Advances in Economics, Business and Management Research, volume 215
Proceedings of the 2022 7th International Conference on Social Sciences and Economic Development (ICSSED 2022)

Research on Applying Behavioral Economics to Understand Household Sustainable Energy Use

Jianzi Ding[1,*]

[1]*Central University of Finance and Economics, International Economics and Trade, Beijing, China*
**Corresponding author. Email: 364445671@qq.com*

ABSTRACT
With the increasing shortage of energy resources and the appeal of human society to energy conservation and environmental protection, researchers are discovering ways to promote household sustainable energy use. People know that using sustainable energy can relieve environmental pressure and it is consistent with their ideas, but they often do not take effective steps. With further research in behavioral economics, we try to understand why people do not behave in a rational and predicted way and give suggestions to policy makers to affect their behavior by changing their preference and their feelings about different options. Based on the discussion about the traits of household energy use from behavioral economics perspective, there are suggestions that the policy maker can change the default option, provide relevant information, use education, and divide individual contribution.

Keywords: *Behavioral economics, sustainable energy, policy making*

1. INTRODUCTION

Currently, with the development of economy, there is increasing demand of energy use.

Given the fact that the energy consumption has increased rapidly, and the environment has been greatly polluted, many countries are taking actions to promote sustainable energy use, which means that we need to decrease the use of fossil fuels. Governments has introduced measures like encouraging consumers to purchase electric vehicles and adjusting the price of energy to decrease the reliance on fossil fuels. The traditional methods are through macro policies and pay little attention on understanding the individual decision making.

In recent years, with the rapid development of behavioral economics, researchers start applying behavioral economics to analyze people's choice on sustainable energy. According to traditional economics, humans are rational and always choose the optimal choice. But in fact, people are often irrational and would not always pursue the best due to the limit of their cognition [1]. Some people will not choose to use sustainable energy though it is environmental-friendly and economical [2]. In order to explain the incentives of consumers on household energy use and help the governments make better policies, the paper apply the behavioral economics to give some suggestions.

2. TRAITS OF HOUSEHOLD ENERGY USE FROM BEHAVIORAL ECONOMICS PERSPECTIVE

In this section, according to the theory of behavioral economics, the traits of people's behavior when making decisions on choosing the household sustainable energy are discussed with some examples.

2.1 Status quo bias and loss aversion

People tend to maintain the status quo when making decisions, rather than making an objective and comprehensive choice or comparing the cost and benefit of every option. When there are many alternatives, people would regard the status quo as a default option, for example their current phone plan. People are not willing to spend much time on optimizing the result. On the contrary, people would choose a satisfactory option that does not take many efforts. So, when there are many options, people are more willing to choose the default option—the status quo. Even although consumers know some household electricity plans are greener and cheaper, only a small part of families would choose the new plan. The tendency of maintaining the status quo can be

explained by loss aversion. When people face the same amount of loss and benefit, they think the negative utility of loss can be much higher than the positive utility of gaining same amount of benefit [3-4]. Governments that introducing the electric vehicles need to consider that people may only see the price they need to pay, leaving out the future benefit of saving money from fuels.

2.2 Satisficing tendency

People do not optimize their choice by processing all the available information when making decisions among too many alternatives [5]. According to the research, consumers would be appealed more by an extensive array of flavors of jams, but those who were given the limited array of flavors of jams would be more likely to purchase the jams. Part of the reason is that people are not willing to choose the best from so many different options, though they can try every flavor and make the decision. They are satisfied when they choose a good enough choice that does not take much time and effort [6]. When the new sustainable energy use plan cost nearly the same and has certain energy saving effect, they have the tendency of keeping the status quo because they do not optimize the situation and they feel that it is satisfying now. People are motivated to take actions when the benefits is significant.

2.3 Intertemporal choice

People will perceive a decrease in benefit when they make an intertemporal choice. For example, people are not willing to take medicine, because they see the immediate cost and the delayed benefits. They value the present benefit more than the future benefit, which shows the value of time according to the traditional economics. Thus, when consumers consider whether to take actions that cost some money now and will save more money in a long period, they would be more likely to be short-sighted. Only when the amount of money that they will receive is big enough, then they will prefer to lose some money now [7]. Unfortunately, the sustainable energy use measures like replacing fuel cars with electrical vehicles can be expensive to the family. People hardly consider the positive effect on saving the cost of fuels in the daily use of cars in the future.

2.4 Social loafing

People have the tendency of take a free ride, which is to make no effort when they can gain the benefit without the need of paying. To protect the environment and relieve the shortage of energy, admittedly, what one person do is little compared with the whole effort. People think their own decisions of whether to use sustainable energy or not do not matter to the energy saving. So, they contribute less when it is a group thing, rather than the individual benefit. With everyone has the same thought, it is difficult to promote the idea of using sustainable energy. People may accept the idea, but they will not really take the action, which shows the need to point out their individual benefits and losses. Like according to the research, if we ask two groups of students discuss about ideas as much as possible, the group that think and write down everyone's idea individually have much more ideas than those who discuss together in total. Knowing this tendency, if we divide the individual's contribution, we can expect more people are motivated to take actions than we only see the contribution of the whole community [8-10].

3. SUGGESTIONS ON POLICIES MAKING

Knowing that people will have the tendency of maintaining the status quo, satisficing tendency, irrationality of intertemporal choice and social loafing, suggestions are made to help the government promote the use of sustainable energy.

3.1 Change the default option

The default option is necessary to people's decisions making. According to researchers, in the experiment, when the inefficient incandescent lamp was set as the default choice of the consumer, its probability of being selected was doubled [11]. Because there are status quo and people are not willing to change from the default option, the governments can set the greener and sustainable energy use plan as the default option [4]. To some household appliances that have different modes, they can set the greener mode as the default option. Like the car companies, they can set the Eco mode as the default option. Most car drivers will not change it by themselves. This method takes advantage of the status quo and loss aversion to help activate the household sustainable energy use.

3.2 Provide relevant information

People do not take efforts to select the optimal option and are easily satisfied. Therefore,

governments can provide the report of citizens' energy use and the comparison of taking sustainable energy plan with the traditional plan, which can include the cost and pollution of different plan. Offering a visualized report can help people choose the new plan. For example, the report can include the information about the amount of electricity use every year and the cost with the average cost of national use. It can even report like the exercising equipment and shows the amount of energy people have consumed compared with the energy of a kind of food. The report can include the amount of household emission of carbon dioxide and compared with the amount of emission of car use. In this way, people can see easily how much they contribute to the environmental deterioration and will probably prefer the sustainable energy plan. Moreover, due to the loss aversion, the

governments can add some information on bills of the comparison between the cost of traditional household electricity plan and greener plan. Like if people keep the status quo, they will lose more money than those who use the sustainable energy, people will tend to take actions to reduce losses [12].

3.3 Education

The cultivation and the education of residents 'knowledge and concepts of using sustainable energy need to be arranged in school. The research shows that the group of students shows more rational energy consumption and can be effectively affected to promote the idea of using sustainable energy. When they are taught about the benefit of changing the household energy use, they are more likely to accept the idea and take actions. And in social media, use the influence of celebrity to promote the idea and make it a trend to use sustainable just like buying luxury cars. Also, it is more efficient to educate the urban families because they are highly educated and the cognitive cost of promoting their energy-saving behavior. They better know the significance and long-term benefit of replacing the energy with sustainable energy. Typically, People with low education background will using more energy and have lower awareness of saving energy. Thus, families in rural areas will more likely not apply sustainable energy than those in the cities [13-14].

3.4 Individual contribution

It is necessary to show the people their own contribution. The government can show the statistics that reveal the community energy use, including the specific information of each family's contribution. When people can see how other family try to use sustainable energy and follow the greener and advanced concept of taking environmentally friendly actions, they will compete with others, and it will therefore decrease the effect of social loafing. Instead of contributing less to the group, people may be motivated to make their contributions [15]. For example, when people know there are solar panels that are installed in some houses in the community and they save energy, they will be more willing to learn about the new equipment and realize that it can also save money in the long period. When most of families in the community have replace the traditional energy use, the rest of families in the community will follow the trend and join the group out of pressure. When reporting the amount of energy use to the community, the governments should provide both the total contribution and the contribution of each family to make them motivated.

4. DISCUSSION

In fact, here are coercive and effective measures like make direct regulations on the use of fuel vehicles in China to promote the purchase of the electrical vehicles. Cars are not allowed to use once a week while the electric vehicles can be driven freely. Although it seems more effective and useful, it can discourage people from doing other environmentally friendly actions when there is no regulation. Therefore, governments are seeking for other ways that can affect the decision making by changing how they feel in a phycological way. Traditionally, under the macro regulations and subsidy policies, consumers are still not behaving in a rational way of energy use. There are different circumstances in different countries. Like In China, people do not have the options of choosing the household electricity use between traditional plan and sustainable energy plan. We expect the measures of behavioral economic to be applied to electric vehicles industry. With the giant market of cars in China, it can be of great importance to the energy saving in the world. Thus, it is important for governments to seek the ways of transformation from tradition vehicles to electric vehicles.

5. CONCLUSION

In the paper, we discussed the people's irrational behavior of household energy use. Behavioral economics has a wide range of both psychology and economics, and we can apply it into the field of sustainable energy use. According to the behavioral economics, we try to understand the deviations from the rational behavior that consumers show and give the suggestions to the policy maker. The factors like satisficing effect make people consider the choice in a different way from the traditional assumption of rational people. To help decrease the deviation that consumers show, suggestions like changing the default option will help the policy maker work out more effective strategies. The paper is mainly about the integration and application of the study of economics. More empirical and experimental study of the effectiveness of behavioral economics measures on household energy use are needed. So, we can evaluate the specific impact of the measures by means of statistics and help decrease the energy use and promote household sustainable energy use. Knowing the specific determinants and their contributions or impacts of the consumers' behavior will make it clear for governments to take actions. The further study can be conducted in different countries because the different culture and people's attitude vary a lot. There should be adjustments to the suggestions in different countries, so that they can be more effective and valid.

REFERENCES

[1] WILKINSON N, KLAES M. (2017) An introduction to behavioral economics[C].Macmillan International Higher Education

[2] Pamela Courtenay-Hall & Larson Rogers, (2010), Gaps in Mind: Problems in environmental

knowledge-behavior modelling research, Environmental Education Research, Volume 8, Issue 3

[3] Moshinsky, A; Bar-Hillel, M, (2010), LOSS AVERSION AND STATUS QUO LABEL BIAS, SOCIAL COGNITION, volume 28, issue 2, pages 191-204

[4] Daniel Pichert, Konstantinos V. Katsikopoulos, (2008), Green defaults: Information presentation and pro-environmental behavior, Journal of Environmental Psychology, Volume 28, Issue 1, Pages 63-73,

[5] Simon, Herbert A., (1955), A Behavioral Model of Rational Choice, The Quarterly Journal of Economics, Volume 69, Issue 1, February 1955, Pages 99–118

[6] Kahneman, D. (2003). Maps of bounded rationality: psychology for behavioral economics. American Economic Review, 93(5), p.1449-1475.

[7] Rick, S., & Loewenstein, G. (2008). Intangibility in intertemporal choice. Philosophical transactions of the Royal Society of London. Series B, Biological sciences, Volume 363, Issue 1511, Pages 3813-3824.

[8] Simms, A., & Nichols, T. (2014). Social loafing: a review of the literature. Journal of Management Policy and Practice, 15(1).

[9] Stroebe, W., & Frey, B. S. (2011). Self-interest and collective action: the economics and psychology of public goods. British Journal of Social Psychology, 21.

[10] Gunnthorsdottir, A., & Rapoport, A. (2006). Embedding social dilemmas in intergroup competition reduces free-riding. Organizational Behavior and Human Decision Processes, 101.

[11] Dinner, I. M., Johnson, E. J., Goldstein, D. G., & Liu, K. (2010). Partitioning default effects: why people choose not to choose. Ssrn Electronic Journal.

[12] Yates, S. (1982). Using prospect theory to create persuasive communications about solar water heaters and energy conservation /.

[13] Dirk Brounen, Nils Kok, John M. Quigley, (2013). Energy literacy, awareness, and conservation behavior of residential households, Energy Economics, Volume 38, Pages 42-50

[14] Zografakis, N., Menegaki, A. N., & Tsagarakis, K. P. (2008). Effective education for energy efficiency. Energy Policy, 36(8), 3226-3232.

[15] Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2008). Normative social influence is underdetected. Personality & Social Psychology Bulletin, 34(7), 913-23.