

# Management of Waste Disposal Systems in Nonthaburi Provincial Administration Organization

Nonthaburi Provincial Administration Organization  
Environmentalist, Professional level  
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## I. General information

Nonthaburi has a total area of 622.38 square kilometers (2018) with a population of 1,246,295 people. The administrative area is divided into 6 districts with 46 local administrative organizations consisting of 1 Provincial Administration Organization, 19 municipalities and 26 sub-district Administration organizations. Nonthaburi Province is located on the banks of the Chao Phraya River. The Chao Phraya River is divided into 2 parts: the east and the west and most surrounding areas are plains. Nonthaburi's territory is in contact with Bangkok, Pathum Thani and Nakhon Pathom provinces.

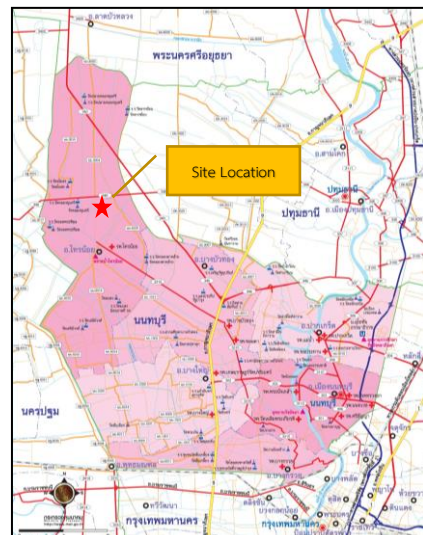
From the growth and expansion of the city, the provincial economy (especially consumption and trade) is growing and expanding very fast. This has meant an increase of housing estates and residences which therefore leads to environmental problems such as waste water, increasing amounts of waste, traffic congestion and air pollution problems.

Nonthaburi has set a key target to be an environmentally friendly city by focusing on developing and solving problems on 3 issues:

- Creating a Green Environment
- Combatting city pollution
- Effectively managing waste

This way we aim to achieve our target to ensure that “Nonthaburi Is Clean” and is an environmentally friendly place to live and work in.

Nonthaburi Provincial Administration Organization (NPAO) Assigned to be the primary unit responsible for overseeing and managing the waste disposal system. With waste disposal service center in NPAO providing solid waste disposal services to all 45 local government organizations in Nonthaburi Province. Which currently uses sanitary landfill methods with an area of approximately 500 rai, located in the area of Moo 2,8 Khlong Kwang District, Sai Noi District, Nonthaburi Province



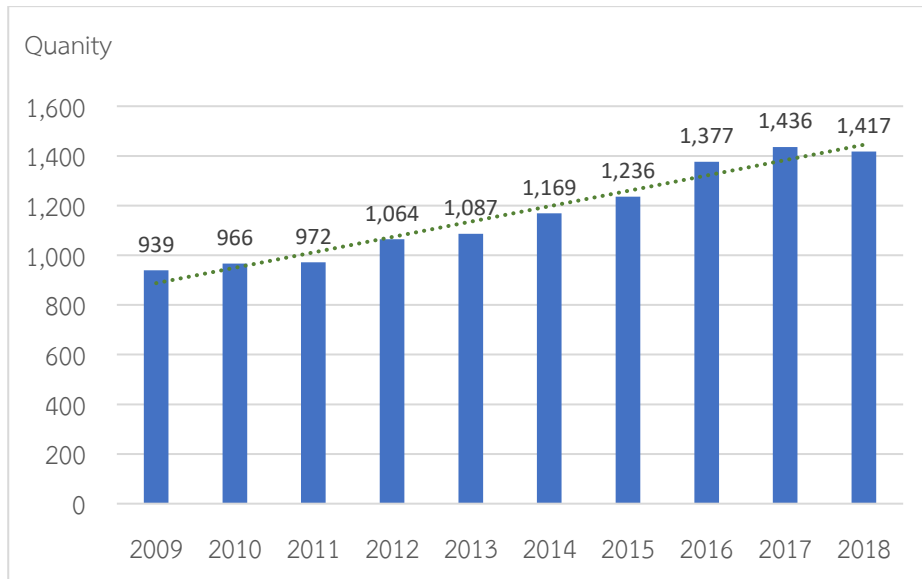
Location of NPAO Waste Disposal Site

## II. Situation of Waste Management in Nonthaburi Province

### a) Quantity and properties

The amount of waste recorded before disposal in the landfill area of NPAO in the year 2018 is 1,506 tons/day consisting of 1,436 tons/day of waste in Nonthaburi province and 70 tons/day of waste outside Nonthaburi province.

The increase of waste from 2009 to 2018 has an average increase rate of 5.5 percentage, with the rate of waste per capita of 1.15 kg/person/day. The average annual amount of waste between 2009 and 2018 is shown in below.



Source : NPAO, 2019

Figure 2 The average annual amount of Waste between 2009 and 2018

Waste characteristics (from the analysis of the composition of waste in 2007) show that 40.55% are food scraps and organic waste, followed by plastics 23.23%, metal 5.34%, toxic/ hazardous substances (for example flashlight, electric bulb) 0.31 percent, as per the detailed chart below.

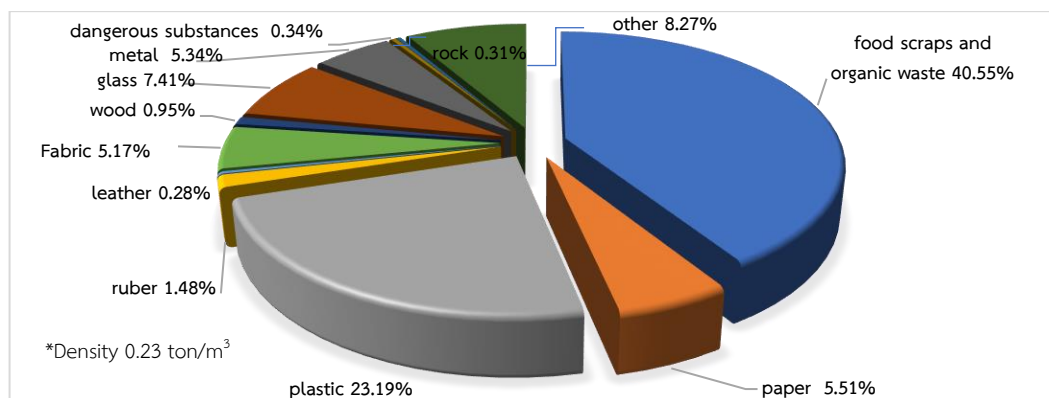


Figure 2 Physical properties of solid waste

#### b) Waste management model

Nonthaburi Province has made a memorandum of agreement between the local government organizations within the province, a total of 3 copies (latest on 24 September 2019), with the cooperation being divided into 2 parts which are;

(1) NPAO is responsible for developing the waste disposal system and providing waste disposal services. The plan is to dispose of waste at the rate of 200 baht/ton by implementing a waste disposal system using Pyrolysis and Gasification technology. This is planned to be completed and ready for operation by the year 2024 (currently the sanitary landfill charges are at the rate of 150 baht/ton). By deducting the income from the waste disposal service for Khlong Kwang Sub-district Administration Organization, which is the project location of 15 baht/ton

(2) Every local government organization in Nonthaburi has the duty to collect waste in their own area and deliver to the waste management system of NPAO by paying disposal fees to NPAO at a rate of 200 baht/ton



Figure 3 NPAO's Sanitary landfill Site

#### C) Waste Separation

Nonthaburi has set a policy to reduce waste separation by campaigning to separate the source of waste by specifying the separation of waste into 4 types which are (1) recyclable waste (2) compostable waste (3) general waste and (4) hazardous waste. NPAO is responsible for collection of such hazardous waste from local government In Nonthaburi and disposed of by a licensed private organization.

For infectious waste NPAO has an infectious waste disposal system using Rotary Kiln technology. The phase I project can support 7.2 tons/day of infectious waste and the Phase II project can handle 9.6 tons/day of infectious waste, which is sufficient for management of all infectious waste occurring in Nonthaburi Province.

## II. Management of Waste disposal systems of NPAO

The waste disposal center of NPAO has been open since 2004 and consists of waste disposal services, infectious waste disposal system sewage disposal system, hazardous waste storage, waste separation and RDF electricity plants, waste fuel and electricity generating plants from LFG. etc.

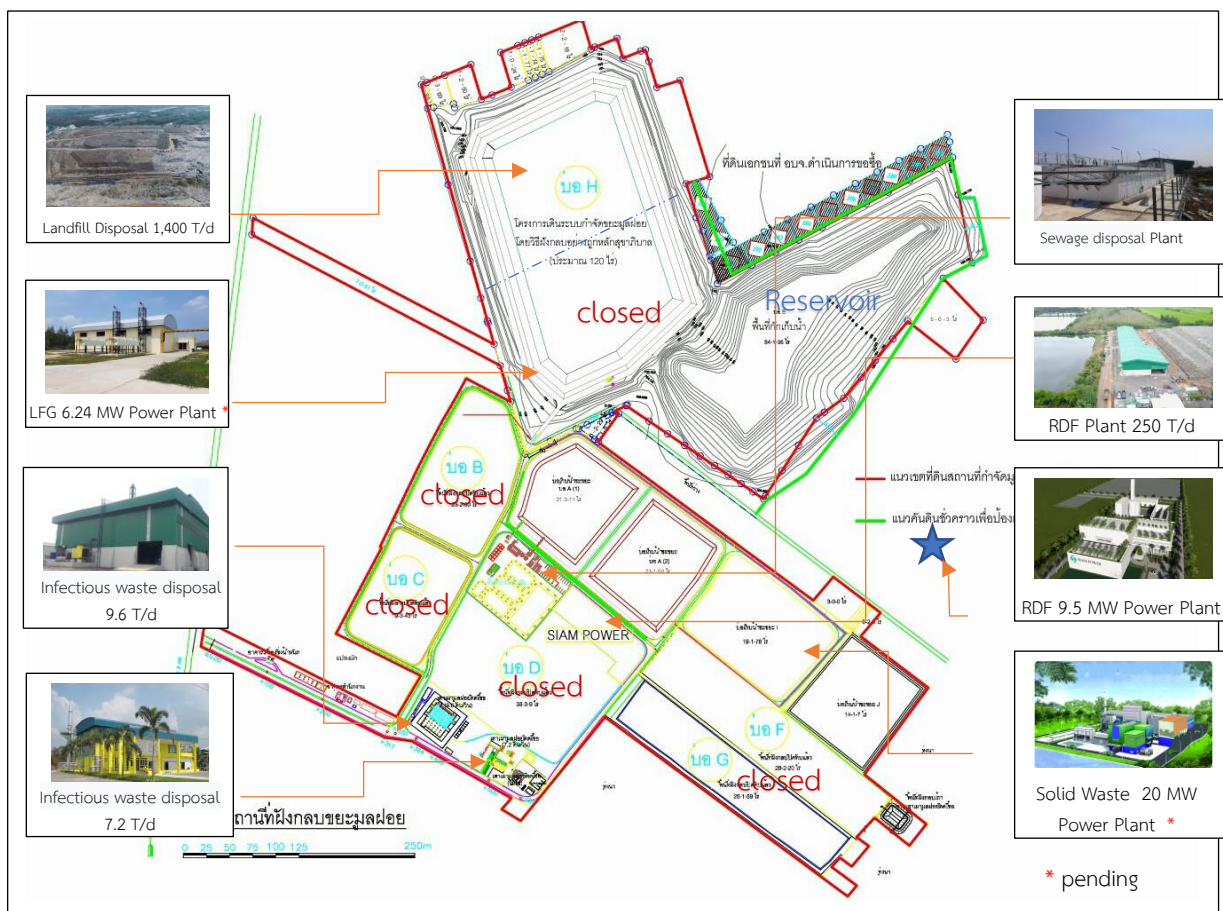


Figure 2 Project within the waste disposal center of the NPAO

NPAO has been using sanitary landfill operations since 2005 by employing the private contractor at the annual rate of 200 baht per ton, while the NPAO collects fees from local government organizations at the rate of 150 baht/ton. NPAO pays to local government organizations for the central waste disposal action.

Allowing the private sector to operate the waste disposal business on behalf of NPAO, with the private investors and the entire project management themselves currently, there are 3 projects in this type of public private partnership (PPP) which are

(1) A project for private investment to construct and manage a waste disposal system for NPAO. This project has been implemented since 2006 by using pyrolysis and gasification technology. It is used to dispose of waste instead of landfill systems in accordance with sanitation to suit the amount.

The NPAO has implemented a study and will prepare an environmental impact assessment report on waste and the urbanized area of Nonthaburi. This will include the feasibility of investment under Private Investment In State Undertaking Act, B.E. 2535 and 2556, as the investment value is higher than 1,000 million baht (regulations for private investment at that time).

At present, the NPAO has completed bidding for the project and has announced the results of the private selection of the project. Super Earth Energy 8 company limited are the winning bidders. The cabinet has approved the selection results and the draft investment contract on 7 October 2019, however, as there are still issues regarding the next steps after signing the agreement because the project will require Implementation of Public-Private partnership Act, B.E. 2562 or under Act on the Maintenance of the Cleanliness and Orderliness of the Country, B.E. 2560, the Ministry of the Interior shall consult with the Ministry of Finance and the joint venture between the government and private policy committee before proceeding into the contract signing process. It is expected that these discussions will be completed by FEB. 2020 and the project is expected to proceed as planned and project construction will be completed and open for service during 2024. For this project, when construction is completed, it will be able to support waste from all local government organizations in Nonthaburi Province. The plant will process more than 1,000 tons/day and can produce electricity of at least 20 MW.

(2) A construction and management project for using waste from the old landfill of the NPAO to produce fuel for electricity production. By allowing the private sector to invest in the project (proceeding in accordance to the Notification of the Ministry of Interior on Waste Management B.E. 2560). This Quick Win Project will use the old landfills that are buried in the B, C, D, F and G ponds, covering an area of 133 rai. With a total waste of about 3 million tons, which is not currently being used, this waste will be excavated and unloaded to produce waste fuel RDF, sent to waste disposal system and converted into electrical energy with an electricity capacity 9.5 MW. In accordance with the agreement, the private investor will return the empty space that has been excavated and moved to NPAO in order to be used to manage the landfill pond areas. The NPAO has already entered into an agreement with Siam Power Company Limited and construction is has begun. The project is expected to be complete and ready for operation in November 2020.

(3) A construction and management project for using gas from landfill. On the old landfill, NPAO allow the private sector to participate in the project to find benefits from using gas in the landfill area of the H pond, a total area of 50 rai which has been closed and unused since 2015. The installation of traps and gas collection will clean and adjust the methane concentration before transfer to the electricity distribution system with a total capacity of 6.24 MW. This project was implemented in accordance with the Notification of the Ministry of Interior on Waste Management

B.E. 2560 under the disposal project. Waste to produce electrical energy and potential power system data are ready for operation in the first phase (Quick Win Project). Implementation of this project will help support Thailand's greenhouse gas reduction policy. Because methane gas, which is a greenhouse gas, is burned and converted into heat energy to produce blue energy. Additionally, odors caused by the waste decomposition process will be treated and incinerated in the process of using gas from landfills. The project is expected to be complete and ready for operation in February 2020.

### III. Management of Plastic waste

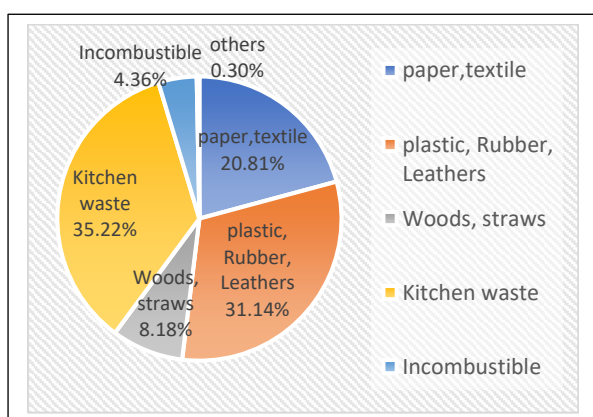
Plastic waste management in Nonthaburi is focused on the implementation of the "Clean Province" policy which is a campaign to reduce and sort waste through public relations (3R policy) to reduce and stop the use of plastic bags.

In the years 2017-2019, the amount of waste disposed of at the disposal center of NPAO has increased. In a 2019 report of 38 local government organizations in Nonthaburi Province who are participating in the project, the proportion of waste that is separated consists of:

- general waste 97.47%
- organic waste 1.36%
- recyclable waste 1.09%
- hazardous waste 0.08%

In the amount of waste that is sorted before being collected for disposal at the waste disposal center, only 0.04% is plastic waste. This therefore only a very small amount that has been taken out of the system.

During our waste disposal process, the waste separation staff will sort plastic waste such as plastic bags, water bottles etc. Such sorted items are exported for sale outside the area in the amount of 10 tons/day (from 1,400 ton/day) representing a percentage 0.21 of the amount of waste to disposal.



In the year 2019, in the total amount of waste disposed of, 31.14% was classified as plastic, rubber and leather waste. Compared with the data analyzed in 2007, when the total number of plastic, rubber and leather waste is about 24.95%, the total proportion is increased by 6.19%.

Figure 4 Physical properties of solid waste, 2019

According to the data, though it may be seem that the number of plastic, rubber, and leather waste has slightly increased from the previous year, NPAO views that the waste reduction and segregation policy is an ongoing process in which every stakeholders involving in the waste , particularly plastic waste, management needs to be emphasized and driven by, As Nonthaburi is considered as a suburb of Bangkok which means is has a high population growth rate as well as the economic growth. These two factors are the examples that become the main challenges for NPAO's capacity in dealing with plastic waste, However, NPAO is committed to tackle with the plastic waste by using the advance technology. In 2024, the waste treatment plant will be established and become the NPAO's waste to energy. Also the waste treatment plant an appropriated separation process (direct melting system) because it is more effective and efficient. In addition, fortunately, at the beginning of this year the Thai government has publicly announced to ban a single-used plastic bags. This can be a great opportunity for not only Nonthaburi but also Thailand's plastic waste satiation as a whole to achieve the success of plastic waste management. Moreover, rather investing another waste disposal plant, NPAO will be able to spend money on raising awareness to the people especially the young generation.

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