Presentation for Workshop ADEME-NEDO

March 12, 2019

Who is Veolia?

Resourcing the World

Around the globe, Veolia helps cities and industries to manage, optimize and make the most of their resources. The company provides an array of integrated environmental solutions related to **water**, **energy** and materials – with a focus on **waste** recovery – to promote the transition toward a circular economy.

Resourcing the world

Veolia’s business (global)

168,800 employees , operation in **48** countries

Generating **€25.9** billion revenue (2017)

LATIN AMERICA

€840.6 million
revenue
12,441
employees

NORTH AMERICA

€2,396.8 million
revenue
8,593
employees

FRANCE

€7,682.9 million
revenue
50,337
employees

AFRICA MIDDLE EAST

€1,741 million
revenue
12,375 employees

EUROPE (OUTSIDE FRANCE)

€9,517.4 million
revenue
62,364
employees

ASIA OCEANIA

€2,945.9 million
revenue
22,690
employees

Our history

1853-1900

Drinking water is delivered to cities to meet the challenge of urbanization.

1853
Founding of **Compagnie Générale des Eaux**

1900-1939

Wastewater services, waste treatment and access to energy expand on a large scale.

1945-1992

Environmental services provide support for reconstruction and the industrial growth.

1992-2013

A concern for sustainable development gradually emerges as a global priority.

2003
The Group is renamed **Veolia Environnement**

In the face of growing scarcity, resource management must be reinvented to create a new economic and social dynamic.

2014
The new Veolia
Resourcing the world

160 years of industrial history

2017 Key Figures of Veolia in Japan

Water

67 drinking water treatment plants managed
58 wastewater treatment plants managed
173 municipalities with contracts for drinking water billing service
More than 802 municipalities with contracts for water leakage investigation
9 long-term industrial O&M contracts
Several hundreds EPC references built across major industries

Energy

100 GWh produced

More than 40K tons of CO_2 emission is avoided

2 biomass power plants

Waste

50,402 tons of plastic waste treated

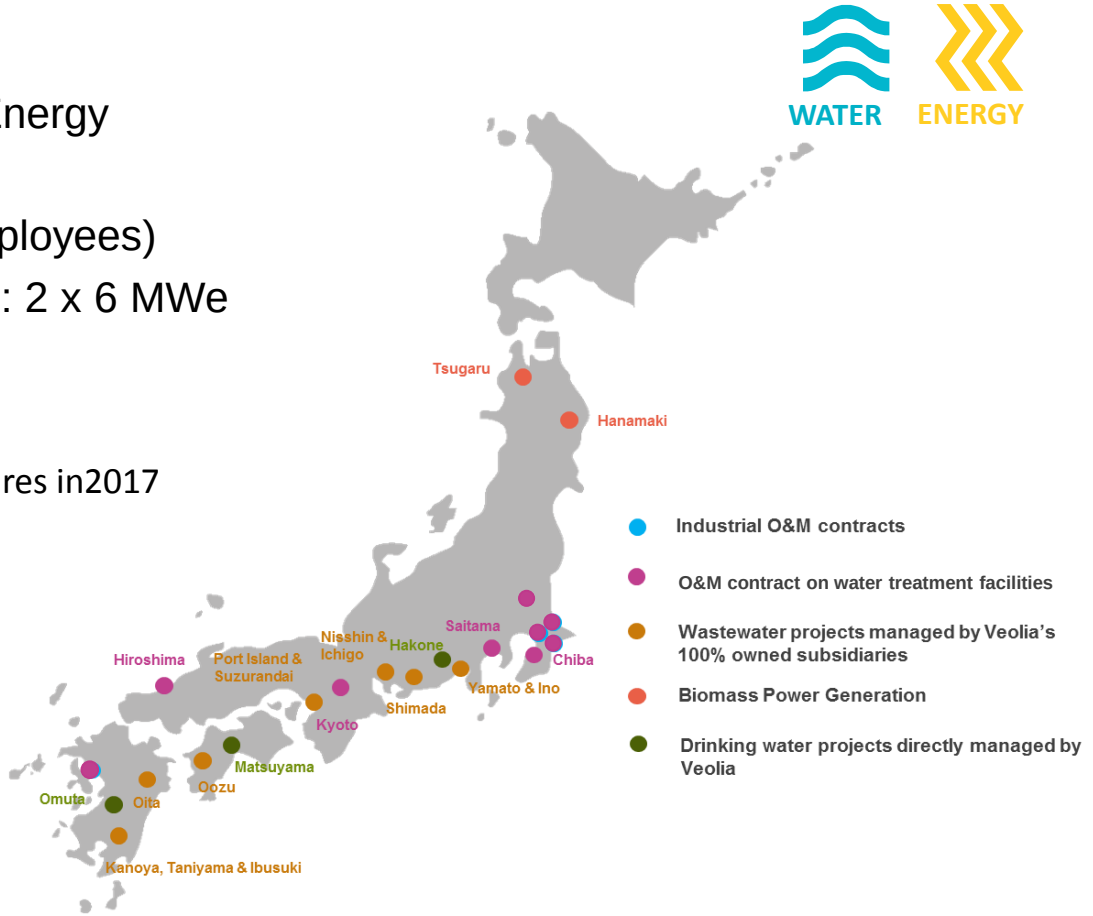
27,552 tons of plastic recycled

3 plastic recycling plants

Veolia’s Presence in Japan

- Industrial Water, Municipal Water, Energy
- EPC, O&M, Customers services
- Present in all major cities (2950 employees)
- 2 wood biomass to energy projects : 2 x 6 MWe
- 1,000 EPC contract for industries
- 1,000 maintenance in a year.

Figures in2017



ENERGY BUSINESS

Veolia Energy Scope of Activity

Energy production at regional scale
地域規模のエネルギー生産
Heating & cooling networks
暖房・冷却ネットワーク

450 heating and cooling networks
暖房・冷却ネットワーク

3,500 hospitals
病院

2.4 millions
240万
housing units
住宅

On site energy production
現場でのエネルギー生産
Industrial utilities
産業用ユーティリティー

- Biomass バイオマス:
  - Wood 木材
  - Agriculture 農業
  - Sludge 汚泥
  - …
- 2.0 MTof biomass processed
  バイオマスの処理量
  (2.0 メガトン)

Better use of energy
エネルギーの効率的利用
Energy services (industrial or building)
エネルギーサービス（産業・ビル）

237 biomass facilities
バイオマス施設

1,800 industrial sites
産業施設

9,400 Educational, cultural, leisure and sports facilities
教育・文化・娯楽・スポーツ施設

Veolia’s strengths in relation to biomass

- Strong **technical skills**, Veolia’s core business with more than 100 biomass plants under operations and **10,000 MWe of power capacity generated from solid fuel CHP plants**.
- Excellent **supply chain management**
- Added value in terms of **management and monitoring of greenhouse gas emissions**
- Widespread **geographical coverage** to identify local opportunities and capitalize on best practices
- Well-developed research and innovation within the group's **R&D centre**
- **Training,** knowledge development (the group's internal **campus**)

Veolia consumed more than 2.5 million tons of biomass throughout the world in 2016

A full project cycle offering

Design

Integration into the biomass supply chain: quantitative and qualitative appraisal of resources and design of biomass mix

Choice of technology: analysis of the head demand load curve, choice of boiler technology (combustion, feed system and storage), smoke treatment system

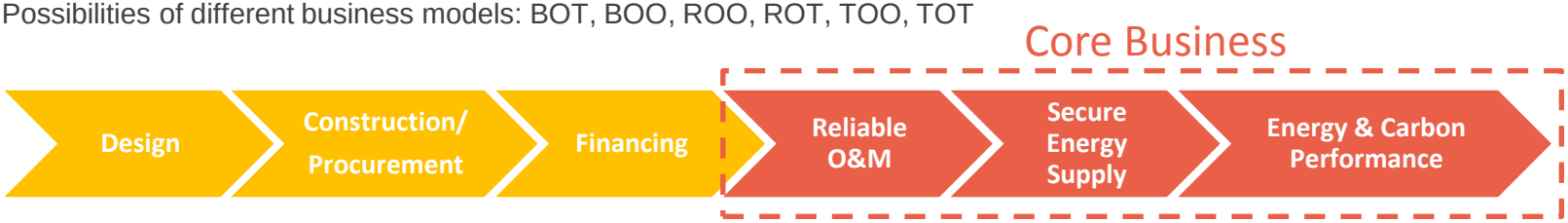
Construction/Procurement

Selecting enterprises: screening of equipment manufacturers and construction firms

Handover: conducting the inspections required by regulations and enduring work conforms to speculations, performing testing

Financing with Partners

Possibilities of different business models: BOT, BOO, ROO, ROT, TOO, TOT



Reliable O&M

Multi-energy management

Operation and maintenance, major maintenance

Secure Energy Supply

Securing supplies: identifying and validating fuel supply chains, setting up supply agreements with specific parameters

Optimization and supervision: continuous monitoring of fuel quality: regular and systematic control

Energy & Carbon Performance

Technical, environmental and financial performance guarantees

BIOMASS TO ENERGY

Worldwide References

City of Pecs – Hungary

Background

- City of 150,000 residents among which 80,000 are connected
- Burning coal since 1959

Contractual data

Design, construction, finance, operation and maintenance of a new biomass plant with a wood-fired and a straw-fired units

OBJECTIVES

- The Pannon Power plant was built in 1959 and initially operated on coal and supplied the second-largest heating network in Hungary: 181 km, serving 31,000 housing units and 480 public buildings
- Diversify the plant's energy mix to make the Hungarian commitment to renewable energy sources (an EU goal) a reality and increase the country's energy independence
- Deliver heat to inhabitants at competitive rates

SOLUTIONS

- A biomass heating plant (2 units) and two gas-powered boilers replaced the coal boilers:
  - One unit is fired by woodchips with a bubbling fluidized bed boiler – 50MWe and 70MWth
  - The other one is fired by straw and other baled agricultural products and is connected to two turbines (one condensation turbine with double extraction to produce power during the summer, and a back pressure turbine used during winter to produce heat and electricity)
- Biomass supply complemented by the development since 2005 of a very short rotation poplar coppice (optimization of local wood and agricultural networks)

RESULTS

- Largest cogeneration plant and district heating network using only biomass fuel.
- Decrease of 12% of price of heat for customers and savings of 150,000 tCO2 / year

Fort St. James facility in B.C Canada

- Consume 307,000 metric tons of biomass a year, converting sawmill and logging waste from the British Columbia forestry industry and trees killed by the mountain pine beetle epidemic into electricity.
- Generate electricity to be sold to BC Hydra & Power Authority
  – the 40 MW electrical production to power almost 40,000 households
- Help avoid the annual discharge of 95,000 metric tons of CO2
  – the equivalent of keeping more than 45,000 cars off the road.
- Create approximately 250 jobs; 80 new direct and indirect jobs will be created during the 30-year operation period.

Food & Beverage, Tea & Coffee
Energy & by-product valorization: Jacob Douwe Egberts

Netherlands

Joure

Instant coffee manufacturing

Instant coffee and Liquid coffee for coffee machines

Veolia scope

-Design, Build, Operate and Maintain a biomass boiler (15 ton/hour)

-Supply of industrial utilities: steam, compressed air, chilled water

Wastewater treatment O&M

Challenge

Jacob Douwe Egberts (JDE) produces coffee and tea products. The Dutch company faced some challenges to meet the growing global demand for their coffee products:

- Greater demand for steam & critical utilities relative to market growth
- Changing Dutch legislation - Spent Coffee Ground (SCG) could no longer be landfilled
- Contribute to sustainability targets of JDE

Solutions

- Co-Construction with the client of a spent coffee grounds thermal valorization solution which meets the site & client requirements (including return on investment))
- Technical pilots to select the boiler and the spent grounds dewatering solution
- Energy valorisation of the biogas from the wastewater treatment plant
- Utilities outsourcing contract with guarantees (10 years)

Benefits

Reduce Operating Costs: 10% gas savings for the whole plant, avoidance of disposal costs for Spent Coffee grounds

Maximize productive uptime: Construction completed in time, utilities in place to meet increase in planned production volumes

Product recovery: By-product valorization of spent coffee grounds and biogas

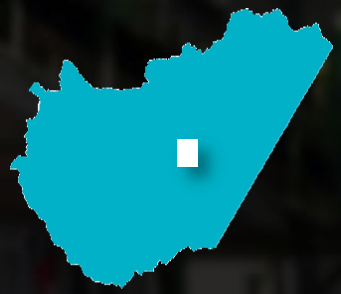
Guaranteed compliance: Guaranteed compliance for energy (emissions), water (effluent and cooling water discharge) and waste (zero waste to landfill)

Health & safety: No accidents during construction

Environmental footprint: 14.000 tonnes of CO_2 avoided annually

Food & Beverage, Fruit & Vegetables
Energy services & Biogas valorization, Bonduelle, Nagykőrös

Hungary
Nagykőrös



Fruits & vegetables

Canned vegetables (corn, peas)

200 million cans/year

Veolia scope

Energy systems O&M
Steam supply
Using sludge-sourced biogas to produce steam

Challenge

The Nagykőrös plant produces canned peas, corn and beans. These manufacturing processes require a significant amount of energy, traditionally provided exclusively by natural gas. Veolia has been the long term partner of the site for on-site energy supply.
Bonduelle was required to build a wastewater treatment plant for its food processing factory in Nagykőrös to meet the new Hungarian wastewater treatment standard.

Solutions

Construction of a system to route biogas to the boiler: Veolia buys the untreated biogas from Bonduelle.

- Veolia treats the biogas using a compression/cooling system developed by Veolia to offset fluctuations in biogas quantity and quality due to the seasonal nature of the activity.
- Adaptation of one of three existing boilers (3 t/h) for the combustion of biogas (small back-up boiler that had previously been put to little use).
- Flexibility to adapt to seasonal nature of production.

Benefits

Reduced operating cost: Energy cost reduction, 17% reduction on annual energy bills

Product recovery: 350,000 m³ natural gas saved per year

Maximize productive uptime: Continuous and secure steam supply

Environmental footprint: Avoiding 650 metric tons of CO_2 per year

BIOMASS TO ENERGY

References in Japan

Main biomass projects in Japan 1/2

Commencement of operation in Nov. 2015

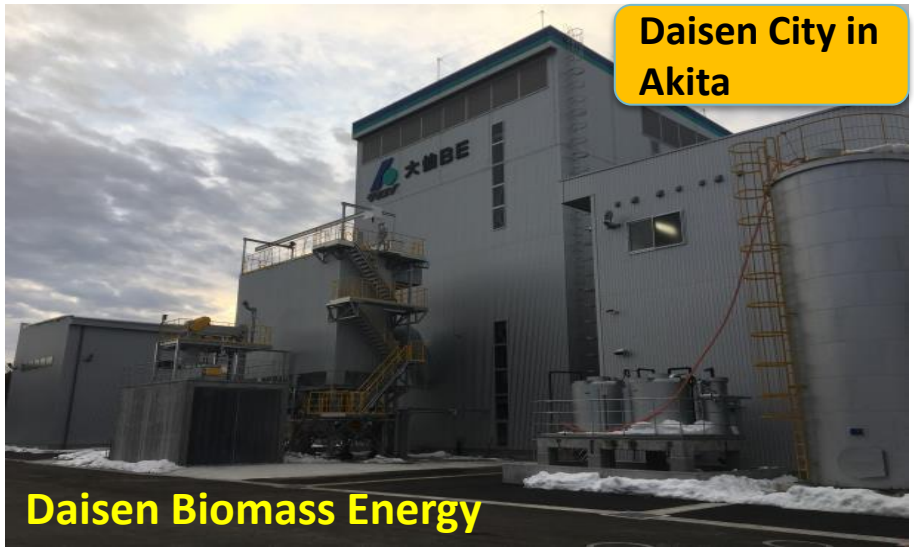
- Boiler Type : BFB
- Steam Produced : 28t/h
- Pressure : 5.78MPa
- Steam temp : 425ºC
- Electricity : 6250 kW
- Wood chips : 220t/day
- Moisture : 40-50%

Commencement of operation in Feb. 2017

- Boiler Type : BFB
- Steam Produced : 28t/h
- Pressure : 5.78MPa
- Steam temp : 425ºC
- Electricity : 6250 kW

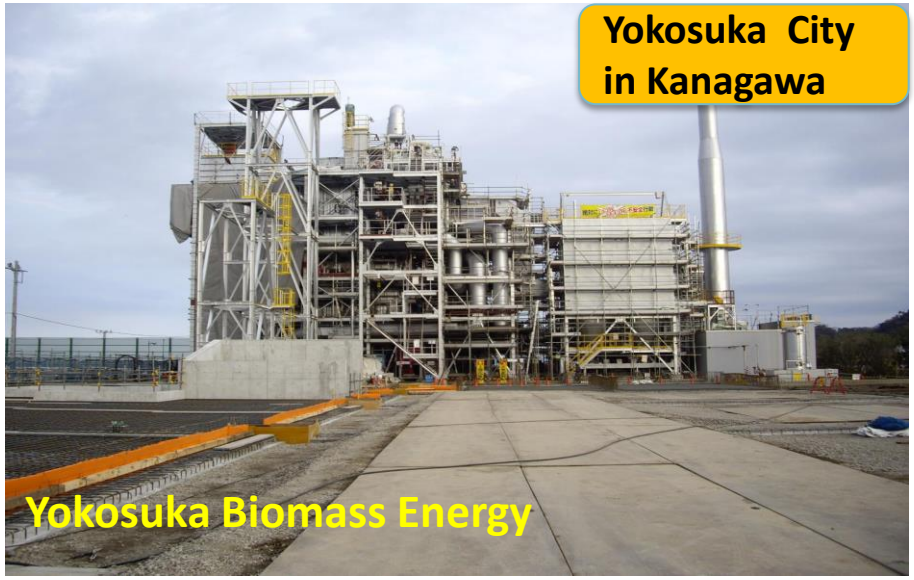
O&M : VT Energy Management

Main biomass projects in Japan 2/2



Commencement of operation in Feb. 2019

- Boiler Type : BFB
- Steam Produced : 28t/h
- Pressure : 5.78MPa
- Steam temp : 480ºC
- Electricity : 7050 kW
- Wood Chips : 220t/d



Expected Commencement of operation in Nov. 2019

- Boiler Type : BFB
- Steam Produced : 28t/h
- Pressure : 5.8MPa
- Steam temp : 475ºC
- Electricity : 6950 kW
- Wood chips : 220t/day
- RPF : 10t/day

Main biomass projects in Japan 2/2

Gushikawa Wastewater Treatment Plant

- Owner : Okinawa Prefecture
- Operations : NOSA Okinawa Renewable Energy Consortium
  : SPC Representative Nishihara Env. Okinawa
- Duration : 20 Years from April 2016
- Input : Methane Gas (Digestion of Sludge)
  - Gas : 2,384 Nm3/d～3,160 Nm3/d
- Output : Electricity
  - Production : 360 kW (60kw/h x 6 Lines)

Akiyamagawa Joka Center

- Owner : Tochigi Prefecture, Sano City
- Operation : Sano Hybrid Electricity K.K
  : JV by Ohara and Nishihara
- Scheme : PFI (BOT)
- Duration : 20 Years from April 2016
- Input : Methane Gas (Digestion of Sludge)
- Output : Electricity
  - Gas : 250 kW (50kW×5 Line)
  - PV : 940 kW (Solar Panel 0.26kW×3,616 枚)

To conclude….

- Since the establishment in 2002, Veolia Japan has led many projects to success and contributed to our clients by…..
  - *Wide range of solutions to operational needs.*
  - *Leveraging on our global experience and expertise.*
  - *Understanding local contexts that is required to success*
- We continue to be committed to investing in our projects and resources in order to archive efficiency and better resourcing.