CASE STUDY

WASTE TO ENERGY

TOTAL INVESTMENT: EUR 225 M

KEY FEATURES: LOW CARBON / CIRCULAR ECONOMY

+ SUPPORT FOR NEW TECHNOLOGIES, SMES AND LOCAL COMMUNITIES

PRODUCTION CAPACITY:

- BIOGAS/BIOMASS: 59 MWe + 4,000 NM3/H
- PELLETS: 49 MW + 120,000 T/YR
- MUNICIPAL WASTE TO ENERGY: 300,000 T/YR

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FROM WASTE TO ENERGY: INVESTING IN CIRCULAR ECONOMIES

Meridiam's portfolio of Waste to Energy projects is growing and diversifying, but with certain common characteristics – of transition to renewables, circular economy principles and support for new technology, SMEs and local communities.

Projects converting Waste to Energy (WTE) are growing in number as a significant area of focus of Meridiam's business. There are now **eight separate investments in Meridiam's WTE portfolio**, following financial close being reached recently on several new projects. Cursory glance across the list shows considerable diversity. Projects range from large scale WTE plants generating heat and electricity from municipal waste, to the purification of biogas at landfill sites for domestic use as Renewable Natural Gas.

Several of Meridiam's WTE projects are developing or operating plants at more than one site. The portfolio now includes WTE operations at around 20 separate locations in total. Through a strategic partnership with Evergaz France, for instance, Meridiam has acquired a 70% stake in the biogas assets platform BMP (Bio Methanisation Partenaires), which operates nine WTE plants; some generate **biogas/ NGV for commercial sale** through methanization of agricultural waste and others use cogeneration units to **turn the biogas into electricity and heat** as well.

Common to all of these projects is a drive to aid **transition from fossil fuels to sources of renewable energy**, combined with numerous other benefits. WTE projects are directly in tune with Meridiam's central mission of investing in sustainable infrastructure with positive impact. The very nature of WTE operations not only secures contributions to national and international targets – such as the UN's Sustainable Development Goals, which are central to Meridiam's impact-oriented approach. They also have highly localised characteristics, **benefiting local businesses and communities**.

The Biokala Biomass project launched recently in the Ivory Coast is a case in point. Through a 28-year concession, Meridiam and its partners in the project, EDF and SIFCA (an Ivorian agribusiness group), will design, build, finance and operate a WTE plant fuelled from combustible biomass sourced from local plantations, to generate electricity via a 46MW thermal power plant.

This will contribute significantly to the Ivorian Government's national plans for **increasing the share of renewables in the country's energy mix**. Designed to be 'multi-sectorial', the project will also form an **industrial base with jobs** and economic benefits associated with the site's energy generation and transmission by local utility provider CIE. Plus, it will **boost the**

FICAP/COGECAB (Pellets)

Agrimaine Biogas Cogeneration

local agricultural economy by valorising its waste as biomass and avoid 4.5 millions tons of CO_2 over the lifetime of the project. It is estimated that the project **will increase revenues of more than 12,000 local smallholders** by between 12% and 20% overall. The direct link established with the smallholders will also be leveraged to provide them **access to better and more sustainable agricultural practices**.

Biokala Biomass follows a similar model established at biogas sites in France. The Agrimaine Biogas Cogeneration project in an agricultural region of Western France, which reached financial closing in December 2017, was formed by a partnership of Meridiam and AB2M, a company representing local farmers. These **113 local farmers benefit from receiving revenue** from sale of their organic waste to the project company Agrimaine and from a share of the commercial sales of electricity and heat generated. The extra revenue for the local farmers amount to 7000 EUR/y/farmer. "Helping local farmers was crucial to the aims of Agrimaine and we will work to maintain that initial spirit of the project. Methanization slurry supplied from farms within 25km of the plant is still providing 99% of the feedstock for producing biomethane, which is generating heat and electricity and revenue which is very reliable through long-term fixed tariffs," says Meridiam's Agrimaine project manager, Marjorie Lemos.

"The project has effectively developed a **virtuous circular economy**. As co-shareholders, the farmers receive revenues from the plant and by supplying their waste as feedstock; and they now also get back a share of the **plant's digestate as an ecologically friendly fertiliser**, which is helping to reduce their costs as well."

There tends to be two main types of agricultural business in this part of France, Marjorie explains: the large-scale and generally economically successful arable farms; and the smaller farming businesses which often find the going a lot tougher. "Through involvement as partners in Agrimaine Biogas Cogeneration project company, these **farmers are receiving a considerable boost to the sustainability of their businesses**," Marjorie says.

Getting local communities involved, literally giving them some buy-in to help them benefit from WTE projects, is an important aim. Two of Meridiam's WTE projects – Agrimaine Biogas Cogeneration and the Pellets/Black Pellets production facility under development near Reims (see WTE projects list) – have launched and closed successful **crowdfunding initiatives**; around one third of the €1m of investment in Agrimaine was raised from local people in Mayenne; and small investors have injected a total of €3.5m in FICAP.

"We see this as a powerful tool for **anchoring projects into local communities**. We want them to feel involved and to benefit financially via small investments," says Meridiam's WTE project board representative, Emmanuel Walliser.

"It's also partially a **de-risking approach**," Emmanuel adds. "We want local communities' support and backing for WTE projects

Short movie for Agrimaine crowlending

https://youtu.be/02vU6FU7d4w

introduced on their doorstep. Commonly local challenges come about due to negative perceptions of industrial developments, but WTE projects are actually highly positive, for local economies as well as transition to renewable energy from waste".

"Getting local people's buy-in through small investments adds a further layer to the circularity of WTE projects, allowing communities a direct financial benefit. Initially we just wanted to test whether crowdfunding would be possible, but we've been very pleased with the results. We now have hundreds of local people actively involved in Agrimaine and FICAP."

There are further benefits to Meridiam's WTE investment projects, not least the creation of jobs in local communities. The FICAP facility and a neighbouring COGECAB plant, for instance, are expected to **maintain 350 jobs directly and through their supply chain in the Grand Est region**.

This is another project demonstrating strong circular economy principles. When fully operational, the FICAP plant will manufacture white and black pellets from sustainable regional wood sources for commercial industrial markets; and wood waste to fuel the COGECAB cogeneration power plant. COGECAB will generate 90GWh per year of renewable electricity

for the local grid (enough to power 30,000 homes), as well as 130GWh of thermal energy for local industry including FICAP.

"These technologies and processes are not new. They are already proven, but the real **innovation comes in combining them to create 100% renewable energy through circular economy principles**," Emmanuel says. Overall, it is estimated that the combined FICAP-COGECAB facility, located in the Pomacle-Bazancourt Bio-economy cluster near Reims, will contribute to the reduction of nearly 230,000 tonnes of CO_2 equivalent carbon emissions.

The technology is proven, but **Meridiam's WTE investments are helping to establish what is a relatively new and burgeoning industry**. In partnership with the SME Waga Energy, Meridiam has invested €11m in Wagabox – securing installation of two Wagabox units at landfill sites in Normandy and Occitanie and potentially a number more.

Wagabox units purify biomethane produced by material decomposing at landfill sites – combining existing technology with **Waga's innovative inverted distillation and freezing technique**. The result – Renewable Natural Gas (RNG) – is sold to gas suppliers for domestic use through 15-year fixed tariffs underwritten by the French Government. The only civil engineering required is in the preparation of the ground and a simple foundation. The Wagabox unit is essentially plugged in and left – remotely operated by Waga.

"Wagabox units can be installed at any landfill site, if they have good access to the gas supply network nearby. The size of production has to justify the cost, so they need sufficient quantity of waste and gas to treat, but generally speaking, as long as a site has about 10-15 years of waste, then installing Wagabox will make economic sense for landfill operators," says Meridiam's Wagabox Project Manager, Thibault Simon.

Meridiam has committed to a long-term partnership with Waga, investing jointly in a project SPV, which is seeking further sites for Wagabox and biogas purifying contracts with landfill site operators. Nine Wagabox units are in use so far, supplying more than 20,000

Waga

Gipuzkoa

Olsztyn

homes with RNG and preventing the emission of 30,000 tonnes of CO2 from fossil fuelled energy.
"The idea is to install more. We have a pipeline of around 30 potential sites with the right criteria which are being studied further. At least 20 have a fixed tariff secured for sale of the RNG and so just need agreement of the landfill owner," Thibault says.

Wagabox is relatively new technology, but with the concept proven, attraction and interest is growing, Thibault adds. "Importantly, Wagabox creates renewable energy from landfill methane, instead of polluting by burning it or releasing it into the atmosphere," he says. "In the overall cycle of waste, it's a really positive development and **a game changer for landfill operations**."

Another asset handling municipal waste is the new Gipuzkoa Environmental Complex. The waste plant is situated near the city of Donostia-San Sebastian in the province of Gipuzkoa, in the Basque Country. With a 200,000 t annual capacity, the plant receives the solid municipal waste collected by municipalities, pre-treats it by separating recyclable waste from unsorted residual waste, and dries the remainder which, together with residual waste from other facilities, is incinerated. As a result of the incineration, electricity is produced: the energy generated is enough to provide electrical power to more than 45,000 households.

This asset is essential for Gipuzkoa as there is no available landfill in the whole territory. Prior to the project, waste collected by the granting authorities was transported outside the region.
From an environmental standpoint, the technical choices made by Meridiam and its partners shall ensure that emissions (from fumes) are kept at levels well below the current limits set by the legislation.

A similar project is being developed by Meridiam in Poland. Olsztyn, capital of the Warmian-Masurian region, in north-eastern Poland (270,000 inhabitants) has developed through its public company MPEC a district heating system to satisfy the demand for heat of its inhabitants. The project will guarantee the heat supply to the city after the coal-fired Michelin Polska plant located in the area ceases to supply heat to the district heating network in 2021.

Furthermore, Poland is under pressure to comply with the EU waste treatment regulations and the construction of this WtE plant handling 100,000 tons of municipal waste per annum is a step towards adhering to these regulations. The project will deliver the energy recovered from waste in the form of heat to the Municipal District Heating System and electric energy to the power network.

Through eight separate platforms, Meridiam is therefore an active investor in Waste to Energy projects in France, Germany, Spain, Poland and the Ivory Coast in West Africa. ■

Gipuzkoa

WASTE TO ENERGY INVESTMENT PROJECTS:

French biogas assets platform with Evergaz France: Investment €36.6m. 70% ownership of Evergaz assets platform BMP, plus 29% stake in Evergaz SA. BMP operates nine WTE biogas sites generating revenue from sale of biomethane, heat and electricity.

German biogas assets platform with Evergaz: Investment €21m. Meridiam and Evergaz SA have combined to form Evergaz Germany, which now owns and operates three biogas assets in Germany.

Agrimaine Biogas Cogeneration, France: Investment €24.9m. Cogeneration of heat and electricity from methanization of agricultural waste. Project company Agrimaine is owned by Meridiam (40%) and AB2M representing a group of 113 local farmers.

Gipuzkoa Environmental Complex, Spain: Investment €24.0m. In partnership with Urbaser, 35-year design, build, finance and operate concession for WTE plant, pre-treating, separating and recycling recyclable waste. Electricity generation through incineration of non-recyclable waste.

Olsztyn, WTE, Poland: Investment €35m. DBFO partnership with Urbaser, for WTE plant which will provide heat and electricity for 270,000 inhabitants of the city of Olsztyn, replacing current coal-fired facilities.

Biokala Biomass, Ivory Coast: Investment €24m. 28-year DBFO concession. Electricity generated from incineration of agricultural waste in a 46MW thermal power plant.

Integrated biofuel production and renewable energy generation, France: Investment €58m. In partnership with EDB (Européenne de Biomass), development, finance and operation of two inter-related facilities: FICAP produces white and black pellets for industrial markets; and supplies the second facility COGECAB, which produces renewable energy for industrial and domestic use.

Landfill biogas recovery, Wagabox, France: Investment €11m. Financed by Meridiam and Waga Energy, two new Wagabox units have been installed at landfill sites in Normandy and Occitanie, southern France.

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