

# GUIDELINES FOR USING RENEWABLE ENERGY IN AGRICULTURE IN CHIANG MAI PROVINCE

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## Introduction

### (Statement and Significance of the Problem)

in the current world situation The current energy used in both oil coal and gas It's a big problem and it's getting more serious. Combined with the war, the price of energy has increased significantly. And resources, including gas, coal, oil, are counting on the days to be exhausted. Many countries focus on developing the use of renewable energy in the manufacturing and agricultural sectors. In particular, the use of clean energy will have a positive effect on the global environment. The advantages of renewable energy are It is a renewable energy that can be renewed and reused for consumption and utilities instead of the original energy source continuously without ever running out. environmentally friendly Help reduce the impact, pollution and pollution released into the environment caused by the fossil fuel processing process. and reduce carbon dioxide emissions that cause global warming. go is a structural shift from focusing on short-term economic outcomes to sustainable growth. The development of the country in the future will not separate environmental issues from the activities. economic and social and has set clear goals in moving towards a circular economy and Environmentally friendly low carbon society coupled with the change in consumption behavior to reduce the use raw materials and reduce waste from the production process To solve environmental problems and solve the problem of inefficient use of resources. which destroys the sustainability of natural resources and ecosystems as a starting point for development Economic and social advancement coupled with preserving the environment in balance To pass on natural resources and a good environment to the next generation in the long run. by promoting a circular economy that uses resources efficiently, sustainably and in line with the capacity of the ecosystem

The use of renewable energy reduces dependency. Expensive energy to be imported improving the economic conditions of the country because it can produce energy for its own use and able to distribute income to the population as well help stimulate the economy to expand Reduce foreign fuel imports Because people turn to products from natural sources that can be produced within the country to help prevent environmental problems. Including various pollution because petroleum energy is used less. Helping humans live longer by reducing the effects of energy consumption. which often causes unexpected health problems Thailand is in the same situation. together with the economic conditions of Thailand Especially for agricultural groups whose incomes are not balanced with expenditures. Helping to reduce production costs is therefore a very important approach that must be accelerated. In which, alternative energy is Energy that can replace fossil fuels such as coal, petroleum and natural gas. which will run out in the near future It also emits enormous amounts of carbon dioxide. which is the cause of the greenhouse effect and global warming problems in general Renewable energy refers to energy that exists in nature and can be used to replace the original energy unlimitedly Examples of important renewable energy that are widely used are solar energy, hydro energy, wind energy, biomass energy. geothermal energy which are all sources of energy with high potential It can effectively solve the problem of energy shortage and reduce pollution.

A wide range of energy from sources that exist in nature or from natural processes that are spontaneous or can be produced for unlimited use. Renewable energy is often seen as a new technology. but in reality Humans have been using natural energy for heat, light, transportation and other benefits for a long time. But in the past 500 years, humans have preferred fossil fuels such as oil, gas and coal. However, renewable energy is not energy that does not affect the environment. But they impact the environment at a lower rate compared to fossil fuels. which produces high levels of pollution and carbon dioxide causing the greenhouse effect which is the cause of global warming by working principle of renewable energy Can be used in 2 ways, namely direct use, such as using heat energy from the sun to preserve food. Using wind power to sail the seas and powering wind turbines to grind grain. Using solar energy to warm the day and help start a fire at night, etc., and converting energy into the form of direct current or alternating current with various devices which have physical properties that can change the form of kinetic energy, mechanical energy or potential energy such as solar panels, wind turbines, generators, etc., in line with the operational guidelines Department of Alternative Energy and Energy Efficiency according to the civil state strategy Guidelines to drive Thailand towards stability, prosperity and sustainability Thailand 4.0 by upgrading the development of energy use in the agricultural sector to have higher efficiency. Helps to increase the efficiency of energy use in the agricultural sector. Machines reduce farmer operating expenses. Including providing opportunities to access a wider variety of powerful equipment. At present, the energy efficiency of agricultural machinery and equipment has been continually developed. as well as work capacity and productivity. If the automatic farm control and management technology is applied properly, it will help to increase production efficiency and increased energy consumption

Nowadays, we can use renewable energy in a variety of ways. Especially electricity generation to help save costs and reduce pollution and the world's environment. Including saving energy from other sources, so renewable energy is an energy that can be used to replace traditional energy unlimitedly. It is also found in nature and can be recycled. to help reduce the problem of power shortages which may happen in the near future Promotion of energy efficiency in agriculture and elevate production standards in the agricultural sector to a higher level with a focus on creating and transmitting A body of academic knowledge, technology, innovation and local wisdom in participatory agriculture

The concrete implementation of various technologies usually occurs only in large farms. with capital and knowledge While medium and small farms Smallholder farmers also have less access to modern production technology. use of renewable energy It is necessary to study the factors. To provide basic information that can lead to the use of suitable renewable energy. benefit farmers and encouraged to be widely used in Chiang Mai Basic information about agriculture in Chiang Mai.

### **Research Question**

1. General socio-economic conditions and physical of farmers What is it like in Chiang Mai?
2. What is conditions of using renewable energy in the agricultural sector in Chiang Mai Problems and obstacles in the use of renewable energy in the agricultural sector
3. How is demand for renewable energy in the agricultural sector Chiang Mai?
4. What is guidelines for using renewable energy in agriculture, problems and suggestions

## Research Objectives

1. To study the general socio-economic conditions. and physical of farmers in Chiang Mai
2. To study the condition of using alternative energy in the agricultural sector. Problems and obstacles in the use of renewable energy in the agricultural sector. Chiang Mai Province
3. To study the demand for renewable energy in the agricultural sector. Chiang Mai Province
4. To formulate guidelines for energy use, problems and recommendations regarding the use of renewable energy in agriculture.

## Research Hypothesis

1. Knowledge and understanding of renewable energy affects farmers' use of renewable energy.
2. Economic factors affecting farmers' use of renewable energy
3. Responding to needs in the socio-economic dimension affects farmers' use of renewable energy.

## Scope of the Study

In this research, the study area was defined in three parts: content scope; population boundary and time boundaries

**population boundary** Chiang Mai Province has a total area of 12,566,911 rai, of which 1,854,294 rai is agricultural land ( 14.75% of total area) is rice cultivation area 556,649 rai, field crops 251,129 rai, vegetable crops 111,084 rai, and fruit trees 612,148 rai. 92,276 rai of perennial plants, with 419,479 rai of irrigated agricultural areas and 419,479 rai of agricultural land outside Irrigation 1,434,815 rai Chiang Mai Province consists of 25 districts, 204 sub-districts and 2,066 villages, 835,977 households, 181,371 agricultural households. The most is Mae Chaem District, amounting to 181,303 rai, which this research will study on a household basis. The sample size was obtained by calculating the sample size using the formula of Taro Yamane (Taro Yamane', 1973 : 727-728) The confidence level of 95 percent and the level of error of 5 percent resulted in a total group size of 400 people.

**Content Scope** subject research Guidelines for using renewable energy in agriculture in Chiang Mai Province Determine the scope of research on the basic information of farmers groups related to their readiness and interest in using renewable energy. and in terms of renewable energy Scope of study on the subject biomass energy Solar energy, wind energy and hydro energy. Government renewable energy promotion policy and the use of renewable energy in the agricultural sector

**The scope of the research period** in the year 2023

## Significance of the study

Research Benefits Can be divided into 3 parts:

**Policy benefits** The results of the research will determine the roles of relevant agencies that will support the implementation of renewable energy in the agricultural sector. It will also lead to policy formulation on renewable energy that can respond to real problems. both in the development of prototype tools Including the preparation of long and short guidelines to support the needs of the farmers.

**Management Benefits** Promoting the use of renewable energy can be driven on the facts of farmers and can support farmers at the group level

**Academic benefits** The results of the research can be extended to study in other areas. and other professional groups Because each area has different economic geography.

### **Definition of term**

Renewable energy refers to energy that can be used to replace conventional energy such as hydropower, solar energy, wind energy, and biomass energy.

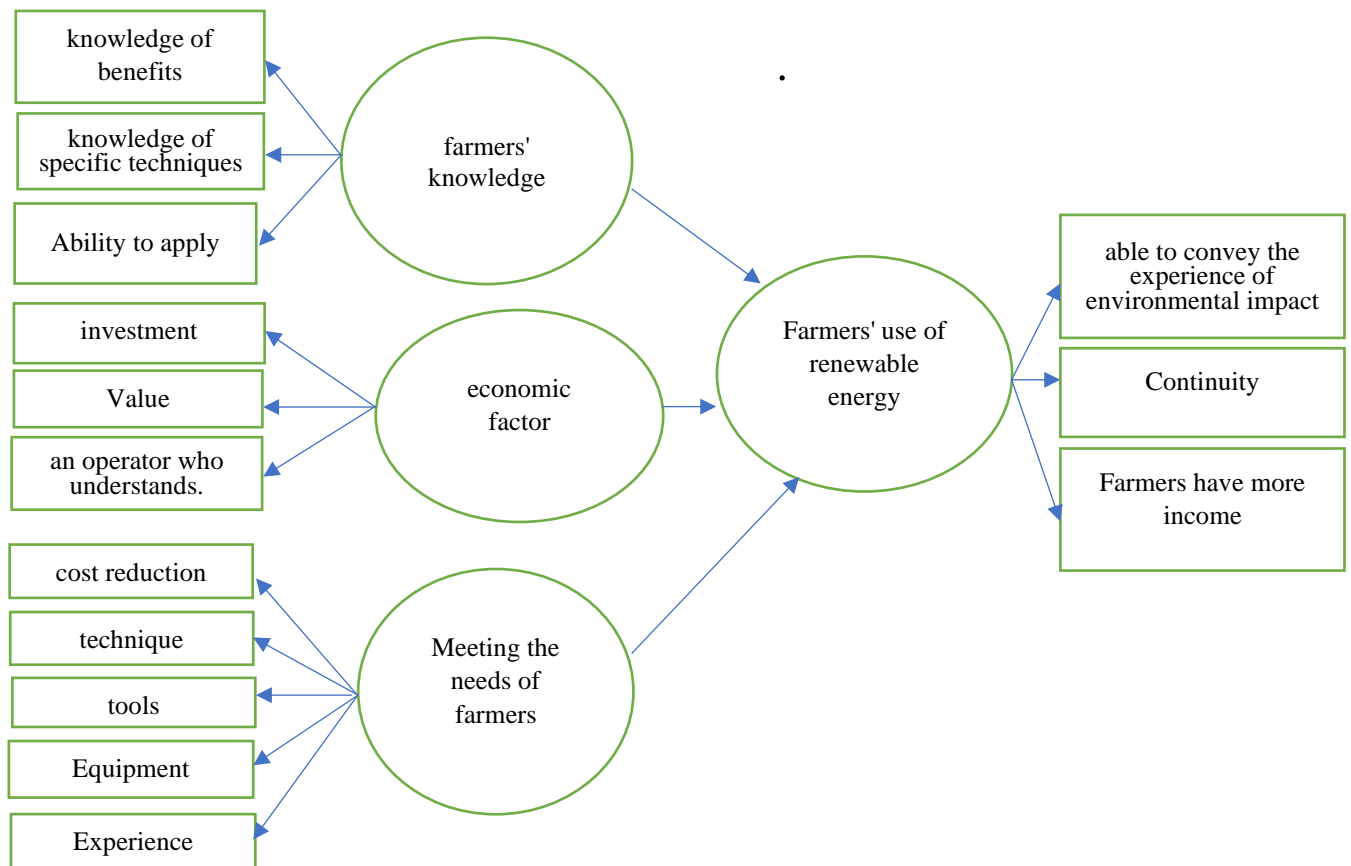
Economic factors refer to investment costs, product prices, worthiness of using renewable energy.

Demand response refers to the need for renewable energy knowledge. The need for knowledge of renewable energy tools the need to exchange experiences Demand for the right equipment price The need for continuity of government support

### **Theoretical concepts used in research**

1. Theoretical concepts about management
2. Concepts and theories about society and culture
3. Concepts and theories about feasibility and feasibility assessment
4. The theory of environmental management
5. Participatory Theory Concept
6. Theoretical concepts of learning
7. The concept of energy and management
8. The concept of energy security
9. The 13th National Economic and Social Development Plan
10. 20-year energy conservation plan (2011-2030)
11. Renewable and Alternative Energy Development Plan of Thailand
12. Electric Power Development Plan of the Year B.E. (2012-2030)
13. Related Research
14. Conceptual Framework

## Conceptual framework



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