

# 26<sup>th</sup> World Gas Conference

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Biogas business strategy of Osaka Gas  
“Developing of compact biogas production system”

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# Contents

- Efficient use of biomass potential in Japan
- Our approach increasing biogas use
- Development of technologies to increase biogas production
- Development of compact biogas production system
- Conclusions

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# Efficient use of biomass potential in Japan

## Japanese status about renewable energy

- In Japan, energy supplier are required to promote renewable energy by laws.
  - The treatment cost of organic waste is big problem in many industries.
- ⇒ Increasing the renewable energy use is needed.

## Energy use of biomass potential in Japan

- 11 million tons-carbon (10 Gm<sup>3</sup>/y city gas) of biomass is set as a goal for energy use by 2020.
- One of the most synergetic renewable energy for gas companies is biogas.

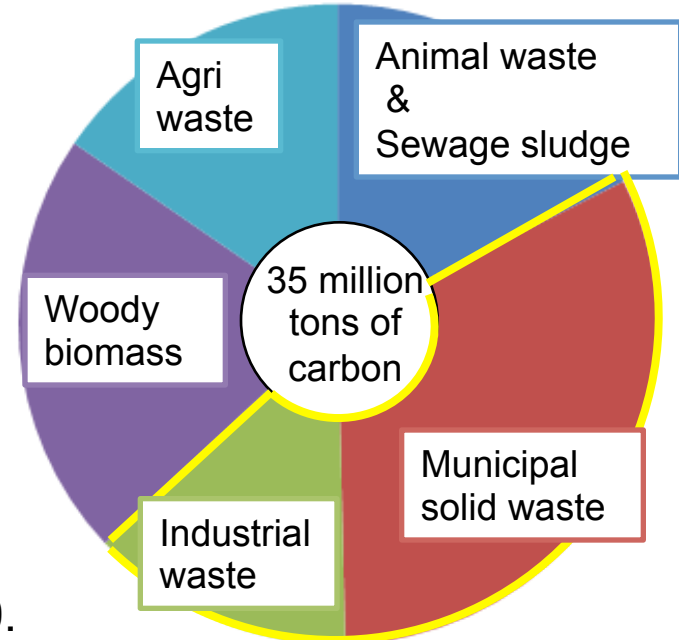


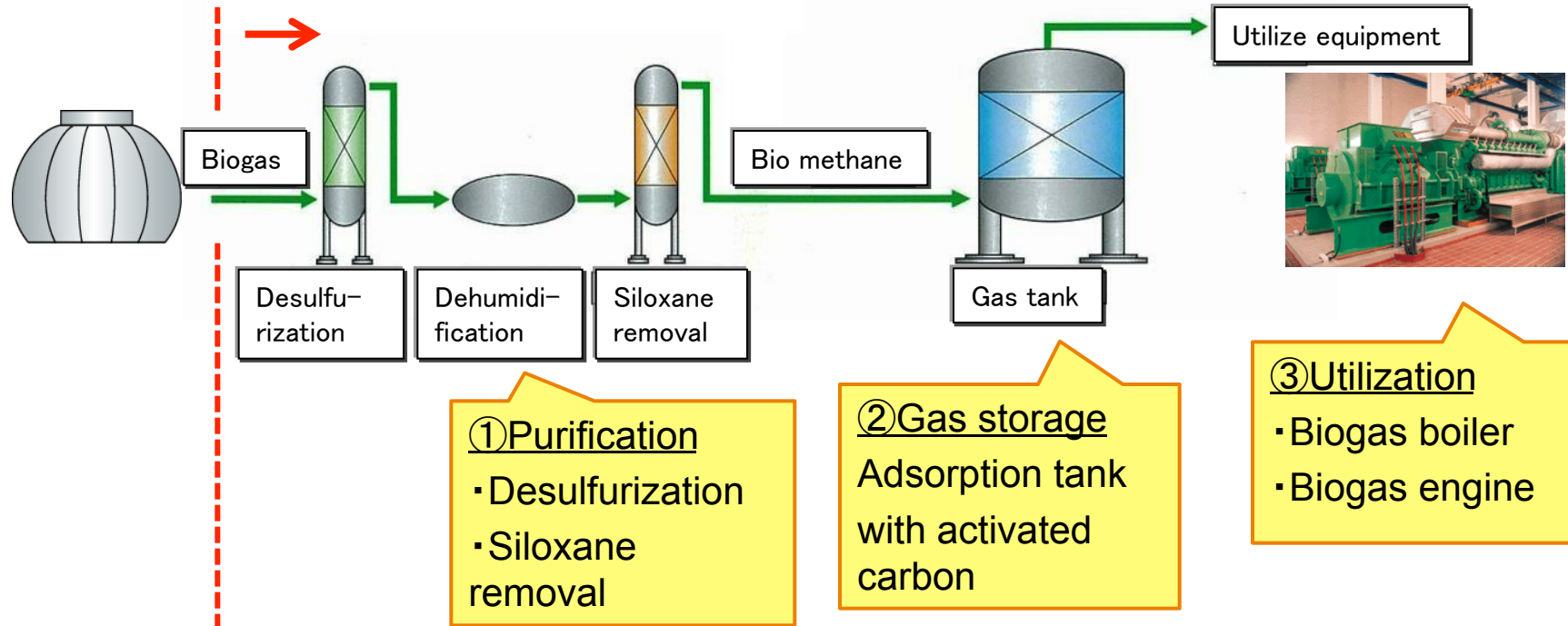
Fig. Efficient use of biomass potential in Japan

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# Our past approach increasing biogas use

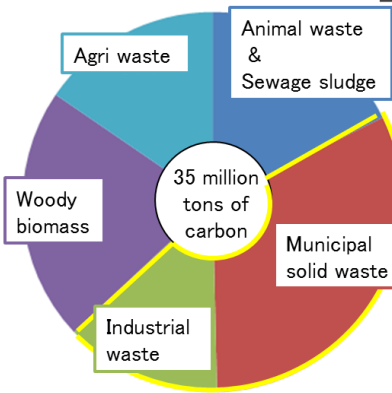
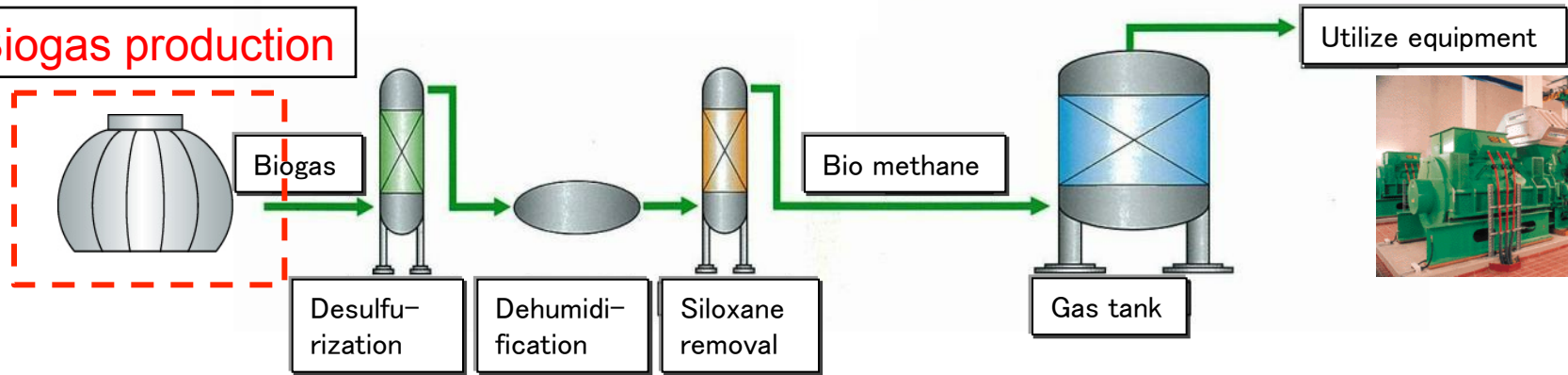
## Development of using already produced biogas



# Our new approach increasing biogas use

## Development of biogas production technologies

### Biogas production



Many of Animal waste & sewage sludge are already used as biogas

Our target: the municipal solid waste & industrial waste

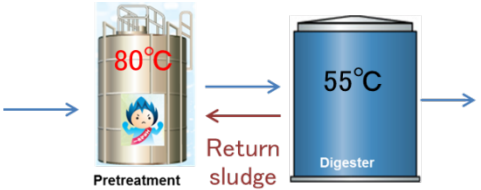
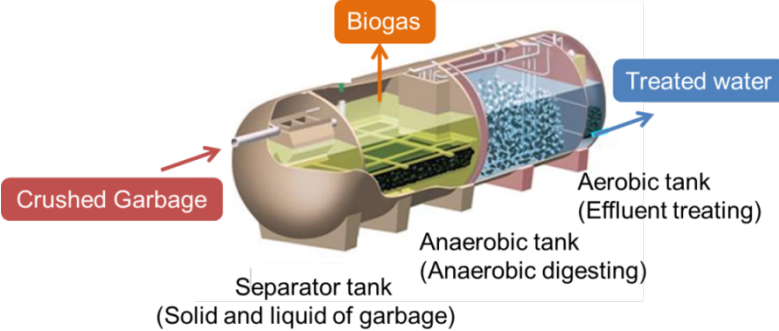
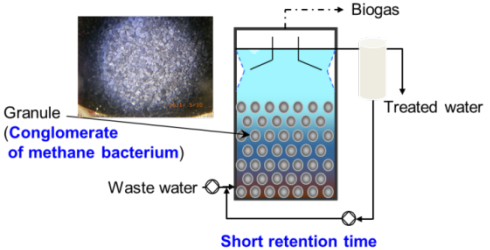
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# Our technologies increasing biogas production

No biogas production system is existing for small scale facilities.

	<p><b>【Large scale】</b> ⇒Expansion Application field</p>	<p><b>【Small scale】</b> ⇒No system is existing</p>
<p>Municipal Solid waste</p>	<p><b>Hyper-thermophilic hydrolysis</b></p> 	<p><b>Compact biogas production system</b></p> 
<p>Industrial waste</p>	<p><b>UASB (for wastewater)</b></p> 	

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# Biogas production system for small scale facilities

- In 2010, only 27% of food waste and garbage is recycled in Japan.
  - The number of customers who discharge less than 1 ton/d (=365 ton/y) are the majority.
- ⇒ **Development of the biogas production system for small scale facilities is necessary.**

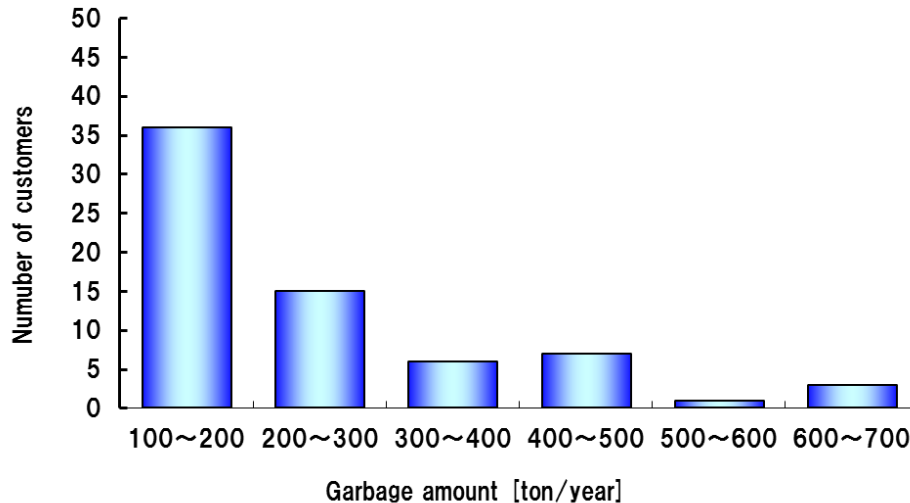


Fig. Distribution of number of customers for each garbage in A-city.

# What's compact biogas production system?

## Concept

Development low cost biogas production system

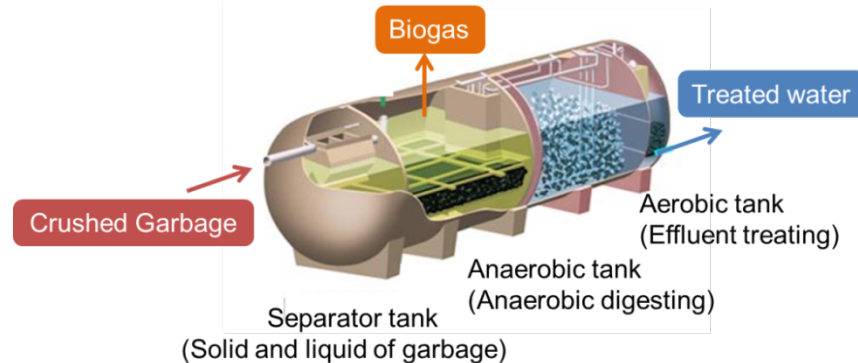
## Problem

- Initial cost
- Running cost
- Treatment of digested fluid



## Solution

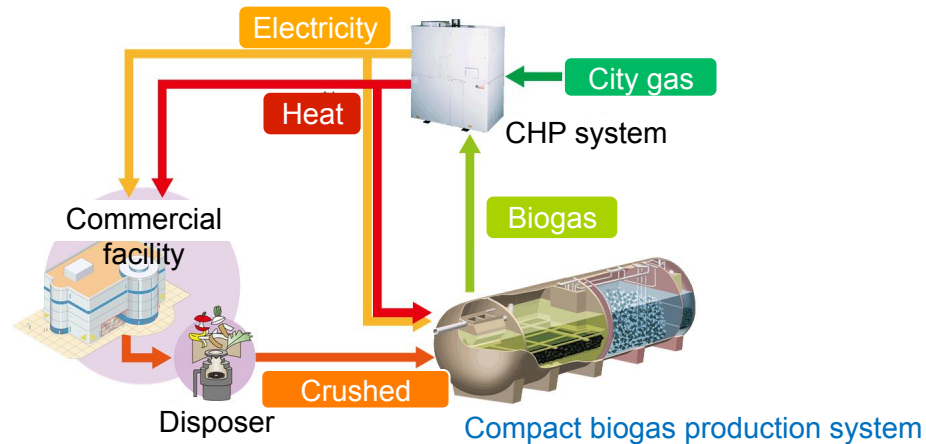
- Septic tank design
- Integrating biogas production and effluent solution



# Utilization of this system on-site.

## City gas sales expansion with this system

- In small scale facilities, the amount of generated biogas is small and varying in volume and quality.  
⇒ Heat and electricity can be generated efficiently through mixed combustion of biogas and city gas.
- The excess of heat and electricity are used in the system installation site.

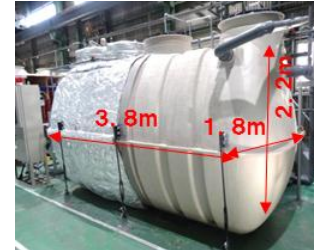


# Environmental assessment

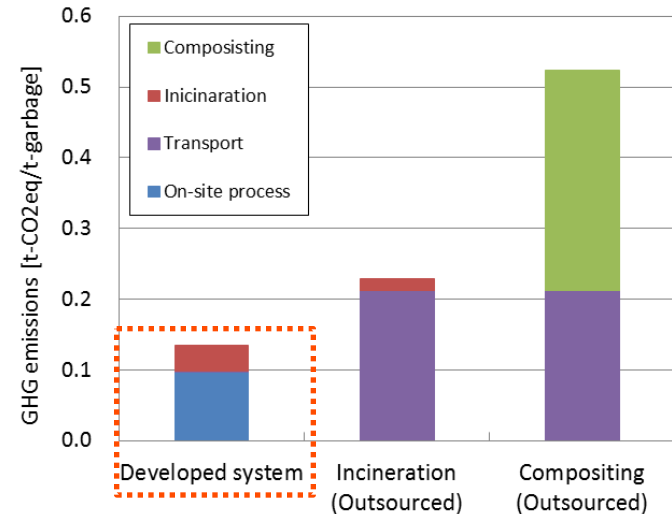
Compact biogas production system is best process from GHG emission point of view.

## Three cases

- **Compact biogas production system:**  
Effluent treatment, incineration of excess sludge
- **Outsourced incineration:**  
Transportation, incineration of garbage
- **Outsourced composting:**  
Transportation, composting, reduction of manufactured fertilizers



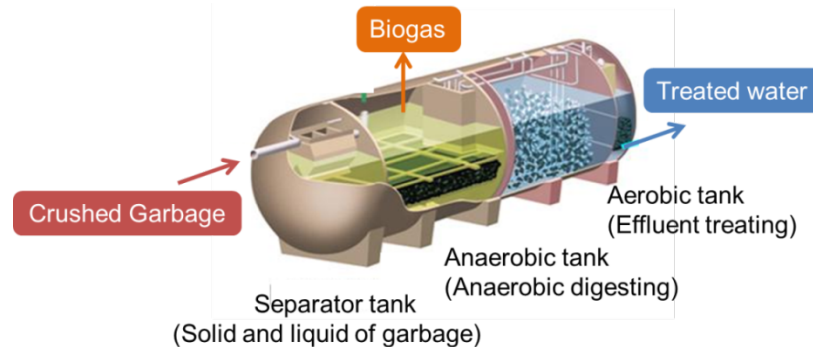
50kg/d model demonstrator



# Conclusion

We have developed the low-cost and compact biogas production system.

- Osaka gas has developed technologies to increase biogas use.
- We are developing new-type biogas production system for small scale facilities for that existing system is difficult to be installed.
- Compact biogas production system was shown to contribute to reduce greenhouse gas emission compared to outsourced incineration or composting.





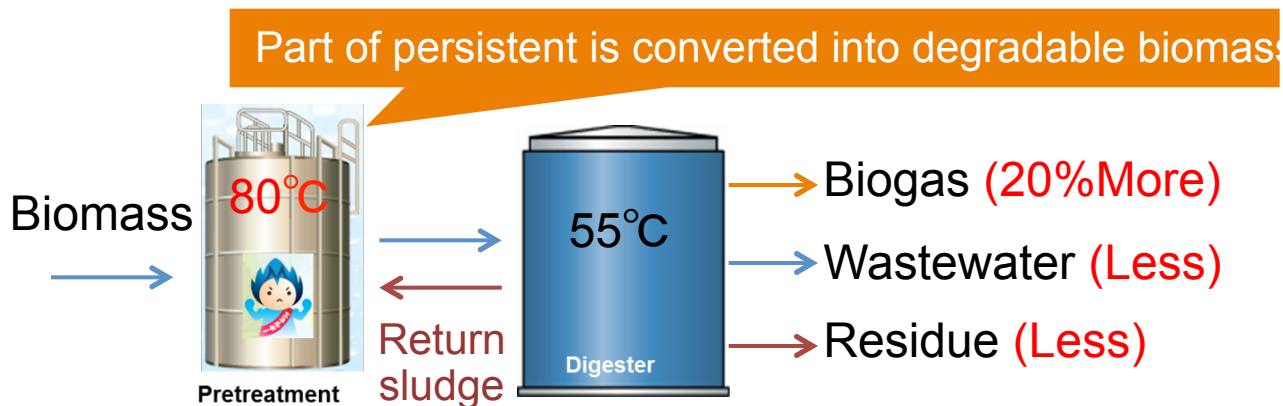
Thank you for your kind attentions!





# Our technologies increasing applicable biomass①

- High efficiency methane digestion ⇒ "Hyper-thermophilic hydrolysis"  
pretreatment



The treatment cost of wastewater and residue is the biggest problem to install biogas production system in Japan

⇒ Merit is very large.

# Our technologies increasing applicable biomass②

- Wastewater treatment ⇒ Expansion of “UASB(upflow anaerobic sludge blanket)”
- Methane digestion process from wastewater
- Development to apply UASB for chemical factory effluent  
(They include inhibitors for bacteria such as suspended solid, salt, oil and so on.)

