

Waste for power generation: Prospective of an alternative clean energy consumption in Thailand

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Abstract

Waste-to-Energy is a challenging management in developing countries. There are many different technologies to generate electricity from wastes. However, reuse and recycling are first prioritized, however, some fraction of waste can be used as energy sources. The initial cost to generate electricity from solid waste incineration is prohibitively high due to the cost of advance technologies and the cost of equipment to control emissions. Another concern is that of social resistance of pollutants in solid waste incineration to generate electricity. Thailand is an agriculture-base country and has experiences in technologies to utilize waste as an electricity source. Biological biogas technology is suitable and cost effective in the management of organic waste including in animal manure waste, waste water in agricultural industrial-processes for electricity generation. There are increasingly interesting alternatives of biological waste technologies rather than in municipal solid waste incineration for electricity generation. This research studied in the existing technologies for electricity generated from waste, long term government policy, carbon dioxide reduction, electricity cost production and incentive investments for an alternative clean energy source in Thailand.

Keywords: Waste for electricity, Biological waste, Carbon dioxide reduction, Electricity cost, Incentive investment.

1. Introduction

From the government plan in increasing renewable as energy sources for electricity generation in 2015 called AEDP 2015-2036 is aiming to increase the share of renewable energy penetration in electricity generation in Thailand to 30%, which is equivalent to 19,635 MW by 2036, the AEDP plan [1] is expected to be integrated renewable energy in electricity generation increasing from 4,279 MW at the end of 2014 to 19,635 MW in 2036. Since Thailand is an agriculture-based country and with high solar irradiation potential, the sources of renewable capacity are highly projected to solar power (6,000 MW), and followed with biomass (5,570 MW), hydro power (3,282 MW), wind power (3,002 MW), biogas (600 MW), municipal solid waste (501 MW), and

electricity from energy crop (680 MW). The energy target for biogas and municipal solid waste is a challenging energy management of a sustainable development for the Thai government. The scheme of feed-in tariffs in 2015 for waste (landfill gas) is 5.60 Baht/kWh with the subsidiary of 10 years, and feed-in tariffs for biogas (from wastewater/waste products) is 3.76 Baht/kWh with the subsidiary for 20 years. However, the feed-in tariff scheme in Thailand has changed due to energy policy in each government. New renewable energy investors have to assure for long term electricity generation. This paper studies the costs for electricity generation from waste, including from municipal solid waste incineration, organic waste in animal manure waste, waste water in agricultural