considered for this project: Financial year wages and salaries, home repairs, physical functioning, physical activity, outdoor tasks, and unpaid work.

In statistical methods, regression [7] is used to estimate the relationship between variables. The focus is on the one or more independent variables and dependent variables. Regression analysis is used to understand how the typical values of the different variables change when the independent variables are varied.

3   Results

Variable	Estimate	P value	Continuous/ Categorical
Financial year wages and salaries	0.118	<0.001	Continuous
Home Repairs	-0.301	<0.001	Categorical

Physical Functioning	-0.742	0.003	Continuous
Physical Activity	-0.081	0.026	Continuous
Outdoor Tasks	0.046	<0.001	Continuous
Unpaid Work	0.025	<0.001	Continuous

Table 1: Results of Linear Regression

4 Discussion

Income or employment reducing electricity consumption could lead to a fall in income and/or employment [8]. So, increase in financial year wages and salaries increases electricity consumption. Generally, unpaid work like volunteering, social activities etc are more likely done by teenagers because their need some experience to find a job. Several investigations have reported that when the number of adolescents in a household increases, residential electricity consumption increases as well [3]. Outdoor workers in a household get higher electricity bills. For instance, because of lawn moving work they must regularly charge the battery of lawnmower depends on the number of houses they do lawn moving, which consumes more electricity usage. Lawnmower consumes minimum 1000W (which is equal to home air conditioner) and maximum 1400W [9].

5 Conclusion

To validate the chosen variables this project uses regression analysis on a univariate basis on how likely the variable is related to the electricity usage.

I can conclude that the following user behavior in the household can lead to electricity usage that is financial year wages and salaries, home repairs, physical functioning, physical activity, outdoor tasks, unpaid work.

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Biography

I am currently pursuing my Master of Computer Science (Management) at the University of Queensland. I did my Bachelor's in Computer Science Engineering at JNTUH. I want to become a Data Scientist as I am interested in Data Science.