

A Study on the Factors Affecting Household's Energy Consumption Behavior in Jiangsu Area of China

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1. INTRODUCTION

Household's energy consumption refers to the energy consumption of electricity, gas, coal, biomass and new energy used by residents for cooking, lighting, heating or cooling, household appliances, hot water and other household life purposes.

Combing through numerous domestic and foreign research documents, we select three internal factors of environmental quality, family characteristics and lifestyle, and two external environmental factors of energy policy and publicity and education to explain the formation of household's energy consumption patterns, as shown in Table 1.

Table 1 Variable definitions of factors affecting household's energy consumption

Explained variable	Explanatory variables	Observed variables
Household's energy consumption	Environmental quality	Environmental knowledge Environmental values Environmental attitudes
	Family characteristics	Family annual income Family population Family living area
	lifestyle	Recognition of energy saving habits
	Energy policy	Energy prices Policies and regulations
	Publicity and education	Energy conservation promotion

2. DATA AND METHODOLOGY

We conducted a two-month questionnaire survey using stratified random sampling in 13 cities of Jiangsu Province. In Nanjing, Suzhou, Xuzhou, Nantong, Yancheng and Wuxi. The questionnaire is divided into five parts according to the factors that influence household's consumption. Except family characteristics, the other parts all use a five-level scoring scale.

The most commonly used energy in the sample households is electricity, which accounts for 100% of the total; Jiangsu's pipeline natural gas has entered the cities and some rural households, accounting for 75.1% of the surveyed households; The solar energy is popular in rural areas, accounting for about 46.6%; households using liquefied gas account for 24.9%; Households in all areas do not directly use coal. A small number of households in northern Jiangsu use biogas, firewood and straw, and they account for 3.6% of the total.

Select electricity, pipeline natural gas and solar energy that account for a large proportion of household energy consumption and conduct Pearson correlation analysis.

3. RESULTS ANALYSIS

The environmental knowledge, environmental values and environmental attitudes among environmental quality factors are all negatively related to household's energy consumption, and the households all have a positive willingness to use solar energy. Families who pay attention to energy issues, understand energy-saving products, recognize environmental protection, and are responsible for environmental protection have shown positive energy conservation behaviors.

Among the family characteristics, the annual household income is positively correlated with electricity consumption and pipeline natural gas. The number of electrical appliances in the sample households is positively correlated with income. The consumption of some household appliances has high income elasticity, which brings effect of significant correlation between electricity consumption and income. The increased demand for floor heating by high-income households has also led to the sensitivity of natural gas consumption to income performance. The number of household population is positively correlated with electricity consumption and pipeline natural gas. Electric energy consumption is mainly used for household lighting, entertainment and air-conditioning systems. These consumptions have the characteristics of sharing. The marginal electric energy

consumption of family members is low, and the increase of the number of households will lead to a small increase in the total household electric energy consumption while reducing the per capita electric energy consumption. Pipeline natural gas is used for household cooking, water heaters and floor heating, etc. The gas consumption is obviously affected by the number of family members. Family living area is positively correlated with energy consumption. The larger living area of the family, and the larger area of lighting, heating and cooling within the family. In order to maintain the comfortable living space, energy consumption will increase accordingly. There is no significant correlation between family characteristics and the willingness to use solar water heaters.

Lifestyle is negatively related to household energy consumption. The energy consumption of these families which have acknowledge about some good energy-saving habits, such as choosing energy-saving lamps and energy-saving appliances, turning off the lights when you leave, turning the air conditioner temperature not too low in summer and not too high in winter, turning off standby appliances, and choosing pots and utensils with good heat preservation performance, shows lower level. Lifestyle are not significantly related to Solar consuming willingness.

Among energy policy factors, the perception of energy prices is not related to energy consumption. From the general law of the market, the higher the price, the lower the demand; the lower the price, the higher the demand. However, energy products such as electricity and gas are necessities in household consumption, and the price elasticity of demand is low. Although sample households have different perceptions of energy prices, their energy consumption levels are not significantly related to price perceptions. Policies and regulations are not related to energy consumption. Most of the sample households agree with energy-saving policies, but they have not significantly affected household's energy consumption behavior. Energy policy is not significantly related to the willingness to use solar water heaters. Publicity and education are negatively related to energy consumption and positively related to the willingness to use alternative energy solar products. The survey found that the environmental quality and lifestyle factors of sample families who participated in the "Energy-saving and Low-carbon" series of publicity activities carried out in Jiangsu Province or read through the media such as "Energy Conservation Proposal" and "Energy-saving Tips" Higher energy consumption habits are better, which is directly reflected in the energy consumption level and willingness to use solar water heaters.

4. MAIN CONCLUSION

4.1. Family environmental quality affects family energy consumption behavior

Families who care about and know about the environment pay more attention to the energy-saving standards of products in the energy consumption. Families that agree with environmental protection are more self-disciplined in energy consumption behavior.

4.2. Family lifestyle affects household energy consumption behavior

Whether a family's lifestyle is simple or luxurious, closed or open, casual or rigorous, it is closely related to family characteristics, and at the same time, it is a behavioral characteristic guided by values.

4.3. Energy policy and publicity and education have different roles

Various energy-saving publicity activities that went deep into the community and were seen in the media helped families cultivate environmental quality and showed their effects in household's energy consumption behavior.

4.4. The factors affecting the willingness to use solar water heaters are complex

In addition to environmental quality, other factors, including family characteristics, lifestyle, energy policy, and publicity and education are not significantly related to it. Almost all households in the sample agree that solar water heaters are economical, environmentally friendly, and energy-saving, but some factors outside the research have hindered the willingness to use solar water heaters.