
Sustainable Self-Reliance of Energy of The Rural Community

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Abstract

This paper was prepared by synthesis of salient knowledge for extension of research on Sustainable Self-reliance of Energy of the rural community at Surin Province. Objectives aimed to study on background and dynamic of energy utilization of community and guideline for conservation and development of sustainable self-reliance of energy. Research techniques were composed of Anthropological research, Participatory Action Research (PAR) with Appreciation-Influence-Control (A-I-C) technique. Research areas were carried out at Ban Mai, Tra Sang Sub-district, Maung Surin District, Ban Pratattbu, Pratattbu Sub-district, Prasart District, Surin Province and rural communities in Surin Province area. Result of research was concluded as follows.

Background and dynamic of community's energy utilization of Ban Mai, Tra Sang Sub-district, Maung Surin District, Ban Pratattbu, Pratattbu Sub-district, Prasart District, Surin Province and rural communities in Surin Province area covering household activities, occupational activities, and transportation presented changes of their patterns and demand which could be divided into 3 periods; 1) Prior to 1970, traditional energy was used by communities. Such energy was referred to primary fuel or renewable energy relying on natural resources and environment of community. So self-reliance was sustained both household and community scale, and 2) Period of 1970 - 1980, road was constructed in community, fossil fuel and Liquefied Petroleum Gas (LPG) which were new patterns of energy were accepted by community. Outbound setting established un-self-reliance community on energy 3) Period of 1980 - 2013, electricity introduced to community providing a new platform of community energy utilization was intensively and widely used. The demand of new energy form was increased rapidly as well as expenditures on energy consumption was also increased.

Result of research on proposal of conservation and development of sustainable self-reliance energy policy guideline was discovered 2 policies e.g. 1) Policy on ancestors' local wisdom of heat energy inheritance and 2) The Government has to increase knowledge on appropriate energy utilization for local

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people in relation to suitable context and similarity of ethnic identity including benefit of self-reliance energy of community to agencies concerned.

Keywords: energy, self-reliance, sustainable

Introduction

Energy is important to the entities in the world. It is basic factor of development and directly impacts to people quality of life. All activities of human need energy. Mankind has continuously invented and developed technology for energy producing and utilization since pre-history period (Kraipat Cheenkachorn, 2008: 1). Starting from stone age, human knew how to use fire for cooking until history period about 3,000 before Christ. Human knew technology for using energy from solar, water, and wind. After that energy from water turbine and coal were used. Recently energy from fossil fuel and natural gases have been used for 100 years. Energy from fossil fuel was key energy source which was used both transportation sector and agriculture sector. Presently, shortage of fossil fuel is defined as critical stage. If fossil fuel is exhausted, world economy will be certainly unstable. Because world economy has become totally based on fossil energy. World energy situation was fluctuated continuously. These factors result in direct impact on world energy security (Phiphat Nonthanathorn Et.al. 2007: 11).

Since the world entered into development period and household and population increasing period. Energy demand of community was increased as well. Community understanding of energy was important to

encourage development of community on energy potential. Local resources could be used for community's benefits by supporting from knowledge and government agencies including changing natural resources consumption behavior for maintaining environment in terms of balance condition for sustainable development. (Nongnapat Kuwaranyu thengkamol, 2008: 6).

Community's quality of life was most dependent on energy due to household cooking, light, watching TV, listening radio, and convenient transportation. Currently, community has different pattern of energy consumption. They relied on energy that came from external household and village. Furthermore, increasing population and household affected their energy demand. Community's member disregarded with energy source in community such as biomass energy, solar energy, wind energy, and human and animal labor etc. These energy sources were typically traditional energies for household and occupation activities that proceeded within community long time ago.

Ban Mai, Tra Sang Sub-district, Maung Surin District, Surin Province, was a new village that was established more than 50 years. Khmer language was applied for local communication. Most of them did agriculture. Main crop was paddy farming. (Satit Chumcheangai. 2014 : July 14) Village members have their own local wisdom on several energy management techniques. Some households used buffalo labor for paddy field plowing, making charcoal for their cooking, and applying

wood vinegar (by product of charcoal producing process) as insecticide. At present, village members were dependent on external energy for their daily life using and occupational activities e.g. electricity, fossil fuel, and LPG. So expenditures on energy consumption were increased accordingly. In the meantime, they reduced using energy from natural resources that were discovered in their local area; the reason why they cannot be self-reliance energy community.

Ban Pratattbu, Pratattbu Sub-district, Prasart District, Surin Province and rural communities in Surin Province area was an old village that was established more than 160 years. Khmer language was applied for local communication. Most of them did agriculture. Main crop was paddy farming. (Surahai Laison. 2014 : June 6) Village members have their own local wisdom on several energy management techniques. Some households making charcoal for their cooking, and applying wood vinegar (similar to the making charcoal of Ban Mai, Tra Sang Sub-district, Maung Surin District, Surin Province) as insecticide. At present, village members were dependent on external energy for their daily life using and occupational activities e.g. electricity, fossil fuel, and LPG. So expenditures on energy consumption were increased accordingly. In the meantime, they reduced using energy from natural resources that were discovered in their local area; the reason why they cannot be self-reliance energy community. Researcher is interested in study and survey on background of energy utilization in rural community both commercial energy and

alternative energy. Such data were employed into analysis of current energy utilization situation, investigation of local energy sources for explore its potential, and finding real sustainable self-reliance of energy for everyone.

Research Outcome

The research result was concluded according to research objectives and methodology. Findings and salient knowledge were summarized and selected as follows.

1. Background and dynamic of community's energy utilization

Community context was studied in the extents of way of life, belief, culture, tradition, history, and energy utilization of community. Research results were as follows.

Ban Mai, Tra Sang Sub-district, Maung Surin District, Ban Pratattbu, Pratattbu Sub-district, Prasart District, Surin Province and others was selected for study area of background and dynamic of community's energy utilization. It was found that heat energy type for household cooking was applied both traditional type (fire wood and charcoal) and modern energy type or non-renewable sources (electricity and LPG). Most of them used several types of heat energy in combination for their cooking activities. In case of illumination energy, natural material was used as light source of household for long time ago. Most of materials were derived from forest such as local torch or *Janlauh* (local name). It is made from rotten wood mixed with River Spiderwort latex).



Figure 1 Applying Fire Wood and LPG for Cooking

Figure 1 showed heat energy application for an ordination feast. Left figure presented rice cooking preparation for ordination feast of participants that huge of rice has been cooked and took a long time. Fire wood or charcoal was used in plentiful rice cooking so dishes were gained popularity owing to its use in cooking by LPG for convenience and rapidity.

After 1980, people could access electricity services. Electricity lamp was used widely. When electricity was available, several household accessories could be used for example electric rice cooker, electric fan, TV, radio etc. These accessories made convenience for villagers but they raised household energy consumption expenditures. Energy for transportation, they used animal labor in the past such as cart with cattle. Once modern

technology came into community, its pattern of energy consumption has been changed from animal labor to energy by technologies e.g. bicycle, motorcycle, and motor car respectively. Energy for occupation activities in the past, they used buffalo for paddy field plowing and cart with cattle for transportation. Presently, instead, they used plowing machine or pushcart tractor, and threshing machine especially mobile harvesting & threshing machine. So villagers abandoned traditional energy or animal labor as ever did in the past. In replacing animal labor use, therefore, animal dung would not be obtained for farm input. Chemical fertilizer was replaced of traditional fertilizer. Cost of chemical fertilizer was dramatically more increasing than green manure. Not only to pay for farm machines, fossil fuel, and chemical fertilizer, but villagers also to bear costly household expenditures.



Figure 2 Different Paddy Field Plowing Pattern

Figure 2, left hand side showed plowing by buffalo labor in the past. Right hand side showed plowing machine both walking plowing machine and pushcart tractor. The energy consumption pattern development of Ban Mai and Ban Pratatbu covering household activities, occupational activities, and transportation could be concluded the change pattern of energy consumption for 3 periods; 1) Prior to 1970, traditional energy was used by communities. Such energy was referred to primary fuel or renewable energy relying on natural resources and environment of community. So self-reliance was sustained both household and community. 2) Period of 1970 - 1980, road was constructed in community, Fossil fuel and Liquefied Petroleum Gas (LPG) which was new pattern of energy was accepted by community. It was necessary to take energy from outbound of community that made un-self-reliance community on energy, and 3) Period of 1980 - 2014, electricity was introduced to community. It provided a new platform of community energy utilization that was intensively and widely used. The demand of new energy form was increased rapidly as well as expenditures on energy consumption.

2. Guidelines for conservation & development of sustainable self-reliance of energy

Guidelines for conservation & development of sustainable self-reliance of energy the researcher proposed the proposal on policy and measures by applying research technique of Participatory Action Research (PRA) with Appreciation-Influence-Control (A-I-C) were as follows.

The first proposal is a policy on ancestors' local wisdom of heat energy inheritance with measures of 1) coconut oil will be promoted for cooking oil that can be produced in community. This knowhow for making coconut oil was transferred from parents or grandparents to new generation. 2) Energy which is produced from animal dung will be promoted such as bio-gas for reducing household expenditure on energy. 3) Knowledge of solar heat utilization for food preservation has to be seriously disseminated to youths.

The second proposal is that the Government has to increase knowledge on appropriate energy utilization for local people with measures of 1) Promotion of Physic Nut (natively *Saboo Dam*) plantation for being alternative energy 2) Dissemination of energy crop for alternative energy utilization to villager by public and private organization that they can gain benefit from energy resources in community 3) Promotion and dissemination knowledge on utilization of existing energy sources in community 4) Promotion and supporting of solar energy utilization by installation photovoltaic cell to produce clean and sustainable electricity.

3. Suggestion

Study result was found that energy for self-reliance of rural community in Surin Province related to several agencies for example provincial energy office, Sub-district Administrative Organization, Local Administrative Organization etc. Concerned agencies should pay focus on enhancement and development of village & sub-district energy by knowledge & technology building on energy, and provided

budget, as well as energy planning harmonization with way of life and community environment that was based on available local natural resources. All alternative energies have to be promoted that would be options for local people complying with sufficiency economy guidelines. Energy producing and utilization should be promoted together with careful environment including clean energy utilization under sufficiency economy philosophy to be basic of development on self-reliance of energy. Furthermore it was complied with government policy on alternative energy promotion in community. Moreover, concerned agencies should provide policy on inheritance of heat energy of ancestor's wisdom and promoted as well as the government has to increase knowledge on an appropriate energy of local people complying with sustainable self-reliance of energy concept.

Above guidelines on self-reliance of energy were presented policy proposal to support government policy on energy that enhanced community self-reliance of energy together with national energy consumption risk diversification. Community has to be supported by the government agencies on knowledge and understanding of energy, energy technology. And most important was budget including energy management plan harmonization with community way of life and environment based on available local natural resources under sufficiency economy philosophy. These were basic development of sustainable self-reliance of energy.

Conclusion

Study on background & dynamic of community's energy utilization of rural community in Suin Province, Thailand was found that in the past, local people used energy for light source including utilization of fire wood and charcoal for being heat sources for household cooking. These were natural energies that were existed in local area. Modern technology came into community. Electricity energy and modern machines were used instead of human and animal labor that made more household energy expenditure. Furthermore, area of rural community in Suin Province was site of ancient culture and fertile area. This area was sources of several knowledge and wisdom creations. Such wisdom was knowledge of local people which was retrieved from their experience and craver including accumulation of knowledge from the past. Wisdom and knowledge was transferred from generation to generation with adaptation for appropriate such period and creation of new wisdom and knowledge according to condition of social, culture, and environment. These wisdom and knowledge were harmonized with locally social, culture, and environment context. Local people used nature and labor (human & animal) for earning. But they have to apply existing wisdom and knowledge which was transferred from ancestor to be survival such as an application of human labor, animal labor, and nature. Concept that was heritage of Thai people was applied for carrier by using main local resources.

Regarding energy management, the scheme should start from oneself and link to way of life. Because if we are wasteful of energy consumption and have greed incessantly, no matter what energy is substituted with anything. We are not able to inhibit loss of resources. For instance, fire wood and charcoal are used

without reforestation and maintenance. Natural resource consumer will become destroyer. For knowledge dissemination on energy saving and energy efficient use to household and community is simply implemented with low cost. It is feasible for practice that enhances sustainable community.

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