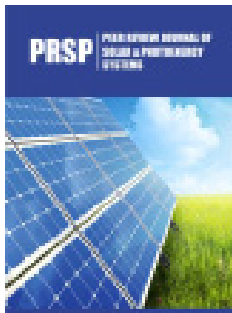


Carbon Neutrality with Agriculture in Thailand

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Abstract

This article explains how solar and biomass energy are used in Thailand's agriculture industry to attain carbon neutrality, which is a major goal of the country's greenhouse gas emission reduction strategy. It also emphasizes how using renewable energy technology in agriculture has positive effects on the environment and the economy.

Introduction

Thailand's agricultural sector has a significant impact on the environment in addition to the economy. This is because the agriculture sector uses a lot of energy and chemical fertilizers, and it burns agricultural residue after harvest, all of which have a significant impact on greenhouse gas emissions. As a result, transforming practices in agriculture to become carbon neutral is both extremely difficult and extremely necessary.

The Role of Agriculture in Thailand's Carbon Footprint

Thailand has large agricultural areas, making up 46.7% of the nation's total land area, or approximately 24 million hectares, according to the Office of Agricultural Economics, Ministry of Agriculture and Cooperatives' 2021 agricultural statistics. These areas are used for paddy fields, upland field crops, fruit and perennial trees, vegetables, cut flowers, ornamental plants, and others. This widespread agriculture technique adds a substantial amount to the nation's environmental emissions. Tractors and water pumps are just two examples of the agricultural equipment that this sector uses a lot of energy to run. In 2021, the sector's consumption of energy was 2234ktoe. Furthermore, the importation of chemical fertilizers for agricultural use totaled 4.1 million tons (valued at 103,205 million Thai baht), all of which considerably impacts the carbon footprint. Furthermore, farmers' post-harvest burning of agricultural residue adds significantly to greenhouse gas emissions and PM2.5 levels.

Thailand's Agricultural Potential for Solar and Biomass Energy

Solar energy the Department of Alternative Energy Development and Efficiency (DEDE)

Ministry of Energy, reported in "Thailand Alternative Energy Situation 202" that Thailand has a great potential for solar energy, which is advantageous for solar energy systems. Thailand currently has about 3,060 megawatts of solar power capacity, and annual production is rising steadily. The use of solar energy systems in many agricultural applications is made possible by the substantial solar energy potential. These applications include powering irrigation and water pumps to provide electricity for remote agricultural operations.

Biomass energy and agricultural residues management

Thailand's agriculture sector has a big chance to efficiently manage agricultural waste with the integration of biogas technology. Considering the large amounts of agricultural waste, such as crop residue and livestock waste, the use of biogas technology generates energy while reducing waste. These organic materials are converted into methane through anaerobic

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digestion, a crucial step in the generation of biogas and biofertilizer. Methane can be used to generate electricity or heat. Furthermore, this method yields a nutrient-rich digestate that functions well as a bio-fertilizer, reducing agricultural waste and fostering the development of a more sustainable agricultural system.

In accordance with Thailand's "carbon neutrality" policy, the strategy for decreasing greenhouse gas emissions from agriculture includes support for the use of renewable energy through the aforementioned developments. In addition, the application of biogas technology not only supports Thailand's goals for environmental and renewable energy, but it also expands the farming communities' economic potential in Thailand by lowering expenses related to managing agricultural waste and generating additional income.

Challenges in Implementing Renewable Energy for Carbon Neutrality in the Public Sector

Although there are encouraging trends in Thailand's usage of solar energy technology for agriculture, there are still major technological and economical obstacles to overcome. The primary challenges are the high cost of solar systems and the requirement for technical know-how in both design and installation. Because of these obstacles, the adoption and successful integration of renewable energy solutions must rely on support from the government.

In Thailand, the use of solar energy technologies for agriculture continues to expand in 2021 because of investments and regulations

from the government. This shows a dedication to strengthening the agricultural economy while appreciating the significance of this sector for the environment. In order to achieve the shift from conventional agriculture to a sustainable one that depends on renewable energy, policy assistance must be ongoing. In order to lead Thailand toward climate resilience and low emissions by 2050, Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS) integrates the use of renewable energy sources and agricultural waste management into the agricultural sector. Thailand's Nationally Determined Contributions (NDCs) aim to significantly reduce greenhouse gas emissions from baseline scenarios, and this regulation is a part of that commitment. In addition, the Prime Minister's National Energy Plan places a strong emphasis on developing sustainable energy in order to reach carbon neutrality by 2065-2070. The shift to renewable energy sources is given top priority in this framework, which also provides substantial support for solar and biomass energy projects that have direct applications to agricultural operations.

Conclusion

In Thailand, its attempts to become carbon neutral depend heavily on agriculture. The national energy policies and initiatives outlined in LT-LEDS must be aligned with conventional agricultural methods in order to achieve this goal. In particular, this shift requires the integration of solar energy technology.