WASTE-GO INC.

WASTE MANAGEMENT SOLUTION

SCP3000

WASTE TO ENERGY SYSTEM

WASTE-GO INC.

Synergy Conversion takes municipal solid waste, medical waste, mixed plastics, glass, paper products, textiles, organics and converts the inputs into sterile ‘fluff’ that can be repurposed into fill or bedding, compressed aggregates, insulation, etc or waste to energy.

Waste Management Challenges

Varying composition of waste components (plastic, mixed plastics, paper, glass, aluminum cans, organics, woods, clinical/medical).

Quantity and quality of the waste components.

Microorganisms, viruses, bacteria, molds associated with organics.

The combination of the above result in the creation of pollutants during the typical waste to energy process.

44% of Waste is Landfilled

25% of Waste is Incinerated

13% of Waste is Recycled

Waste Management Challenges

Do Not Bag Recyclables

No garbage

No Plastic Bags or Plastic Wrap

Return to retail store collection bins

No Food or Liquid

Empty all containers

No Clothing or Linens

Use donation programs

Waste Management Challenges

Ideal Scenario

Reality

Waste Management Challenges

Waste Management Challenges

Recycling Challenges

‘Last Kilo’ Waste

Though 13% of waste is recycled,

79% of recyclables ends up in landfills.

- Waste is difficult to recycle; food residue, adhesives, layers of mixed plastic / metal / paper.
- Need to reduce the negative impact of landfills on the environment.
- Need to increase recycling.
- Mandate to eliminate ‘one to one’ waste to landfill.
- Realization that managing waste closest to the source reduces carbon footprint and enables greater cost control, avoidance and mitigation.
- Addressing the ‘last kilo’ waste that cannot be processed effectively and ends up, kilo for kilo, in landfills or incinerators.

WASTE-GO SOLUTION

Deploys a patented conversion technology which normalizes the waste inputs negating the negative influence of the quality, quantities and mix of input wastes streams.

The conversion process, which normalizes the waste, creates a homogenous, consistent end product which becomes an ideal input for waste to energy processes.

The conversion process neutralizes the negative environmental impact of current waste management processes.

Zero to Landfill Waste Conversion

50% Reduction in Weight

80% Reduction in Volume

THE CONVERTER® PROCESS IS A PATENTED AND COMPLETELY MECHANICAL PROCESS BASED ON THE PRINCIPLE OF MECHANICAL TO THERMAL ENERGY TRANSFORMATION.

It exploits moist heat shredding, without the use of pressure: that mechanically heats the waste by means of the friction, generated by a rotary blade and consequent extraction of moisture by evapor ation.

In a 30-minutes cycle the Converter® transforms the waste into a final product which is reduced in weight and volume; totally dry and safe.

The Converter® is a risk-free technology. It allows you to treat waste on site and it does not use chemicals, combustion, or microwaves to do so.

Emission free both for wastewater and gases.

The Converter® is used extensively to achieve zero to landfill.

Key Features

Zero Processing Emissions

Fully enclosed system with no venting / stack requirements.

Sterile By-Product

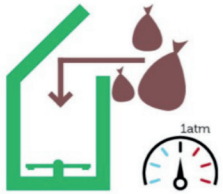
No decomposition, leaching, viruses, bacteria.

Reduced Carbon Footprint

Weight and volume reduction reduces transportation GHG generation, zero decomposition eliminates GHG generation

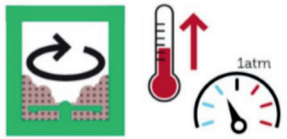
Optimized Processing Cycles

Custom processing applications coupled with ‘one touch’ cycle initiation makes the system simple to use and process optimized.



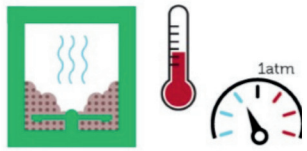
STEP 1

SYSTEM IS LOADED, CYCLE IS INITIATED



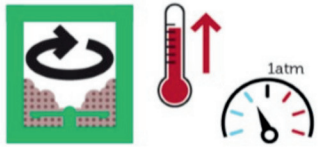
STEP 2

WASTE IS SHREDDED & GROUND



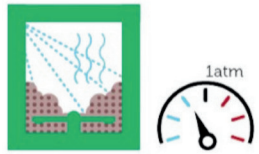
STEP 3

EVAPORATION CYCLE IS INITIATED



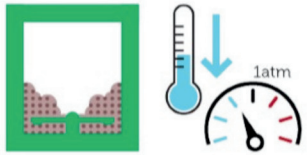
STEP 4

SUPERHEATING CYCLE INCREASES TEMPERATURE TO 151 DEG C



STEP 5

STERILIZATION & PASTEURIZATION CYCLE RENDERS THE WASTE INERT



STEP 6

COOLING CYCLE CONCLUDES THE CYCLE

STEP 7

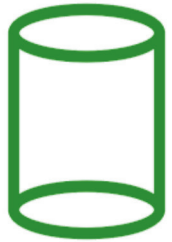
WASTE IS AUTOMATICALLY EJECTED FROM THE SYSTEM

Key Facts And Figures

- Benefits at a Glance

Weight Reduction

Up to 50%

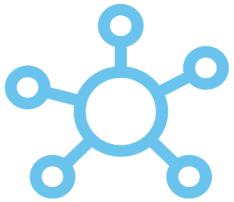


Volume Reduction

Up to 80%

Key Facts And Figures

- Benefits at a Glance



Safe Output

No dust, odor, decomposition, vermin

70 db average

Safe Output

No processing emissions

Key Facts And Figures

- Benefits at a Glance

Easy to Use

Point & Click, Automatic Operations

Load system, select cycle type & press start.

Key Facts And Figures

- Benefits at a Glance

Waste Storage Avoidance

Avoid odors, rodents, viruses, bacteria

Landfill Avoidance

Repurpose, reuse sterile outputs

Key Facts And Figures

- Benefits at a Glance

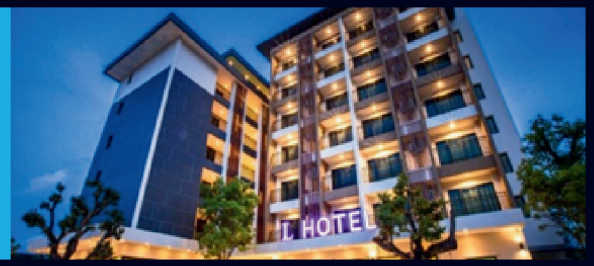
GHG Emissions

Reduced emissions of the entire waste stream

HOSPITALS – CLINICS – LABS
TREATMENT CENTERS

MILITARY BASES – HARBOURS
MILITARY SHIPS – AIRPORTS

RESTAURANTS – HOTELS
MALLS – RESORTS



OFFSHORE PLATFORMS
ONSHORE SITES

PRIVATE YACHTS – CRUISE
MERCHANT VESSELS – FERRY BOATS

AIRPORTS
INTERNATIONAL CATERING FACILITIES

HUMANITARIANS CAMPS – HOSPITALS
CAMPS
CUSTOMS – CONSTRUCTION SITES

Research and Development


ZARA


H&M


Massimo Dutti


BRANDS
FOR
CANADA


MB
MARTINBROWER


McDonald's


MAPLE
LEAF


pepsi


IKEA


FRESENIUS
KABI


INDITEX


PAR
Med


connect
Rx
Specialty Pharmacy

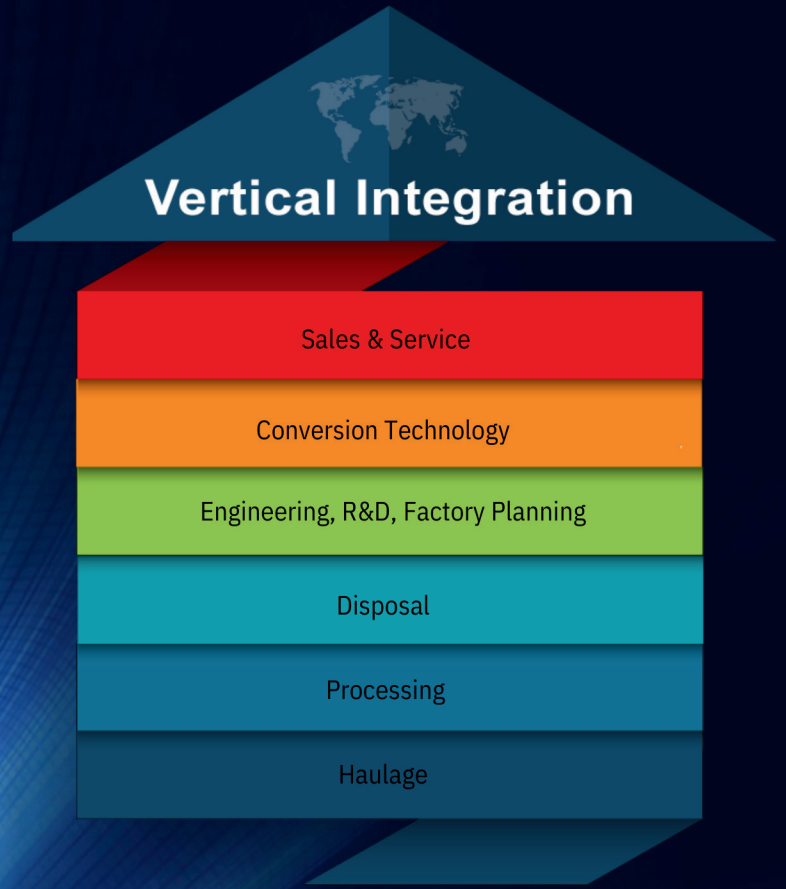

Illumineer
LIMITED


ENER
SAVINGS
INC


SOL
RECYCLING


Joseph Alexander began consulting in waste management in the construction and demolition markets.
2010
Original Patents became Commercialized for the Converter offering.
2014
J. Alexander began developing waste management solutions starting with consulting and collections.
2015
Synergy Conversion is established adding transfer, disposal, and recycling.
2017
Pi Eco Canada joint project to investigate waste plastics to naphtha/deisel conversion.
2017
Expand into alternative waste management solutions, zero to landfill, processing at source.
2018
Synergy joins parent company holding all converter IP in North America for leases, etc for Synergy Conversion
2021

DRIVING VALUE FROM THE CORE



COLLECTION

RECYCLING

FACTORY PLANNING

WASTE CONVERSION

WASTE REPURPOSING

ZERO EMISSIONS

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Converter® Comparison

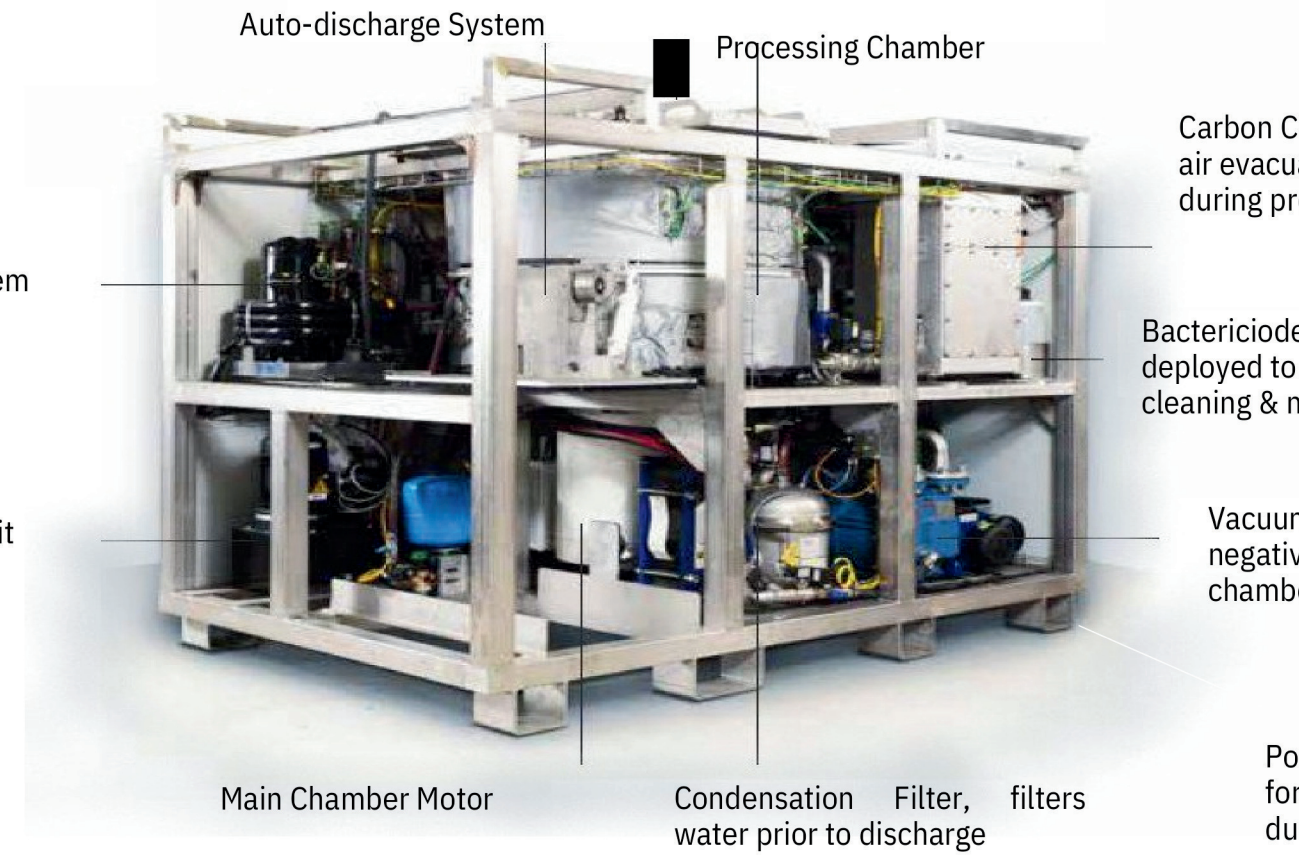
	CONVERTER® (moist heat sterilization)	Autoclave (hot steam process)	Autoclave with a shedder	Incinerator (high-heat process)
Continuous process	x	x	x	x
Integral shredding	✓	x	✓	x
Unrecognisable waste	✓	x	✓	✓
Volume of waste reduction	✓	x	✓	✓
Mass of waste reduction	✓	x	x	✓
Installation requirements	Low	High	High	High
Complexity of the installation	Low	Intermediate	High	High
Possibility of installation “in situ”	✓	✓	✓	x
Technology approval and recognition by countries all over the world	High	Intermediate	High	Low
Level of sterelization	High	Intermediate	High	High
Odours	Low	High	Intermediate	Intermediate
Level of noise	Low	Intermediate	Intermediate	High
Treatment of pathological and anatomical waste	✓	x	✓	✓

	CONVERTER® (moist heat sterilization)	Autoclave (hot steam process)	Autoclave with a shedder	Incinerator (high-heat process)
Impact on the environment	No	Intermediate	Intermediate	High
Treated waste recyclable	✓	x	x	x
No contaminated rejection (such as water, steam)	✓	x	x	x

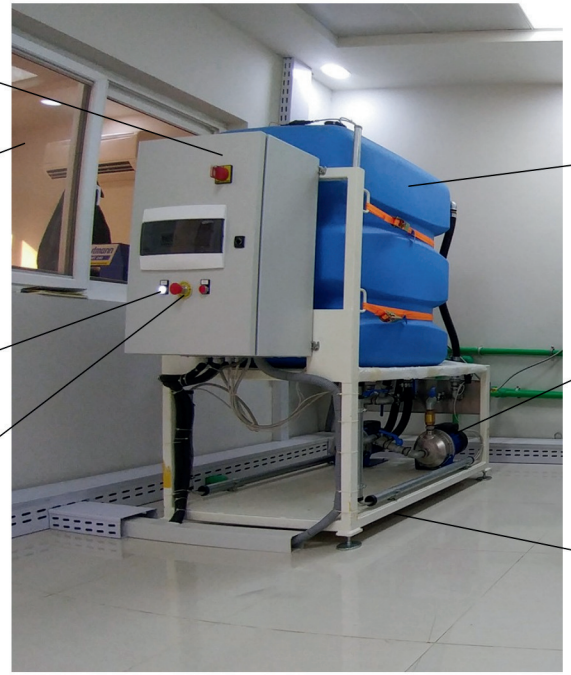
Converter Configuration

Each system is comprised of three subsystems – the converter itself (centre), a chiller system (left) and electrical cabinet (right). The electrical cabinet houses any transformers, relays, protection circuits, motor controllers and main computer. The chiller system contains a water/glycol mix which is circulated through the converter to control the temperature of the converter unit. The main system/converter is where the waste is processed, converted and rendered inert, free of viruses and bacteria.

Converter - Main System



Converter – Water Recirculation System



Power Switch with Lock Out

Control Panel (ABB, Siemen, Snyder UL/CSA/ CE certified components)

Status Light Bar

Emergency Stop

Water / Glycol reservoir

Circulating Pump

Powder coated steel / stainless steel frame for maintenance free dur ability

Converter – Electrical Cabinet

100 Series

Organic 15 to 20 kg/h
Municipal 30 to 40 kg/h
machine footprint [mm - h]
1500x1100-1400
total installed power [KW] 55
nominal motor power [KW] 50
nominal current [A] 70
peak current [A] 80
Electrical consumption[KW/Kg]
0,4 - 0,6

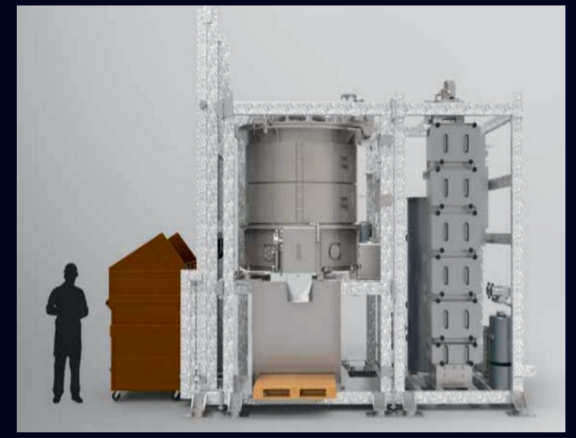
200 Series

Organic 30 to 40 kg/h
Municipal 40 to 80 kg/h
machine footprint [mm - h]
1950x1200-1400
total installed power [KW] 65
nominal motor power [KW] 60
nominal current [A] 95
peak current [A] 120
electrical consumption
[KW/Kg] 0,4 - 0,6

400 Series

Organic 60 to 80 kg/h
Municipal 100 to 150 kg/h
machine footprint [mm - h]
2300x1500-1800
total installed power [KW] 100
nominal motor power [KW] 85
nominal current [A] 120
peak current [A] 150
electrical consumption
[KW/Kg] 0,4 - 0,6

Mega Series 1K, 2K, 5K



5000 Series
organic 500 to 600 kg/h
municipal 1500 to 1800 kg/h

2000 Series
organic 250 to 350 kg/h
municipal 600 to 800 kg/h

1000 Series
organic 150 to 200 kg/h
municipal 200 to 300 kg/h

Mobile / Remote Waste Conversion Systems

Fully Autonomous Waste Conversion Systems

Mobile / Remote Waste Conversion Systems

Mobile / Remote Waste Conversion Systems
Fully Autonomous System Diesel Powered System

1 Converter® 400 liters 1 Cooling System
3 Water Tanks
1 Diesel Generator
1 Electric Control Cabinet Internal lighting system
OPTIONS: NATO Mimetic pattern painting

DIMENSIONS of the CONTAINER: 40’

Mobile / Remote Waste Conversion Systems Containerized System less Power Unit

1 Converter® 400 liters 1 Cooling System
3 Water Tanks
1 Electric Control Cabinet Internal lighting system
OPTIONS: NATO Mimetic pattern painting

DIMENSIONS of the CONTAINER: 20’

Converter Installations

Hospitals
Recolte Portugal 2012 200 series
Ekiplanet Croatia 2016 200 series
Rebaltus Lithuania 2015 100 series
Ekomedika Montenegro 2013 2000 series
MIT Hospital Kazakhstan 2015 200 series
Brno Hospital (Siemens) 2017 200 series
Kolin Hospital Czech Republic 2021 200 series
Seed Hospital Pakistan 2017 100 series
Veterans Hospital Russia 2012 200 series
Global Medical Botswana 2018 400 series
National Hospital Panama 2018 200 series
E2M Hospital Indonesia 100 series
E2E Hospital Philippines 2019 100 series

Grocery / Malls
XMET Group UK 2015 200 series
XMET Group UK 2017 2000 series

Marine / Naval Vessels
Italian Navy 8 ships x 100 series
Italian Navy 60 series
French Navy 4 ships x 100 series
Royal Navy (UK) 8 ships x 100 series
US Hospital ship 60 series

Transfer Sites
Botswana Transfer 2021 2000 series
Kiel Russia 2015 5000 series
Arieco Turkey 5000 series
CRC Petrochemical South Africa 2000 series

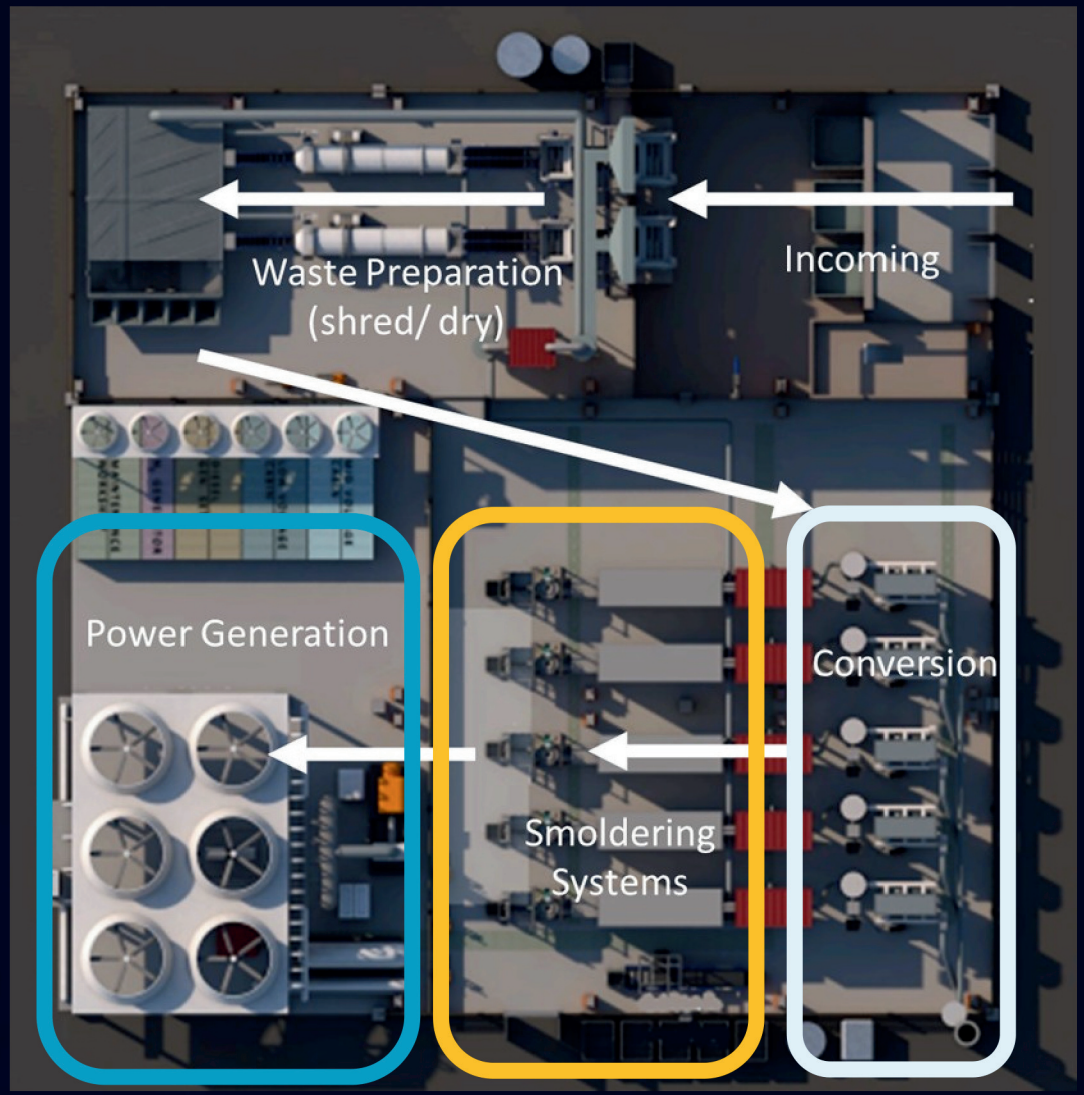
Waste to Energy

The Conversion Process

Step One Input Waste Conversion

Step Two Energy Removal from converted waste inputs

Step 3 Transform energy into electricity



The Conversion Process – Step 1

Utilizing our patented conversion technology, the mixed waste inputs* enter the converter system where the lid is closed and unit up under a slight negative pressure.

A series of mechanical blades rotate to breakdown the waste into a homogeneous, uniform and consistent form with a constant low heating value (min 12 MJ/kg), granulometry (<5mm), density, and humidity.

The process is entirely mechanical and achieved without the addition of an heat sources such as fuels, natural gas or electrical heater bands.

Sensors in the chamber enable the system to vary speed, torque and direction in order to achieve the desired processing.

*municipal solid waste, glass, plastics, papers, medical/clinical waste, mixed wastes. Metals are removed through magnet sorters, non-metal via eddy current tech.

The Conversion Process – Step 1

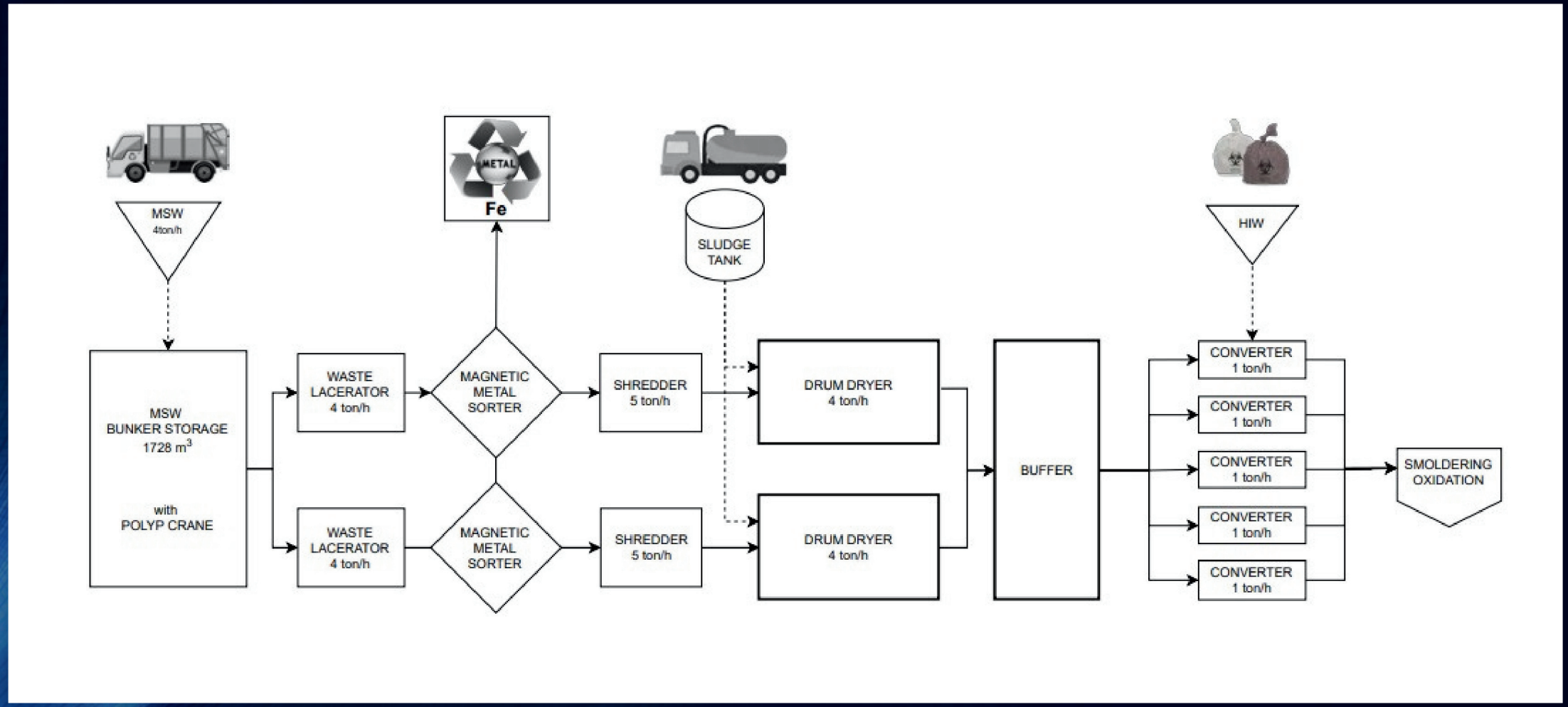
The Converter is designed to reach 20 Logs microbial abatement, corresponding to the elimination of a population of 1014 c.f.u. (colony forming units) with a Sterility Assurance Level of one over one million (@151°C).

The Converter works according to the following batch cycle:

Automatic loading of the waste in the treatment chamber.
•Cycle start-up (1)
•Shredding and heating of the waste (2)
•Complete dehydration at 100°C (3)
•Overheating at 151°C (sterilization) or 121°C (pasteurization) (4-5)
Cooling down through a rotor speed decrease (6)
•Unloading of the treated product by centrifugal forces, into the collecting bin (7)

Used for RDF normalization, dehydration, size reduction and sterilization (when required).
Operating chamber: 2 m3, Hardox high speed rotary blade, Power: 350kW 400V 60Hz, 14.000 kg, 10.5 x 7 m

The Conversion Process – Step 1



The Conversion Process – Step 1

MSW

69% of waste ends up in landfills or incinerators.
Ontario's available landfill capacity is expected to be exhausted in 9 years, by the year 2032.
If the United States were to prohibit Ontario waste from crossing the border, Ontario's landfill capacity will be exhausted by 2028.
Ontario generates 12M MT of waste per year.

Medical

The average healthcare visit generates 1.86 kg of medical waste, the average daily waste for an overnight visit is 2.41 kg / day.
86,892 Metric Tonnes of medical waste is generated in Canada each year.

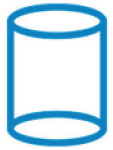
Recyclables

13% of collected waste is diverted to recycling, 80% of which ends up in a landfill / incinerator.
Of the materials sent for recycling it is estimated that only 5 to 9% is actually recycled.

The Conversion Process – Step 1

Weight Reduction

Up to 50%



Volume Reduction

Up to 80%

Safe Output

No dust, odor, decomposition, vermin

Safe Output

No processing emissions

GHG Emissions

Reduced emissions of the entire waste stream

Easy to Use

Point & Click, Automatic Operations

Landfill Avoidance

Repurpose, reuse sterile outputs

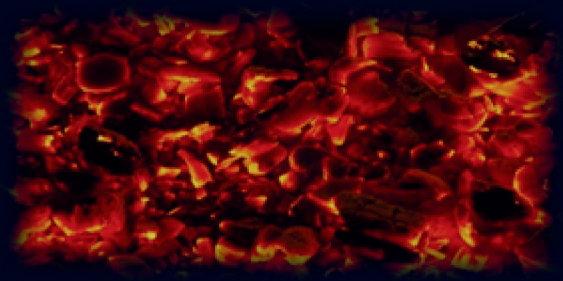
Clean Waste to Energy

The Conversion Process – Step 2

The next step in the process has been specifically designed to avoid the formation of pollutants by fully oxidizing the N-RDF through the combination of different oxidation methods. The state of the N-RDF makes the controlled process possible.

Smouldering combustion can be defined as a semi-self-sustaining, slowly propagating, low-temperature flameless combustion process in which solid fuel undergoes thermal decomposition, producing volatiles and carbonaceous char.

Subsequently to the smouldering phase, volatiles and char are fully oxidized in a gas burner to produce high quality thermal energy.



*Normalized Refuse Derived Fuel

The Conversion Process – Step 2

The converted waste, in a normalized state known as N-RDF, enables Synergy to properly manage the release of energy from the RDF through a smouldering process.

The N-RDF's state has consistent heating values, granulometry, density and humidity. It is these factors which enables the controlled smouldering of the N-RDF in a manner which greatly increases the energy extraction while minimizing negative emissions.

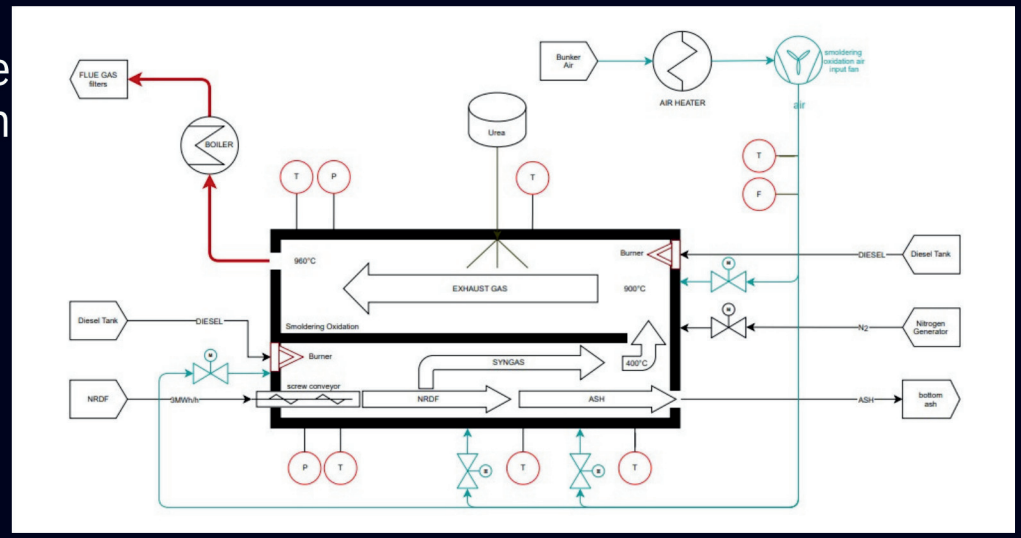
The consistency of the N-RDF allows for a slow, controllable process where, through the injection of a sub-stochiometric quantity of air, the volatile part of the N-RDF is slowly transformed into a combustible gas which is then immediately oxidated at high temperature through the injection of comburent air.

Exhaust gases are processed via a chemical reactor to further eliminate emissions.

*Normalized Refuse Derived Fuel

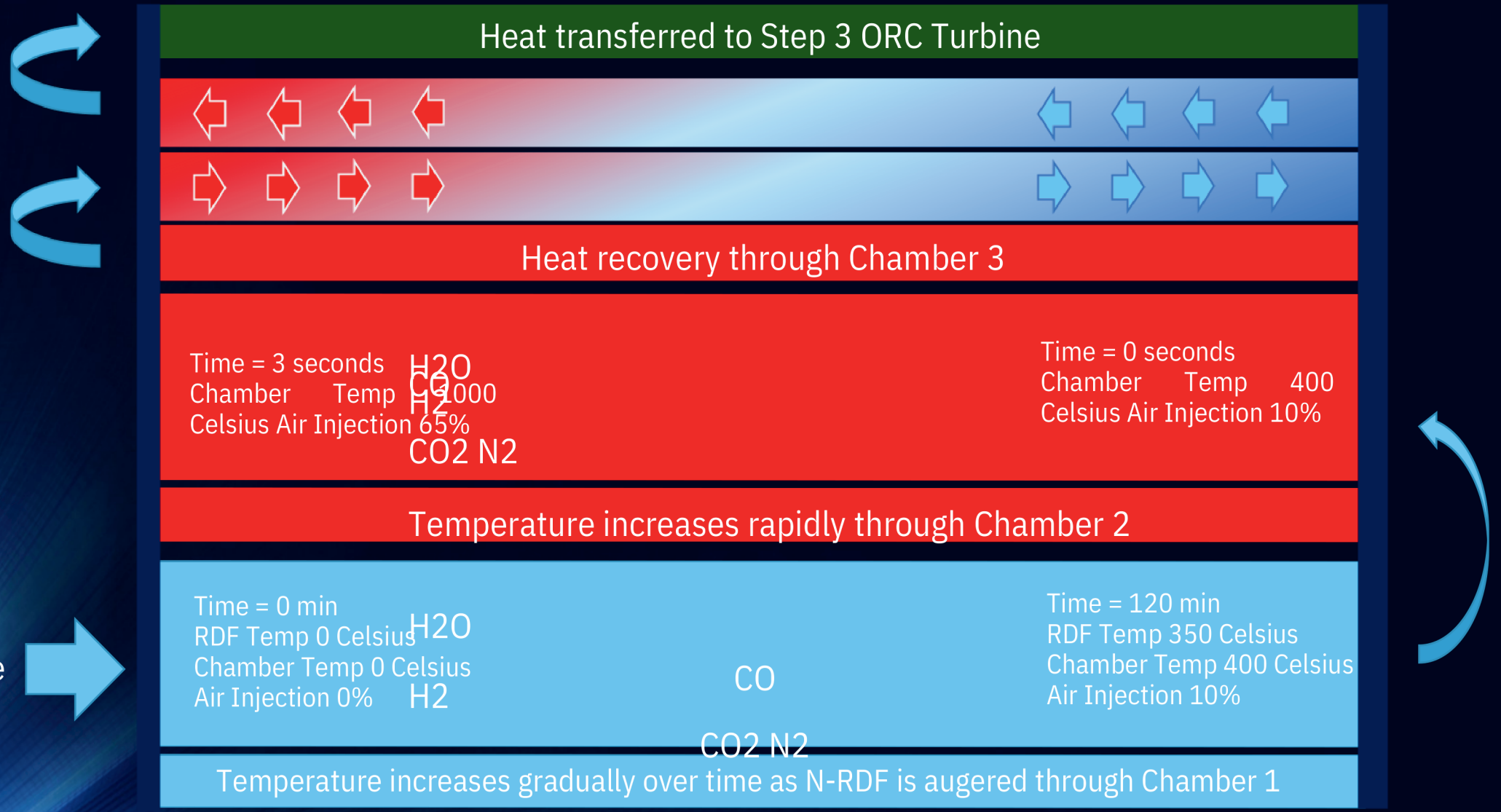
The Conversion Process – Step 2

Step 2 is a multi-phase oxidation method designed to fully oxidate the N-RDF by transforming most of the oxygen, hydrogen, and carbon content of the input in CO2 and H2O, leaving at the end of the process a very low carbon content ash and recovering heat. This is a slow oxidation process in oxygen deficiency, it produces a clean and burnable syngas. The syngas and its latent heat is then fully oxidated in an oxygen excess gas burner to recover the energy content of the N-RDF. The low temperatures used during the first phases of the process and the slowness with which the process is deliberately carried out allows the creation of a very low environmental impact allowing instead an excellent energy recovery. The exhaust gases resulting from the oxidation process after their energy recovery are sent to the filtration system. The non-combustible materials, contained in the loaded NRDF, are rendered inert through their complete oxidation, separated from their metals content, and collected as inert ash.



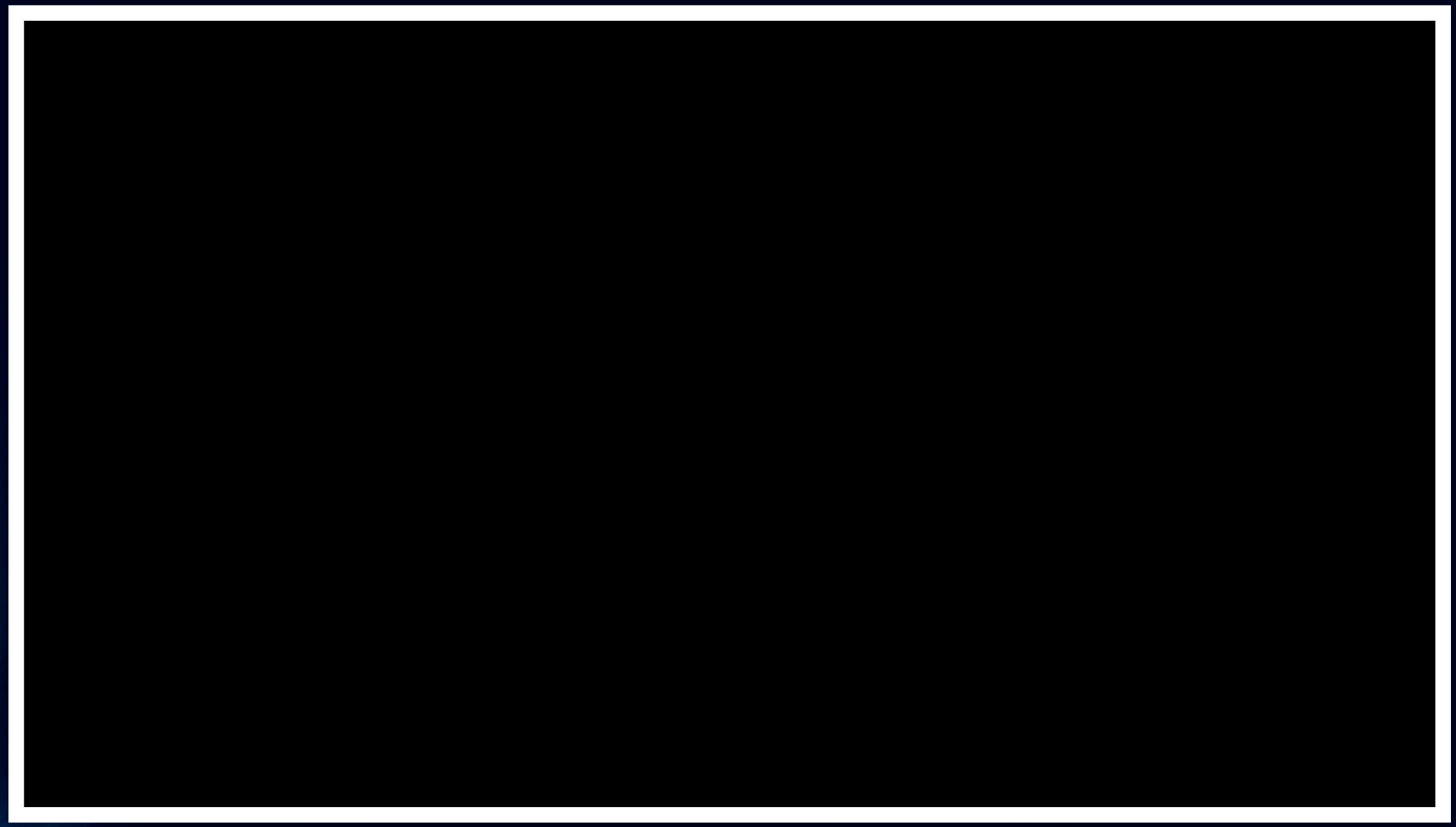
*Normalized Refuse Derived Fuel

The Conversion Process – Step 2 (graphic)



N-RDF enters the chamber

The Conversion Process – Step 2 (video)



This video is hosted by WINwithHoneycomb and can be viewed at: https://www.winwithhoneycomb.com/videos

The Conversion Process – Step 3

The last step in the process is energy recovery, which is carried out using the thermal energy of the exhaust gases.

Though a series of heat exchangers the thermal energy is transferred to an Organic Rankine Cycle turbine.

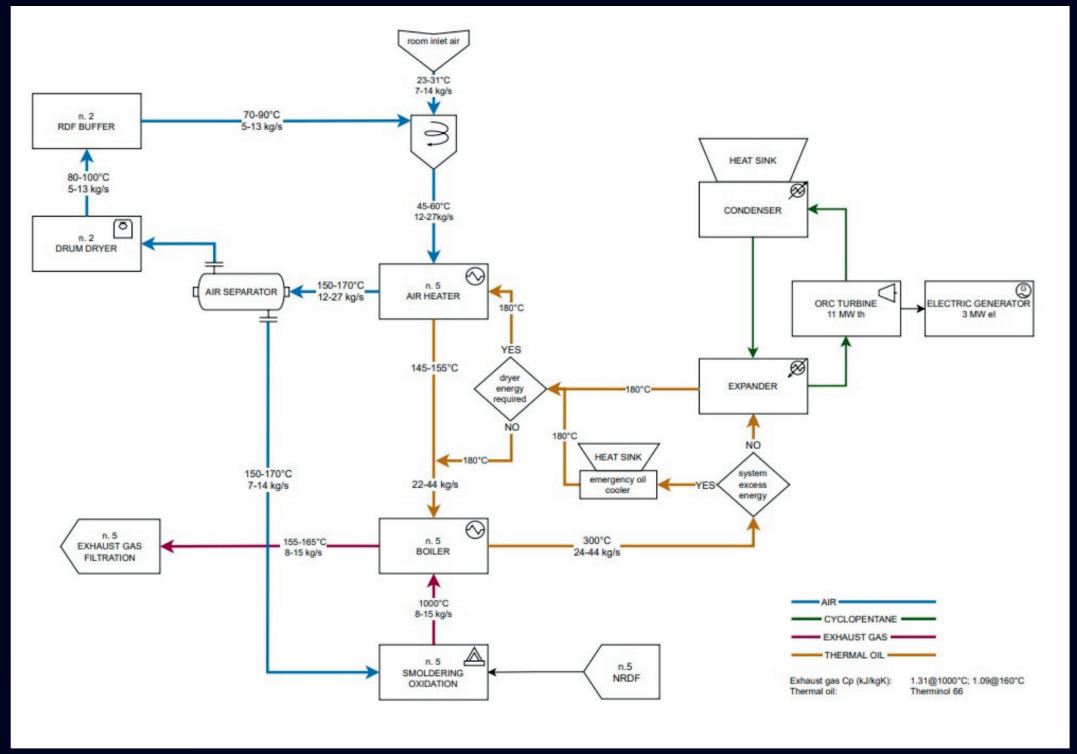
An Organic Rankine Cycle (ORC) system is a closed thermodynamic cycle used for power production from low to medium-high temperature heat sources ranging from 80 to 400°C and for small-medium applications at any temperature level. This technology allows for efficient exploitation of low-grade heat that otherwise would be wasted.

*Normalized Refuse Derived Fuel

The Conversion Process – Step 3

The final step of the process involves:

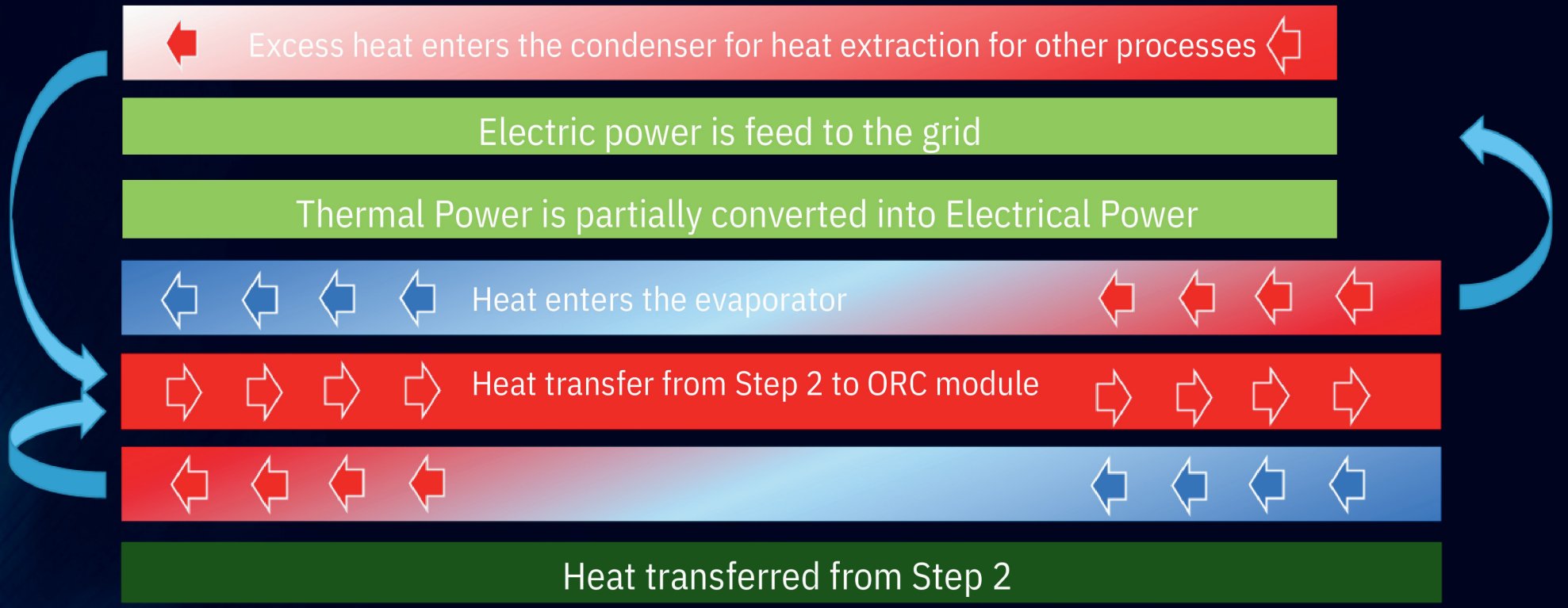
- a boiler cools the flue-gases and transfers the heat from the flue-gases from the gases to a thermal oil
- an ORC turbine then uses the heat of the thermal oil to produce electric energy
- any thermal energy not converted by the ORC turbine is capture through an oil to air heat exchanger to produce on site heat, to enhance the internal plant's treatment processes (210 kWh / ton of input waste is diverted for self sustainment of the process.



3 MW electric generator
600 kW to 3300 kW (20 to 110 %)
(25.2 to 27.5% efficiency)

*Normalized Refuse Derived Fuel

The Conversion Process – Step 3



Emissions

Step 1: N-RDF production has no emissions as the process is entirely mechanical.

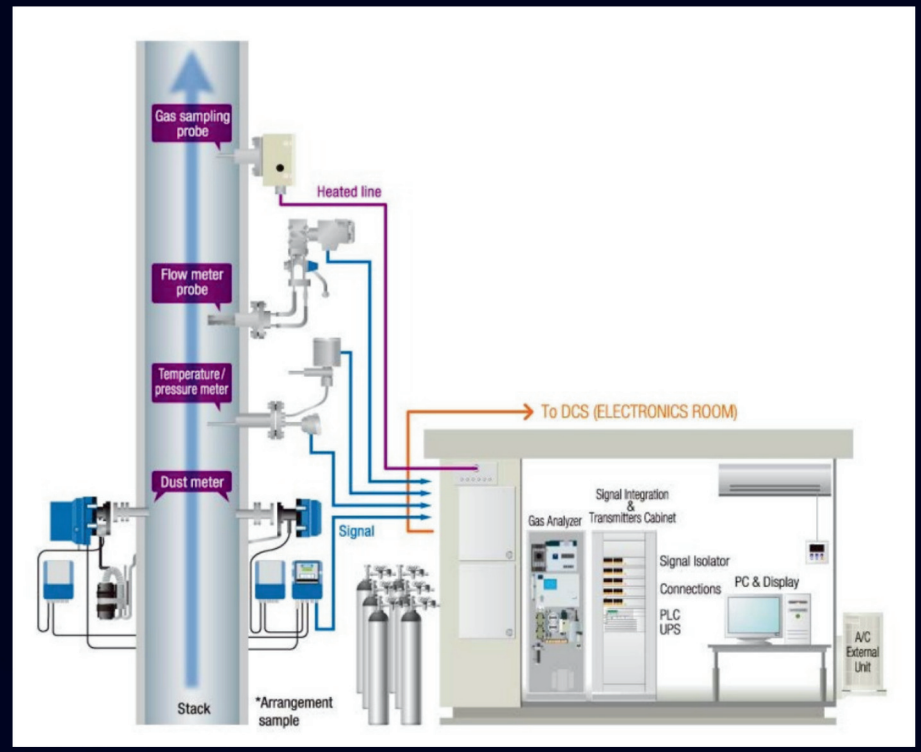
Step 2: N-RDF conversion is a slow process minimizing dust, metal vapours and VOC generations. The exhaust and dust emissions are controlled via several processes including; incoming N-RDF consistency, controlled operating temperatures, controlled airflow (< 2m/s), air filters, dry filtering systems.

Over 95% of SOx can be removed, over 99% of the HCl, and over 95% of the HF. The most common neutralisation reactions are: $Ca(OH)_2 + SO_2 \rightarrow CaSO_3 + H_2O$ $Ca(OH)_2 + SO_2 + 0.5\ O_2 \rightarrow CaSO_4 + H_2O$ $Ca(OH)_2 + 2\ HCl \rightarrow CaCl_2 + 2\ H_2O$ $Ca(OH)_2 + 2\ HF \rightarrow CaF_2 + 2\ H_2O$
transformed into calcium sulfite, calcium sulfate, calcium chloride, and calcium fluoride, the acidic gases
are captured on bag filters as solids.

Emissions Monitoring

The purposes of emissions monitoring are to:

•provide data and information about the facility emissions, to demonstrate compliance with the regulatory requirements
•provide emission performance information to the facility automatic management system
•enable the operators to take corrective action, if necessary.



The Conversion Process - Figures

Feedstock	Treatment	Average low calorific value	Energy Generation Capacity
Municipal Solid Waste Sewage Sludges Medical/Clinical Waste Max size 2.5 x 2 x 1.5 m 500 kg/m3 13.3 MJ/kg energy	ton/day 96 ton MSW 18 ton sludges 4 ton medical	Up to 288 MWh per day 13.3 MJ/kg dry 12 MJ/kg 19 per wet	3 MW electric generator 600 kW to 3300 kW (20 to 110 %) (25.2 to 27.5% efficiency) Energy required: 210 kWh / ton of input waste

The system / plant is modular, increasing input can be processed with a duplication of the required processes.

Plant Availability

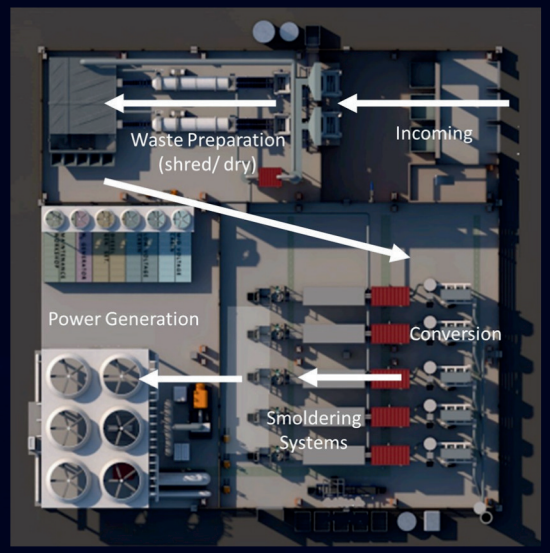
The waste treatment areas (N-RDF production and smoldering oxidation) is designed to work 24 hours / day. To avoid any waste treatment service interruption and to manage the peak in the feedstock input, the N-RDF production area is designed with an overcapacity of 50% on nominal capacity and the smoldering oxidation area with an overcapacity of 20% on nominal capacity.

The electric production area is expected to work at least 8.400 hours per year (>95%), considering 2 weeks of maintenance activities. During the ORC stop, the plant can manage the waste treatment activities but is not able to recover its energy content.

Maintenance plans and schedules, managed through a detail maintenance program, with virtual links to technology experts in place for plant maintenance, predictive analytics and supply chain management.

Plant Specifications & Processes

- 6400 m2 plan with a reinforced concrete basement of 80 m x 80 m
- a light building built on the basement 72 m long x 72 m wide x 12 m high a chimney 20 m high
- an electric grid connection (3kWA 20kV 60Hz)
- an internet connection (symmetric > 20 MB)
- water for civil use (no water is used into the process)
- sewerage system for civil use (no water is discharged by the process)



The outlined infrastructure houses the following processes:

Incoming waste reception
Waste Storage
N-RDF Production
Thermal Treatment of N-RDF
Ash Management
Flue Gas Cleaning
Fly Ash Management
Emissions monitoring and Control
Energy Recovery

System Tracking Software

A waste tracking system software is installed in the plant, holding all the information generated during pre- acceptance, acceptance, storage, treatment, and removal off site.

The plant server records the following information:
Truck crossing the eco-site gate
The pre-acceptance data
The plate and the picture of the truck with date and time of the entrance and of the exit
The weight at entrance and at exit
The dumping operation videos
The result of the acceptance procedure
The position of the transported batch of waste inside the storage area
The processing period (start and end, date, and time) of every batch
As a way of keeping an up-to-date waste inventory, the waste tracking system also aims at avoiding the accumulation of aged waste.

Additional Details Available

Incoming MSW Receiving Process
Material Preparation
Incoming Sewage Sludge Receiving Process
Waste Storage Process (MSW, Sludge, Medical)
Smoldering System Details (air feeding, oxidation monitoring, feeders, oxidation process, temperature maps, process flow charts, non-catalytic reduction processes)
Oxidation Module
Ash Management
Flue Gas Cleaning
Dust Management
Acid Gas Management
Filtering System
Flue Gas Reactor
Exhaust Gas Monitoring
ORC Turbine Details
Process Control System

Certifications

NCAGE AH649

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