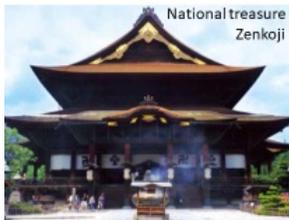




Nagano City Biomass Industry City Concept -Circular Food Waste-



City of Nagano



Town of Obuse



City of Turku



2022.6.21 Tuesday

The City of Nagano

New Industry Creation Department

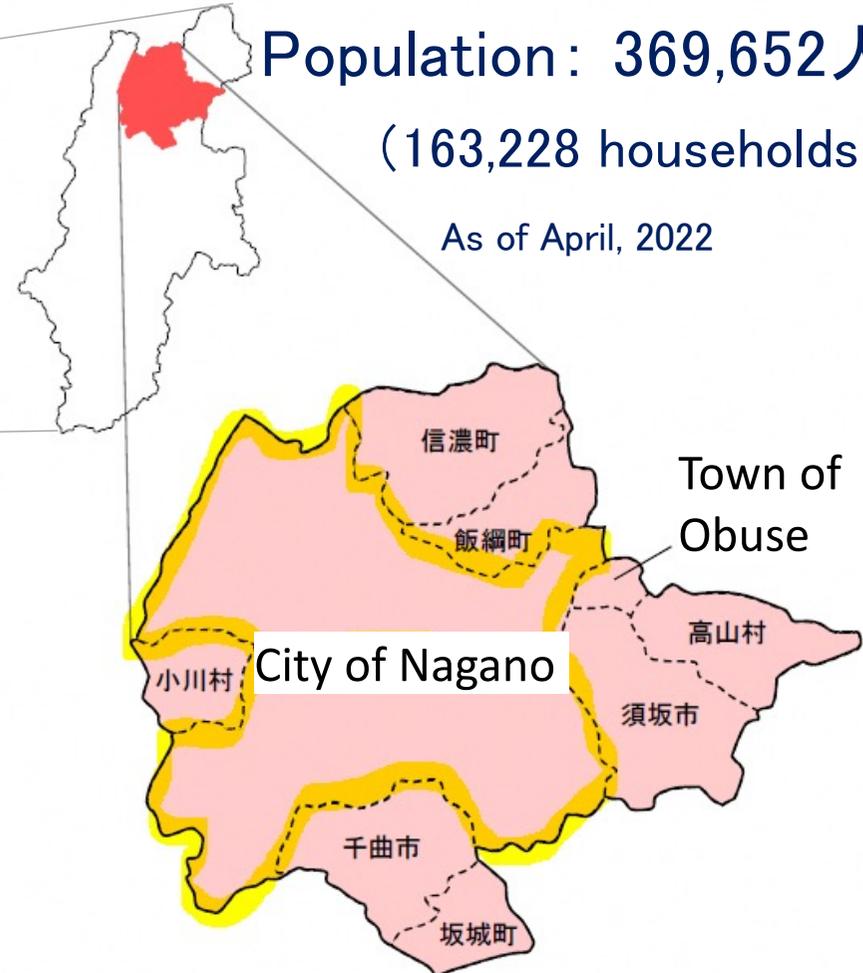
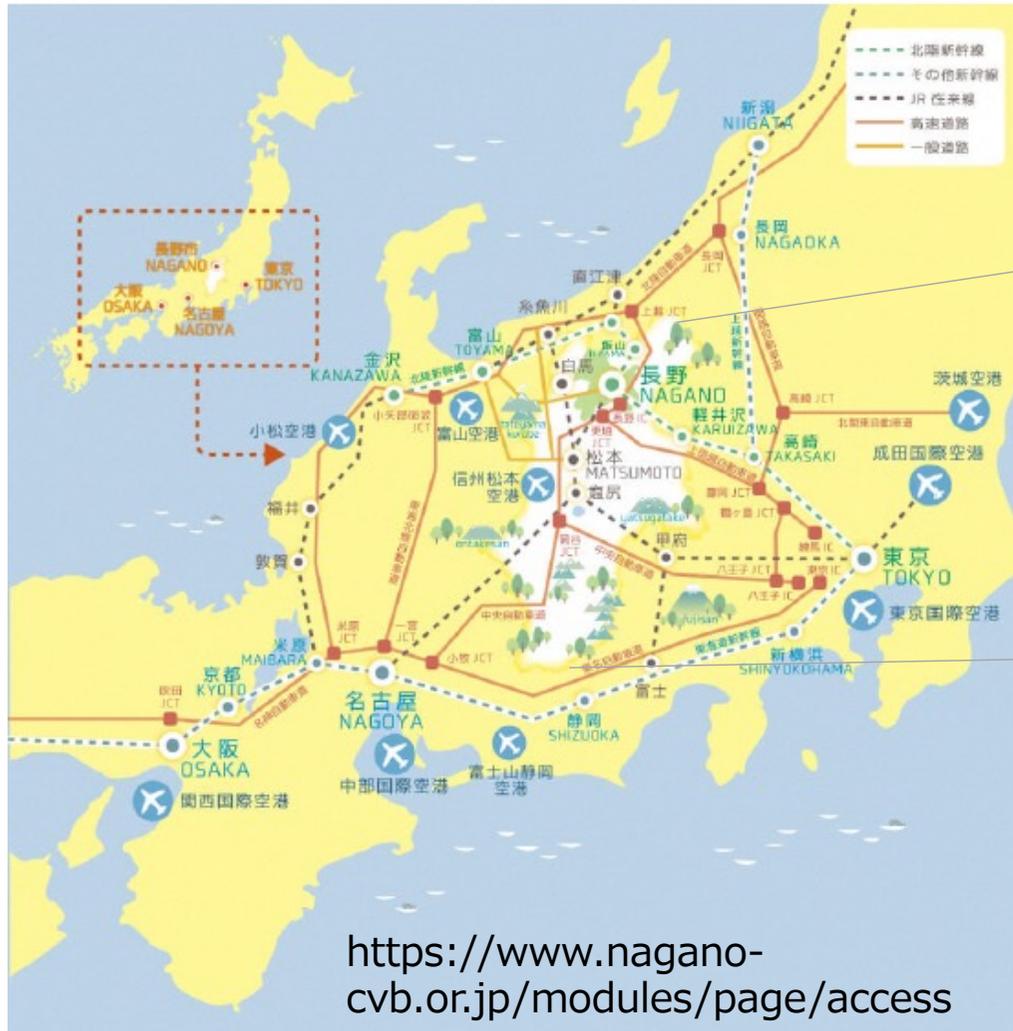
Biomass Promotion Team

Location

Located at the northern part of Nagano Prefecture in the middle of Japan

Land area : 834.81km²
Population : 369,652人
(163,228 households)

As of April, 2022



18th Winter Olympic Games held in 1998
High-speed transportation networks established
Easy connection to Tokyo and other major cities in Japan

Local tourist spots

Nagano City is one of Japan's famous tourist spots, and many tourists visit from abroad. There are many sightseeing locations within the vicinity of the hotels. This makes Nagano City the perfect places for athletes to refresh themselves while experiencing Japanese culture and the outdoors.

Togakushi

The Sacred Mountain Togakushi is a point of origin for religious belief in Japan. The area is dotted with shops serving Togakushi Soba which is famous throughout the country. There is a shrine steeped in legend and surrounded by forest, Togakushi Shrine, and a Ninja Museum.



Zenkoji

Founded about 1,400 years ago, the main temple built in 1707 has been designated a national treasure. The opening ceremony of the 1998 Nagano Olympics began with the ringing of the Zenkoji bell.



Matsushiro

You can walk through the town formed around the Sanada Jumangoku Castle, the Matsushiro Castle ruins, samurai houses that retain an old-world feel, temples and gardens.



Shiga Kogen Highlands & Yudanaka Shibu Onsen

The Shiga Kogen Highlands sit at an altitude of over 1,000m and are teeming with plantlife. This location was used for the Alpen Ski area during the 1998 Winter Olympics. Located at the base of Shiga Kogen in the center of the Yudanaka Shibu Onsen village area is the Jigokudani Valley which is famous for its use by Japan's monkeys in the winter.



Obuse

This city flourished as an important location both in terms of transportation and economy, and many cultured people travelled here. Even now there is a road remaining that still has the feel of the Edo era, and many tourists visit here.



Niigata Prefecture

Nagano Prefecture

Gunma Prefecture

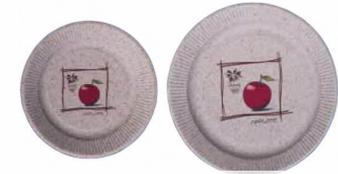
Nagano City

Nagano Station

Nagano City Biomass Industrial City Concept

- The 1998 Winter Olympics and Paralympics

Eco-Conscious Olympics



Paper saucers made from waste of apple juice production

- Formulated in 2010 "Nagano City Biomass Town Vision"

Effective use of biomass resources according to local characteristics



① "Thinned wood" abundantly present in forests that occupy about 60% of the city area



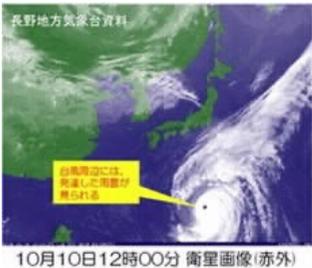
② "Waste Mushroom growing medium" generated from fungiculture



③ "Food processing residue" generated from miso, juice production, etc.

- Damage by typhoon - 2019

Disaster prevention, global warming measures



Future vision

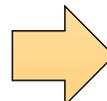
- 1 "A decarbonized city that realizes 2050 zero carbon"
- 2 "A city where resources circulate and urban areas and mountainous areas coexist"
- 3 "A city where the development of local industries and the conservation of the environment create a good cycle"
- 4 "A sustainable city that is resilient to disasters and is independent by utilizing local resources"

- Develop existing efforts promoted by the Biomass Town Vision
- Strengthening resilience in preparation for an increasing number of disasters as well as global warming countermeasures

Nagano City Biomass Industry City Concept

[Priority utilization biomass]

- ① Woody biomass
- ② Waste mushroom medium
- ③ Food waste



We will promote the utilization of biomass in the region through industry-academia-government collaboration, aiming to create an environment-friendly and sustainable city through regional circulation and local production for local consumption.

Outline of Nagano City Biomass Industry City Concept

Nagano City, Nagano Prefecture, population about 370,000, area about 83,000 ha

Utilization target (10 years later) ※Utilization ratio

Unused biomass

Thinned lumber, forest residue, etc. : 46% → 63% due to the use of lumber and the conversion of lumber scraps to solid fuel

Waste-based biomass

Waste mushroom medium: 86% → 90% due to solid fuel raw material, feed conversion, methane fermentation utilization, etc.

Food waste: 97% → 100% by utilizing methane fermentation

Business project

- ①Woody biomass utilization promotion project
 - i Manufacture of wood pellets using sawnwood powder
 - ii Bio-bricketing of multiple biomass resources
 - iii Promotion of use of wood-burning / pellet stove
 - iv Power generation using pruned branches
- ②Waste mushroom medium utilization promotion project
- ③Food waste utilization promotion project

Spillover effect

Economic spillover: Approximately 9.8 billion yen

Fossil fuel replacement amount Electricity 20,080MWh / year
 by using biomass energy Heat 135,129 GJ / year

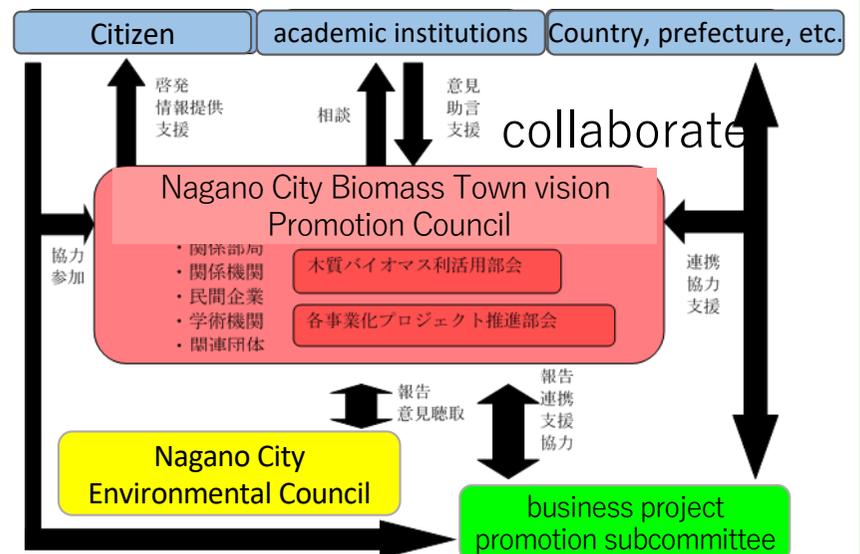
Fossil fuel replacement costs 480 million yen / year
 by using biomass energy

Greenhouse gas (CO2) emission reduction: 13,381t-CO2 / year

Reduction of industrial waste treatment amount: 28,188t / year
 Fuel supply in the event of a disaster: wood pellets, briquettes
 300t / year, etc.

Implementation system

Develop the existing industry-academia-government collaboration organization "Nagano City Biomass Town vision Promotion Council (established in 2010)" and establish a business project promotion subcommittee to collaborate with each other.



Nagano City Biomass Industrial City Concept Business Project



【Effects of business projects】

- Preventing global warming and building a carbon-free society
- Establishment of recycling system
- Waste reduction
- Creation of energy
- New job creation
- Disaster prevention and mitigation measures
- Forest conservation

Realization of zero carbon in 2050 and achievement of SDGs

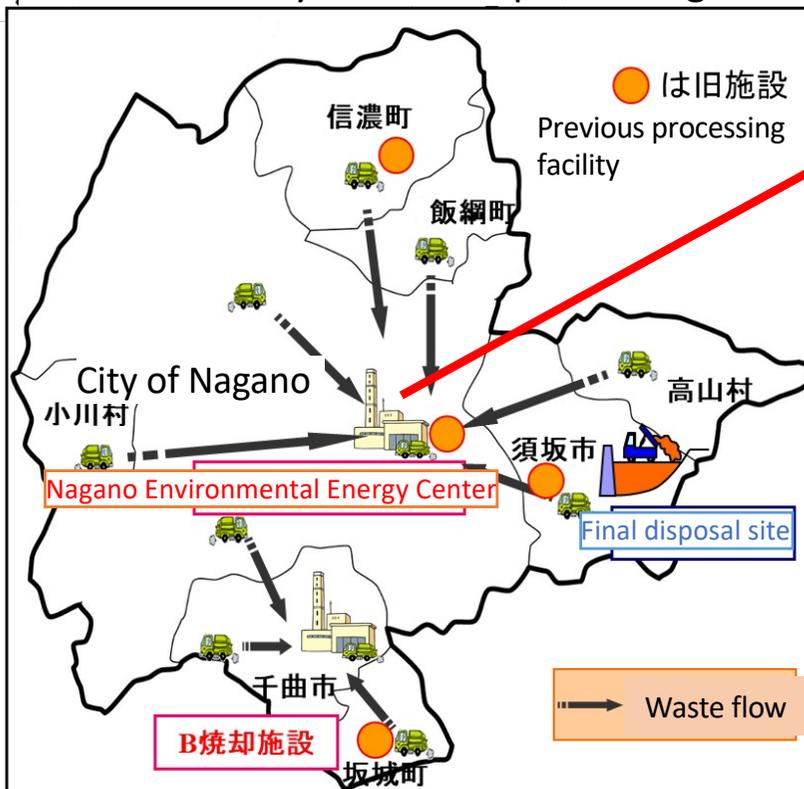


Promotion of utilization of food waste

| バイオマス名 | Biomass reserves | | 変換・処理方法 | Usage fee | | 利用・販売 | Utilization rate Carbon conversion amount (%) |
|-------------------------|------------------|-------------------------------------|---------------|-----------|-------------------------------------|----------------|---|
| | 湿潤量 (t/年) | Carbon conversion amount (t-C/year) | | 湿潤量 (t/年) | Carbon conversion amount (t-C/year) | | |
| Waste-based biomass | 203,357 | 26,535 | | 193,165 | 24,449 | | 92 |
| Waste mushroom medium | 50,676 | 11,025 | 堆肥化 | 43,581 | 9,482 | 堆肥、畜産敷料 | 86 |
| Food waste | 91,228 | 4,032 | | 88,908 | 3,930 | | 97 |
| Food waste (household) | 25,518 | 1,128 | 焼却(熱・発電利用) | 25,518 | 1,128 | 電気及び温熱利用 | 100 |
| Food waste (business) | 19,063 | 843 | 焼却(熱・発電利用) | 19,063 | 843 | 電気及び温熱利用 | 100 |
| School lunch | 237 | 10 | 飼料化、堆肥化 | 237 | 10 | 飼料及び堆肥利用 | 100 |
| Food processing residue | 46,410 | 2,051 | 飼料化、堆肥化、メタン発酵 | 44,090 | 1,949 | 飼料及び堆肥利用、電気及び熱 | 95 |

Widening the area of waste disposal

"Waste flow" by wide area processing



Nagano Environmental Energy Center

Incinerator capacity : 405t / day
 Power generation capacity : 7,910kW
 Annual power sales :
 Approximately 40 million kWh
 Ash melting furnace : 44t / day

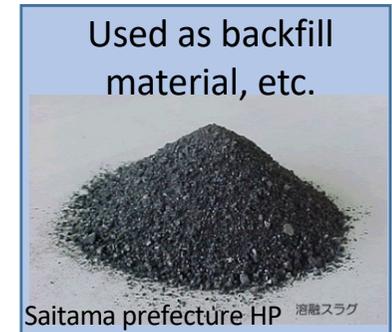
Electric power



heat



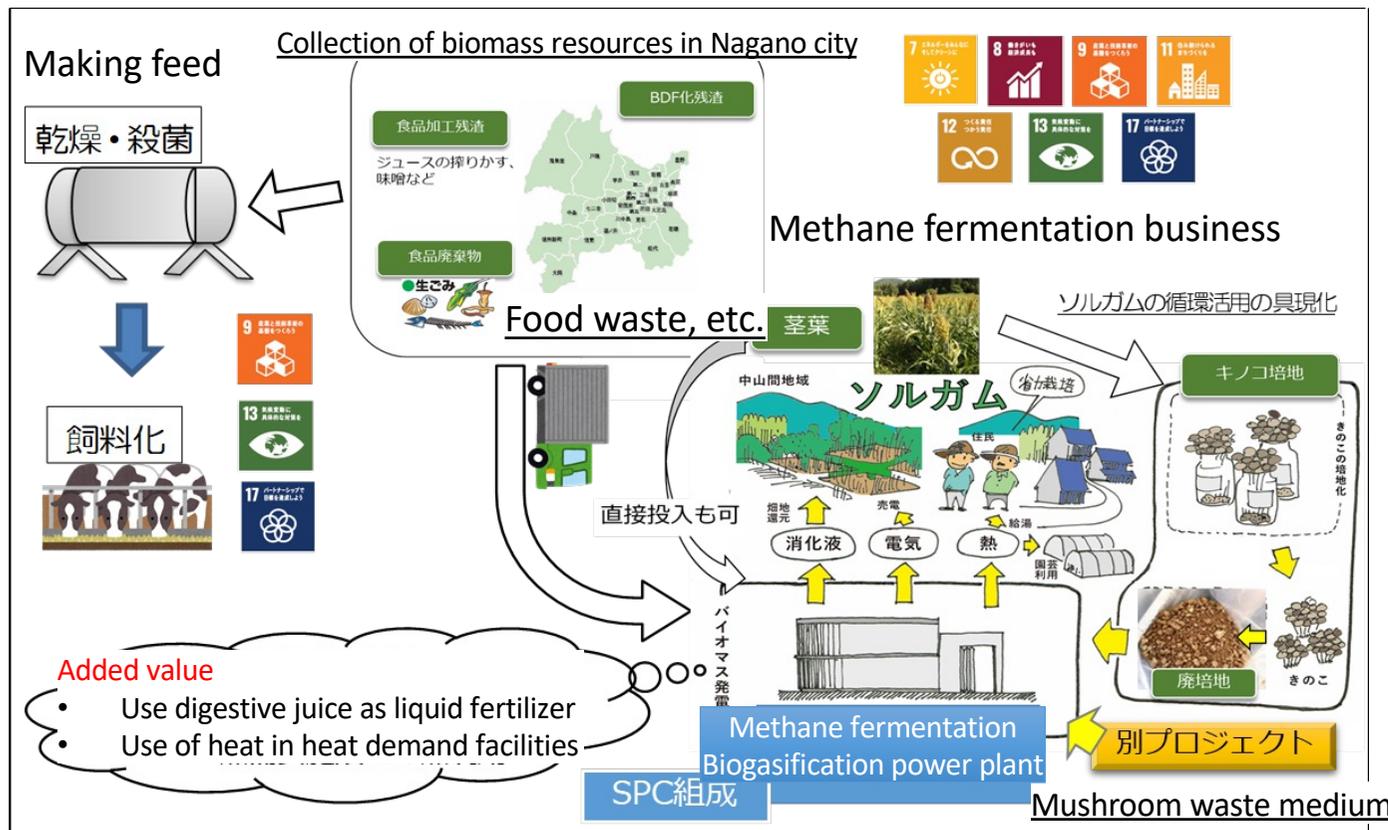
Ash molten slag



Food waste utilization promotion project

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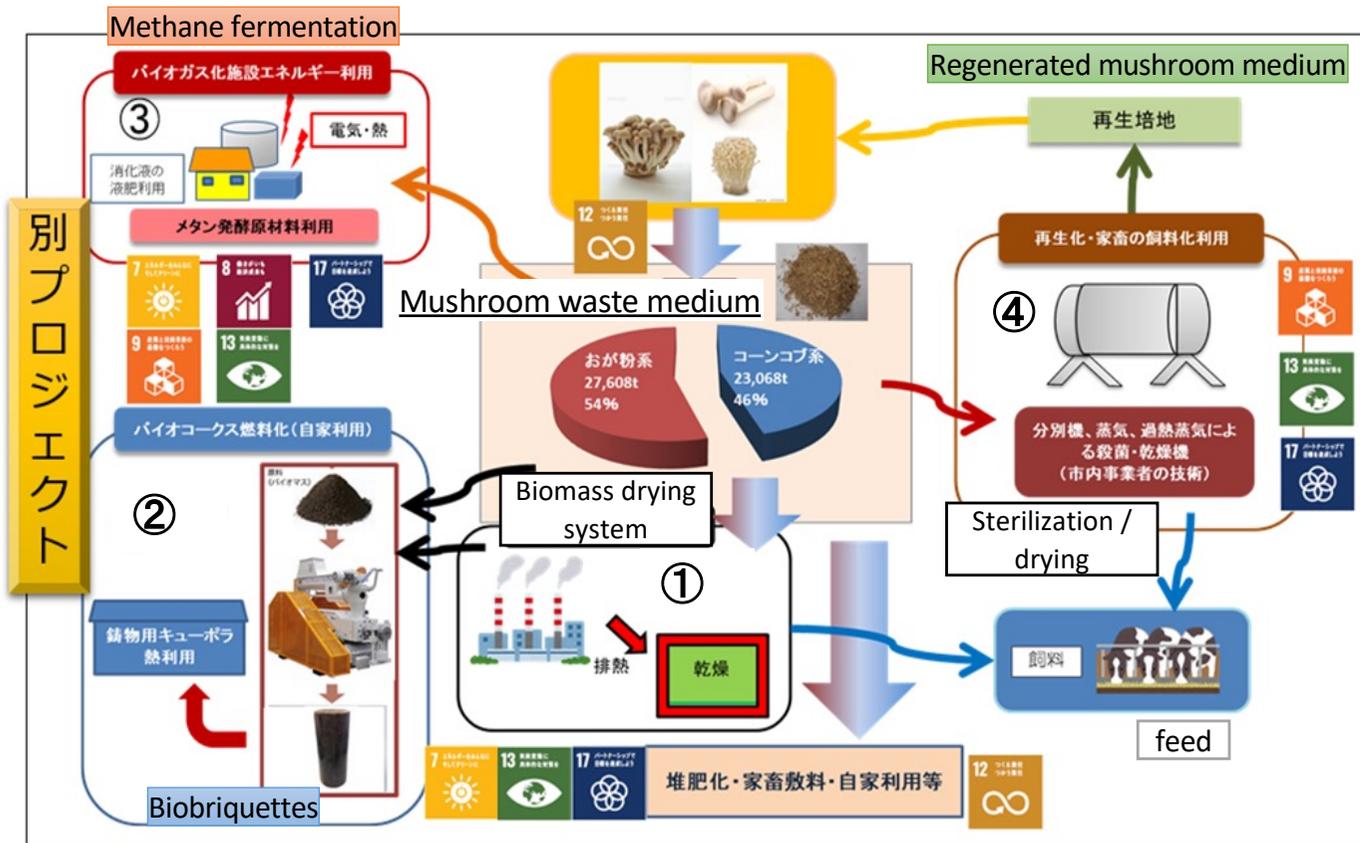
Methane fermentation and power generation facility for food waste, etc.



- Biogasification power generation mainly using organic waste such as food processing residue and mushroom waste medium generated in Nagano city
- Effective use of digestive juice
- Also considered as an emergency power source in the region

Waste mushroom medium utilization promotion project

| バイオマス名 | Biomass reserves | | 変換・処理方法 | Usage fee | | 利用・販売 | Utilization rate Carbon conversion amount (%) |
|-------------------------|------------------|-------------------------------------|---------------|-----------|-------------------------------------|----------------|--|
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- ① Waste incinerator Dry with residual heat, use as feed for cattle and use as a raw material for solid fuel (②)
- ② Manufactures biobriquettes by drying and compression molding, and uses them as a substitute for coal coke in the casting business.
- ③ Used as a raw material for the aforementioned methane fermentation power plant
- ④ After being sterilized and dried, it can be used as a feed for cattle and as a regeneration medium for mushrooms.



Row of cedar trees in Togakushi Shrine

Thank you for your attention.

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