

Behavioral Change for Energy
Conservation Case Study of
Post-Fukushima Experience in Japan

Chizu Kano

Examensarbete i Hållbar Utveckling 121

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Content

1. Introduction	1
1.1. Research Context	1
1.2. Research Goal	1
1.3. Research Questions	1
2. Background for the study	3
2.1. Sustainable Energy Consumption	3
2.2. Behavioral change as sustainable energy solution	4
2.3. Japan: Post-Fukushima and national energy issue	5
3. Theoretical framework	8
3.1. Theory of Planned Behavior	8
3.2. Additional determinants to the TPB	10
3.3. Theory of motivation in social interaction	12
4. Methodology	14
4.1. Literature review	14
4.2. Choice of methodology	15
4.3. Study location	16
4.4. Data collection	16
4.4.1. Selection of participants	17
4.5. Limitation of the study	17
5. Results and analysis	19
5.1. Interview results on the Fukushima incident and energy issues	19
5.1.1. Changes of opinions towards energy consumption	19
5.1.2. Behavioral change on energy consumption	20
5.2. Interview results on TPB and additional determinants	21
5.2.1. Drivers to trigger energy conservation behavior at households	22
5.2.2. Barriers to prevent energy conservation practice at households	24
5.3. Content-analysis on the annual energy report (FY2008 and FY2012)	26
5.4. Content-analysis on report of Japan Business Federation	30
6. Discussion	32
7. Conclusion	38
8. References	40
Appendix 1: Interview questions in English	44
Appendix 2: Interview questions in Japanese	45

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Kano, C., 2013: Behavioral Change for Energy Conservation: case study of post-Fukushima experience in Japan. *Master thesis in Sustainable Development at Uppsala University*, No. 121, 45 pp, 30 ECTS/hp

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The results identified that the Fukushima incident has little impact on people's behavior, while there has been increasing anxiety on energy systems among them. The Fukushima incident itself therefore does not seem to affect energy conservation behavior among the Japanese. Rather, it can be assumed that energy conservation can be triggered by personal aspects or situational aspects such as perception on preferable outcome, perceived easiness of achieving the behavior, moral norm (sense of "mottainai"), past habit, and community level of social mood on energy conservation. On the other hand, family support and discomfort were found to prevent from making the behavior to occur. Moreover, since there was an evident distrust of the public towards the government, it was difficult to share the same energy issues between the two sectors, hence, restoration of the distrust is a crucial challenge for the government.

Keywords: Sustainable Development, energy conservation, post-Fukushima, household energy consumption, qualitative research, behavioral study

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1. Introduction

1.1. Research Context

Environmental, social, and economical pressure on energy issues has been a serious and urgent concern for the world, notably in countries that are highly dependent on imported-energy. This worldwide challenge calls for sustainable energy consumption from the demand-side. While efficient energy consumption is pursued both from technological advancement and behavioral change of energy consumers, behavioral change at individual level is essential with regard to more and more increasing demands on energy in non-OECD countries.

In addition, after the Fukushima incident in March 2011, serious reconsideration on nuclear energy has been discussed and a new path without nuclear energy is becoming a vital key both in Japan and many parts of the world. Having the post-Fukushima disaster and emerging political and public reception on energy issues as the background, this study will investigate receptions on energy issues from viewpoints of several actors – public, political, and perspective from a business federation. They will be examined through text analysis of the data obtained from in-depth interviews carried out in two areas called Kyoto and Shiga prefectures in Japan, and text analysis of energy reports from the Japanese government and Japanese federal business federation.

1.2. Research Goal

As Agency for Natural Resources and Energy in Japan (2011) points out, household energy demand has been increased due to changes in public lifestyle and a shift towards finding more convenient and comfortable ways of living. By pursuing the subject of energy conservation behavior in Japan, it improves the situation of current energy issues such as exploitation of limited energy resources, greenhouse gas emissions, dependence on imported energy, and more importantly, recent controversial discussion on phasing out of nuclear energy power plants. This provides solutions not only for Japan, but also for other countries that have similar energy situation as Japan. Behavioral change towards lifestyles in Japan is therefore essential.

This research will therefore investigate the following aspects;

- 1) Possibility of sustainable energy consumption in Japan at the individual level; and,
- 2) Key barriers and drivers to change behavior for energy conservation.

1.3. Research Questions

Given the research objectives above, the paper would like to answer the following research questions;

- 1) What has changed on public reception and practice on energy consumption after the Fukushima nuclear incident in Japan?
- 2) What are the barriers to bring about behavioral change on energy consumption at the household level in Japan?
- 3) Is there a gap between public, political, and economic sectors' reception on energy issues?
- 4) How could energy conservation be triggered by the Japanese people?

Therefore, the paper will first present the background of the study including the idea of sustainable energy consumption to capture the importance of understanding the behavioral change of the public, and energy situation in Japan. Theoretical framework using the Theory of Planned Behavior and Motivational Model in social interaction theory will be introduced accordingly to gain better understanding of the background. After introducing the study methods including study location, interview methods, and analysis methods, the results of the text analysis will be presented and discussed further to conclude the study.

2. Background for the study

2.1. Sustainable Energy Consumption

Environmental, social, and economical pressure on energy issues has been a worldwide challenge since the world has observed various issues related to energy supply such as; non-renewable energy sources in short supply, limited contribution of renewable energy, rising price of energy resources in international market, controversies on nuclear energy, and increasing impact of greenhouse gas emissions from energy generation on global warming. Still, future energy consumption in the world is expected to grow by more than 50 percent from 2008 to 2035, in which non-OECD countries account for the increase of the demand in recent years due to changes in life-standard, industry, and transportation (Energy Information Administration, 2011). Under the situation of numbers of societies with growing energy-demand, income, and population, application of sustainable energy consumption is urgent.

In 1987, the World Commission on Environment and Development, also known as the Brundtland Commission, brought about the concept of sustainable development in their report stating that sustainable development is to *“meet the needs of the present without compromising the ability of future generations to meet their own needs”* (World Commission on Environment and Development, 1987, 50p). Energy issue is discussed in the report as one of the Commission’s greatest concerns as energy is not only essential to cater to human needs and allow them to maintain their activities including social, cultural, technological, medical, and economic development, but also it is a matter of protection of the environment and prevention of pollution. More recent study on the sustainable consumption by UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP) summarizes the ways of achieving sustainable energy consumption in four basic ways (CSCP, 2005: p.5);

- A) Demand-side energy efficiency (also termed energy end-use efficiency): This most important option relates to technical, organisational and individual measures to reduce the final energy needed to heat/cool our houses, produce goods etc.
- B) Co-/tri-generation: Introduction of on-site co- or tri-generation of heat, cold, and power can dramatically improve energy efficiency on the supply side. This option is largely related to the issues of energy generation and distribution.
- C) Renewable energy: The third option is renewable energy produced and used onsite through biomass or solar thermal collectors etc. as well as that fed into the electricity grids.
- D) Limiting energy services: The final option could be to limit the amount of energy services we use (e.g. by capping dwelling floor space) to a level sufficient to cover our energy-related needs.

Sustainable energy consumption summarized by CSCP can be further discussed from the viewpoints of energy suppliers and consumers. The energy supplier aspect involves co-/tri-generation of energy as energy-efficient generation means, renewable energy supplied to replace non-renewable energy sources, and limiting energy

services. It is a challenging issue for energy suppliers (e.g. electricity utility or natural gas company) as well as governments to make their policies in accordance both with the global and local demands.

The energy consumer aspect encompasses energy efficiency from technical, organizational and individual standpoint. Energy efficiency is defined as a moderate ratio^a of the amount of energy consumed in a given input of energy supplied, which is slightly different from energy conservation that is a reduction of total amount of energy consumed (Gillingham, Newell, and Palmer, 2009). In other words, energy efficiency is relative to the available energy supply that requires energy conservation as well as technical advancement. In a similar way, Ting, Mohammed, and Wai (2011) make clear distinction on characteristics of energy efficiency. They divide approaches to promote energy efficiency into two categories; structural energy conservation and non-structural energy conservation. While structural energy conservation represents the technological instruments and tools that often require capital investment, non-structural energy conservation refers to improvement or change of the consumer's behavior to reduce energy consumptions (Ibid).

The author of this paper believes that the reduction of energy use is a more promising and longer-term solution for the energy issues because there should be a limitation of the extent that technological advancement or renewable energy use can provide solutions to energy issues. As an example, it is expected that the world will need more and more energy with the current world trend of increasing population in the industrialized world. The main reason is that more societies are shifting towards energy-demanding cultures in life-standard, industry, and transportation (Energy Information Administration, 2011). In this paper, non-structural energy conservation thus will be under focus to find out the individual level of energy use aside from their desire to buy or use eco-efficient instruments.

2.2. Behavioral change as sustainable energy solution

The key elements to pursue sustainable energy both from supply and demand side have been proposed. Although both supply and demand sides are important to find integrated solutions (Watson et al., 2010), energy efficiency from consumer dimension of the energy use may be a crucial key with regard to current energy issues including increasing population and energy-demanding societies. Energy efficiency from demand side can be grouped into structural and non-structural energy conservation. Despite the recent technological advancement and opportunities of structural energy conservation, there is a need of understanding people's behavior, their lifestyles, and long-term choices on how they live to improve the non-structural energy conservation. Kempton and Schipper argues that understanding people's behavior and choices is as important as studying energy efficiency of appliances since it is essential to understand the factors influencing both energy efficiency and total energy use (1994). Their argument indicates the possibility of people's behavior as a potential means for energy conservation together with technological eco-efficient instruments.

^a In consideration of sustainable energy consumption, the moderate ratio of energy efficiency here should accordingly present the percentage of energy use associated with future ability of providing energy for net generation's needs.

oreover, the need of understanding the people's behavior on energy conservation is argued further by critiques that claim the limitation of structural energy conservation. Ting, Mohammed, and Wai (2011) argue that structural energy conservation is not necessarily efficient because people tend to use the technology or tool more often when it is labeled as 'energy efficient'. Further critiques on energy-efficient appliances point out unchanged levels and nature of consumption over the past decades, notably in industrialized countries. According to Peattie and Peattie (2009), majority of people's life in industrialized countries in the last 20 years have experienced merely a continuum of consumption growth offset by eco-efficiency improvements without changing their lifestyle. This calls for deeper understanding of non-structural and behavioral aspect of consumers for energy efficiency and need to recognize the structural energy conservation as just a supplementary tool to help energy efficiency. Thus, this paper will investigate the energy use of the public with a great focus on their behavioral or non-structural energy conservation.

2.3. Japan: Post-Fukushima and national energy issue

Energy issues have always been the Japanese government's concern since Japan is one of the countries that are heavily reliant on imported energy sources. Energy produced domestically in Japan was only 7.7% of what the nation consumed in 2010, and 19% including semi-domestic energy such as nuclear energy (Agency for Natural Resources and Energy, 2011). Energy supply in Japan is greatly dependent on imported energy such as oil, liquefied natural gas (LNG), and coal. Japan is the world's third largest net importer of crude oil as well as the third largest consumer of oil (Energy Information Administration, 2012). It is also the largest importer of LNG, and the second largest importer of coal (Ibid). Before the 2011 earthquake in Japan and its resultant explosion of a nuclear power plant, nuclear energy used to account for 13% of energy consumed in 2010 and Japan was the third largest consumer of nuclear power after the United States and France (Ibid).

Since March 2011, Japan has been facing intensive nuclear energy issues. On 11th of March in 2011, a 9.0 magnitude earthquake and the tsunami that followed it affected two Fukushima nuclear power plants in the north-eastern coast of Japan, leading to the explosion, melting of the core of the nuclear reactors, and radioactive pollution in the atmosphere (Agency for Natural Resources and Energy, 2011). Not only has the Fukushima nuclear incident resulted in discontinuing of all the nuclear power generation in Japan from the 2011 earthquake until September 2012^b, it also triggered serious discussion on the use of nuclear power. Germany, Switzerland, and Italy have decided to stop their existing nuclear programs and to phase out existing reactors (Greenpeace International and EREC, 2011). Likewise, during the response to Fukushima incident and affected energy supply in summer 2011, the Japanese government asked business sectors to reduce their electricity 15% lower than previous year and the public to voluntarily reduce electricity use as much as possible (Ibid). This resulted in the situation in which energy consumption in Japan decreased by 4.7 percent in 2011 compared to 2010, notably in commercial and residential sectors (ENERDATA, 2012).

^b Ohi nuclear power plant has started from September in 2012 as the first working nuclear power plant after the Fukushima nuclear disaster in Japan. Ohi nuclear power plant will be mentioned further in this study.

On the other hand, phase out of nuclear energy plant remains to be a challenging issue both for the government and the public. According to Energy Information Administration (2012), after the Fukushima incident, oil consumption and LNG consumption have increased in order to replace the nuclear energy that used to account for 13% of energy consumption. LNG is preferred to replace nuclear energy after the Fukushima incident because, concerning the greenhouse gas emission to be lowered, it is cleaner than other fossil fuels. In that sense, nuclear power was a great contributor to Japanese society both to prevent the CO₂ emission and decrease independence on imported energy. Although renewable energy has drawn a great attention from the environmental standpoint, non-nuclear renewable energy such as hydroelectric, wind, solar, and tidal power, could contribute only 2% of the country's electricity generation in 2010 (Ibid).

One of the solutions lies on the demand side of the energy consumption at individual level. According to the agency for natural resources and energy, as presented in figure 1 below, energy consumption coming from household occupies 14.4 percent of gross national energy consumption in Japan (2011). This may not be as significant as industrial sector that occupies 43.9 percent of gross national energy use (Ibid). Yet, energy demand from residential sectors, service and household sectors, have been growing more than other sectors since 1973 when the oil crisis came to an important issue of the country. This is a significant increase compared to industrial energy consumption, which on the contrary decreased 10% during the same period. Thus, energy demand from household sector is one of the crucial keys for an energy efficient society in Japan.

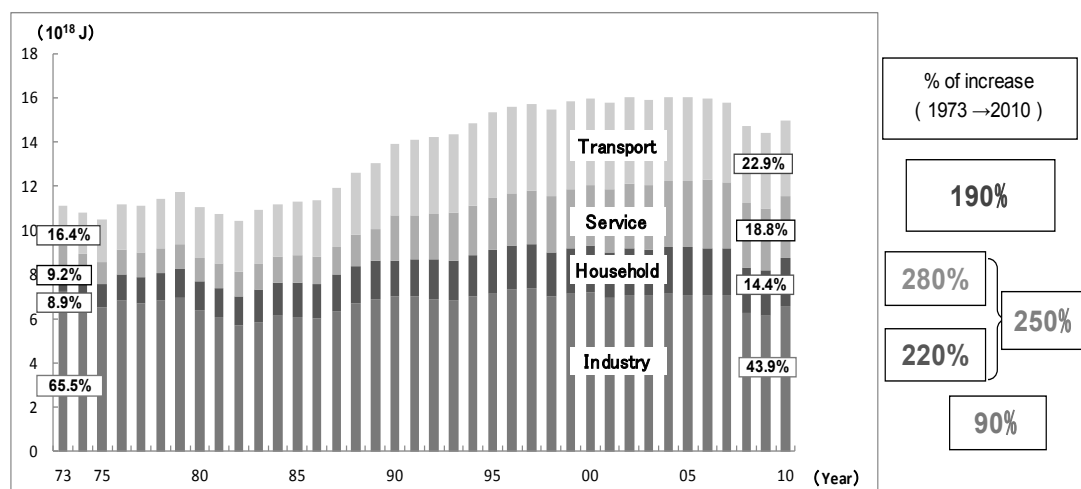


Fig. 1. Energy Consumption in Japan 1973-2010 (developed from Agency for Natural Resources and Energy, 2011; 2012)

In addition, considering the situation of energy issues including heavy dependence on imported-energy, greenhouse gas emissions, shutdown of existing nuclear power plants, and remaining high energy demand from the society, it should be meaningful to explore the demand-side of post-Fukushima experience. Post-Fukushima nuclear incident had observed energy conservation among the public, notably among commercial and residential sectors with voluntary participation on energy-saving, during the period of 2010-2011 (ENERDATA, 2012). Okubo and Tsuchiya assume that this energy reduction has been achieved due possibly to the pressure from the government and electric power companies, controlled power-cuts in certain areas, and increasing media coverage on related issues (2009).

Fukushima incident can be a defining event that seems to have triggered behavioral change among the Japanese people as the reduction of energy use was observed after the incident. What were the key factors to change the behavior towards more sustainable way of using energy in Japan? What has been changed after the Fukushima nuclear disaster? To answer these questions, the public recognition on the energy issues need to be explored. According to Lindenfeld, et al. (2012), in order to achieve behavioral change of the public, researchers need to investigate how the public understands certain situation or information so that the importance of culture, social networks, and communication practices are taken into account. Conversely, this invites an additional question; what is the role of other sectors in society such as government or bigger association influencing the public to occur behavior for sustainable energy consumption? It should thus be interesting for this paper to explore reception of energy issues from the public and government, and economic circle of Japan in order to seek for how sustainable energy consumption in Japan can be triggered.

3. Theoretical framework

It has been discussed that the sustainable energy consumption is a crucial problem worldwide including Japan, notably after the Fukushima nuclear incident in March 2010. In regard with the need of reconsidering energy consumption and the fact that Fukushima incident became a driver to perform energy conservation, it is significant to further explore change of behavior and opinion among the public in Japan, both currently and after the Fukushima incident. There can be internal factors, like personal belief, as well as situational factors, such as the nuclear incident, to trigger or prevent behavioral change on energy consumption. In order to investigate the behavioral change in this study, the Theory of Planned Behavior, its additional determinants, and Motivational Model in social interaction theory, are applied.

3.1. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is introduced as a theoretical framework in this study to understand significant barriers and drivers underlying intentional and behavioral change on energy conservation. Stemming from his original theory, the Theory of Reasoned Action, the TPB was introduced by a social psychologist, Icek Ajzen. The TPB has been widely used to systematically identify determinants that influence decision making in various behavioral studies including environmental behavioral studies such as recycling behavior, water conservation technology adoption decisions, green consumerism, and conservation behavior (Lam, 1999; Tonglet et al., 2004; Herland, Staats, and Wilke, 2006; Lynne et al., 1995; and Wilson and Dowlatabadi, 2007). It is thus fruitful to apply the TPB in this study in exploration of what factors drive or prevent behavioral change for energy conservation among the Japanese.

According to the theory (Ajzen, 1991), behavior is obtained by interaction between motivation (intention) and ability (behavioral control). The TPB assumes that intention can directly predict behavior. Intention is determined by three conceptual factors as followed;

1) Attitude towards the behavior

Attitude towards behavior refers to a person's evaluation or appraisal of the behavior in question. It is associated with judgment of the behavior from a personal viewpoint (Ajzen, 1991). Before an individual decides to take or not to take an action, the action is evaluated as favorable or unfavorable behavior. Behaviors that are believed to have desirable results make favorable attitudes, and reversely, behaviors that are believed to have undesirable results often form unfavorable attitudes (Ibid). Personal judgment on energy conservation whether it is good or bad, favorable or unfavorable, and valuable or worthless is reflected on the attitude towards the behavior. This is also proved by study on recycling behavior from Tonglet et al. who found that positive attitudes to recycling were the most significant predictors of recycling intentions as well as behavior itself (2004). Since the behavioral change at household level, such as recycling behavior in their study or energy conservation behavior in current study, does not occur unless householders view the behavior and the outcomes from the behavior in a positive way, attitude towards behavior should thus be examined in this study.

2) Social norms

According to the TPB, intention is partly affected by the perceived social pressure on performing or not performing the behavior in question (Ajzen, 1991). When the behavior is regarded as politically correct, the behavior is likely to be performed since it has few possibilities to get objection, disapproval, or negative feedback from others. Therefore, if an individual perceives positive evaluation from his significant person by changing his behavior for energy-saving, behavioral change on energy-saving is likely to happen. This determinant in this study can play a significant role to understand the social pressure after the Fukushima incident and causal relationship between the social pressure and behavioral performance or non-performance. As discussed earlier, the energy reduction between 2010 and 2011 was achieved because possibly because of the pressure from the stakeholders such as government and media (Okubo and Tsuchiya, 2009). Likewise, energy discussions are ongoing issues in Japan as there still are mass demonstration against re-emerging nuclear power plants, and government's pressure on the public to reduce the energy consumption at individual level (Energy Conservation Center Japan, 2012). This should be thus fruitful in this study to understand the causal process of social norm and resultant behavioral intention to occur.

3) Perceived behavioral control

The third determinant of behavior is unique factor that is different from Ajzen's previous theory of Reasoned Action in which only attitude and perceived social norms explain behavior. Perceived behavioral control refers to an individual's perception of the capability to achieve the behavior. The perception of capability depends on evaluation to know whether the behavior can be achieved with ease or difficulty. Evaluation of the behavioral ease or difficulty requires information through knowledge and past experience or information (Ajzen, 1991; Conner and Armitage 1998). The more accurate the information, the more detailed behavioral control is perceived. Then, they are judged and perceived to be possible or impossible, positive or negative, and favorable or unfavorable to achieve. The more control over the behavior is perceived, the more likely the behavior is attained. Furthermore, depending on the accuracy of perceived ease or difficulty of the behavior to know actual control over the behavior, perceived behavioral control also plays as a main determinant to explain behavioral change. Blake (1999) and Kennedy et al. (2009) point out that pragmatic concerns such as time, money, or living conditions are significant factors to influence the perceived behavioral control in the TPB. Financial aspect on energy consumption, for an example, is a facilitator of energy conservation since, by saving energy use, it will be reflected on their bills in most cases. Thus, it should be significant to also look at factors underlying the perception on behavioral control in this study.

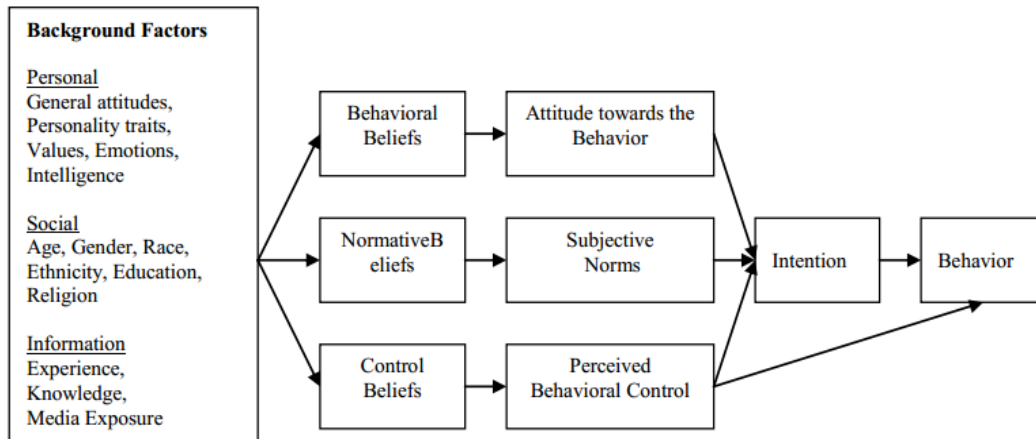


Fig.2. The Theory of Planned Behavior (Ajzen, 2005: p.135)

Each of the three determinants is based on beliefs. Behavioral beliefs about the consequence of a behavior produce attitude towards the behavior, beliefs about the normative expectations of other people generate social norms, and beliefs about controllability of behavior influence perceived behavioral control (Ajzen, 2005). Those beliefs are based on background factors such as personal, social, and informational factors (Ibid). Ajzen (2005) presents that there are background factors such as general attitudes, personality traits, values, emotions, intelligence, age, gender race, ethnicity, education, religion, experience, knowledge, and media exposure (p.135) as shown in figure 2. In this study, it is assumed that Fukushima incident affected the background factors, such as knowledge, experience, or media exposure, which can trigger salient beliefs. Influenced background factors or determinants from the Fukushima incident thus should be explored in this study for deeper understanding of relationship between the nuclear incident and energy use in Japan.

3.1. Additional determinants to the TPB

Despite previous researches proving that Ajzen's theory using attitude, social norm, and perceived behavioral control has been successfully applied in various behavioral studies from leisure activities to environmental behavioral choice (Tonglet et al., 2004), energy conservation behavior in Japan, notably after the special situation of Fukushima incident, should entail more determinants that are not explained by the TPB. Considering that the TPB is open to the inclusion of additional factors (Ajzen, 1991), this study therefore will apply additional determinants that can influence energy conservation behavior; self-identity, moral norm, and past experience. Although those three additional variables function as moderators of behavioral change only in some cases or for particular behaviors, they are essential elements that underlie behavioral causality (Conner and Armitage, 1998).

1) Self-identity

Fox and Frye (2010) recognize that self-identity, or self-concept, has been accepted as one of the crucial elements to influence an individual's behavior. For instance, when one views himself as a person who contributes to environmental conservation, his self-concept tends to make him engage in practices related to environmental conservations. It is assumed that the stronger one's self-identity is,

the stronger attitudes he will get (Conner and Armitage, 1998). Stets and Biga (2003) put importance of studying identity that affect attitudes towards pro-environmental behavior since people have as many identities as the numbers of social networks of relationships and roles to which they are linked in the social structure. They define an identity as “a set of meanings attached to the self that serves as a standard or reference that guides behavior in situations” (Ibid, p.401). While self-identity is widely recognized as a factor to influence the attitudes towards certain behavior in the TPB, the self-identity also guide behavior and those influences are independent of the influences of attitudes on behavior (Ibid). It should be fruitful in this study to look at self-identity and causal relationship with the attitude towards energy conservation behavior.

2) Moral norm

The second additional element is moral norm. Moral norm is “an individual’s perception of the moral correctness or incorrectness of performing a behavior (Conner and Armitage, 1998: p.1441)”. Tonglet et al. (2004) in their study on recycling behavior using the TPB suggest that moral norm is a significant predictor of recycling behavior as an additional variable to the TPB. As they indicate, moral norm has been significant determinant in studying behaviors that are either socially unacceptable, or that have a moral dimension (Ibid). Regarding the current energy situation in Japan, moral norm may build a basis of motivation for behavioral change on energy conservation. Since moral norms are socially determined and socially validated values (Conner and Armitage, 1998), considering the current situation that government, media, and the public understand the urgent need to think about the energy issues in Japan, not only social pressure but also moral standards on using energy should be of great importance in Japan.

3) Past behavior

The TPB recognizes the past behavior with behavior as “important source of information about behavioral control (Ajzen, 1991: p.204)” since knowledge and information are important elements to help anticipating the controllability and capability of the behavior in question. The more information and knowledge people acquire, the more accurate perception they tend to have. In the same way, past experience and habit are great contributors on performing a behavior (Conner and Armitage, 1998). Since past information or repetitive behavior gives reliable and detailed knowledge about the behavior, they can influence the perception of controllability, beliefs, and other factors. Marcey and Brown (1983) in their study of conservation behavior state that past experience is the most influential predictor of the behavior. Unlike the TPB explaining that the past behavior is one of factors that influence the perceived behavioral control, Marcey and Brown argue that behavioral intention is affected by past experience, social norm, and attitude. Inclusion of past behavior can thus be applied in this study to examine causality of energy conservation behavior.

Attitude towards behavior, social norm, perceived behavioral control, self-identity, moral norm, and past experience have been proposed as potential determinants of behavior to be occurred. These determinants will provide structural ideas through interview process as well as analysis of the results.

3.2. Theory of motivation in social interaction

On the contrary to the structural model of the TPB, which is often used in quantitative researches, more qualitative and interactive model of behavioral process should be explained further. Jonathan H. Turner, in his book “A Theory of Social Interaction” (1988), reviews early and contemporary models of motivation, interaction, and interpersonal structure to integrate a theory of social interaction. Social interaction is “a situation where the behaviors of one actor are consciously recognized by, and influence the behaviors of another actor, and vice versa. (Ibid, p.13)” In his view, social interaction is three separate interrelated processes of interaction each of which needs separate theoretical models and principles; motivational, interactional, and structuring process. To examine drivers and barriers to cause behaviors, it is fruitful in current paper to pay special focus on Turner’s reviews on motivational models that are acquired from studies in nineteenth century and early-twentieth century.

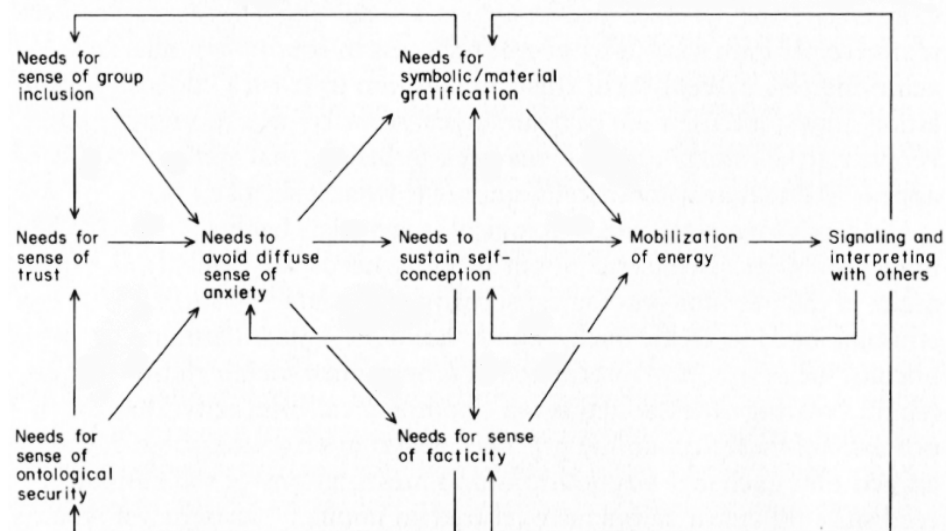


Fig.3. Model of motivational process (developed from Turner (1988, p.58))

Motivational process in social interaction is where individuals are mobilized to deposit energy in their dealing with each other. Turner’s reviews on utilitarianism and behaviorism reveal that interaction is energized by realizing rewards or utilities and avoid punishments or costs. Utilitarianism see actors seek to maximize utilities through calculation of cost and benefit based on hierarchy of values, while behaviorists calculate punishment and gratification based on the salience of needs. Centered on the ideas of utilitarianism and behaviorism to focus on calculation of utility/gratification and cost/punishment based on hierarchy of values/salient needs, the contemporary theories provide additional motive forces on such calculation.

Figure 3 summarizes the model of motivational process. In the process of motivation, there are signaling, interpreting, and structuring of several significant needs. The needs include sense of group inclusion, trust, security, anxiety reduction, material and symbolic gratification, sense of facticity, and self-confirmation. The more the number of these needs are met in an interaction, the more likely will it be repeated. Ethnomethodological approach recognizes unconscious human needs to sustain a sense of **group inclusion**, or to feel that they are part of a larger solidarity. The sense of group inclusion in turn fulfills the need to **sustain a self-conception** of individuals and to **mitigate anxiety**. Conversely, anxiety intensifies without group inclusion or when interaction is not routinized and integrated to provide the sense of **trust** with others and **ontological security**. The sense of trust is unconscious belief that the responses of others are predictable and reliable. Ontological security, as defined by Turner, is the sense that things are as they appear without any hidden dimensions. These unconscious feelings give a sense of predictability of the effect of a behavior and influence the intensity of needs for **gratification**. Another important motive force from ethnomethodological standpoint is the **need for facticity**. The way an individual accounts for a given situation is constructed by a sense of a shared and factual world. This presumption of the world becomes a crucial background of the situation to motivate the individual to use folk practices. Based on those significant factors, actors become unconsciously determined or reluctant to interact with each other.

Those propositions are based on Turner's reviews on early and contemporary models on motivation that are selectively revised for social interaction theory. One might argue that the viewpoint from social interaction theory provides only the case of human interaction. It is assumed that not only do the propositions explain human interactions as Turner focused, but also interaction with the situation, consequent situation, given environment, or information. Turner's model of motivational process hence can provide ideas of how individuals get motivated to take a certain action through recognizing a given situation and predicting the results from the action. The paper thus will employ the model of motivational process given by Turner to analyze the study.

In sum, Turner's approach recognizes needs of people in order for them to respond and take actions in interactions. Such needs include sense of group inclusion, trust, security, anxiety reduction, material and symbolic gratification, sense of facticity, and self-confirmation. The whole interactive picture shown in fig.3 may not be explained in this study since the study is not following his approach solely. Nonetheless, those aspects presented by Turner's model will give fruitful insight in current paper's discussion.

4. Methodology

4.1. Literature review

Several literatures should be reviewed first in this chapter to introduce methodology of the study. The first literature is study from San-Pui Lam (1999), in which he demonstrates the sufficiency of the TPB in conservation study. Lam (1999) investigates Taiwan citizens' intentions to save water by using the TPB and additional elements, perceived moral obligation and perceived water right. The results in the study demonstrate that the TPB is a useful model to predict behavior and the three main determinants, attitude, social norm, and perceived behavioral control, have significant influences on intentions and performance on saving water. One of the additional factors, perceived water right also is found to be a significant stimulus for Taiwanese citizens' intention to install water-saving appliance. However, by using quantitative study that is widely applied to test the TPB, he also points out the need for understanding significant moderating effects and interaction among each variable in the TPB. In fact, as Vining and Ebreo (2002) indicate, the methods applied in conservation research are often studied in a quantitative way while qualitative methods are widely accepted in the field of psychology in general.

Similar argument is mentioned by Conner and Armitage as well. Conner and Armitage (1998) do not only contribute to the additional variables for this study, but they also highlight the causal and interacting process between each element in the TPB. As they point out, "It is assumed that the TPB describes a causal process by which variables such as attitudes impact on behavior. However, most tests of the TPB have employed correlational designs which do not allow us to test this causal assumption (1998, p.1432)". Although most of the methods used for the theory of planned behavior are quantitative and few studies have used qualitative research methods with the theory (Renzi and Klobas, 2008), a combination of the TPB framework and qualitative research enhance understanding of the behavior and point out the significance of the influential TPB factors (King and Dennis, 2006).

Nonetheless, there have been a scarce numbers of investigation on conservation behavior, notably energy conservation behavior, using the TPB. This paper is thus intended to change the conventional way of understanding energy consumption and conservation behavior by using qualitative methods. Since the TPB is associated with psychological aspects on the behavioral performance, it is assumed that qualitative research should give deeper understanding on causal and interacting process between each element (intention, attitude, social norm, and behavioral control) of the TPB as well as the additional variables (self-identity, moral norm, and past experience) in this study.

In addition, by pursuing qualitative study, some literatures on qualitative study should be further reviewed here. Kurz et al (2005) employ discursive approach to analyze the public talking about water and energy consumption to identify the way they construct energy and water as resources. The study is carried out with 30-45 minutes of open-ended interviews with members of nine households. Their interview results are divided into two analytical frameworks: the ways participants constructed their use of resources and the ways they perceived themselves and

others in regards to the consumption and conservation of resources (ibid). The results show that the energy is viewed as something that is used for the necessities of life while the participants rather focus on the way energy generation is adopted by their policy makers, than the amount of resources they consume. Moreover, it is found that, throughout the interview, the participants start to position themselves as ones who conserve resources and position the others as ones who do not (ibid). As can be realized in their study, with a small number of interviews, analyzing the public discursive talk can explore the socially constituted nature of reality and the ways in which this reality is constructed, represented, and accounted in discussion within particular social contexts.

In addition, text analysis methods provided by Lacity and Janson (1994) can illustrate how the research results will be analyzed later. They divide the methods for text analysis into three approaches – positivist, linguistic, and interpretivist approach. For the materials used in the current paper, interpretivist approach should be meaningful to be presented here. Interpretivists approach is useful for transcribed interview results because it is concerned with the contextual situations that influence the author as well as researcher's interpretations (ibid). For instance, intentional analysis, one of the interpretivists approach, takes four steps to understand data. The first step is to identify the facts of the phenomenon that are socially shared and agreed upon by all participants. Second, the researcher should find the cause they ascribe to the realities. Next, emerging themes should be identified. In the last step, the researcher should conceptualize the text's essences, subjective understanding from the study through creativity, intuition, and reflection of the researcher. The analysis methods provided by Lacity and Jason thus will outline the approach used for text analysis in this study.

4.2. Choice of methodology

The paper will carry out qualitative research to answer the research questions given in this study that are;

- 1) What has changed on public reception and practice on energy consumption after the Fukushima nuclear incident in Japan?
- 2) What are the barriers to bring about behavioral change on energy consumption at the household level in Japan?
- 3) Is there a gap between public, political, and economic sectors' reception on energy issues?
- 4) How could energy conservation be triggered by the Japanese people?

In order to reach the answers, the paper will conduct parallel qualitative approaches. The first approach is to analyze data obtained from in-depth interviews. The interview will utilize the Theory of Planned Behavior (TPB), a theory which explains that a behavior is obtained by intention (motivation), attitude towards the behavior, social norm and perception towards the behavioral control. As discussed in the previous section, not only does the TPB lack some crucial elements such as self-identity, moral norm, and past experience; causal and interactional process between each variable of the TPB (intention, attitude, social norm, and behavioral control) are also missing in the theory. Unlike conventional way of using the TPB, qualitative approach in this study thus will give deeper understating of the public opinion on the energy conservation, change of public opinion and practice on energy conservation after the Fukushima nuclear incident in Japan, and which factors drive and prevent behavioral change for energy consumption. The second approach is to analyze reports from the Japanese

government and the business federation in Japan. It will investigate the political and economic perspective on the energy issues. The parallel study will find a gap between public and political or economic reception on the same critical issues in Japan. By looking at three different perspectives on the same issue, the paper will also look at interactions of each actors and how such interactions affect behavior of the public. Both the TPB and Turner's approach will therefore be utilized to examine the parallel study. As explained earlier, Turner recognizes significant aspects to motivate human interactions such as sense of group inclusion, trust, security, anxiety reduction, gratification, sense of facticity, and self-confirmation. Those aspects will be additionally taken into account in the discussion together with the aspects presented in the TPB.

4.3. Study location

Shiga prefecture and Kyoto prefecture in Japan have been selected as interview location. The two prefectures are located in Kansai region, the second most populated area in Japan after Tokyo area. What makes these two prefectures significant in this study is a re-emerging nuclear power plant located in a town called Ohi, within 30km away from both prefectures. Ohi nuclear power plant has been drawing many disputes over the politics and the public in 2012 as the first nuclear power plant to be functioned after the Fukushima nuclear disaster. Two nuclear reactors at Ohi power plant have been fired up since September 2012. During the political decision-making process and after the restarting of the nuclear reactors, mass demonstrations have taken place in many cities in Japan, including Kyoto and Shiga. Since this paper will also look at the potential change from Fukushima nuclear incident, choosing these locations is expected to provide rich contexts from the interviewees.

4.4. Data collection

Interview data was obtained from seven in-depth interviews. Two sets of interview questions were set as follows; 1) questions concerning the change of opinion and practice on energy conservation after the Fukushima incident and; 2) questions concerning the elements that trigger and barriers to behavioral change on energy conservation regarding to the TPB.

The first set of questions is concerned with the post-Fukushima and the change of public opinion and practice on energy. The following questions were asked;

- 1) How did Fukushima nuclear incident affect you, your opinion, or lifestyle?
- 2) Did Fukushima nuclear incident change your opinion on energy? If so, then how?
- 3) Did the incident change your way of using energy? If so, how?

Those questions overall will give reception on energy issues, including nuclear energy, and Fukushima incident. The second part of interview is based on "Constructing a Theory of Planned Behavior Questionnaire" and "Sample TpB questionnaires" by Icek Ajzen (2006) to outline the basis of interview questions concerning the TPB. However, since original questionnaires introduced by Ajzen are part of a quantitative study, it was shortened to have simpler questions to adjust for a limited time frame in qualitative interviews. They are based on each determinant that was presented earlier in the previous chapter. See Appendix 1 for the interview questions.

Energy reports from the Japanese government and Japan Business Federation were selected to reveal political and economic perspective on energy issues. Energy reports from the government include annual reports from Agency of Natural Resources, fiscal year of 2008 and 2012. Annual report on energy in 2008 is published both in English and Japanese while the report in 2012 is available only in Japanese. With regard to the Fukushima incident that happened in 2010, comparison between the reports before and after the incident will be examined. Also Japan Business Federation's reports regarding energy policy and energy issues were selected to inspect economic standpoint of energy issues. Japan Business Federation, also known as Keidanren, is an economic organization with a membership consisting of 1,285 representative companies of Japan, 127 nationwide industrial associations and 47 regional economic organizations (Keidanren, 2012). The federation published proposal for energy policy in 2011 and a policy proposal on environment and energy in 2012. The reports concerning its view on energy issues will be examined.

4.4.1. Selection of participants

The participants in this study were recruited from the interviewer's acquaintances and their friends living in the study area. They were selected by personal observation in view of demographic division such as age, living location (city or rural area) and gender. Variety of demographic difference of participants will make it promising to approach the causality of behaviors from various standpoints.

Due to the theoretical assumption from the TPB discussed in previous sections, each demographic aspect should contribute to have a different influence on some factors in the TPB. Age can assumedly contribute to experience or knowledge about certain things related to energy conservation (e.g. oil shock in 1970s). Participants in the age group of <29, 30s, 40s, and 50< were selected accordingly. As indicated earlier, two locations were chosen to investigate – Shiga and Kyoto.

Accordingly, there are seven participants to be investigated. Small numbers of participants are recruited due to the researcher's limited access to potential participants and people's reluctance to engage in one-hour face-to-face interviews. The following analysis and discussion should thus be in the context of demographic tendency on energy consumption or related behaviors found in previous studies in order to avoid generalizing one sample's unique opinion as the public opinion.

The interviews were conducted during the period 19th October and 3rd of November in 2012. Each interview took place for 50-60 minutes and was recorded by auto-recorder. The transcription of recorded interview and field notes were translated from Japanese to English.

4.5. Limitation of the study

Before presenting the results of interviews, some limitations of the study should be mentioned here. First, since the research is carried out using qualitative exploration on the public opinions on studied issues, the results may not be generalized for different studies with different people, cultural and social background, and time. Yet, this study based on a qualitative method is significant for acquiring the public opinion from the participants since an

opinion is often constructed within various factors that are often complex to be understood by numbers. The author of this study believes that such factors can be examined better by qualitative study rather than quantitative study. Second, representation of the public may not be achieved successfully from the participants in this study. As mentioned earlier in this section, there was limited access and time to reach potential participants who could engage in one-hour face-to-face interview. This weakness will thus be treated carefully in the discussion so that the study can avoid biased opinions to be generalized.

5. Results and analysis

As mentioned earlier, in-depth interviews were conducted to examine changes after the Fukushima incident, and barriers and drivers to trigger energy conservation behavior among Japanese people. Perspective on energy from other actors was also examined through parallel investigation on reports from Japanese government and Japan Business Federation. This chapter presents results and analysis both from transcribed interviews and the selected reports from the government and the federation. It should be noted again, before presenting results and analysis of the study, that the public opinions in this study will be represented by opinions from the selected participants, and political perspective will be represented by Japanese government. Likewise, the economic perspective will be exemplified through the opinions of Japan Business Federation.

5.1. Interview results on the Fukushima incident and energy issues

The first part of the interview questions are concerned with changes of the participants' life styles, opinion on energy, and behavior in relation to energy consumption. Three questions, "How did Fukushima nuclear incident affect you, your opinion, or lifestyle?", "Did Fukushima nuclear incident change your opinion on energy?", and "Did the incident change your way of using energy?", were asked. Answers from the participants were transcribed and organized into two sections; changes of opinions towards energy consumption and behavioral change on energy consumption. Changes of opinions towards energy consumption found insecurity and uncertainty of using nuclear power, and future vision of energy in Japan, while there are a few participants who experienced behavioral change for energy consumption.

5.1.1. Changes of opinions towards energy consumption

Insecurity and uncertainty of using nuclear power

It was revealed that most of the participants are concerned about insecurity and uncertainty of producing nuclear energy in a country like Japan with a lot of earthquakes. Some participants are concerned about **insecurity of nuclear energy**. Nuclear energy is pointed out by one of the participants because *"it is not suitable for Japan. We have experienced some catastrophic earthquakes and there are hundreds of small earthquakes to fear us. It's natural to think it is dangerous to put nuclear power plants in such a country. (#7)"*. Other answers imply that people have perceived reality of using nuclear energy. Since the Fukushima incident exemplified the worst possibility that could happen with nuclear power plants, it made people realize the **uncertainty of nuclear energy**. People never imagined that the accident would happen because *"Japan had created a myth that 'nuclear energy is safe (#2)", "I used to think it could be managed and controlled by technology (#5)", and "We started to use nuclear energy after the consideration of many possibilities or advantages of using it (#3)"*. Those beliefs were exploded by the nuclear incident and made people realize the limitation of technological control, careless imagination and prediction of human beings. Moreover, as one of the participants says, *"Before the incident, the energy was always provided without questioning about why and how it was there, so I realized the importance. (#2)"*, the **importance of energy** in general was realized after the Fukushima accident.

Future vision of energy in Japan

While they perceived insecurity and uncertainty of nuclear energy, some of the participants mentioned future vision of energy generation and energy use in Japan. The answers show that they are interested in **alternative energy sources instead of nuclear energy generation**. They started to question the real need of using nuclear energy while having a situation like Fukushima in the same country because *“We have suffered enough with nuclear radiation after the World Wars. And now we are getting exposed by radiation again, this time, by ourselves. It’s just stupid to keep having nuclear power plants while we know the possibility and fear of the energy coming from it. (#7)”* Participant 5 points out that *“if they can’t control nuclear power plant, we may have to manage energy within the ability of using renewable resources and spend lots of money to import other energy resources even if it costs a lot. (#5)”* In addition, he discusses the importance of pursuing renewable energy and changing energy consumption behavior as examples of alternative way to use energy in the future because *“I think there are very small numbers of windmills in Japan. Since energy efficiency of using wind or solar power has been increased lately, we can focus more on renewable energy. (#5) and “We realized the need of using energy from the Fukushima incident and also the sacrifice or victim, which were the result of nuclear power that we chose. So if we know the reality about energy, we should use less energy, stop using unnecessary lights in the cities or everywhere, stop watching TV every day, stop the crazy cooling conditioning on the trains. I started to think about those stuffs. (#5)”*

At the same time, one of the participants gives insight on the nuclear power plant and future vision of energy in Japan. Participant 2 (3?, Shiga, male) points out the **difficulty of abandoning nuclear power** because of the situation in Germany. He continues, *“What they are doing now is buying power, maybe power generated from nuclear energy, from neighbor countries that are demographically connected with the continent. It means if Germany’s partner country has a problem, Germany also would share the same problem. I just think that not only Germany, but also the entire EU should quit using nuclear power plants otherwise it is just meaningless to have such decision about quitting nuclear power plants in one country. In the case of Japan, we live on islands and problems come and go through the whole country, so giving up nuclear power plants in Japan must be as hard as giving up nuclear power plants in whole EU. (#2)”*

5.1.2. Behavioral change on energy consumption

Despite the changed opinions on energy consumption after the Fukushima incident, **only a few participants indicate that there have been changes in energy consumption behavior after the incident**. Participant 2 says it is because *“there was energy-saving campaign claiming about the possibility of the planned power-cut. Without electricity, there’d be no sufficient economic activity and it’d be a matter of life or death like everyone says. (#2)”* In a similar way, participant 5 has started to put effort on energy conservation because *“We (his company) are asked to do it by the financial circle like business federation. And when I started to do it, I got to know I could do it. (#5)”* and *“since there was an energy-saving campaign everywhere, I realized how simple and easy it is just to cut off unnecessary energy use and realized how much I wasted before. (#5)”*

While most of the participants experienced some changes in their opinions and a few experienced changed in

behaviors, **the Fukushima incident had little impact on most of the participants** because “*Most parts of Japan still can survive without changing their life-standard even after the incident (#2)*” and “*our region had nothing to do with the incident’s effect. (#1)*” Likewise, due to no crucial influence from the incident, some participants felt a sense of security as they say, “*I thought about energy-saving because of the energy-saving campaign implying that there may be a possibility of power-cut in my region. But I somehow thought it would never happen. Maybe I felt a sense of security for no reason. (#4)*”, “*I’m not even aware that energy will be gone. I’m not cautious about it. I rather feel there is nothing beneficial about restraining to consume energy that you need. (#6)*” Other participants gave different reasons depending on their understanding and knowledge about energy issues since “*I’m not a professional and can’t give a good answer to that. (#1)*”

Participant 3 (55, Shiga, female) claimed that both her opinion and behavior on energy have not changed since she always had the same opinions that energy is important and limited and same behaviors that try to save energy as she claimed, “*I’ve always thought energy is limited and my opinion has not changed. The Fukushima incident was merely an exemplified case of limited energy source... It doesn’t matter whether the incident happened or not. There’s no unnecessary use of energy in my case and in my family. So even if I wanted to make some efforts after the incident, there’s nothing to reduce. (#3)*”

5.2. Interview results on TPB and additional determinants

The second part of interview questions are based on the Theory of Planned Behavior (TPB), as mentioned earlier, that explains behavior can be attained by attitude on the behavior, social norm, and perceived control over the behavior. The author of this study added three additional elements to the TPB. Self-identity, moral norm, and past behavior were therefore additionally examined in the interviews. Self-reported actual behavior on energy conservation resulted that participant 1, 2, 3, 4 and 5 reported that they are actually engaged in energy conservation at household. The reasons include unconscious **habit** (#1), **positive belief** in the activity itself (#2), **sense of guilt** coming from wastefulness (#3 and #4), and **social urgency** (#5). On the other hand, participant 6 and 7 reported that they do not practice energy conservation at home because of **discomfort** (#6) and **family support** (#7). Based on this self-reported actual behavior and results from the interview answers and comments, the following will present results and analysis to find out the drivers and barriers of energy conservation behavior.

	AB	A	SN(F)	SN(P)	PBC	PBC2	MN	SI	PE
Participant 1	○	Positive	Nothing	Nothing	Yes	easy	Yes	No	Yes
Participant 2	○	Positive	Nothing	Nothing	Yes	easy	No	Yes	No
Participant 3	○	Positive	Nothing	Nothing	No	difficult	Yes	No	No
Participant 4	○	Positive	Nothing	Nothing	No	difficult	Yes	No	No
Participant 5	○	Positive	Need of alternative energy	Nothing	No	difficult	Yes	Yes	Yes
Participant 6	×	Positive	Nothing	Nothing	Yes	difficult	Yes	Yes	Yes
Participant 7	×	Positive	Nothing	Nothing	Yes	difficult	Yes	No	No

Fig.4. Simplified results from interviews

*AB=Actual behavior, A=Attitude, SN(F)=Social norm(friends and family), SN(P)=Social norm (politicians), PBC=Perceived behavioral control, PBC2=Perceived behavioral control(difficulty or easiness), MN=Moral norm, SI=Self-identity, PE=Past experience

Figure 4 shows summarized and simplified results from the interviews concerning potential determinants of

energy conservation behavior. Those are, however, based on direct answers from each question. For instance, to the question “Is energy-saving valuable or meaningful for you? Or is it worthless? Why?”, all the participants answered “yes” implying that they all have a positive attitude on energy conservation. Nonetheless, other comments that are acquired in different questions, such as *“I rather feel there is nothing beneficial about restraining to consume energy that you need. (participant 6)”*, show her negative attitude on energy conservation. Since the current study is carried out with qualitative data, naturally occurring information like the latter comment from participant 6 should be cherished and valued. The interview transcription thus was further organized and analyzed to find out drivers and barriers of energy conservation at home.

5.2.1. Drivers to trigger energy conservation behavior at households

Attitude on energy conservation

From the interview answers, it was found out that all the participants have positive attitudes on energy conservation because of **perceived outcome and effect** and **sense of guilt** for wastefulness.

Also, other interview answers added some findings on attitude towards energy conservation. When they believe that energy conservation brings desirable results or effect, people are motivated to take action for it. For instance, participant 1 claimed, *“Depending on what kind of outcomes or objectives of doing it, some people may not do that as well. I'm not really sure about the outcomes of doing it, but if using less energy in life can help the people at the affected area by earthquake or Japan, I guess I'll do that. (#1)”* Moreover, people think that financially cheaper result is mostly preferred because *“everyone is thinking only about financial aspects, maybe. They may be thinking that if changing to energy-efficient appliance or car is a cheaper option, they'd go for it. It doesn't matter if it eventually becomes energy conservation or ecologically friendly as a result. (#2)”* and *“What matters the most for us directly from any energy issue is the cost of electricity and gas that we pay every month. (#7)”* Those results prove that positive attitude is essential for energy conservation to be turned into action.

Social norm

The question concerning social norm revealed that majority of the participants perceive that people in general only talk about energy issues without thinking about it seriously. Financial reason and knowledge or understanding of the energy issue was presented as the possible reasons. Only participant 5 presented that he perceives that *“everywhere and everyone started to think about energy issues seriously.(#5)”* On the other hand, all the participants gave negative comments on how politicians see energy issues. People perceive that politicians are working on nothing but keeping their political positions by exploiting energy issues. One of the comments on the Japanese government is as follows, *“They agree on making nuclear power plants functioning again because they were assured to get votes from people who are for re-functioning of the nuclear power plants. They don't care if the power plants cause ecological problem or such, and what matters to them looks like only the next election. I don't think there is any politician really trying to take action for something else rather than votes. (#3)”*

On the other hand, throughout the interviews, it was found that there are societal mood on energy-saving in

reality. Most of the participants revealed the existence of “*topic about planned power cut in our region (#2)*”, “*energy-saving campaign (#4)*”, “*many people demonstrating against nuclear power plant (#5)*”, “*everywhere talking about wind power or solar power (#2)*”, “*more and more people who are educated to think about the moral of cherishing nature or energy. (#6)*” and “*mood of society where energy-saving is regarded as an extremely good thing to happen. (#7)*” It indicates that they actually perceive social mood where energy-saving is supposed to be a right action to take.

Also, social pressure at community level was presented as a driver to save energy at household level. As they explained, “*Japanese people are easily affected by mood of society, so, such mood would be very meaningful and valuable. (#2)*”, mood of society is presented as a meaningful aspect to influence Japanese people. On the other hand, community or smaller level of mood is presented to be rather effective than societal level as “*when a community like apartment level with more than 60 or 70 residents shared a purpose like cutting the shared energy cost, I become strict about changing behavior or taking action for that. It’s the same with the family level, but not societal level. (#3)*”. A similar comment is presented by another participant claiming that it is in reality effective when the same purpose and action are shared together as “*I wouldn’t do anything if only TV keeps saying about energy-saving, but if my best friend takes some action for it, I’d do that too. In fact, it has been successful at my office since we all share the awareness and purpose to save energy at office. (#5)*”

Perceived behavioral control

All the participants said they are capable of using less energy than the current amount, but some of them said it is impossible to reduce into half of the current amount. There were three types of answers in regard to this question. One is from participants 1 and 2 who claim they can easily do it if its outcome is identified or when it is an urgent situation to do it. The second type of answer is from participants 3, 4, and 5, who claim they cannot do it and it is hard because they, all of them, are doing their best currently and cannot reduce more. The latter answers are because of the nature of the question “If you are to reduce the amount of energy used in coming year by 50% of what you have consumed in the previous year, can you do it? And what are the obstacles or motivational factors under that situation?” It can therefore be assumed that the latter answers’ “no” implies their actual behavioral practice at home. Indeed, the first two types of answers were given from the participants who practice energy conservation behavior at home. On the other hand, the third type of answer was from participant 6 and 7 who perceive the action to be possible even though it is difficult. The reasons behind it include **discomfort (#6)** and **family support (#7)**.

Moral norm

As a result of the question concerning moral norm, majority of the participants feel guilty from overused energy at home. The guilt is the result of **discipline taught by parents (#1)**, **financial aspect (#4, #6, and #7)**, and **non-financial matters such as wasted resources (#3 and #5)**. On the other hand, participant 2 answers “no” to the question because he finds energy necessary to survive rather than a wasteful regret or guilt.

Also, a Japanese word, “Mottainai”, was frequently used by all of the participants in terms of energy

conservation during the whole interviews. “Mottainai” means a sense of guilt about wasted object, effort, resource, or any related factor that is not appropriately used. Examples of the sense of guilt include “*It is not a waste of money that I’m talking about. It is a waste of everything (#3)*”, “(In the case of overusing cooling air conditioner) *I just feel guilt from such a waste, but not from financial waste. It is a waste of cooled temperature, used energy, the effort of the appliance itself, and everything. (#5)*” This kind of sense of guilt was reported as a driver of energy conservation behavior however conscious or aware of energy conservation people are. One example is from the participant 3’s comment, “*A person like my husband would naturally save energy without being aware of energy consumption. He always mentions about how “mottainai (wasteful)” it is to keep lights turned on and he goes around the house and turn off everything, even things being used at the moment. (#3)*”

Past behavior

Participant 1, 5, and 6 answered that they have experienced less energy-consuming lifestyle in the past. Reasons of the experience were because of the **surrounding environment** such as people (#1), home appliance (#5) or climate (#6). And other participants, on the contrary, never had a lifestyle that was less energy-consuming, because of **financial aspects** (#2 and #4), **disbelief in society** (#3), and **lack of awareness** (#7).

Moreover, most of the comments from participant 1 include behavioral beliefs concerning his habit that was acquired from his childhood as he explained “*Thinking about wastefulness is settled in me as a habit. Even without awareness or consciousness on energy conservation, I do turn off lights and don't use electricity that I don't use. Just like an ordinary habit, I don't use energy that is not necessary. (#1)*” and “*Since I was a kid, I have been told to never leave lights and faucets turned on and doors opened by my parents. I guess the effect of parents is very significant. Some houses may not teach kids about those things and those houses normally don't have any habit like that. (#1)*”

5.2.2. Barriers to prevent energy conservation practice at households

Barriers to prevent energy conservation practice can be extracted both from comments of participant 6 and 7, who reported that they do not practice energy conservation at home, and from other participants’ comments.

Attitude on energy conservation

“*I’m not even aware that energy will be gone. I’m not cautious about it. I rather feel there is nothing beneficial to restrain and reduce energy consumption that you need. (#6)*”, “*It is valuable to do it, but I’m not sure if we will benefit from it. When it comes to the benefit, it’s only about our self-satisfaction or financial aspect, from my viewpoint as a housewife. (#7)*” These are comments from participant 6 and 7 that explain their belief and attitude on energy conservation. Although all the participants including them find energy conservation valuable, when it comes to the benefit, both of them have a **negative attitude** on energy conservation at home.

Furthermore, some comments found that **money-centric attitude** can be a barrier to energy conservation behavior at home. For instance, participant 2 and 4 gave answers concerning their past behavior, “*When I think about the time I used to live with my parents, I guess I was worse about energy-saving behaviors. Even when my*

mother warned me the electricity cost was expensive, I just thought paying for it solved the problem. Now I know my mother didn't mean like that in financial sense. Now I know it's not only a financial issue. (#2)" and *"If I lived alone and paid for myself, I would have had a different experience since I'd have thought more about the financial aspect. I lived with my family and got married without living alone at any point, but I basically spend my husband's money. I have never had to spend money on energy that I earned myself. Maybe that's why. (#4)"* Their comments thus illustrate that money-centric attitude can be a barrier to energy conservation behavior.

Social mood

Recent social mood on energy-saving was reported as a preventing factor to save energy in Japanese households. As presented earlier, every participant perceived that people talk about energy conservation only on the surface without thinking about it seriously. Participant 6 and 7 said *"Though they don't do anything in particular, they somehow at some point say that the nature is important. The word "ECO" is everywhere now and it may be spread through the society, but it just seems to be only on the surface. (#6)"*, *"There is a trend on saving energy or ECO, but only limited people are engaged in taking action for it. I think it's because they don't find it meaningful or advantageous to think about it. (#7)"*, and *"I am a little sick of the mood of society where this energy-saving is regarded as an extremely good thing to happen. (#7)"* It can be seen that they perceive the society talking about the nature or energy-saving, but do not see the importance of it. Considering the negative comments on politicians presented earlier, social distrust can be the reason behind it. For instance, participant 3 explained *"When there was energy-saving campaign, I didn't want to (practice energy-saving). I don't like it when people like them ask citizens to do such a hypocritical thing saying "please cooperate in energy-saving". I rather question the energy used for the campaign cars driving around the city (#3)"*

Family concern

Family concern was reported as a preventing factor to practice energy conservation at home. Participant 7 was reported as stating that *"I can't (save energy at home), and therefore I don't. I alone may be able to do that, but with my family, it is hard"* and *"when it comes to other family members with my big husband and small baby, I don't think I can stop them from using energy they need, like for controlling their body temperature. It'd be difficult, but still, I can reduce more. (#7)"*

Discomfort

From participant 6, discomfort coming from reduction in energy use is reported as she commented *"It'd be difficult, physically, like I need to have air conditioning right after taking shower. I can't stand with sweating after taking shower and when I go to bed. But I can cut the entertainment or other needs like TV or lights, but I just need the cooling system. That's it. Other than that, I can use much less."* In the same way, she finds comfort is a crucial factor to practice energy-saving at home. She refers to her past behavior as *"I did, in Italy. Though the comfort was the same, I didn't have to use much energy thanks to the weather and breeze."*

(Self-identity)

Last of all the factors presented above, interview answers from self-identity were found to be irrelevant to the

current study. As a result from the interview, participant 2, 5, and 6 identify themselves as the type of people who save energy. The other participants' answers show that their self-identity does not have any relation with energy conservation. They identify themselves as "normal (#4)", "lazy (#3)", "don't think this is something to do with identity (#1)" or "take something environmentally-friendly behavior only when I find it meaningful or influential for me or my family (#7)". As the participant 5 indicated, *"I am rather a type of person who tries to reduce even small amount of energy, but what surprises myself is, now that I just had this interview, I realized how much I don't practice it in reality. (#5)"*, his self-identity does not reasonably connect to his actual behavior. The similar comment came from participant 1, who stated that *"I am not that type of a person. But, I don't think this has something to do with identity or something like that. (#1)"*, stating that his behavior is not based on his self-identity.

The results and analysis from interview transcription have been presented. The results and analysis were organized to identify changes of opinion and behavior for energy consumption after the Fukushima incident, and drivers and barriers of energy conservation behavior were identified. Results and analysis from the questions related to post-Fukushima experience revealed some changes of the participants' opinions towards energy issues, such as insecurity and uncertainty of nuclear power, attention to other energy generation sources instead of nuclear power, and doubt in abandoning the existing nuclear power plants in Japan. In contrast, most of the participants have not experienced changes in their behavior in relation to energy consumption, because the Fukushima incident did not affect their lives locally. Drivers for energy conservation practice at home include the following aspects: positive attitudes based on its preferable (notably financially preferable) outcome/effect and sense of guilt; community level of mood-making; perceived behavioral control where people perceive energy conservation is an easy task to achieve; moral norm because of a Japanese moral sense, "Mottainai"; and habitually repeated behavior. On the other hand, barriers of energy conservation behavior consist of negative attitude, money-centric attitude, social mood on energy-saving, family concern, and discomfort. In addition, interview results from all the participants revealed their dissatisfaction with the Japanese government. This can make the next section meaningful. The next section will introduce results and analysis of the selected reports from Japanese government and Japan Business Federation.

5.3. Content-analysis on the annual energy report (FY2008 and FY2012)

In this study, annual energy report from Agency of Natural Resources, fiscal year (FY) of 2008 and 2012, were selected to analyze perspective of the government on energy issues. The Agency of Natural Resources publishes the energy report every year, yet a report from FY2008 is the latest document that is available in English. In this regard, the report from FY2008 was reviewed both in Japanese and English, and a report from FY2012 was selected to present a comparison between 'before' and 'after' the Fukushima incident happened in 2010. Although the government publishes other documents or reports concerning energy issues or energy-conservation, they are often simplified version of the annual report for the public viewers or single policy statements. Annual energy reports therefore are fruitful for this study because they provide an overall picture of the government's activities and concerns on energy issues.

Overview

With the background of worldwide financial crisis in 2008 and Kyoto protocol's first commitment period (2008-2012), the annual energy report in FY2008 emphasizes on future perspective of unstable crude oil prices and global warming issues. Since both issues are worldwide concerns, in which oil prices influence world economy and greenhouse gas emission is set as a worldwide goal to pursue, the report has a focal concern on world trend on those issues and Japan's role in the trend. It recognizes that Japan should strengthen its economy to be more stable for future increase of energy prices or geopolitical instability and should promote technological development both to utilize potential new energy, energy saving, and nuclear energy.

On the other hand, the annual energy report in FY2012 pays special emphasis on "zero-based" revision of energy policy. By "zero-based" revision, they mean starting the energy policy over again in regarding to the context and aftermath of the Fukushima accident and required tasks. The report consists of tasks identified by the earthquake and nuclear accident in March 2010, measures employed after the accident, efforts that have been made concerning nuclear power plants, and overview of conferences and committees to revise the energy policy of Japan. It points out the vulnerability of energy system in Japan that was revealed by the Fukushima incident and public distrust of the energy system. For that matter, the report is aware of presenting the difference between conventional approach and new approach including newly employed measures or efforts.

Two reports thus were analytically reviewed and compared to find out changes of political opinion on energy issues before and after the Fukushima incident. Frequency of using keywords, such as the "public" and "nuclear power/energy", were compared to see how those words have been regarded by the government before and after the incident. Also, how they use the keywords was critically explored. As a result, there are several findings in comparison with the report FY2008 and FY2012.

Shift to more localized perspective on energy issues

One of the evident changes on the annual energy report after the Fukushima incident is that government has taken more local and realistic issues into account. In FY2008 report, their focus was put on international perspective to look at the energy issue as a global problem, to learn from other countries, and to locate Japan's role in the global energy market or global warming. Neighbor countries such as China and South Korea, European countries, and the US are often referred to locating Japan's role in the global energy scene. On the other hand, FY2012 annual energy report is associated with domestic issues, notably nuclear issues. Since the Fukushima incident exposed the vulnerability of energy system and resulting mistrust of the public on nuclear energy, the government in the latest energy report presents problem-based information about post-Fukushima management. Their main concern is nuclear power that caused an evident effect on the public. It focuses on tasks and further risks discovered by the incident, measures employed after the incident such as planned power-cut in some areas and revision of energy price and renewable energy system, management of the Fukushima nuclear incident such as revised regulation on assessing nuclear power plants and compensation for the damage. As a result of problem-based political management, overall picture on energy issues from political perspective is focused at a national level.

Role of the public

Government has been concerned with public distrust in nuclear energy both before and after the Fukushima incident. Since the government has been focusing on public security, mutual understanding with the public on need and safety of using nuclear energy was and still is a crucial political concern. Yet, the idea of the “public” has changed after the Fukushima incident. The annual report in FY2008 talks about the public as an important sector who should understand the security and need of having nuclear power plants in their country or neighborhood. Hence the government’s focus was on giving opportunities to inform and share the information of nuclear power plants and energy-security. In contrast to the top-down approach to see the public, the annual report from FY2012 appears to have more subjective standpoint of the public. Not only does the report mention the public as an important social sphere in current nuclear energy situation, but it also takes the public viewpoint by taking their economic activities, financial burden and civic discussion into account.

Nonetheless, in reality, the public is still outside of political decision making. An example can be drawn from the process of restarting Ohi nuclear power reactors.

“Since April 3 in 2012, there had been discussions on the Ohi nuclear power reactors. The main topics were safety and necessity of having the nuclear power reactors. Based on implementations of security measures, inspection and accumulation of information regarding the accident, and safety assessment on stress test of the nuclear reactors, the government approved a safety action plan for restarting nuclear power plants submitted by Kansai electric power company (KEPCO). The need for nuclear power was inspected from three considerations; possible shortage of electricity despite the efforts from supply side, a possibility that pause on nuclear power can increase energy cost to cause the public financial burden, and ensured energy security. In those considerations, the government decided to put efforts on gaining the public understanding to reflect the political decision. They agreed to take a decision to restart the nuclear reactors if there was a certain level of the public understanding. (Agency of Natural Resources, 2008, p.19-20, summarized and translated from the Japanese)”

In short, the decision-making process on restarting the Ohi nuclear power plants was reflected by the electric power company, the government, and a “certain level of public understanding”. However, no detailed explanation of “the certain” level of the public understanding can be found in the report. It is therefore assumed that, although need of the public opinion appears to be a significant factor in decision-making, to what extent the public is reflected in the decision making process is still unclear in the report.

Future energy perspective

It was found from both reports that the government’s future perspective on energy choice, notably choice of nuclear power generation, has been changed after the Fukushima incident. In FY2008, the government was aiming for nuclear power to be 30-40% of the overall energy mix after 2030. Behind the government’s attention on promoting nuclear power, there was recognition of nuclear energy as a means to mitigate greenhouse gas emission and safety of nuclear power plants was underestimated. Regarding the ups and downs of oil price, increasing demand for energy, and Kyoto protocol’s commitment to reduce greenhouse gas emission, nuclear

power as well as new energy was promoted as an alternative means to compensate for fossil energy sources. Also, the government did not put sufficient consideration on the security of nuclear power. “Each of the nuclear power plants is designed based on the uniqueness of its location such as past records on earthquakes or tsunamis and has proper countermeasures...We identify that our security control on nuclear power plants satisfy the security demand (Agency of Natural Resources, 2008, p.226, translated from the Japanese).”

In contrast, the government’s perspective on energy choice after the Fukushima incident has largely changed because of their previous focus on nuclear power. According to the FY2012 report, the government has decided to reduce the dependency on nuclear power generation, since the security of nuclear power plants has been questioned by the public. Their new tasks are therefore to pursue dispersion of risks and energy efficiency by maximizing energy supply from renewable energy sources, cogeneration or private power generation. In June 2012, the government proposed “Options for

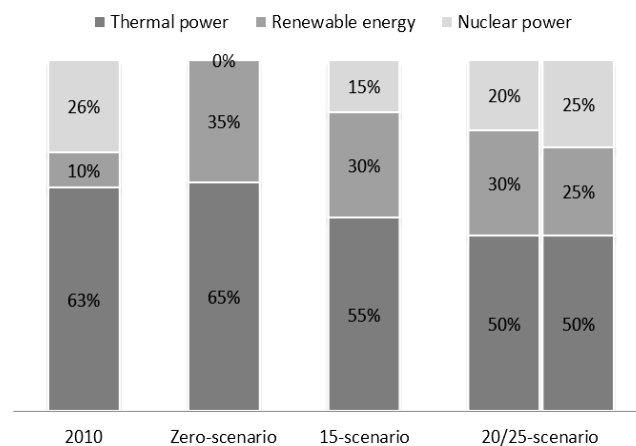


Fig.5. Options for Energy and the Environment
(developed from Agency of Natural Resources, 2012)

Energy and the Environment”, in which three scenarios of balancing nuclear energy and renewable energy until 2030 is proposed. The first proposed option is “zero-scenario”, where the energy generation will be only from renewable energy sources and thermal power generation. The second one is called “15-scenario” wherein the share of nuclear power generation will occupy 15% of the total energy generation. The third scenario, “20/25-scenario”, aims at nuclear power generation at ratio of 20-25% within the total energy generation. Each scenario is drawn in Fig.5.

Compared to the initial energy plan in FY2008 where nuclear power generation was aimed to occupy 30-40% of the total energy, it can be observed that the government decided not to promote the use of nuclear power generation. Nevertheless, the new policy shows that the government’s choice on energy is not certain yet. For instance, the options for energy allure some questions on exactly what the government is going to take direction from now on, such as how will they deal with mitigation of global warming if thermal power is increased and nuclear power is decreased?, how will they make sure the reliability of renewable energy?, and how will they handle the public distrust while keeping almost the same dependency level of nuclear power in the third scenario? Or is the proposal only to postpone the problematic energy issues to the future? According to the report, the future decision on energy choice will be discussed with the public comments by a committee for energy plan. Yet again, how and to what extent the committee will take the public comments into political consideration is not certain.

In sum, the government’s reports show some changes after the Fukushima incident. The first finding is that their focus is shifted from the international perspective to localized view. While in FY2008, the government was

concerned with economic competitiveness and environmental role of Japan in the world, domestic problems revealed from the incident, notably nuclear energy issues, are under the focus now. The second result is that political consideration on the public has been changed as presence of the public seems to be more evident in the latest annual energy report. Nonetheless, whether and how the public participation is included in political decision-making processes is still uncertain from the report. The third point is the future direction of energy since the government is concerned with independency from nuclear power generation. Yet, as the three scenarios on energy decision in 2030 show, there are uncertainties on what they are actually going to do now or how they are going to deal with each scenario.

5.4. Content-analysis on reports of Japan Business Federation

The second content-analysis is accompanied with reports published by Japan Business Federation to give economic view towards opinion on energy issues. Japan Business Federation, also known as Keidanren, is an economic organization with a membership of more than a thousand companies of Japan, and is a leading organization in the Japanese business circle. The federation published a proposal for energy policy in 2011 and a policy proposal on environment and energy in 2012. As a leading organization of business circle to give a different viewpoint, other than the public and political perspective on energy issues, their reports were chosen for this study. First, it was found that the federation is critical about the government's proposal on the three scenarios for energy generation. It is because of its unrealistic approach on current energy issues. Second, based on more realistic perspective, the federation suggests how energy issues should be dealt with.

Critics on the government's policy

First, Japan Business Federation has a critical viewpoint on the three scenarios that the government has proposed. The federation insists on the need to modify the policy. In their view, there should be a concrete and realistic plan that can provide direction for the next 3 to 5 years of energy supply, and it should be clear about the energy security in terms of its effect on lives of the public and companies' economic activities. In that sense, the government's proposal on future options vaguely and poorly explains about the next 18 years of energy supply without clarifying achievability of renewable energy, scale and cost of backup power generation, or analyzed influence on economics such as industry, international competitiveness, or employment. Likewise, the federation claims that the government should release objective data, and cherish transparent and public discussion instead of focus on "rash debate" over the electricity matter. It is thus assumed that the federation has a critical and doubtful standpoint to the government's proposal of energy scenarios, for it is unrealistic and abstract. A clear and concrete plan therefore should be made in order to take realistic considerations into account.

Japan Business Federation's view on energy

Moreover, as a leading economic organization of Japan, Japan Business Federation has a focal concern on hollowing-out of the domestic economy after the Fukushima incident and electricity shortage in the following summer. In order to avoid hollowing-out of domestic industry, the best mix for energy to balance the issues of energy security, economic growth, and environmental protection, is called for. The federation's view is similar to the viewpoint of the government before the Fukushima incident happened. They are concerned with the realistic

issues such as Japan's responsibility to mitigate global warming, domestic economic recession, and evident public distrust in nuclear energy.

The federation's central view on energy issue is the need for stabilizing energy supply, with fossil fuels, nuclear energy and renewable energy. It is crucial to stabilize the energy supply rather than have reckless political discussions on energy issues. Hence, steady fuel-based energy supply should be pursued with strong negotiation strategies, and the public distrust on nuclear energy should be restored with thorough investigation of the Fukushima disaster and complete prevention of future nuclear accident. Renewable energy, along with nuclear energy, is crucial for mitigation of global warming and Japan should take a responsible role to reduce greenhouse gas emission. However, limited energy supply or political restriction can undermine corporate activity as well as technological innovation to achieve higher energy efficiency and lower costs for renewable energy. Thus, renewable energy is necessary and essential to be pursued, but forecasts of energy efficiency and conservation and renewable energy introduction should not be exaggerated. As can be observed, stabilization of energy supply is the most important key factor that the federation emphasizes on.

Three perspectives, from the public, political, and economic sphere, have been presented. Links among three sectors should be touched upon before discussion. As mentioned earlier, the public opinions were represented by the interview participants selected for this study, and political perspective was represented by the government's report, and economic viewpoint was based on Japan Business Federation. From the public point of view, insecurity and uncertainty of using nuclear power, and future vision of energy in Japan were found in this study, while there are a few participants who experienced behavioral change for energy consumption. Notable aspect in the study was their distrust in Japanese government that was agreed from all the participants. The government, on the contrary, perceives the public distrust in nuclear power plants, not the government itself. Consequently, the government's perspective after the Fukushima incident is focused on local and public viewpoint. Yet, the role of the public or future political path on energy issues is still uncertain as can be seen from their political decision-making process or proposed future scenarios. Economic perspective, on the other hand, demands that the government should construct more realistic and concrete future path in terms of energy issues. Stabilization of energy supply, thus, is a crucial key to enhance both energy sufficiency and Japanese economy that is hollowing out. As there are realistic and economic concerns that Japan should take into consideration, the federation insists on using nuclear energy at current moment, therefore, it recognizes the urgency of restoration of public distrust in nuclear energy.

6. Discussion

In this chapter, using the results and analysis presented in previous chapter, there will be discussions to provide answers to the research questions.

What has changed on public reception and practice on energy consumption after the Fukushima nuclear incident in Japan?

From the interview results and analysis, some of changes in the participant's opinions towards energy issues have been found. First, they have developed a sense of insecurity and uncertainty over relying on nuclear energy. Since the Fukushima incident exemplified the worst case of the possibilities that could happen with nuclear power plants and natural disaster, they are more concerned about the limitation of technology that could also limit security and certainty of nuclear energy. Second, renewable energy or alternative way of using energy, such as energy conservation, are increasingly gaining interest among by the participants. Due to their anxiety over using nuclear energy in Japan, they have begun to wonder if there are alternative paths, instead of being reliant on nuclear energy, to deal with energy issues.

Despite the increasing anxiety on energy issues, yet, people's actual behavior on energy consumption has not been changed mostly. This result contradicts with Turner's motivational model, which explains people are motivated to take actions to mitigate anxiety. One of the reasons is because of locality of the situation. As it was answered in the interview, most of the Japanese could still survive without changing their life-standard even after the incident. As a consequence, they felt sense of security and felt like it was pointless to be aware of energy consumption. Another possible reason is that they feel they will anyway be reliant on nuclear energy. There is a doubt in abandoning existing nuclear power plants in Japan. As one of the participants indicated, giving up nuclear power plants is as difficult as abandoning nuclear power plants in the whole EU countries, since a country that has decided to phase out existing nuclear power plants may eventually import neighbor's electricity that are generated by nuclear power. This example illustrates how energy issues in a country can restrict possibilities of change in another country. As Japan Business Federation indicated, it is indeed realistically difficult to abandon nuclear power plants at this moment and there is a limitation to stabilize energy supply only with expensive and environmentally-unfriendly fossil fuel, energy efficiency, energy conservation, and renewable energy. As a result, thus, people are still reluctant to change their behavior at home due to the sense of security and perception of continuous dependency on nuclear power like before the incident happened.

What are the barriers to bring about behavioral change on energy consumption at the household level in Japan?

As presented in previous chapter, this study found some barriers and drivers of behavioral change on energy consumption at home. From the perspective of the Theory of Planned Behavior (TPB) and Turner's Model of Motivation, perceived outcome and gratification by taking an action is a vital element to motivate the intention. Current study confirms the theories because it was found that people are motivated to take action when they believe that energy conservation results in a desirable outcome or effect, notably a financially preferable result. There may be an argument saying that results from the interview show that money centric attitude acts as a

barrier to energy conservation behavior. However, as can be assumed from the interview results, perceiving the easiness and harmlessness to pay for the electricity undermines the motivation to save energy, but perceiving the importance and burden of price paid for electricity does not. The former attitude does not translate outcome of energy conservation into a gratification or desirable outcome. Thus, when the influence from the issue is a crucial and financial matter for actors, they are motivated to seek a serious solution.

Other personal factors are found to be drivers of energy conservation behavior. The first one is perceived behavioral control, as indicated by Icek Azjen in the TPB, explaining that the more the easiness of achieving the behavior is perceived, the more likely the behavior will be taken. Participants who find energy conservation at home easy also self-reported that they actually deal with energy conservation practices. On the contrary, participants with perception of difficulty of doing it self-reported that they do not work on energy-saving at home because of family support and concern with discomfort. As Blake (1999) and Kennedy et al. (2009) state, pragmatic concerns such as financial aspect on energy consumption was found to be a facilitator of energy conservation.

Secondly, one of the additional factors, moral norm, was found to be a significant sense in the behavior of energy conservation. Notably, a Japanese word, “mottainai”, was commonly indicated among the public and it can also induce energy conservation behavior unconsciously without awareness of energy consumption. “Mottainai” often means a sense of guilt about wasted object, effort, resource or any related factor that is not appropriately used. As Conner and Armitage (1998) explain that moral norm is a socially determined and socially validated value, the sense of “mottainai” is also socially and culturally constructed value that cannot find a single translation in English word.

Thirdly, habit was found to be a factor to drive energy conservation activity at home. Discipline from parents or in childhood was proved to be a triggering factor to stabilize the behavior as a habit. On the other hand, past experiences from temporarily surrounding environment such as comfortable climate condition or home appliance do not seem to have continuous effects over time. As Ajzen (ibid) implied, past behavior can provide accurate information such as controllability and capability of the behavior that can strengthen perception on the behavior in question. However, as current study found, past behavior does not have over-time effect on a person’s behavior if it is not repeated over time until it turns to a habit.

People perceive that there is a social mood on energy conservation as a consequence of the nuclear power disaster and following energy-saving campaign. As explained by the TPB, intention is partly affected by the perceived social pressure and social appropriateness of performing the behavior. However, the social mood has a contrasting influence on people’s behavior. They become reluctant to engage in energy conservation assumedly because of, first, disbelief in the government that is conducting the campaign, and second, disbelief in other public people who talk about a socially correct thing only on the surface.

On the other hand, it should be emphasized here that community level of mood on energy conservation was

reported to be effective. This can be explained by the Motivation model of interaction of Turner (1988). Compared to societal level of mood, community level of mood has more sense of trust, security, and group inclusion that mitigate anxiety in the situation or towards an issue that they interact because they see other people in the smaller scale that enables to recognize each other. Compared to individual level of awareness, furthermore, the consequent gratification or recognition of facticity has greater influence on mobilization of action taking. In other words, community level can facilitate interaction between the issue and the people.

In this study, self-identity or self-conception, that was highlighted by Turner (1988), Fox and Frye (2010), and Conner and Armitage (1998), was not found to be a significant driver nor a barrier of energy conservation behavior in this study. The author of this study, nonetheless, believes that the self-concept plays a certain role in a socially appropriate behavior like energy conservation in Japan. Since there is a social mood and there are people who talk about energy conservation (even on the surface), there should be at some point people's self-conception shaped in such a social trend. Self-identity was introduced in this study as an additional element to the TPB because a person's view on self can contribute to engage in practices related to his self-conceptualized identity. Results of the study, yet, did not find any significant relationship between the participants' self-identity with their actual behavior. A possible reason why self-identity was not evident in the results is because of the interview process that was selected in this study. Since the participants were directly asked whether they find themselves to be a type of person who works on saving energy, it was hard for the participants to quickly identify themselves in a conversation of energy issues. Naturally occurring self-identity should thus be studied further in future research.

What is the gap between public, political, and economical sectors' reception on energy issues?

Theory of motivation by Turner (1988) identifies significant aspects in interaction between people, and sense of trust is one of the significant aspects to allure motivation in interaction. Trust, as well as a sense of group inclusion and security, can lead to reduction of anxiety in the interaction. This makes the facticity in interaction, recognition of shared and factual situation that people are in. Assuming the "interaction" in this study means the dealings of the public with the government and with energy issues, the public need to have a trust in what the government is concerned with and trust in importance of energy issues in order to create the facticity that makes them motivated to respond to the situation. "Trust" was found in current study to be a noteworthy aspect that is missing among the public – trust in energy system and, more notably, trust in the government.

First, after the Fukushima incident, there has been a lack of trust in energy system among Japanese people as mentioned earlier in this chapter. They started to feel the anxiety on nuclear energy and uncertainty of energy stability in Japan because the accident exemplified the worst situation that Japanese government predicted. The government recognizes that the public is suspicious of nuclear energy and revision of energy system is necessary for energy security issues in Japan. In fact, the government's report in FY2012 focuses largely on nuclear energy issues such as management of the planned power-cut in some areas, revision of energy price and renewable energy system, revision of regulation to assess nuclear power plants, and compensation for the damage of the accident. It is assumed that the government makes sure that they are dealing with evident problems that have

arisen from the nuclear accident. Nonetheless, it is difficult to see what the government's intention to choose power generation means. They proposed the three scenarios for future energy options – zero-scenario, 15-scenario, and 20/25-scenario. In their proposal, there is not thorough explanation for the future.

The proposal allures some significant questions, for instance, such as whether or not they are going to pursue the phase out of nuclear power generation; what are the possible solutions for the renewable energy that is expected to grow more than twice as they had in 2010; and, how the mitigation of greenhouse gas emission will be avoided when there will be no nuclear energy. A similar argument is stated by Japan Business Federation, Japan's leading organization of economic corporation. As stated by the federation, the government's proposal on future options is long-term yet poorly explained without description of renewable energy achievability, scale and cost of backup power generation, or influence on economics both at the local and global level.

Second, as the interview participants all claimed, they do not have trust in the government because they can sense the selfishness of politicians thinking only about their political position. As one of the participants pointed out, for instance, people think Japanese politicians seem to take action for nothing, but for votes to keep their political position. In consequence of such distrust in the government, the public feel that energy issues are not an important matter unless it affects their lives. Not only does it result in a situation where the public feel reluctant to engage in energy conservation, but also it can ultimately have a converse effect. For instance, as one of the participants stated, *"When there was energy-saving campaign, I didn't want to (practice energy-saving). I don't like it when people like them ask citizens to do such a hypocritical thing saying "please cooperate in energy-saving". I would rather question about the energy used for the campaign cars driving around the city (#3)"* Likewise, the public assume that other people in the public also feel in the same way in spite of the recognition of social mood on energy-saving. Since people believe that nobody is talking and thinking about it seriously, they tend to have a negative attitude about the social mood. In this regard, thus, it is hard to share the same issues between the public and government because there is no trusted interaction between each other.

One of the explanations of the public disbelief in the government is their hazy perspective on political activities about energy issues. Since the government's response to the Fukushima accident was slow, the public assumed there was something that government wanted to hide from them. Correspondingly, analysis on the government's report revealed that they do not transparently take the public opinions in their political process, while the government recognizes the importance of public opinion and more localized perspectives. For instance, they decided to restart the Ohi nuclear power plants if there was a certain level of the public understanding. Yet, there still remains a blurred political process on what level and how many of the public understanding is the "certain level" in their sense. Furthermore, their decision on energy choice is also unclear. Some of the public and the business federation support continuation of nuclear power from a realistic viewpoint to ensure stability of economic and energy security. Other public opinions are against nuclear power that has caused serious and irreversible problems in Japan. However, the viewpoint from more responsible actor, political perspective, is neutral, where there are options saying both no and yes to nuclear energy. Although energy choice is a crucial aspect, blurry political decision making may only postpone the serious situation.

In contrast, Japan Business Federation has a concrete standpoint on the energy choice. They emphasize on the need of nuclear energy in realistic perspective to stabilize energy supply and hence to recover the economic hollowing-out as well as to innovate technologies to increase energy-efficiency. This is similar to the political report of FY2008 which focused more on global matters in energy issues such as Japan's responsibility to mitigate the global warming and to strengthen the economy for stable energy supply. Although all the sectors recognize the public distrust in nuclear energy, as the federation insists, abandoning nuclear energy may not be a realistically suitable choice for Japan. It would be as hard as abandoning all the nuclear power plants in all the EU countries like one of the participants mentioned, and stability of energy supply also is a key for Japan to enhance energy efficiency. As the federation indicated, renewable energy is an essential path to pursue for long-term cost and benefit of the future, but technological advancement is necessary to be pursued at the same time to effectively utilize renewable energy.

How could energy conservation be triggered by the Japanese people?

By summarizing all the discussions above, it can give answers to the last research question. First, it should be mentioned that, while the public feel anxiety of having nuclear power plants in Japan and are concerned with other energy sources, their behavior is not followed to mitigate the anxiety and the concern. The Fukushima incident itself therefore does not seem to affect energy conservation behavior among the Japanese. Rather, it can be assumed that energy conservation can be triggered by personal aspects or situational aspects such as perception on preferable outcome, perceived easiness of achieving the behavior, moral norm (sense of "mottainai"), past habit, and community level of social mood on energy conservation.

Moreover, restoration of the public distrust is a crucial challenge for the government to cope with. In this study, it was found that transparency and inclusion of the public opinion in decision-making process were unclear, and that there is a lack of concrete and realistic future energy plan. Such vagueness in political activities makes it hard for the public to trust the political happenings, although it may not be the only reason. Not only does it result in the public distrust towards the government, it makes people think that talking about energy conservation is hypocritical. Consequently, in a society where energy-saving campaign is everywhere and while energy conservation is perceived to be hypocritical, it is hard for the people to have a positive attitude to the social mood or other people talking about the issues. Thus, though the government recognizes the public distrust in nuclear energy, restoration of the public distrust both in energy supply and the government itself is a crucial key in order to share the same issues such as energy matters between the two sectors.

For the last discussion point, national level of energy conservation in Japan should be touched upon. While energy conservation behavior should be pursued and cherished as a significant approach to enhance energy efficiency in Japan, it is still important to improve technology to make renewable energy or energy-efficient appliances utilized. As it was proposed by Japan Business Federation, Japan is undergoing economic and environmental challenges both at national and global level, and those tasks should be always one of the major concerns of the government. While struggling with the economic and environmental tasks, the government may

put less importance on the public opinion and there may be more public disagreeing with the government. Phase out of nuclear energy, for instance, may not be a primary concern for long-term and sustainable energy consumption if it undermines the stability of energy supply. It is inevitable to have contradictory opinions between each sector of the society, and inclusion of the public opinion may not be always taken for granted. What matters here therefore is that the government should take a concrete and realistic energy path in which transparent decision-making is proceeded.

7. Conclusion

For concluding remarks, it should be first noted once more that the paper has been carried out to find out following research questions;

- 1) What has changed on public reception and practice on energy consumption after the Fukushima nuclear incident in Japan?
- 2) What are the barriers to bring about behavioral change on energy consumption at the household level in Japan?
- 3) Is there a gap between public, political, and economic sectors' reception on energy issues?
- 4) How could energy conservation be triggered by the Japanese people?

As a result, the following aspects can be concluded;

- First, despite the increasing anxiety on energy issues after the Fukushima incident, the study did not find changes in people's actual behavior on energy consumption. One of the possible reasons behind this is a sense of security. Since most of the participants in this study were not forced to change their lifestyles and they perceived nothing was affected, they did not become aware of the energy issues from the incident. Also, other reason includes realistic limitation of phasing out nuclear power plants in Japan that gives them an idea that Japan will be reliant on nuclear energy as it used to be. In sum, the Fukushima incident influenced the public reception on energy issues, but did not have enough effect to change their behavior on energy consumption.
- Second, some aspects were found out to be drivers of behavioral change for energy conservation at home. First, as explained by the Theory of Planned Behavior, when people perceive easiness of achieving to save energy at home, they are more likely to take actual behavior for it. Second, a Japanese notion of "mottainai" sense plays a significant role in behavioral change for energy conservation among the Japanese. It is a socially constructed moral norm that was found to help taking actions for energy conservation without awareness of energy consumption. Third, although past experience was not found to be a driver to cause energy-saving action, repeated behavior, namely habit, can cause a continuous effect on a person's behavior to engage in energy conservation.
- Also, people may feel reluctant to engage in energy conservation at households in which resultant outcome may be rather small and inappreciable, whereas societal level of energy conservation, like energy-saving campaign that the government has been directing, can be a reverse effect on the public who disbelieve in the government. Hence, community level of mood-making for energy conservation can actively make people involved in the matter of energy consumption. Since it can facilitate the interaction between the issue and the people, they tend to relate themselves with financial and crucial outcome of consuming energy.
- Family support and sense of discomfort can be obstacles to practice energy conservation at home. Those elements certainly can undermine the controllability of the behavior, but it can be assumed that other factors,

i.e. social mood, negative attitude, or moral norm, may influence actual decision on choice of action. Further study can focus more on the comparative study on each significant element. In the same way, study on self-identity can be further examined. There can be at some point people's self-conception shaped in a current social mood on energy-saving in Japan. A different approach thus can be taken for future research.

- There is an evident distrust of the public towards the government. Not only does it result in the situation in which the public do not have trust in the current energy system in Japan, but it also causes them to disbelieve in the government's activities in general. This makes it challenging to share the same issues such as energy issues between the public and government. In order to avoid the absence of the interaction between the two actors, the government should focus on restoration of the public distrust both on energy system and their political activities. While they are at present concerned with the public distrust on nuclear energy, however, the trust in the political happenings should be fundamentally restored as well. Transparent decision-making process and more concrete and realistic future energy path hence may make the government itself more reliable.

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Appendix 1: Interview Questions in English

Part 1: Public opinion and practice on energy conservation after the Fukushima nuclear incident

1. How did Fukushima nuclear incident affect you, your opinion, or lifestyle?
2. Did Fukushima nuclear incident change your opinion on energy? If so, how?
3. Did the incident change your way of using energy? If so, how? If not, why?

Part 2: Factors to drive/prevent energy conservation

Taking the examples from a leaflet about energy conservation at home by the Energy Conservation Center in Japan, energy conservation can be practiced through turning of lights when not necessary; shortening lighting time; switching off the TV when not watched; setting the heating at 20 degree in winter, and cooling conditioner at 28 degree in summer. Using the examples presented, please answer the followings;

4. Are you in reality engaged in energy conservation practice at home? What in detail do you do? If not: why?
5. What do you think is the most important thing in order to practice energy conservation or change energy consumption at home?
6. Is energy-saving valuable or meaningful for you? Or is it worthless? Why?
7. How do you think the energy conservation in Japan is perceived by the society, including your surrounding people such as your family or friends? What about politicians?
8. If you are to reduce the amount of energy used in coming year with 50% of what you have consumed in previous year, can you do it? And what are the obstacles or helping facts under that situation?
9. Would you feel guilty to use too much electricity or gas at home?
10. Do you find yourself not a type of person who cares about energy consumption at home and try to save it? If yes or not: why?
11. Have you experienced less energy-consuming lifestyle in the past? If yes: how? If not: why?

Appendix 2: Interview Questions in Japanese

1. 福島での原発事故はあなたやあなたの意見、そして生活にどのような影響がありましたか？
2. 福島での原発事故はあなたのエネルギーに対する意見を変えましたか？もしそうなら、どのように変わりましたか？
3. 福島での原発事故はあなたのエネルギーや電気への行動を変えましたか？もしそうなら、どのように変わりましたか？

2010年3月に起きた震災以来、エネルギーに対する関心が高まっています。そこで省エネに対する意見をお聞きしたいので以下の質問にお答えください。「電気をこまめに消す・点灯時間を短くする・無駄なところを点灯しないようにする・テレビを見ない時は消すようにする・画面を明るくしすぎない・暖房や冷房の温度を必要以上に上げたり下げたりしない」等の省エネルギーセンターの挙げている例を参考に「省エネ生活」についてお聞かせください。

4. 家で省エネ生活やエネルギー使用を変えとなると何が一番大事だと思いますか？
5. 省エネ生活をするということはあなたにとって価値のあることですか？無いことですか？その理由は？
6. あなたの周りの人を含め、社会から見た日本のエネルギー問題ってどういう感じで捉えられていると思いますか？政治家は？
7. もし次の一年で今払っている電気代ガス代を半分にしろと言われたら、できますか？また、それを容易、もしくは難しく感じる理由は何ですか？
8. 実際に家庭では省エネとして努めていることはありますか？何を具体的にしていますか？なぜですか？
9. 電気やガス等のエネルギーを使いすぎることで罪悪感を得ることはありますか？
10. 家でコツコツエネルギーのことを気にするのは自分のキャラクターじゃないと感じますか？なぜですか？
11. 今よりエネルギー消費の少ないライフスタイルを体験したことがありますか？もしそうであればどのように？そうでなければ、なぜ？