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- To encourage researchers to identify significant research issues in identified areas, in the field of Science, Engineering, Technology and Management.
- To help dissemination of their work through publications in a journal or in the form of conference proceedings or books.
- To help them in getting feedback on their research work for improving the same and making them more relevant and meaningful, through collective efforts.
- To encourage regional and international communication and collaboration; promote professional interaction and lifelong learning; recognize outstanding contributions of individuals and organizations; encourage scholar researchers to pursue studies and careers in circuit branches and its applications.
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EDITORIAL

It is my proud privilege to welcome you all to the TheIRES International Conference at Zurich, Switzerland. I am happy to see the papers from all part of the world and some of the best paper published in this proceedings. This proceeding brings out the various Research papers from diverse areas of Science, Engineering, Technology and Management. This platform is intended to provide a platform for researchers, educators and professionals to present their discoveries and innovative practice and to explore future trends and applications in the field Science and Engineering. However, this conference will also provide a forum for dissemination of knowledge on both theoretical and applied research on the above said area with an ultimate aim to bridge the gap between these coherent disciplines of knowledge. Thus the forum accelerates the trend of development of technology for next generation. Our goal is to make the Conference proceedings useful and interesting to audiences involved in research in these areas, as well as to those involved in design, implementation and operation, to achieve the goal.

I once again give thanks to the Institute of Research and Journals, TheIIER, TheIRES for organizing this event in Zurich, Switzerland. I am sure the contributions by the authors shall add value to the research community. I also thank all the International Advisory members and Reviewers for making this event a Successful one.

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SOLID WASTE AS A SUSTAINABLE SOURCE OF ENERGY

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Abstract - This research aims to 1) to promote a sustainable solid waste management to local administrative organization and Governmental Offices including citizen 2) to enhance solid waste management in community by unpolluted incinerator and renew it to green power energy and also local administrative organization's or public land allocation to locate a municipal waste-to-energy plant in order to make it as a center of waste incinerator by collaboration with local administrative organization which are responsible for solid waste management. To operate the municipal waste-to-energy plant, it is required to have large waste logistics to prevent municipal garbage trucks from causing nuisance to people living in neighborhood of the plant and it is cost and time-effective.

Nowadays, waste quantity in Thailand significantly increase because of continuous country development and community expansion. Thailand as one of the top tourist destination has significant growth in economics and society which certainly comes with more waste. In many countries, there are sustainable waste management which are role model for local administrative organizations. They have technology which can be employed for waste disposal and sufficient waste-to-energy production. This is the example that waste-to-energy plant can sustainably address waste problem and operate in the community without causing any problem.

1. Environmental impact from using technology, quantity and component of waste, municipal capacity in waste collection, problems in community, expensive waste management system process and construction, complicated budget approval, complexity in local administrative management, waste management policy in each government authority are different. Therefore, if we can address these problems, we can achieve our goal in renewing waste to electricity. The targeted generating capacity is 323 MW. The advantage of waste-to-energy are cost-effective and reduce problem of waste management. However, there are some limitation for waste-to-energy such as protestation against waste-to-energy plant from people in neighborhood and expensive high technology waste transform process. Therefore, we should employ proper technology to deal with pollution and chemical substance from waste incinerator. Moreover, the ownership of waste are disputable, for example, the investor (local administrative organization) of waste-to-energy plant may not be the owner of waste so the process of interest allocation maybe delayed.

2. The government should support to standardize management system development for waste in community, hazardous waste from industries, infectious waste and hazardous waste from abroad. Moreover, they should improve relevant organizations and regulations as Department of Industrial Works has authority to issue industrial licenses while Pollution Control Department is responsible for pollution problems and all local Administrative Organizations are in charge of waste management in community but there is no specific authority which is responsible for waste management policy and system as a whole. Therefore, the Government should set up this authority to regulate waste management and consult other relevant organizations on waste management issues.

Index Terms - Alternative Energy, Waste, Sustainable, Energy

I. INTRODUCTION

Nowadays, the world is now facing severe energy crisis in which the crisis tends to be more and more intense. (Department of Alternative Energy Development and Efficiency 2014:3) And before 2030, the world will run out of energy and by 2050, we will enter into the lack of energy era.

When that day comes, the fuel and energy price will be exceedingly expensive and will severely affect the lifestyle and living cost of people all over the world. This is the reason why many countries are now interested in renewable energy derives from biogas which is the best choice of alternative energy regarding economic factor. (Department of Alternative Energy Development and Efficiency 2014: Online)

so, waste quantity in Thailand significantly increase because of continuous country development and community expansion. Thailand as one of the top tourist destination has significant growth in economics and society which certainly comes with more waste. In many countries, there are sustainable waste management which are role model for local administrative organizations. They have technology which can be employed for waste disposal and sufficient waste-to-energy production. This is the example that waste-to-energy plant can sustainably address waste problem and operate in the community without causing any problem.

In boundary-less digital world, countries are developing in various aspects such as economics, politics, society, and environment which comes with increasing electricity demand.

Thailand is one of the countries facing electricity power shortage. Therefore, alternative energy invention or exploring become vital. Every country support and focus on alternative energy more than ever in order to reduce petroleum oil consumption which its price has tendency to gradually increase.

Alternative energy is energy from fuel source which will never be used up such as biomass, renewable

energy, which can be reproduced in short time, for example, energy from firewood, chaff, bagasse, ethanol, biodiesel, water, sunlight, geothermal, wind, wave and waste. Alternative energy is green energy. Waste-to-energy is environment and community friendly energy. Waste-to-energy will be demanded from society. Waste-to-energy will be circulating energy which has waste as raw material that always emerges and will never be used up. Therefore, waste-to-energy will be alternative energy for Thailand in the future.

This municipal waste-to-energy plant (unpolluted incinerator and waste-to-energy plant) will be monitored by provincial administrative organization, municipal administrative organization and sub-district administrative organization which can be located in any neighborhood sub-district in order to be the center for waste transportation to the plant. Some local administrative organization is located far from the plant so it is required to have waste logistic management to reduce garbage truck problems.

The commercial unpolluted waste incinerator and waste-to-energy system consist of waste incinerator, steam system, electricity generator, air pollution control and ventilator. This system can incinerate 400-600 tons of waste per day. Waste transportation by garbage trucks will be weighted at the checkpoint where we know total weight of waste. Consequently, the waste will be remove from the truck to waste collection building which is designed to have closed system to prevent smell and waste water. This plant also has waste shredding process in order to reduce humidity and waste sorting system by heavy metal before passing the waste to incinerator process with temperature of 800 – 1,500 °C. In the meantime, incineration will produce heat at the temperature of 410 °C to boil 42 tons of water creating saturated steam more than 40 bar. which will be used to generate electricity later.

This plant also has waste collection system where waste will be stored without sorting process. This waste collection building can store waste up to 5,000 – 6,000 tons which is enough for 10 days (in case of machine maintenance).This waste collection building has RDF, shredding and humidity reduction system. Waste will be lifted by giant crane at the quantity of 3-5 tons a time and moved to incinerator. Waste water will be fermented as gas which will be used as fuel in incineration and produce electricity or will be treated and reused within the plant. With the advent of this technology, wastewater from the plant will be addressed. In the beginning of incineration process, it requires a little fuel to generate heat such as oil and gas. After that the system will circulate heat from incineration itself and employ as heat conductor.

Waste Pneumatic Incineration System creates oxygen integrating with waste fuel. This system burns Nitrogen Oxide (Nox) itself. It also has air and heat circulating which use up all toxic air in process as well as Continuous Emission Monitoring System [CEMS] so they can ensure that they do not pollute the air outside the plant. Heat in the incinerator at the temperature of 850 -1,000 °C with the weather outside the plant that can increase the incinerator temperature 300°C more so the incinerator temperature will be 1,000 – 1,500 °C which can incinerate all toxic gas and germs. It is also 24 hours monitored by computer except during machine maintenance which takes 10 days of every 3 months. However, they have waste collection building which can store waste up to 5,000 – 6,000 tons so they guarantee that there will not be any waste left behind outside the plant.

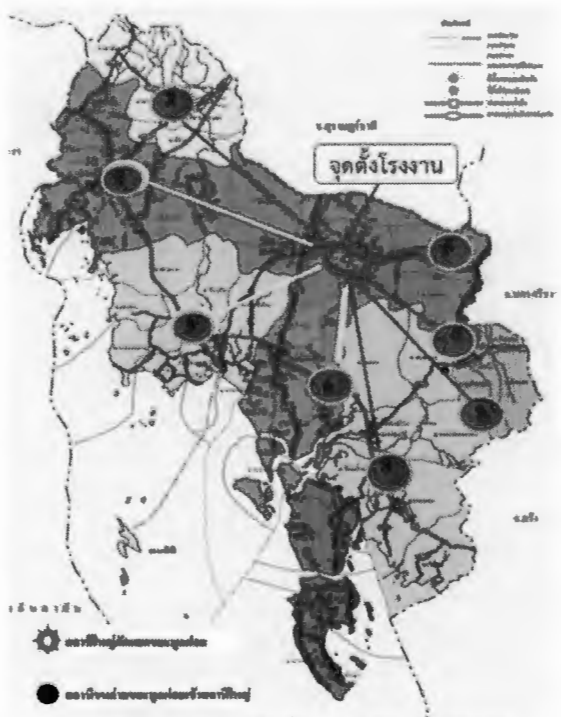
Daily insufficient amount of waste will not affect the system as they have waste storage up to 5,000 – 6,000 tons which is sufficiently reserved for fuel and according to the electricity authority, the municipal waste-to-energy plant cannot employ auxiliary fuel more than 25% of incinerated waste. Auxiliary fuel such as humus bought from farmer and rubble are good auxiliary fuel which can enhance electricity generating capacity.

Fuel transportation to the plant

In order to reduce amount of garbage trucks that might cause nuisance to people living in neighborhood of the plant, they set up large waste a pickup point in each district which will collect waste from garbage trucks from each local administrative authority. This approach is cost and time-effective.

II. PROCEDURE FOR PAPER SUBMISSION

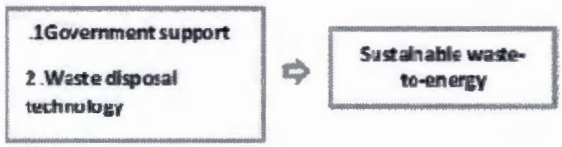
A. Review Stage



Waste pickup point which makes the process cost and time-effective Final Stage

III. PURPOSE OF RESEARCH

1. To promote a sustainable solid waste management among local administrative organization and Governmental Offices including citizen.
2. To enhance solid waste management in community by solid waste.



IV. RESEARCH FRAMEWORK

This article is the research and documentation collection. We conducted research based on relevant textbooks, research project regarding to electricity generation and waste-to-energy inside and outside Thailand, websites regarding to electricity generation and waste-to-energy in Thailand including in-depth interview from director of local administrative authority and relevant government authority. From the research, we can divide and connect variable which conform to purpose of research as follows;

V. RESULT AND DISCUSSION

Government support In the future, Thailand will not have enough energy supply to make economic grow sufficiently and the energy demand tends to be higher and higher. Besides, the reserved fuel which Thailand has is much lower than overall country's demand and this leads to the dependent on energy import which seriously affects the energy security of country.

For this reason, the government has launched policy to support the use of alternative energy and this policy is set to be public policy to solve this significant problem by raising energy development plan to motivate people to use energy concernedly and will finally lead to the sustainable sufficiency of energy. This plan and policy will create and maintain energy security of the country due to the fact that we can produce energy on our own and finally reduce the risk from energy import.

The Government should create incentive for investor by increase Adder from 3.50 baht/unit to 5.00 baht/unit or change to FIT at 8.00 baht/unit in period of 25 years. As waste incineration requires high technology and large capital investment, the Government should build incentive for private sector to invest in this scheme which help the Government to save budget. Moreover, the process can be delay, in case the local administrative authority is responsible for this scheme as they have complicated process and regulations.

In addition, the Government should reduce license processing steps for municipal waste-to-energy plant as it is relevant to many governmental authorities such as Ministry of Interior (local administrative authority collects waste), Ministry of Natural Resources and Environment (Pollution Control Department), Ministry of Industry (Department of Industrial Works – a license issuer) and Ministry of Energy (monitor sale and purchase of electricity) which is troublesome for license applicant. The Government should set up One-Stop-Service to attract investor from private sector.

Moreover, Board of Investor (BOI) should be more open and facilitate procedure with paperwork and expand investment period from 8 years to 15 years as the investment with high technology requires large capital investments. The investment loan installment is usually longer than 15 years so they should promote the business according to the loan installment period.

VI. WASTE DISPOSAL TECHNOLOGY

Nowadays, we have advance technology so we should use it to address waste disposal problem such as seeking proper machine and technology which does not cause any damage but sustain and develop the environment.

Example

The proper technology for waste disposal should have capacity at 300-600 tons a day and can incinerate and employ heat to produce electricity at 5.5-9.5 MW and is able to generate electricity to local electricity authority at 4-8 MW as green reserved energy for Thailand. The integrated waste disposal 1) should be responsible and owned by local administrative authority. That local administrative authority will be in charge of waste collection for the quantity of 300-600 tons/day. The local administrative authority selection will base on authority's ability which can either be provincial administrative authority, municipal administrative authority or district administrative authority. The authority should have 50 – 60 rai to set up power plant and should have existing waste landfill 2) The budget used to build the power plant should be provided by the Government and investor from private sector and local administrative authority will be responsible for waste collection.

People's Participation

Waste problem in Thailand becoming a huge concern resulting from increase of population and expansion of community. In Thailand, we dispose waste by using waste landfill or improper incineration which cause problem to community in neighborhood such as smell and creating breeding source for infectious disease carrier insects. Moreover, wastewater from landfill pollute natural water source. At the moment, there are many water source in many areas that cannot be used as it is too polluted causing health problem to people and also global warming which resulting from waste piling up that creates Methane. In addition, garbage trucks passing in the areas and large amount of waste landfill can cause nuisance for people that they could possibly protest against the waste landfill. There are coming problems that the Government should address

immediately by issuing policy or plan to solve this overflow waste.

Therefore, the idea of municipal waste-to-energy plant to dispose despicable waste into power green energy for the country helps the country to save money from buying fuel from other countries such as oil and gas etc. The municipal waste-to-energy plant is the sustainable and integrated approach to solve waste problem. Moreover, it does not cause any problem. Local administrative authority can generate income from electricity tax and spend that money on education, sport, religious and public service development for people and on Clean Energy Fund to support those who suffer from power plant operation.

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