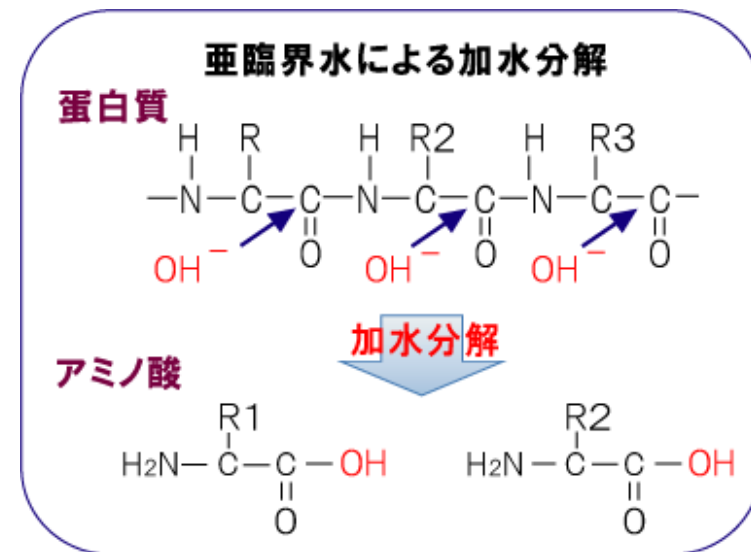
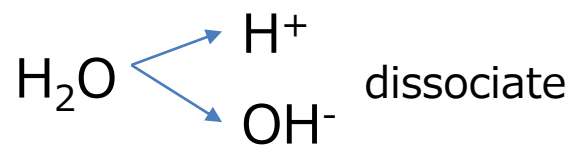


1. What is subcritical water treatment?
2. What can it do?
3. What happens to residues?
4. Flowchart
5. Installation Conditions, Space

## ① Definition of Subcritical Water Treatment

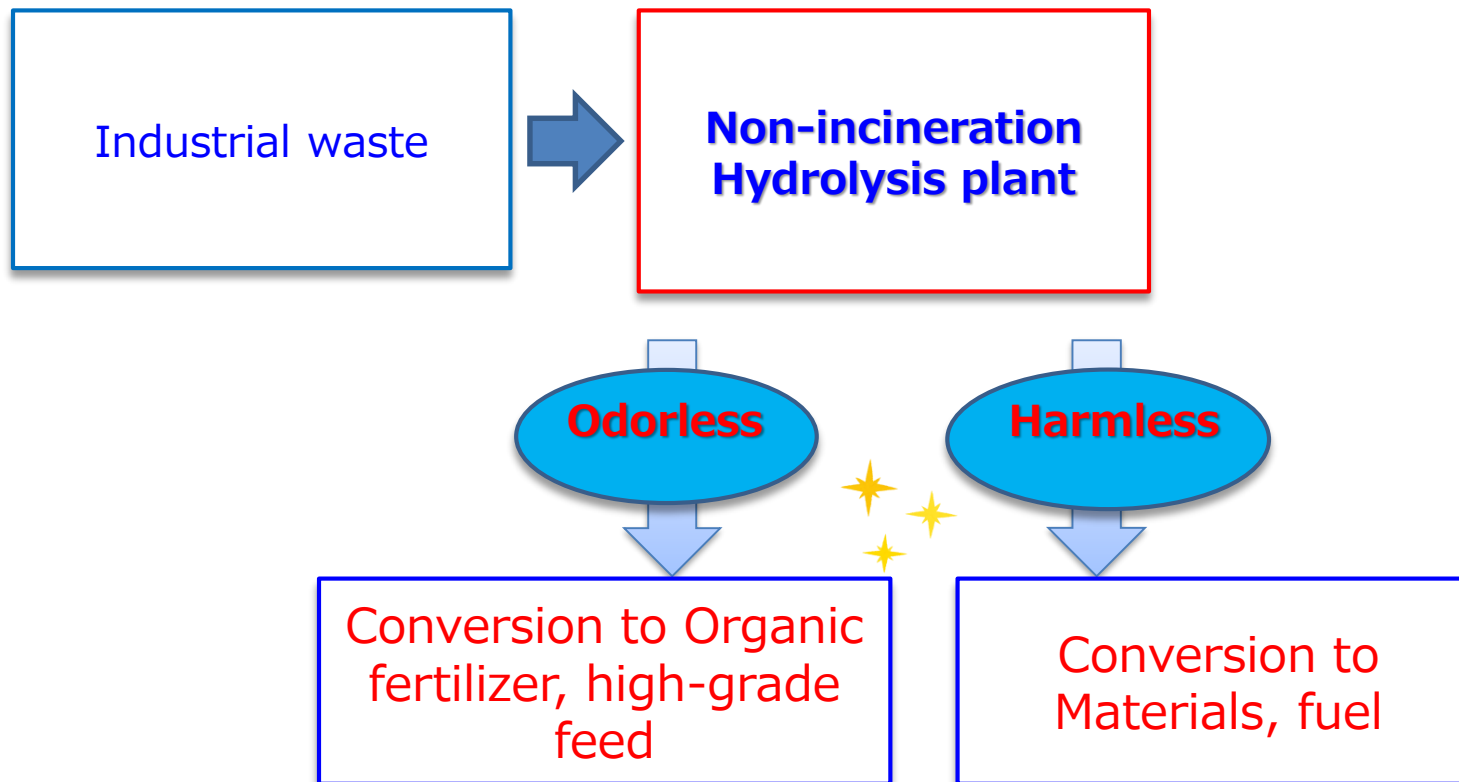
The principle of HYDROLYSIS resembles treating waste in a giant pressure cooker. Hydrolysis treatment is a process whereby organic waste is detoxified and depolymerized by balancing pressure with temperature.

At subcritical water, by maintaining temperature at pre-boiling point, water molecules that are about to evaporate oscillate violently and through repeated collision, the molecular bond of treated material is ionized or electrolytically dissociated.



## ② What can it do?

Maintaining a high-temperature, high-pressure condition results in ionization and with it decomposition and volume reduction, and through high pressure, detoxification can be achieved. This process does not use combustion so there is no “dioxin” and “CO<sub>2</sub>” generated, and residues can be converted into valuable products such as energy, fertilizer and feeds.



③ What happens to residues?

This is also explained in ②

## Processed Material

Processed food residue (marine, livestock, crop residues)

Raw waste, sewage sludge, livestock excrement)

Plastic waste

Medical waste, PCB

## Generated Product

⇒ Livestock feeds

⇒ Fertilizer, fuel

⇒ Fuel

⇒ After detoxifying, it can be converted into construction materials

- Food residue
- Crop residues
- Marine product waste

Nutritional ingredients remain even after sterilization treatment, and depolymerized feeds contribute to the growth of livestock.

**Livestock Feed**

- Raw waste from daily living
- Sewage sludge
- Livestock excrement
- Marine product waste

We will contribute to the promotion of agriculture that revives soil through use of environment-friendly "fertilizer / compost."

**Fertilizer/Compost**

- Wood-based residues
- Rubber-based waste
- Plastic-based waste

Wood-based residues can easily be liquefied. This process can solve illegal dumping of waste tires and similar matter by converting them into energy.

**Ethanol**

- Medical waste
- Incineration ash
- Fly ash

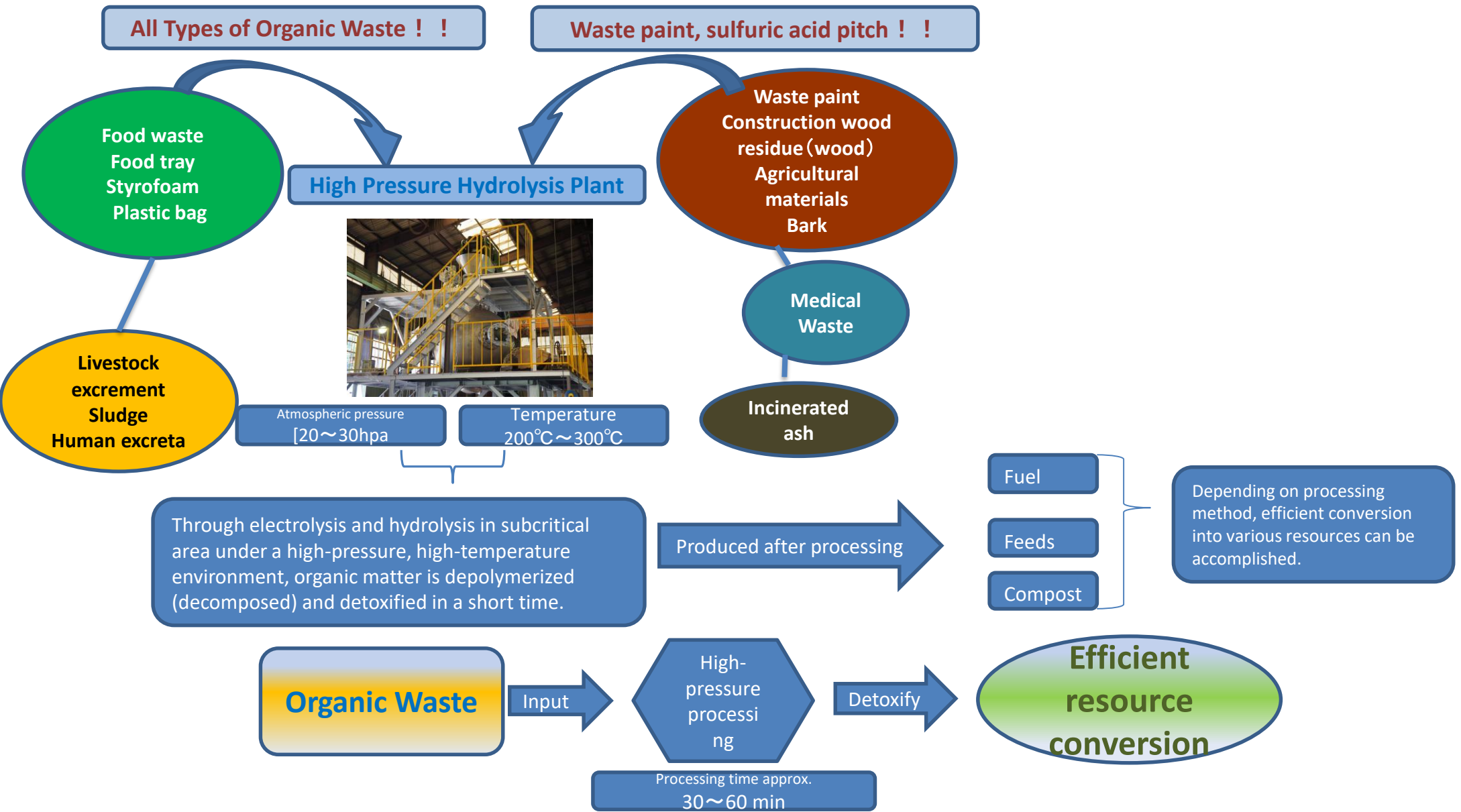
Harmful heavy metal residues discharged by incineration and melting can be detoxified, and pathogenic bacteria from medical waste can be sterilized and safely recycled as construction materials.

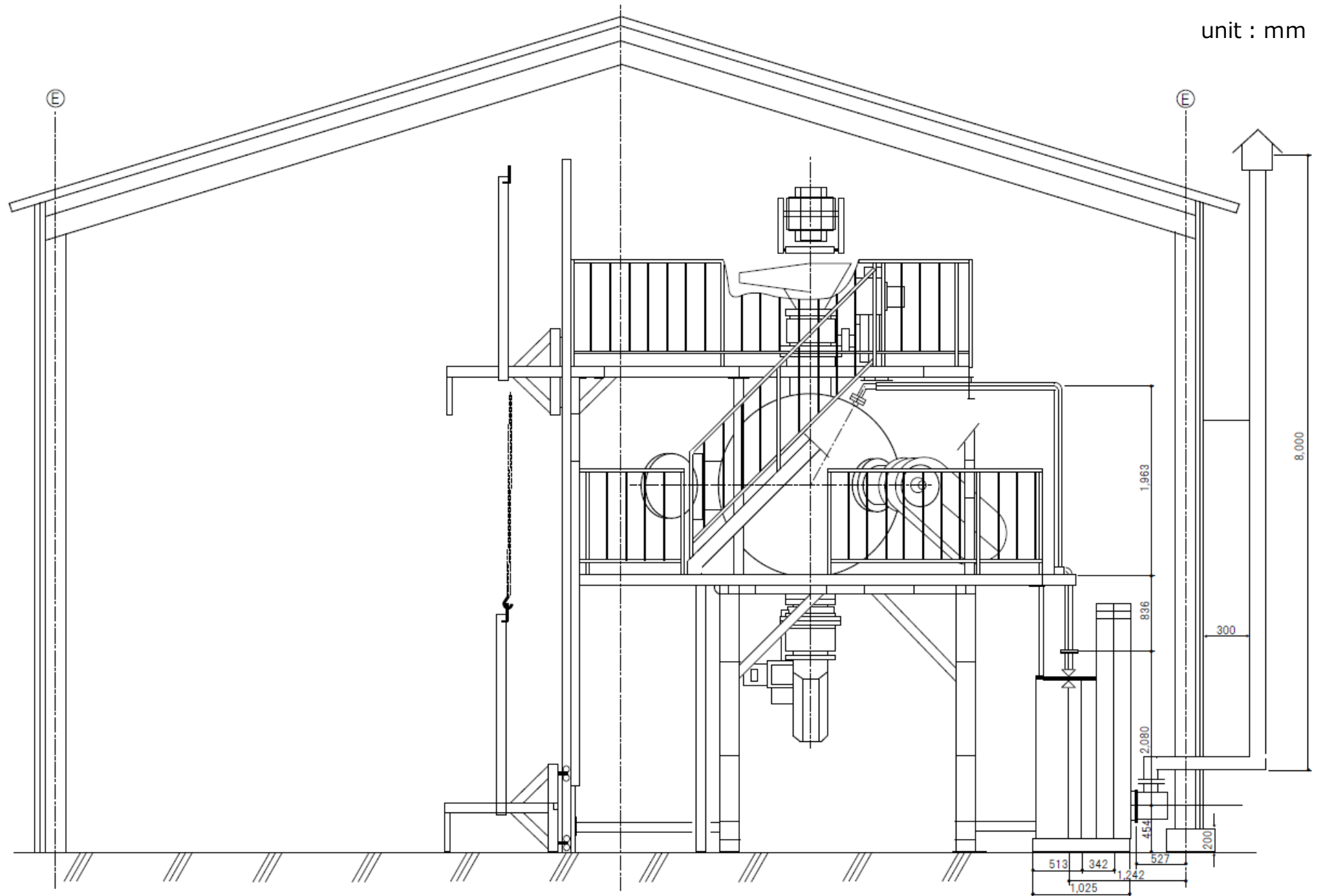
**Building Materials**

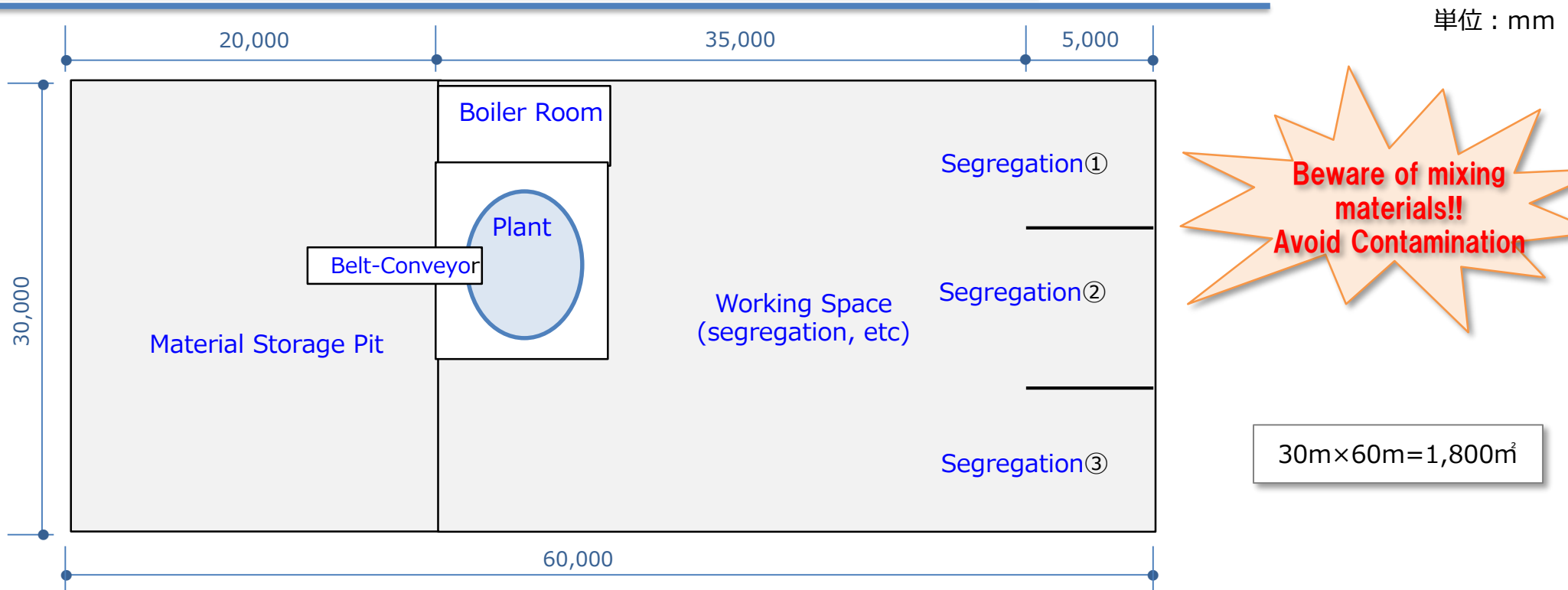
◆“Medical waste treatment” by way of hydrolysis treatment has been approved. (JAPAN)

3. Cases concerning treatment of infectious waste  
 【 Case 】 There is a high pressure steam sterilization processing technology that puts infectious industrial waste in a pressure vessel on which steam is applied at constant temperature and pressure for a certain time, and the output after sterilization treatment is disposed as an industrial waste. A license application was filed for special controlled industrial waste disposal business (infectious waste) to allow the contracting of disposal of such industrial waste to a licensed disposal contractor.  
 【 Action 】 Based on “Installation and Maintenance Management Guideline of Industrial Waste Facility” prepared by the city, prior consultation was conducted in regard to the installation of such sterilization facility. The documents submitted by the treatment facility were examined, but there was difficulty determining if proper sterilization could be done while the waste material is placed inside a vessel or bag. After reviewing the sterilization test results and the like, it was confirmed that sterilization treatment can be performed properly using the treatment facility, so it granted the special controlled industrial waste disposal business permission.

## ④ Flowchart







- The condition of accumulated medical waste is unclear, but it is assumed to be intermixed with waste that have hypodermic needles and blood in them.
  - Since there is a serious danger of infection, detoxification by mixed-waste treatment is recommended.
  - After treatment, it is already sterilized so it is safe to collect metallic objects by magnet or segregate them manually.
- If the present collection method does not segregate waste within the medical facility, thorough segregation as follows makes possible safe and beneficial treatment.
  - segregation of metallic objects such as hypodermic needles → after sterilization, recycling of metals
  - segregation of waste plastic waste → generation of ethanol
  - segregation of blood-stained waste that is potentially infectious → after sterilization, landfilling treatment

If the above treatment is desirable, please refer to Layout ② in the next page.



# ES!E Frequency of Hydrolysis Treatment and Fuel Cost Estimation

MODEL	CAPACITY	Proc. Vol.	Treatment Vol per Batch	No. Of Treatment Batches	Fuel Cost per Batch	Total Fuel Cost	Monthly Fuel Cost	Annual Fuel Cost
ESP-3S	3m <sup>3</sup>	60t	2.5t	24 times	₱1,460	₱35,000	₱874,000	₱10,500,000
ESP-4.5S	4.5m <sup>3</sup>		3.5t	17 times	₱2,190	₱37,200	₱929,000	₱11,150,000
ESP-7S	7m <sup>3</sup>		6t	10 times	₱3,400	₱34,000	₱850,000	₱10,200,000
ESP-3W	3m <sup>3</sup> ×3m <sup>3</sup>		2.5t×2.5t	12 times	₱1,920	₱35,000	₱874,000	₱10,500,000
ESP-4.5W	4.5m <sup>3</sup> ×4.5m <sup>3</sup>		3.5t×3.5t	9 times	₱4,370	₱39,500	₱984,000	₱11,800,000
ESP-7W	7m <sup>3</sup> ×7m <sup>3</sup>		6t×6t	5 times	₱6,800	₱34,000	₱850,000	₱10,200,000

- If one has 8 working hours within 9 operating hours including break time, at 90 min per batch (treatment frequency), it is possible to perform treatment of 10 times in 1 day.
- The monthly and annual fuel cost estimate assumes that treatment has been performed. (As treatment frequency estimate, fractional treatment quantity would entail the same cost).
- The power needed to operate the belt conveyor boiler which inputs treatment raw materials is to be added to the fuel cost.

## Treatment Cost & Profit Computation (Sample)

- 60t/day : ¥480,000
- Month (25 dasy) Treatment Cost : ¥12,000,000
- Annual Treatment Cost : ¥144,000,000