GEODYN™ SOLUTIONS

GEODYNSOLUTIONS.COM

LEADING IN WASTE TO CLEAN GEODYN SOLUTIONS ENERGY

ZERO WASTE

INTRODUCTION

With Geodyn Solutions Technology, the process begins by placing waste material on to the initial conveyor. The system can use a small loader or it can be confi gured to accept material directly from collection vehicles. The process is very useful for waste material with high organic content. The TWS comes equipped for a “negative sort”, removing rocks, metals, and other inert materials or potential contaminants. This sorting line is on the ground level and is typically three feet wide (0.91 meters).

With heavier sorting requirements, Geodyn Solutions has the option of adding a trommel screen and elevated sorting line for the removal of recyclables. Immediately prior to the sorting line, the rotating trommel screen can be placed to remove materials that are under a designated size.

Typically, this screen is 3 inches (7.6 cm), so all small materials will drop into the ground level sorting line. At this point metals will be removed by a ferrous magnetic sorter and rocks and glass are removed by a sorting personnel. The trommels are sized to the desired processing capacity of the system, also it could be designed at the client’s discretion. Also, additional mechanical sorting equipment may be added such as optical sorters and air handlers or other processing equipment.

Geodyn Solutions total waste system (TWS) is patented series of equipment and processes with specialized technology to convert any solid waste material into a marketable product through the cleanest measures.

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ZERO LANDFILL TRANSFORMING WASTE TO ENERGY

SUSTAINABLE TRANSFORMING WASTE FLOWS, MATERIAL AND ENERGY

ERADICATING PATHOGENS, BACTERIA AND ODOR TO A USABLE FINISHED PRODUCT IN AN HOUR

REMEDIATING GREEN WASTE INTO SOIL AMENDMENTS

RECLAIMING WATER FROM WASTE AND MAKING IT USEABLE

46 PATENTS INTERNATIONALLY FOCUSED ON CIRCULAR ECONOMY

ENERGY WATER WASTE SPACE TIME

TYPES OF WASTE PROCESSED

DOMESTIC WASTE / FOOD WASTE

Waste from household activities, including food preparation, cleaning, fuel burning. old clothes and furniture, obsolete utensils and equipment. Packaging, newsprint, and garden wastes.
In lower-Income countries, domestic waste is dominated by food waste and ash. Middle- and higher-income countries have a larger proportion of paper, plastic, metal, glass, discarded items, and hazardous matter.

INSTITUTIONAL WASTE

Waste from schools, hospitals, clinics. Government offices, military bases, and so on. It is Institutional Waste similar to both domestic and commercial waste, although there is generally more packaging materials than food waste. Hospital and clinical waste include potentially infectious and hazardous material. It is important to separate the hazardous and non-hazardous components to reduce health risks.

INDUSTRIAL WASTE

The composition of industrial waste depends on the kind of industries involved. Basically industrial waste includes components similar to domestic and commercial source waste, including food wastes from kitchens and canteens, packaging materials, plastics. Paper, and metal items. Some production processes, however. Utilize or generate hazardous (chemical or infectious) substances. Disposal routes for hazardous wastes are usually different from those for non-hazardous waste and depend on the composition of the actual waste type.

STREET SWEEPINGS

This waste is dominated by dust and soil together with varying amounts of paper, metal. Street Sweepings and other litter from the streets. In lower-income countries, street sweepings may also include drain cleanings and domestic waste dumped along the roads. Plant remains, and animal manure.

COMMERCIAL WASTE / FARM WASTE

Waste from shops, offices, restaurants, hotels, and similar commercial establishments: typically consisting of packaging materials, office supplies, and food waste and bearing a close resemblance to domestic waste. In lower-income countries, food markets may contribute a large proportion of the commercial waste. Commercial waste may include hazardous components such as contaminated packaging materials.

CONSTRUCTION AND DEMOLITION WASTE

The composition of this waste depends on the type of building materials, but typically includes soil, stone, brick, concrete and ceramic materials, wood, packaging materials, and the like.

Specialized waste in **Organic variations** including **Green Biomass, Livestock, Hemp, Seaweed & Palm Leaves.**

WASTE TO CLEAN ENERGY PROCESS

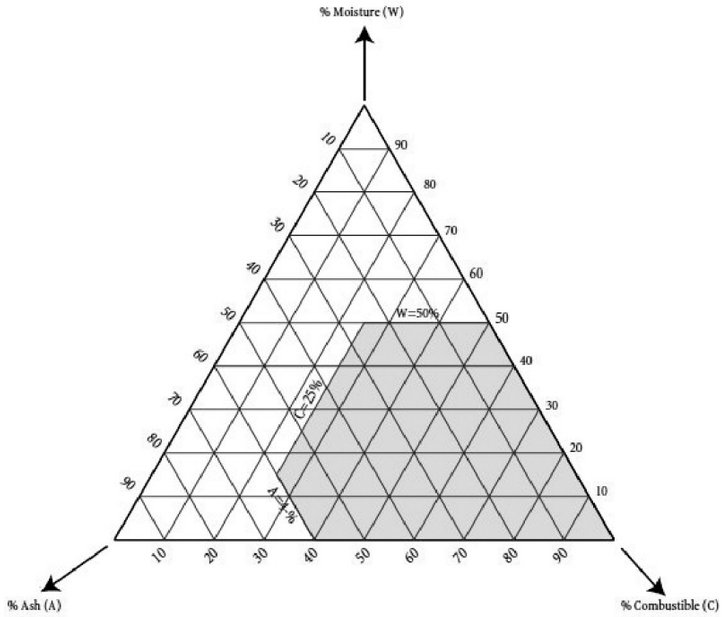
THE TYPES OF WASTE DESCRIBED ABOVE ARE SENT TO A MATERIAL RECOVERY YARD AND THE OUTPUT OF THAT CAN BE CATEGORIZED INTO TWO PARTS FOR THIS DISCUSSION.

1.) **ORGANIC WASTE** – which contains food waste and green waste and
2.) **MIXED WASTE** – which contains everything that can't be recycled, reused and is not metallic or inert (stones, rocks etc).

The two types of wastes are handled differently by MOST technologies. The technologies are limited by the type of waste, amount of heat content and finally the moisture content. For example, for most technologies the waste has to have a balance of MOISTURE, COMBUSTIBLE and ASH CONTENT.

On the other hand, RGI process can take waste from either end of the spectrum. This lowers the cost of conversion by reducing the need to segregate. Still it is advisable to segregate if it is possible as the REVENUE from the output is much higher from the organic waste compared to the mixed solid waste.

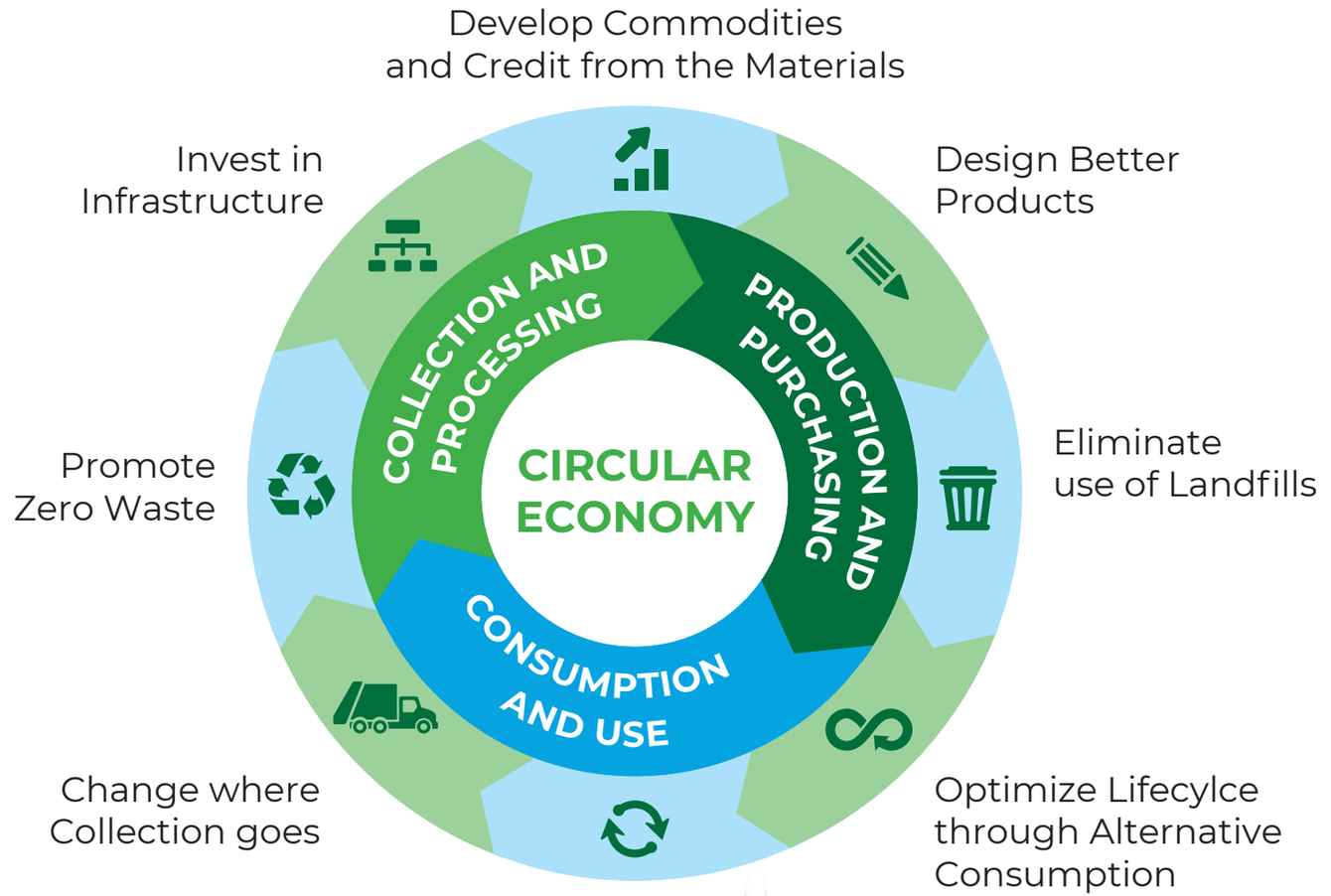
TANNER TRIANGLE FOR ASSESSMENT OF COMBUSTIBILITY OF MSW



“THE CIRCULAR ECONOMY LAID THE FOUNDATION FOR BUILDING A COMPANY THAT IS REINVENTING THE WASTE INDUSTRY – OUR BUSINESS MODEL IS CIRCULAR BY DESIGN.”

Recovery facilities normally have to remove recyclable materials from the sorting line and the remaining waste is then landfilled.

However, with the introduction of Geodyn Solutions, that is no longer the case.



INTELLECTUAL PROPERTY

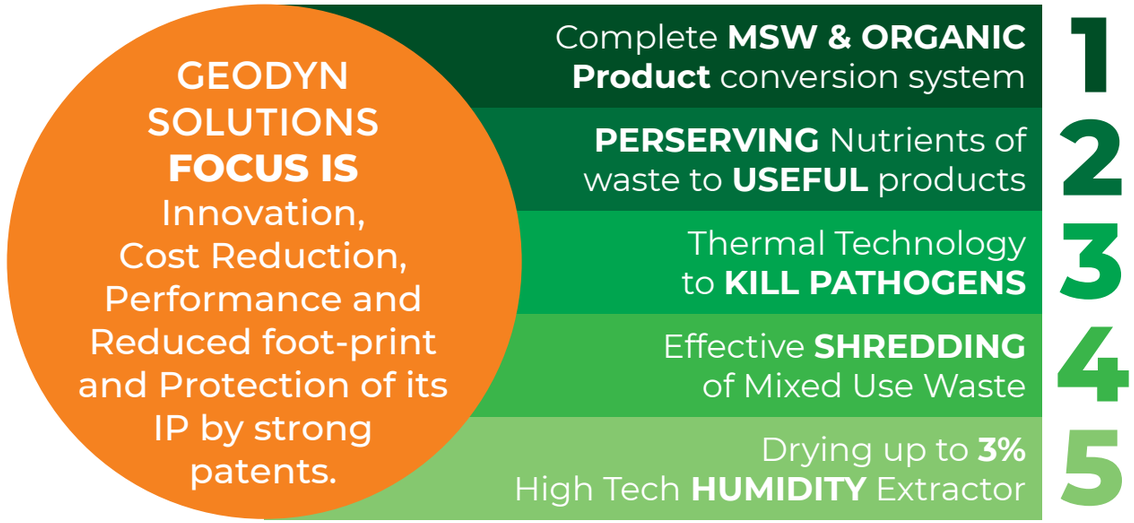
WE INNOVATE AND PROTECT

ATTRIBUTES TO CONSIDER:

- The process has been designed to a profit center compared to a cost center
- The end products are directly convertible into marketable commodities
- Geodyn Solutions process can be tuned to deliver the highest amount of desired end product (it can produce electricity, electric storage, syn-gas, fertilizer or animal food) • the process is designed to be ZERO LANDFILL, so there is NO residual waste destined for landfills (no further disposal) in the shortest period of cycle time.
- The system is designed to reduce the FOOT PRINT of the total plant by 10x (reduced land cost)
- The total comparative investment is lower by 5-8X (lower investment)
- The cost of conversion is designed to be low to accommodate positive ROI in even markets where the revenue potential of pellets is low (lower cost per ton)
- The technology has very low maintenance and operational complexity

METHODOLOGY:

Geodyn Solutions's innovative process is not directly comparable with the various Waste to Energy technologies and processes. This is due to the fact – that Geodyn Solutions Technologies process is designed from specifically to eliminate all the issues that are experienced by the current technologies. Therefore it is recommended that the reader compare the entire system cost being considered versus **Geodyn Solutions**.



WASTE TO CLEAN ENERGY INPUT

GEODYN SOLUTIONS TOTAL WASTE MANAGEMENT SYSTEM OFFERS A HIGHLY EFFICIENT PROCESS THAT LEVERAGES PATENTED EQUIPMENT AND PROPRIETARY TECHNOLOGY TO TURN AN INPUT OF MOST SOLID WASTE MATERIALS INTO MARKETABLE PRODUCTS AS AN OUTPUT.

The key differences between **Geodyn Solutions** system and other solutions in the market are the Patented Radiant Heat technology, and the efficiency of its continuous process approach. The combination of these two unique differentiators, enable the system to complete an end-to-end cycle in as little as 40-120 minutes, depending on feedstock, configuration, and desired end product. The system achieves this with minimum footprint, manpower, and location requirements.

INPUT

Municipal solid waste, plastics, organic waste (green waste, food waste, wood chips, sugarcane, all types of farm waste, manure, shell, hulls, etc.), and/ or multiple combinations of these, excluding commodities and clean fill.

RECENTLY COLLECTED ORGANIC MATERIAL THAT TAKES WEEKS TO BREAK DOWN IN A STANDARDIZED ANAEROBIC DIGESTIVE PROCESS CAN NO BE INCREASED IN THE EFFICIENCY OF PROCESSING IN AN HOURS TIME. WITHOUT DAMAGING THE RICH NUTRIENT CONTENT LEVELS.

1 hour

6-8% moisture

speeding up process by 30,000%

System, Geodyn Solutions Technologies, **Total Organic Processing & Zero Waste System,** makes availble one of the most efficient methods of drying and processing of organic materials. Removing some of the biggest bottlenecks within an organizations operation. Leveraging its proprietary equipment and patented technology to accelerate the separation, processing and non harmful rapid drying systems within 60 minutes time from the first conveyor to the final desired product of nutrient rich, deodorized, non pathogenic, non mold, non pesticide fluff or pellets. While requiring a fraction of the space and in the most minimal time.

The patented radiant heat technology accelerates the processing of wet material to extract the existing moisture in the products at a molecular level to achieve a 6% – 8% moisture. The system achieves these results without damaging nor burning the hemp while removing all contaminants and maintaining a nutrient rich output, protecting the lipids, fats, and terps to be separated through a later process of extraction.

The system is able to complete an end-to-end cycle in under an hour, depending on configuration, and desired end-product. The key to **Geodyn Solutions** system is the combination of the conveying, shredding, and sorting of the organic material into the continuous feed of the patented radiant heat system (extraction, dewatering press, and processor) in an efficient continuous process approach. The system achieves this with minimum footprint, manpower, and location requirements, speeding up the process by as much 30,000% while mitigating any waste byproduct.

OUTPUT

Depending on the input, the marketable end- and by- products options include, but are not limited to:

- Reclaimed water that can be reintroduced into the municipal system or utilized for irrigation
- Solids with high BTUs that emit less greenhouse gases into air in comparison to coal or any other energy source. The system also kills odor causing bacteria and viruses.
  - Pellets ideal for the substitution of coal in the power generation industry. With further processing into the **Material Processing System**, the following outputs are also achievable within one hour:
    - SynGas – 60% (methane, hydrogen, liquid gas, etc.) which could be further processed into green diesel, green jet fuel, and other traditional refi ned oil products.
    - **Bio-crude or bio-oil** – 20%
    - Carbon black – 20%
  - Fluff from organics waste typically used in traditional fertilizers and construction materials, among other applications.
- Carbon credits can be generated as a result of the reduction of equivalent GHG emissions. These can be either absorbed by the organization to offset their own emissions or sold in the market.

OUTPUT

Depending on the desired configuration the output options are fully processed fluff, or compressed pellets (**60 minutes**) that are rich in nutrients, and with a controlled level of moisture, free of mold, pathogens, and bacteria ready for transport and extraction.

The system is also capable of processing:

- **Water:** All excess moisture is re purposed into fi ltered reclaimed water, compliant for irrigation or similar purposes providing a circular economy alternative.
- **Waste:** It provides a zero waste alternative by transforming the organic waste into marketable byproducts.
- **Pellets: Geodyn Solutions**'s pellets are the system's coal equivalent. After going through the pelletizer, pellets are then subjected to the gasifi cation process to create syngas. Syngas is used to create steam, which will be used to power an electric turbine and produce electricity.
- **Fluff**

Geodyn Solutions system has found a way to "buy back" waste and turn it into pellets that are marketable just like coal but without the pollution and emissions, and additionally earn the vendor carbon credits as well.

In comparison to other sources of energy, we see that emission-wise and pollutant-wise they are the superior in every way, especially considering that they are never burned and do not go through the incineration process. On average, one megaton of **Geodyn Solutions** pellets / fluff will be able to produce **1MW/hr of electricity.**

CAPACITY

THERE ARE SEVERAL CONFIGURATIONS IN WHICH THE SYSTEM CAN BE SET UP ACCORDING TO THE DESIRED CAPACITY, THE MOST DEMANDED ONES ARE:


Shown: 3 Container – 3 Ton / hour

¼ METRIC TONS PER HOUR

- Volume can Process per Hour: 250 kg/hour
- Continuous Hours can Operate: 16 hours/day
- Size of Equipment in Sq. Ft.: 500 sq. ft.
- Size of Operation in Sq. Ft.: 1,000 sq. ft.
- Machinery Setting: Transportable – Plug & Play
- Staff Required to Operate: 2
  - 1 Supervisor
  - 1 Loader

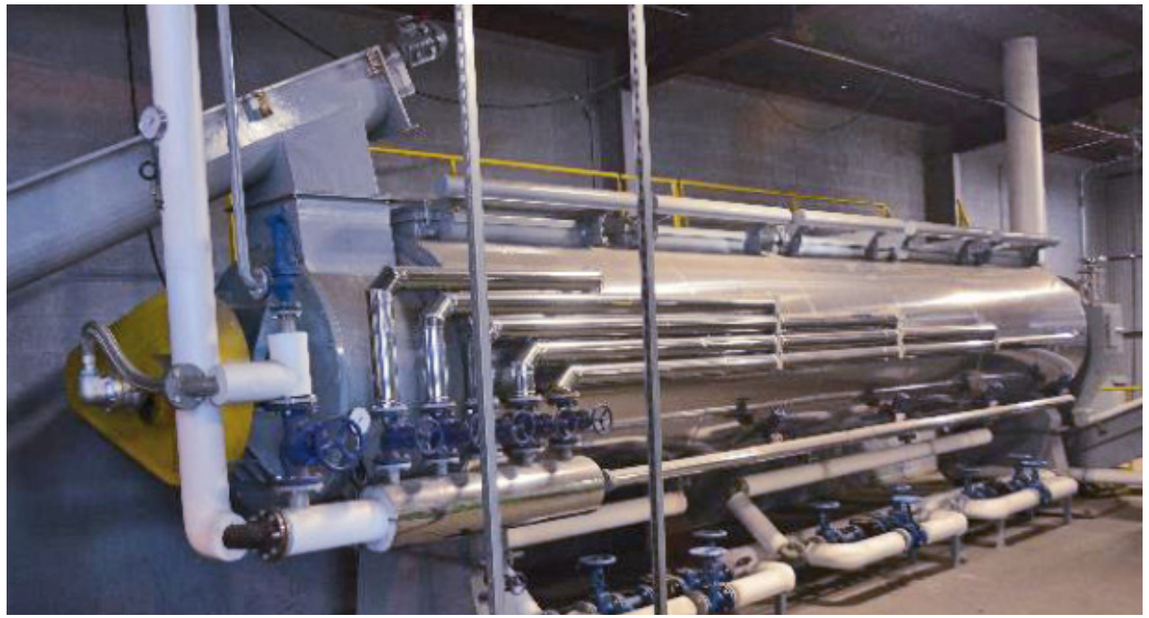
3 METRIC TONS PER HOUR

- Volume can Process per Hour: 3 Tons /hour
- Continuous Hours can Operate: 18 hours/day
- Size of Equipment in Sq. Ft.: 2,000 sq. ft.
- Size of Operation in Sq. Ft.: 5,000 sq. ft.
- Machinery Setting: Containerized – Plug & Play
- Staff Required to Operate: 7
  - 1 Supervisor
  - 1 Operator
  - 1 Loader
  - 4 Sorters

15 METRIC TONS PER HOUR

- Volume can Process per Hour: 15 Tons /hour
- Continuous Hours can Operate: 20 hours/day
- Size of Equipment in Sq. Ft.: 10,000 sq. ft.
- Size of Operation in Sq. Ft.: 20,000 sq. ft.
- Machinery Setting: Fixed
- Staff Required to Operate: 11
  - 1 Supervisor
  - 1 Operator
  - 1 Loader
  - 8 Sorters

¼ to 52 Metric Tons per Hour
Systems scoped to Organic or MSW Input and Output Requirements



SHREDDER

- Equipped with hydraulic pusher moving waste towards the shredding drum.
- The system uses patented blade cooling system.
- It can shred from thin to thick plastic films to toughest palm fronds.
- The waste is processed into uniform sizes of 50 millimeters or less.
- Uniform size and smaller particles are vital to the process since it helps the system to quickly kill bacteria, germs, and eliminate odors.

GEODYN SOLUTIONS RADIANT HEAT PROCESSOR

- During the initial unloading stage (prior to shredder), the odor is initially controlled by a built in mist/spray system.
- **Geodyn Solutions** Radiant Heat Processor will process the shredded waste to reduce the bacteria and odor causing pathogens.
- It is designed to lower the moisture content to less than 10%.
- It utilizes INDIRECT dry steam or oil for energy.

PRESS

- After exiting the Radian Heat Processor, the waste will transfer to the Press.
- It is designed to further remove the moisture content by 40%.
- The liquid extracted from the process is gathered and transferred to a special filtration system via a pump.

GEODYN SOLUTIONS RADIANT HEAT MOISTURE EXTRACTOR

- While the extracted liquid is going through the reclaim process, the solids are transferred to the Radiant Heat Moisture Extractor via the conveyor belt.
- At this stage, solids are further stabilized and the leftover moisture gets extracted and turned into a vapor, leaving the solids with the desired moisture level (as low as 4% - 6%).
- it also disintegrates many of the toxins that are found in the MSW.
- it utilizes INDIRECT dry steam or oil for energy.

PELLETIZER

- A grinder is then used to prepare the material for pelletizing or briquettes.
- The pellets can be made to any specification.
- This system uses **Geodyn Solutions**'s pellet-chiling unit to create a long lasting and high value commodity for energy applications.
- if only organic waste is used, the end product can also be used as fertilizer and/or animal feed.

FINISHED PRODUCT SPECIFICATION

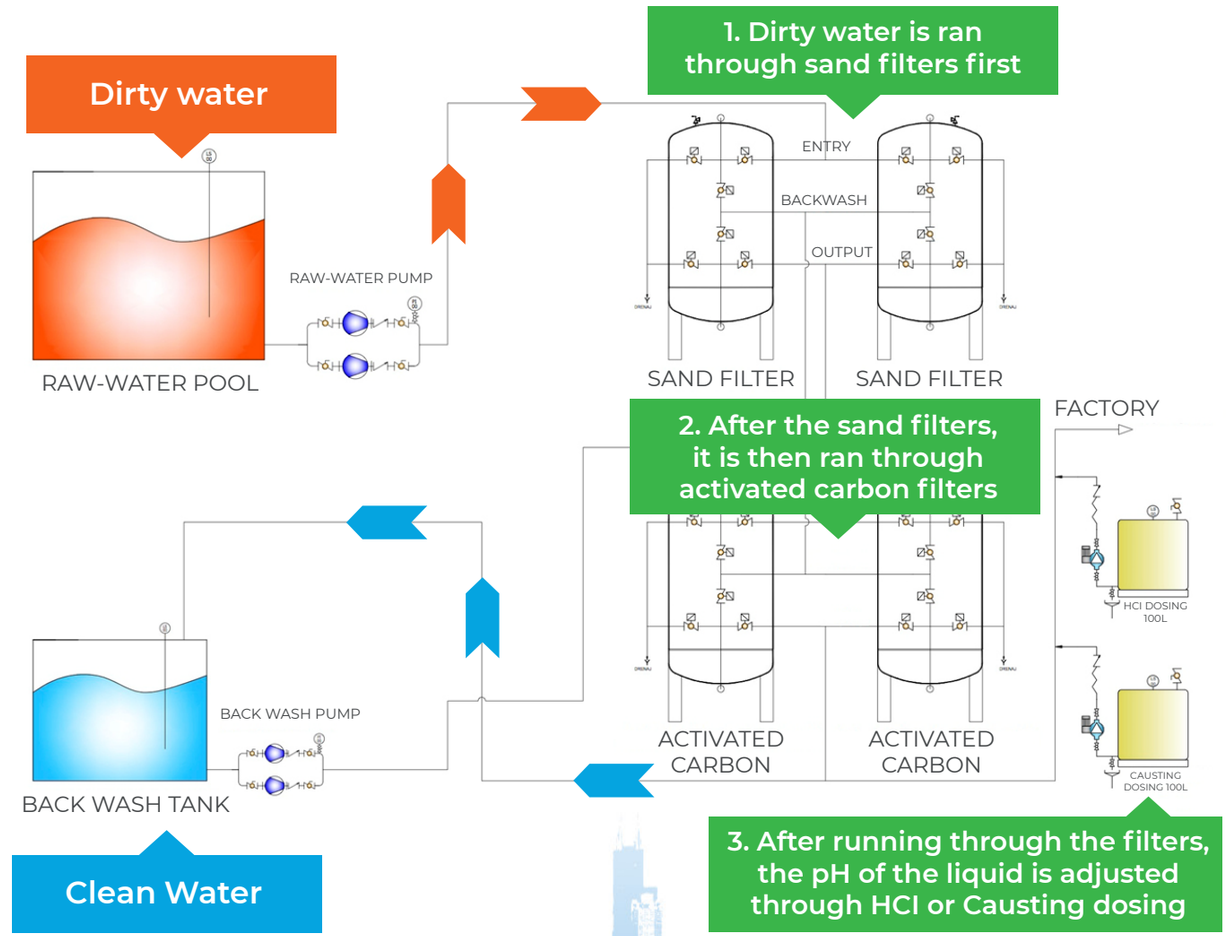
- **Geodyn Solutions's** pellets burn cleaner than any other source of fuel, and have a high BTU value.
- Our pellets do not produce smoke while burning and burns longer due to compact of the pellets.
- Smoke from the pellets if any, would be the Syngass
- Some applications will not require pellets, so material straight from the dryer (aka “fluff”) or ground into a powder form are also options.
- Pellets, fiuff, and powder are highly marketable for energy production, even when not in pellet form.

GEODYN SOLUTION WATER FILTER SCHEMATIC

LIQUID EXTRACTOR / WATER TREATMENT

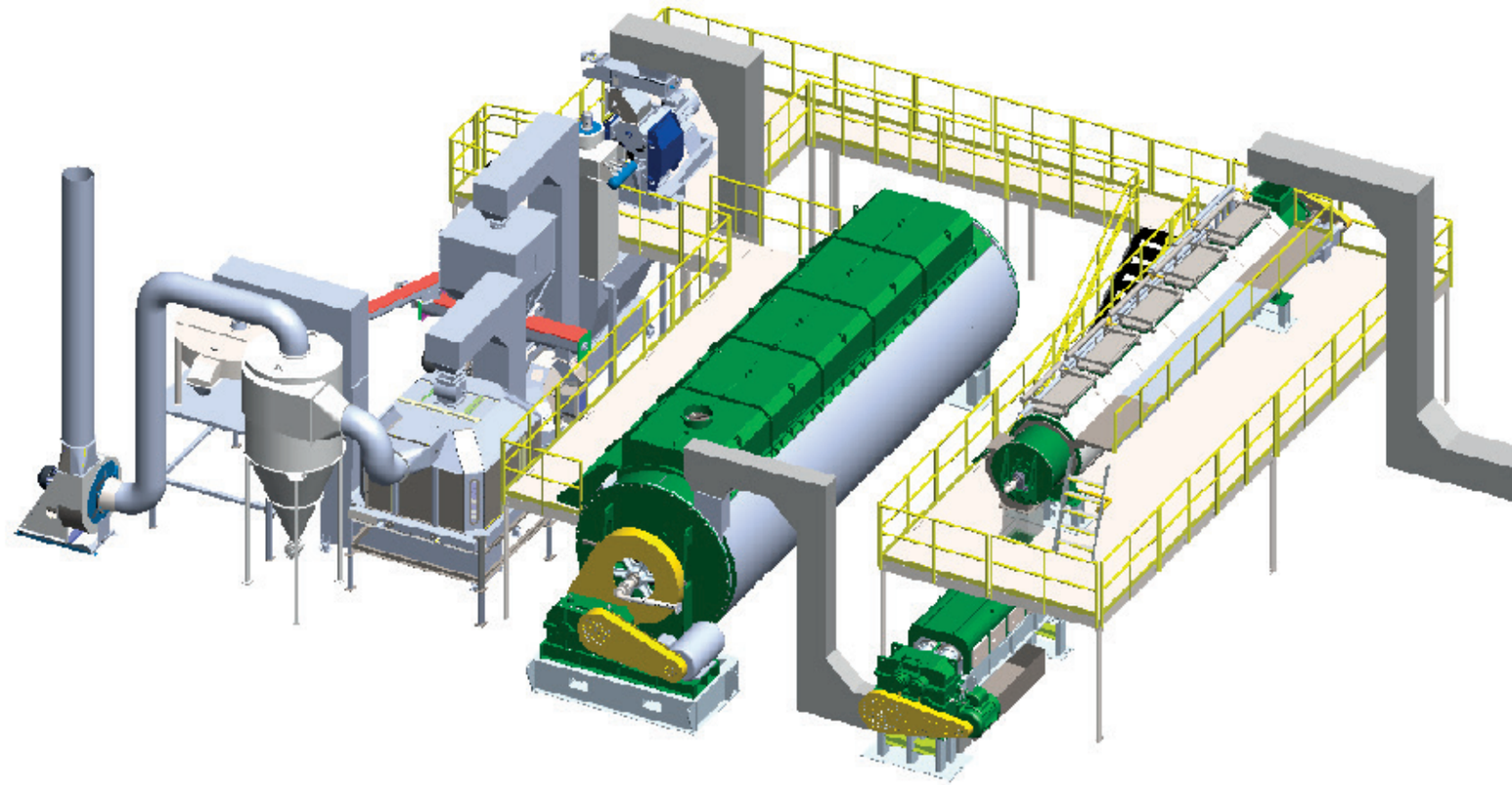
- The dirty water from the press is ran through sand filters first.
- The waste water is further filtered through activated carbon filters.
- The process adds chemicals to the water in order to reclaim it and in effect brings it back up to irrigation standards.
- The reclaimed water can then be used for cleaning, farming, or any other on/off site uses.

GEODYN SOLUTIONS WATER FILTER SCHEMATIC



ALL OF GEODYN SOLUTIONS PROCESS SYSTEMS STARTS WITH SHREDDERS FEATURING A PROPRIETARY DESIGN. THE SYSTEM IS THE HEART OF **GEODYN SOLUTIONS** SYSTEMS.

In summary, **Geodyn Solutions** TWS processed material (garbage or organic waste) performs better than any other processed material in gasifiers or applications that use coal for energy production. **Geodyn Solutions** process eliminates odor, greatly reduces harmful bacteria, and viruses from garbage and/or organic waste. Our system also effectively homogenizes the processed material. These unique actions and benefits, along with the lowest moisture content produced by any system in the world, creates end products (pellets/fluff/powder) that are significantly lower in emissions and avoid clinkering issues in all energy production applications.

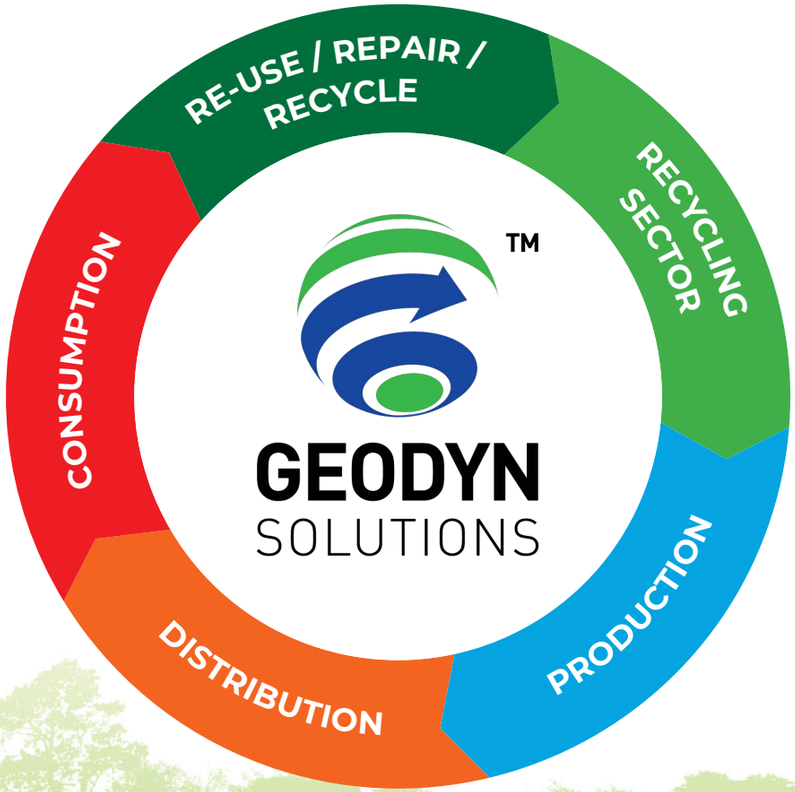


GEODYN SOLUTIONS: DISRUPTIVE TECHNOLOGY & BENEFITS

- No Expensive and Environmentally Non-Friendly storage is needed-Immediate Processing is done in less than one hour
- Modular and small Foot Print, Easy to Assemble, Can Accommodate Needs as they are scaled and provide redundancy
- Products are manufactured by **Geodyn Solutions** manufacturing partners.
- Multiple manufacturing strategically located global sites are being planned
- **Geodyn Solutions** System used radiant heat patented technology to avoid emissions and other disadvantages.
- 12 years of development, deployment and data results with an investment of $25M
- Extensive lab analysis and reports and licensing scrutiny for last 3 years
- Market demand extremely high both in US and globally
- Over 3 years with multiple systems operating in the field within California, USA for MSW and organic feedstock.
- Several complete systems have been manufactured and tuned.

ROI

5 REASONS THE PROVEN CONFIDENCE AND PRECISION IN THE END-TO-END PROCESS



TIME

1 Reduce the 1-3 weeks traditional bottleneck needed for drying hemp to less than 60 minutes. This means that the finished product can be shipped right away, greatly reducing costs for stock keeping (warehouse, security, handling, immobilized inventory, WIP, etc.)

SPACE

2 Free up the space normally used for the traditional drying process. This space can now be dedicated to additional growing area or layout optimization according to the operations.

WASTE

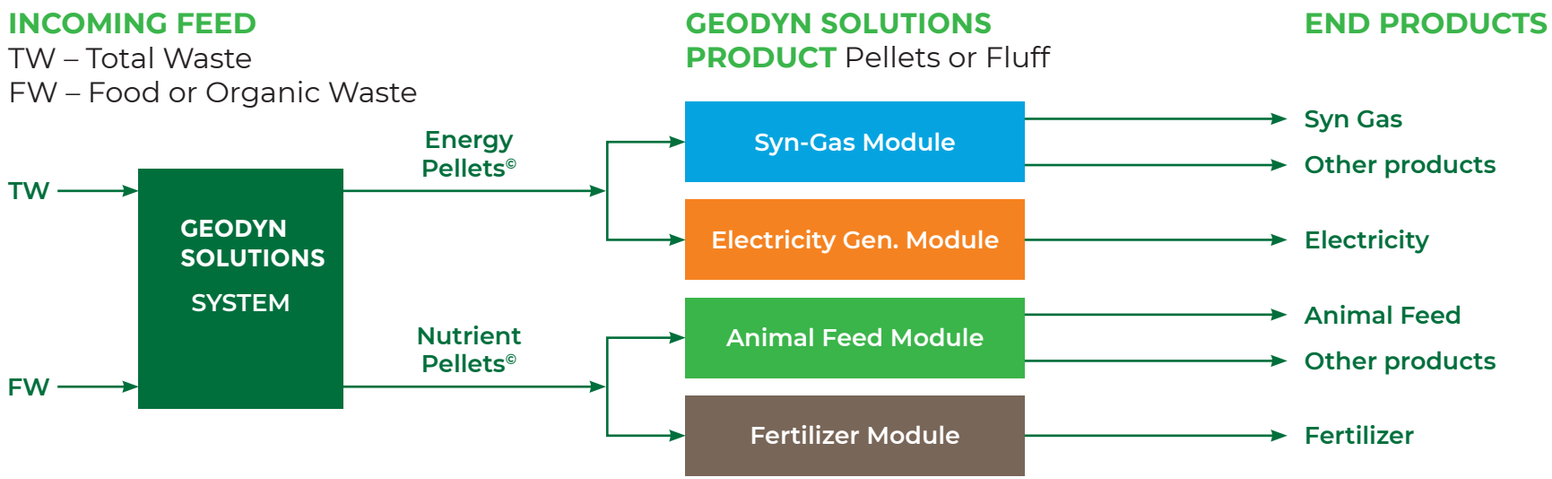
3 Eliminates the waste disposal method, as it provides a zero waste alternative by transforming the organic waste into marketable by products.

WATER

4 It takes all the moisture extracted, filtering and recycling it, making available reclaimed filtered water. The system has the capacity to process and convert wastewater into water that can be reused for other purposes. Reuse may include irrigation of gardens and agricultural fields or replenishing surface water and groundwater.

ENERGY

5 With the addition of equipment, electricity can be created from all waste incurred in the process, therefore making it fully circular with the addition of **Geodyn Solutions** equipment



A NEW PARADIGM OF WORKFLOW

Building resilience and flexibility in operations and the workforce with time, space and product.

STAKEHOLDERS

- Future and current employees
- Contractors
- Operations

THE CONNECTED VALUE CHAIN

Build resilience and flexibility into business models and the value chain of operations, sustability and credits.

STAKEHOLDERS

- Suppliers
- Customers
- Consumers

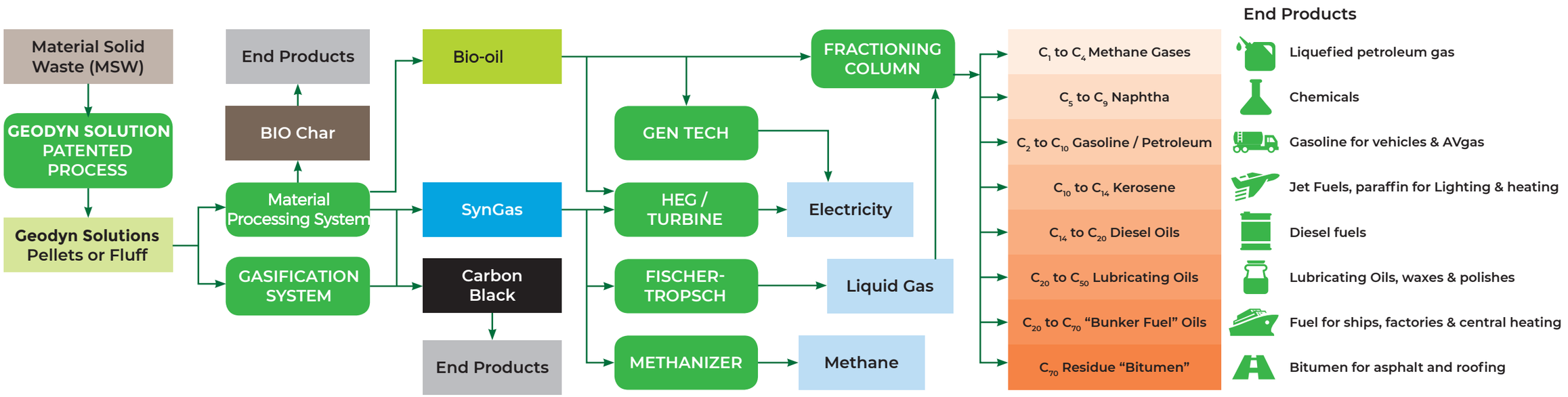
AN ACCELERATED PURPOSE

Embracing a broader responsibility to strengthen a global social license to operate.

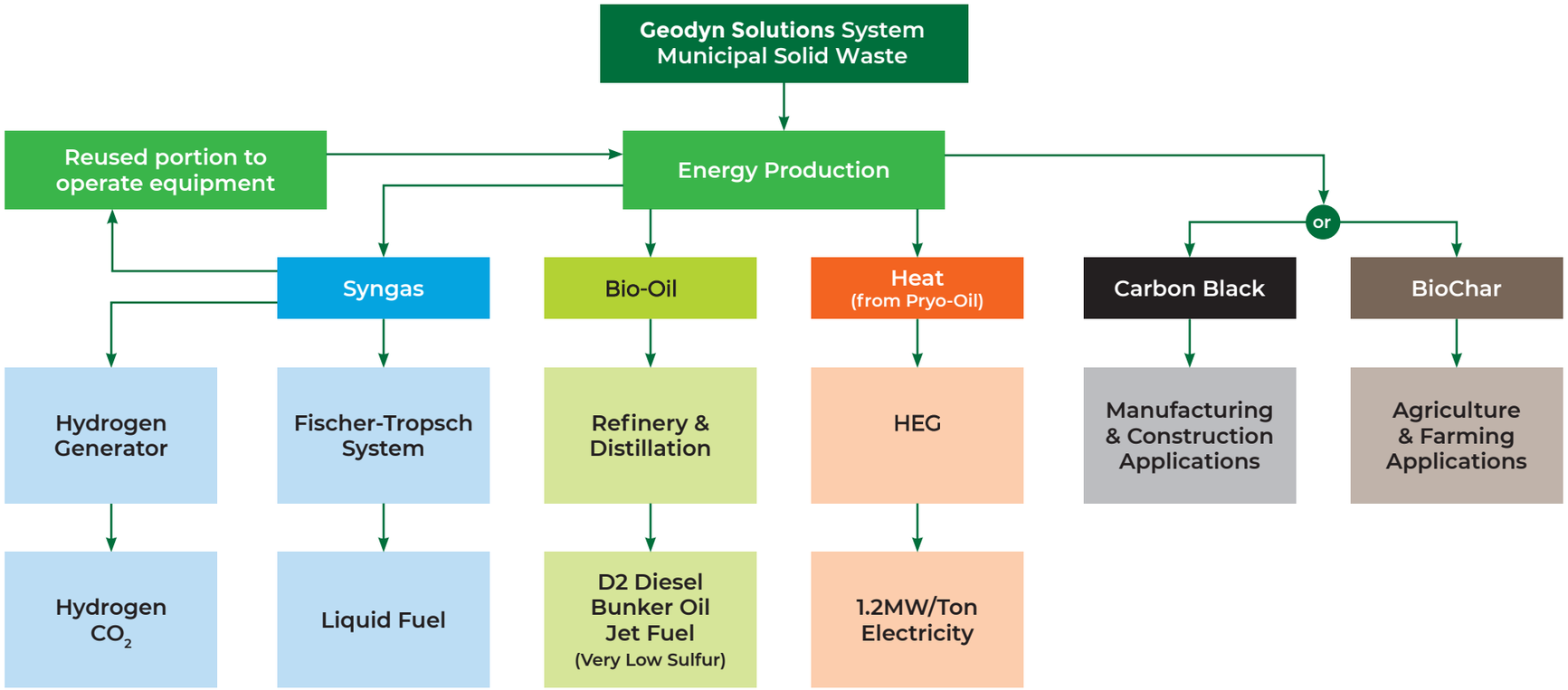
STAKEHOLDERS

- Society
- Communities
- Investors
- Governments

GEODYN SOLUTIONS CORE MODEL SYSTEM FLOW



GEODYN SOLUTIONS MSW SYSTEM



Material Processing System (MPS)	Gasification	Incineration	Geodyn Solutions	Anaerobic Digestion
Normally No Air	Sub stoichiometric Air Exothermic/Endothermic	Excess Air Very Exothermic	Stoichiometric Air	No Air
Only Heat (external or internal)	Lower total volumetric flow	Higher Volumetric flow rate	High Volumetric flow rate	Micro-organisms
Want liquid gases, not desired	Syn-Gas Lower fly ash carry over	Fly ash carry over	No Residues	Digestate
Pollutants in reduced form (H2S, COS)	Pollutants in reduced form (H2S, COS)	Pollutants in oxidized form (SOx, Nox etc.)	No Pollutants, only Water Vapor is discharged	No Pollutants
Higher Char	Char at low temperatures Vitrified slag at high	Bottom Ash	Pellets for Energy Production	Bio-gas (Methane)
Scale: 50 tons/day	Scale: 100 tons/day	Scale: 1500 tons/day	Scale: 350 tons/day	Scale: 250 tons/day
No additional oxygen (only heat)	Some additional oxygen (or air)	Much additional oxygen (or air)	No additional oxygen	No additional oxygen
Batch Processing	Batch Processing	Continuous Processing	Continuous Processing	Batch Processing
Large Footprint	Large Footprint	Large Footprint	Small Footprint	Large Footprint
No Bacteria	No Bacteria	Bacteria Present	No Bacteria	Bacteria Present
No Odor	No Odor	No Odor	No Odor	Odor Present
Operational Costs High	Operational Costs High	Operational Costs High	Operational Costs Low	Operational Costs High
Life Cycle of Equipment: 10 Years	Life Cycle of Equipment: 10 Years	Life Cycle of Equipment: 20-30 Years	Life Cycle of Equipment: 30 Years	Unknown life cycle
Efficiency	High Efficiency	Low Efficiency	High Efficiency	Low Efficiency

GEODYN SOLUTIONS EQUIVALENT POWER PLANT

Incoming MWS capacity	Machine Capacity	Water Content	Liquid Extracted	Pellets Produced	Oper. Hours	Pellets Per Day	Energy Equivalent	Energy Output (19%)	Equivalent Power Plant
Dally	TPH	%	TPH	TPH	Hr	TPD	MWHr	MWHr	MW
20.0	1.0	45%	0.5	0.6	20.0	11.0	60.4	11.5	0.48
100.0	**5.0**	**45%**	**2.3**	**2.8**	**20.0**	**55.0**	**301.8**	**57.3**	**2.39**
200.0	10.0	45%	4.5	5.5	20.0	110.0	603.5	114.7	4.78
400.0	20.0	45%	9.0	11.0	20.0	220.0	1207.0	229.3	9.56

KEY TAKEAWAYS:

- **Geodyn Solutions** 5 TPH machine can process 100 TPD of food waste and is equivalent to 2.4 MW power plant.

BASE CONVERSION:

- Waste delivering 4717 Kcal/kg.
- Systems Energy conversion efficiency is 19%
- It takes 24 Tons of Pellets per Day to generate energy equivalent to a 1 MW plant.

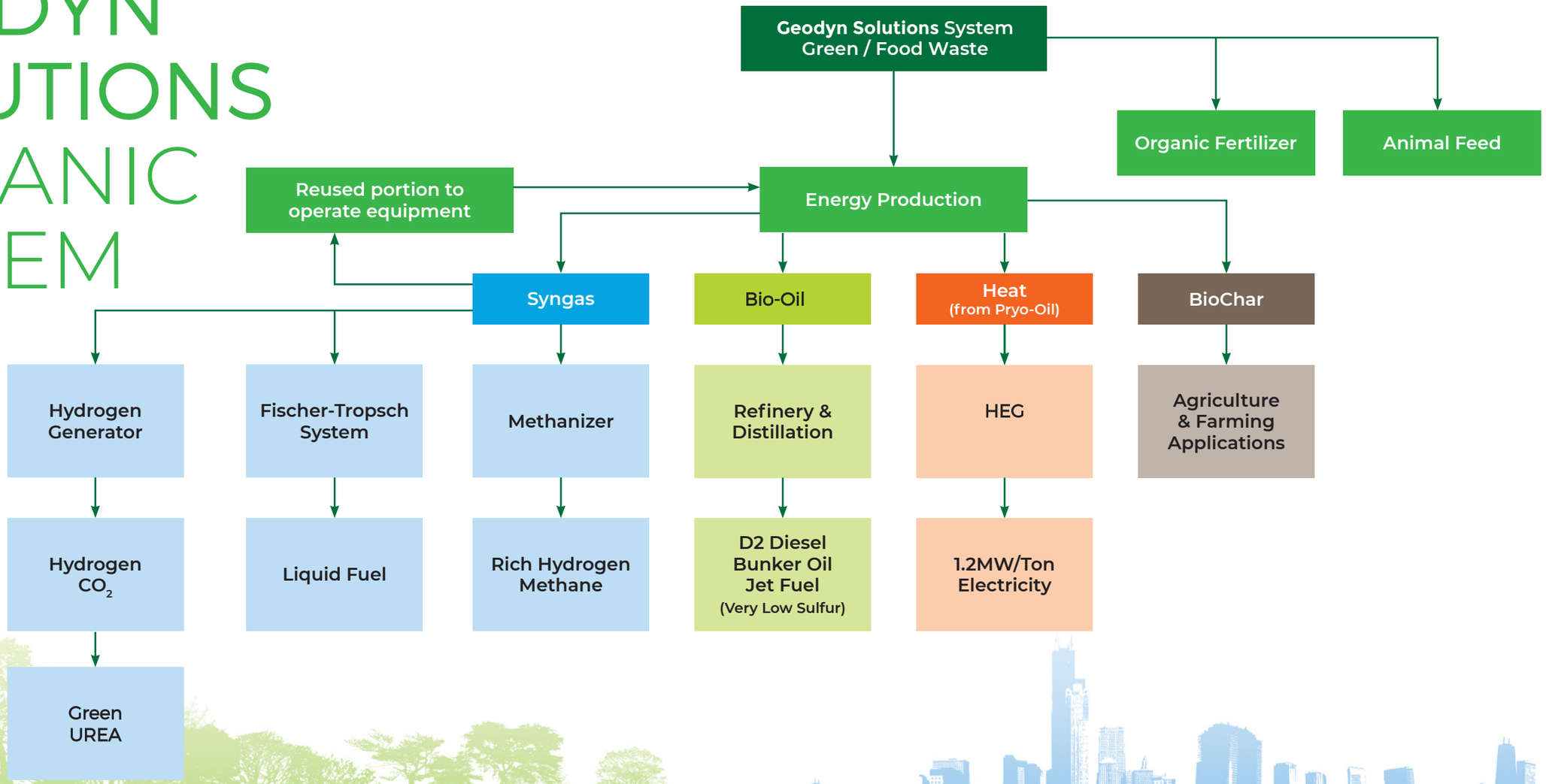
ABSOLUTE ENERGY:

1 Ton of **Geodyn Solutions** Pellets =
4,717,500 Kcal = 5.5 MWh

COMPARISON OF DIFFERENT FUEL TYPES

Item	Natural Gas	Diesel	Coal	Geodyn Solutions
HEAT VALUE	8,700 Kcal/kg	10,200 Kcal/kg	5,000 Kcal/kg	4,496 Kcal/kg
BOILER EFFICIENCY	88%	88%	74%	80%
DENSITY kg/m³	0.74	830	833	719
CO_2	1.96%	3.06%	1.78%	<1.00%
SO_2	--	3.25%	0.5%	0.07%
NO_x	1.87	3.67	2.94	1.02

GEODYN SOLUTIONS ORGANIC SYSTEM



COMPARISON OF **GEODYN SOLUTIONS** ORGANIC WASTE PROCESSOR AND ANAEROBIC BIOGAS DIGESTERS

Anaerobic digestion is the bacterial breakdown of organic materials in the absence of oxygen.

There are over 200 sites worldwide with operating capacities of 2,500 tons per year or more. There are very few large-scale anaerobic digester sites than can approach the 90,000 tons per-year a 15 ton-per-hour **Geodyn Solutions** Organic Waste Processor can handle. There are two facilities located in California which are the largest of their types in the world and are comparable.

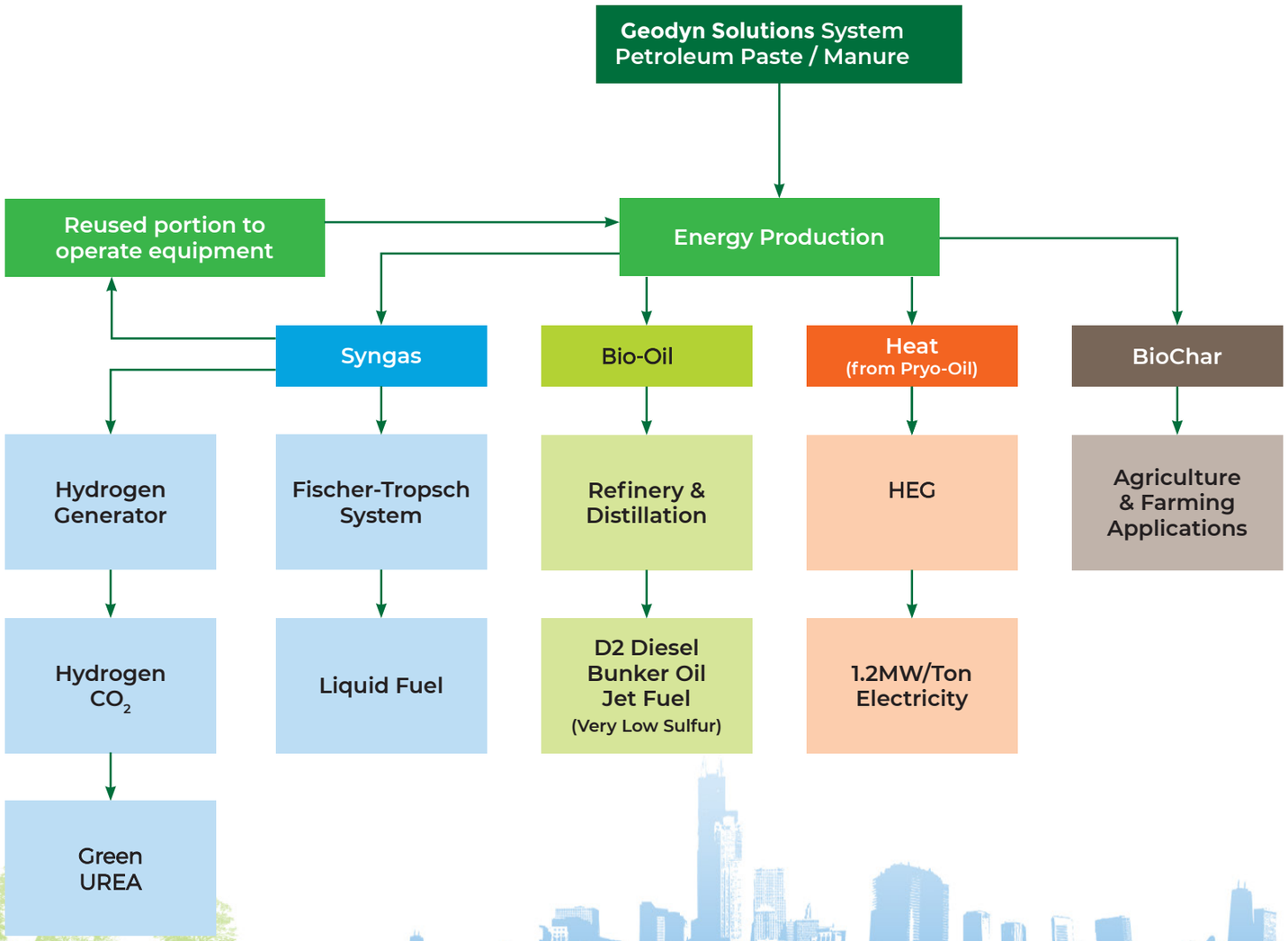
These two installations compared are operating in Claifornia (Northern)Dry and the other in Wet (Southern). The Wet facility is a $105 million installation that can process up to 335,000 tons per year. This facility does not produce electricity. It pipes the methane gas produced to a natural gas pipeline. The Wet Digester is over twice in cost in compate with the processing capacity of a combined **Geodyn Solutions** 15 TPH organics system and syngas system at $15 million. Also the Wet digester has significant “digestate” material (as a residual waste) which thier operation must be pay $50 per-ton to have land-farmed to dry for use as biomass, an added cost that **Geodyn Solutions** system does not have.

The system in Northern California is considered at one of the a better installation for comparison purposes, as it has the same capacity and produces electricity of **Geodyn Solutions**. The table below shows the key metrics:

ANAEROBIC DIGESTION VS. GEODYN SOLUTIONS ORGANICS PROCESSOR

Element	NORTHERN CA	Geodyn Solutions 15 TPH 20 Hours @300 days
# of Processing Units	16	1
Annual Processing Capacity	90.000 tons	90.000 tons
BioChar Residual	0	9.000 tons
Compost	34.000 tons	0
Electrical Output	1.6 MW	3.4 MW
Equipment Cost	$40 million	$15 million
Processing Time	21 Days	1 Hour
Residual Waste Disposed	13.5000 tons	0
Site Acreage	23	2

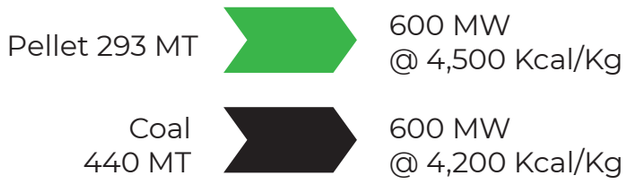
GEODYN SOLUTIONS PETROLEUM MANURE SYSTEM



GEODYN SOLUTIONS PELLET COMPARISON

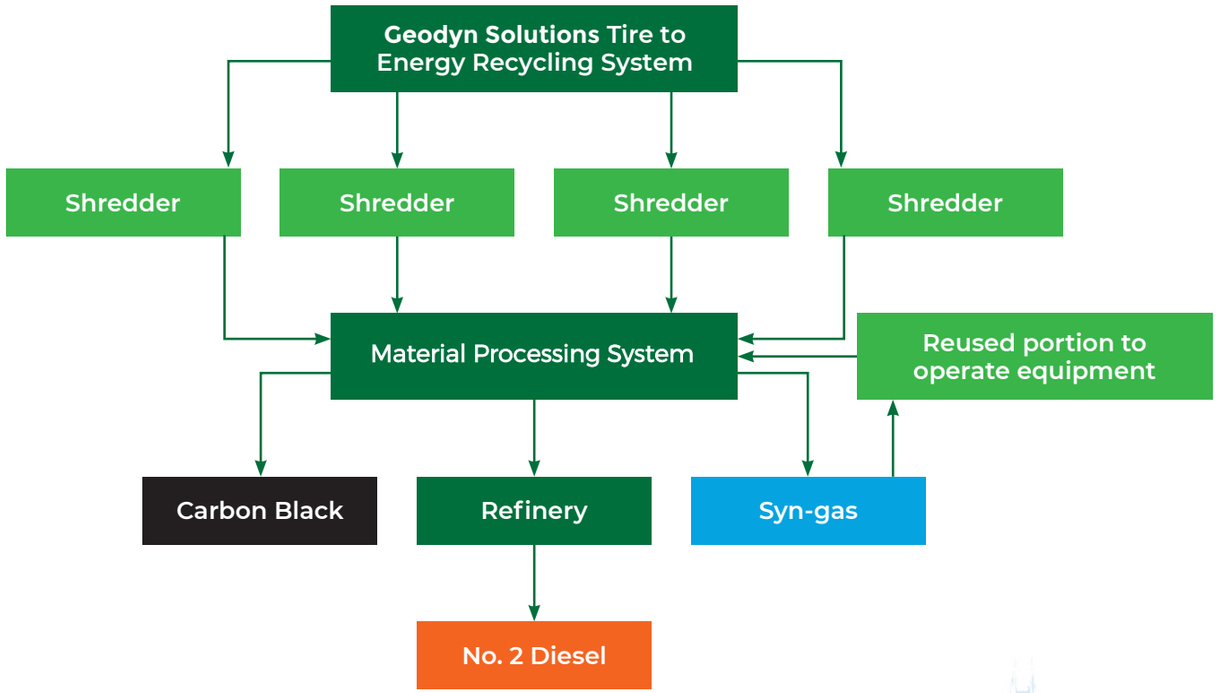
MSW TO PELLET PRODUCTION

GEODYN SOLUTIONS PELLET VS. COAL

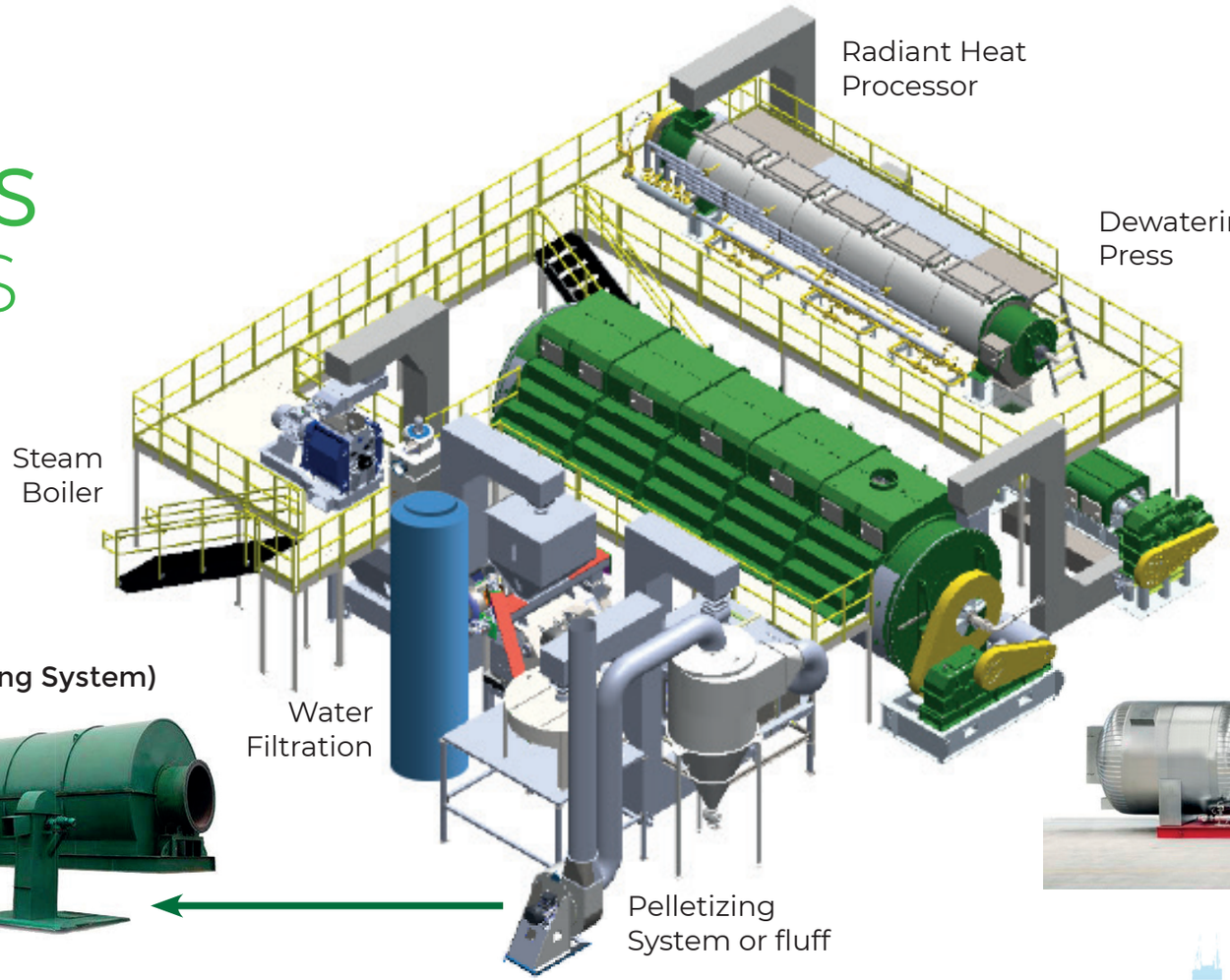


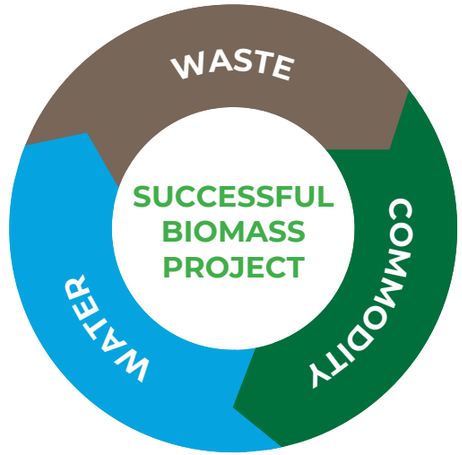
INCINERATOR (SWEDEN)

GEODYN SOLUTIONS TIRE TO ENERGY



GEODYN SOLUTIONS
15TPH TWS LEGEND

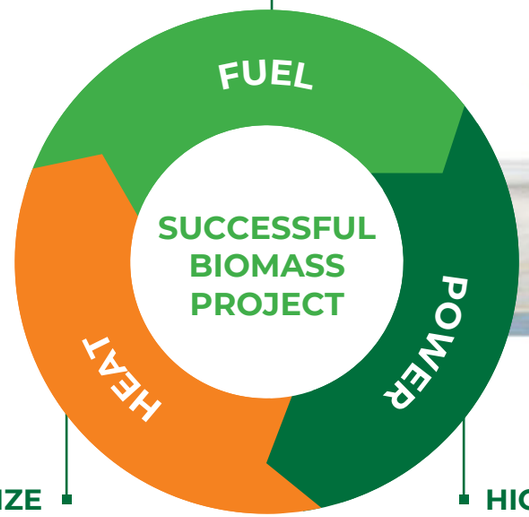




MPS (Material Processing System)

HEG (Heat Energy Generator)

FUEL AVAILABILITY AT AN AFFORDABLE COST IN THE LONG RUN MINIMIZING TRANSPORT COSTS



A HEAT USER TO VALORIZE THE CO-GENERATED HEAT
(CHP configuration is more efficient and remunerative than a power-only one)

HIGH ENERGY VALUE
(Renewable incentives, PPA, feed-in tariffs, green certificates, etc.)
AND RELIABLE SOURCE OF ELECTRICITY IN ISLAND MODE SYSTEM

SYSTEMS REQUIREMENTS

REQUIREMENTS FOR LAND AREA, POWER AND NATURAL GAS

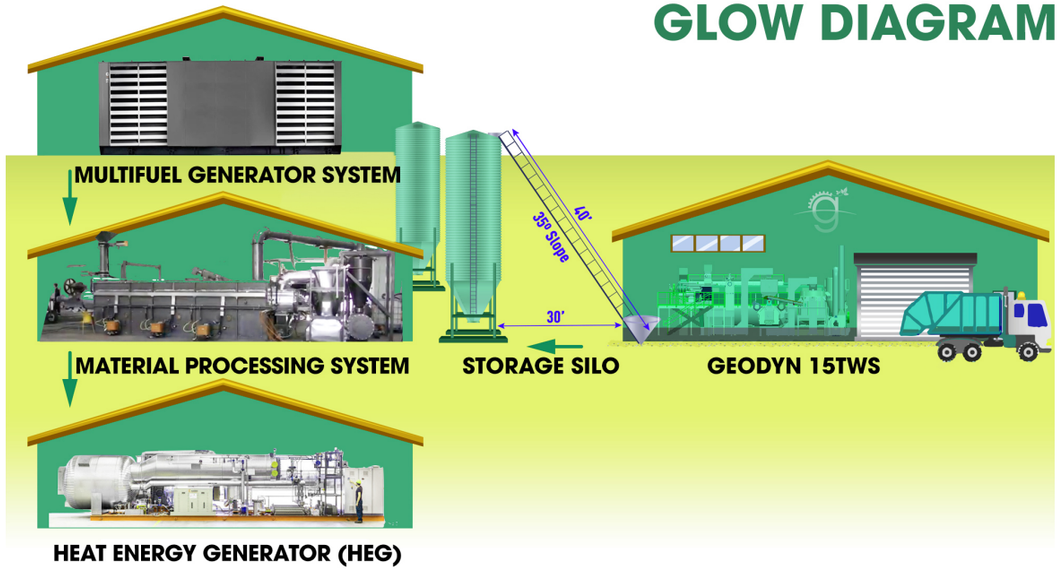
This machine can process mixed waste to pellets coming in various sizes from 3 ton, 5 ton to 15 ton/hour. These Total Waste Systems (TWS) can process green waste and food waste. The final output can be used in soil amendment, organic fertilizer or animal feed.

If it's used as mixed waste (industrial/commercial/residential waste) the final output will produce fuel pellets which can be then used for example: as a commercial fuel for heating and cement kilns. Additional output can be produced when **Geodyn Solutions** Total Waste Systems can be combined with a **Material Processing System (MPS)** to produce: Jet Fuel, Green Diesel (with no sulfur), and low carbon fuel products.

Geodyn Solutions Equipment	Land Area SqFt	Building Area SqFt	Power*	Power w/ Pelletizer	Natural Gas**
1 Ton TWS	3,000	1,000	150	175	0
3 Ton TWS	5,000	3,000	275	475	0
5 Ton TWS	10,000	5,000	300	500	2-4MMBTU
15 Ton TWS	30,000	10,000	450	747	6-12MMBTU

*Power Requirements will be grid to the electrical panel
**Boilers can be operated by natural gas, diesel or propane

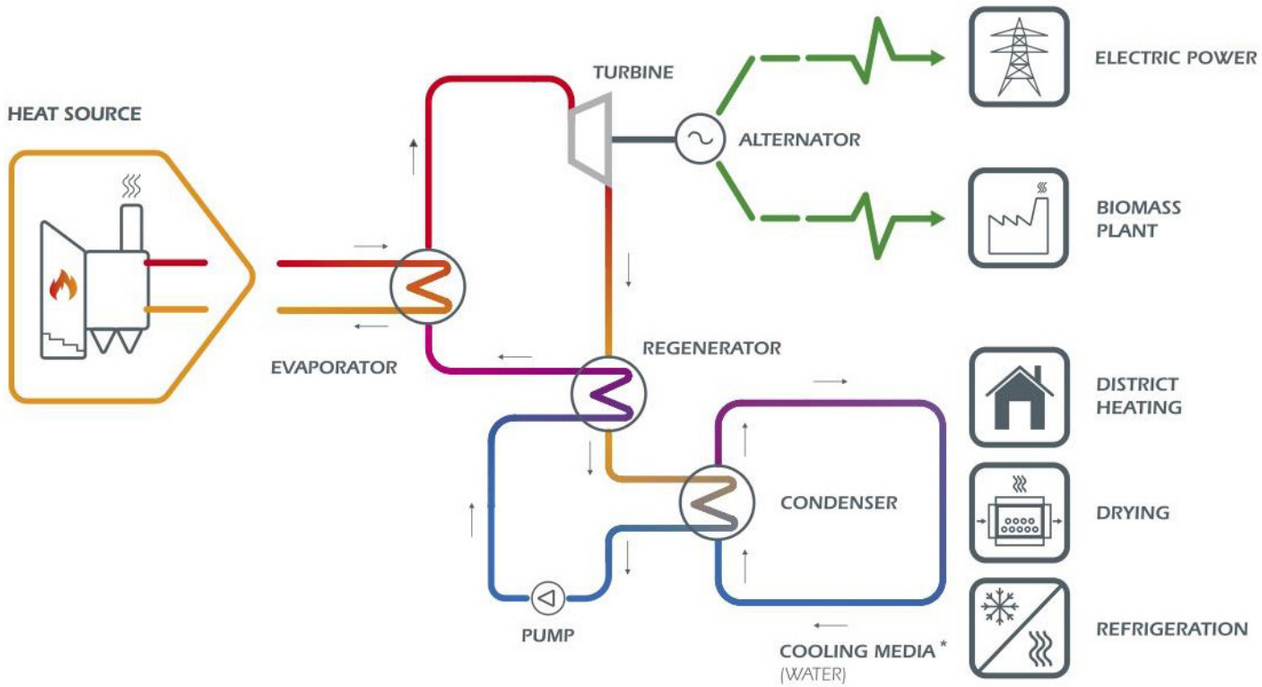
PROPOSED SYSTEM GLOW DIAGRAM



WORKING PRINCIPLE

The **Heat Energy Generator (HEG)** makes use of a closed thermodynamic cycle to convert heat into electricity. The thermal power recovered from biomass combustion vaporizes a suitable organic working fluid, which then expands through the turbine and produces clean and reliable electric power through the alternator. Thanks to the regenerator, internal heat recovery takes place improving the cycle efficiency. Downstream from the regenerator, the organic vapor is condensed and pumped back to start the cycle again. The heat from condensation can either be used by the heat users or dissipated.

The heat from biomass combustion is transferred to the **HEG** working fluid by means of an intermediate circuit or directly via the combustion gases in direct exchange systems. The media used in the intermediate circuits are thermal oil, saturated steam or superheated water.



*In **Heat Energy Generator**-only units, in which thermal users are not present, the cooling media can be either water or air with air cooled condensers.

COMPARISON TABLE OF MAIN TARGETS BETWEEN TWO METHODS HANDLING OF WASTE FOR ELECTRICITY

TT	DESCRIPTION	DIRECT BURN OF WASTE FOR ELECTRICITY PRODUCTION (400T/Day)	GEODYN SOLUTIONS PELLETS FOR ELECTRICITY PRODUCTION (600T/Day)
1	Land area for plant layout	5 ha (large)	2 ha (small)
2	Amount of waste to produce 1 mw electric energy	8 tons	2 tons
3	Dust ash after burning	25%	<5%
4	Processing water in waste	No	To be separated, compressed and processed
5	Types of gas during burning NO_2 CO SO CO_2 THC HCL HF DIOXIN / FURAN H_2O STEAM	 Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes No No No No No No
6	Humidity control	Needed	Not needed
7	Input energy consumption	High	Low
8	Energy output	Low	High
9	Environmental risks	High	Very Low
10	Factory Construction time	>24 months	<18 months
11	Operation and maintenance time	Shorter, more complex maintenance	Longer and simpler maintenance
12	Cost of investment to process one ton of Waste	High	Lower

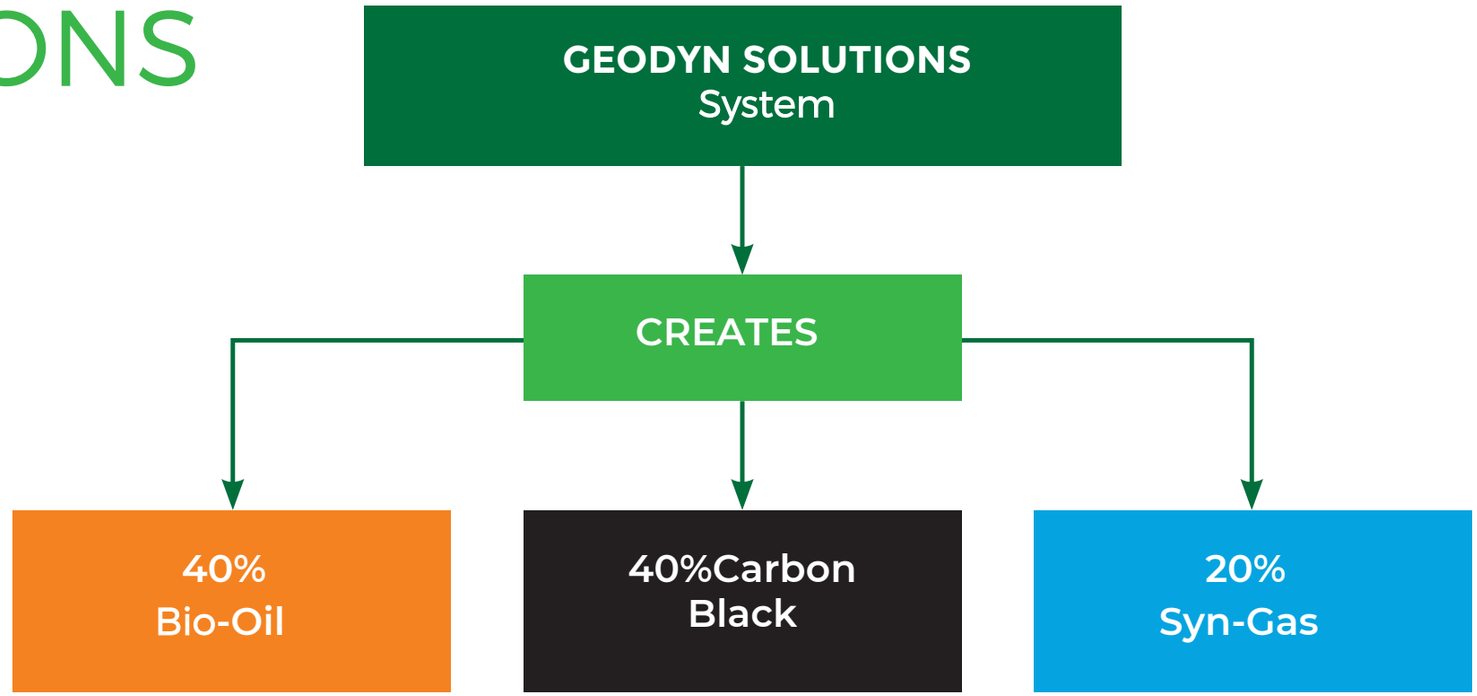
GEODYN SOLUTIONS CORE MODEL SYSTEM FLOW

PHYSICO-CHEMICAL CHARACTERIZATION OF FUEL

Sample Name	Country of Origin	Receiving Date	Referred By
1. Agriculture Waste Pellets 2. MWS+Sludge Pellets	International Coil Ltd., Curugram, Haryana	20.12.2016	Mr. Dixon Santosh

Parameters	Agriculture Waste Pellets	MSW+Waste Pellets
Moisture Content on wet basis, %	9.10	6.25
Ash, % on dry basis	13.45	19.88
Volatile, % on dry basis	68.37	60.21
Fixed carbon, % on dry basis	18.18	19.91
Ash Fusion, (°C)	Ash Deformation at 1000	Ash Deformation at 1000
Bulk Density, kg/m^3	450	255
True Density, kg/m^3	955	525
Size (in mm)	Dia:6, L:15-30	Dia:4, L:20-30
Ignition test	Burns easily	Burns easily
Flow ability test	Flows easily	Flows easily
CV, kcal/kg (on dry basis)	4063	3893
Disintegration of Sample in water	Starts in 85 seconds, completes in 490 seconds	Starts in 190 seconds, completes in 955 seconds

GEODYN SOLUTIONS PELLET



COMPARISON OF VARIOUS TECHNOLOGIES TO HANDLE ORGANIC MUNICIPAL WASTE

No	Technology	Process Time (days)	Working Temp (°C)	Output	% Residual to Landfill	Odor Free End Product	Humidity Control	Pathogen Free End Product	Power Needed	kCal Output	Power Production	Investment	Land Area Required	Environment Risks	Challenges	Sample Companies	Challenges / Advantages
1	Biotunnel Composting	24-28	55-60	▪ CO_2 ▪ Compost ▪ Stab Fraction	45%-55%	No	No	No	Mod	No	None	Low to Mod	High	Low	Area for Maturation	Cleanaway Tunnel	▪ Quality of Compost ▪ Compost Sale ▪ Odors
2	In Vessel Composting System	7-Apr	55-60	▪ CO_2 ▪ Compost ▪ Stab Fraction	45%-55%	Yes	No	No	Mod	No	None	Low to Mod	High	Low	Area for Maturation	Green Mountain	▪ Quality of Compost ▪ Compost Sale ▪ Odors
3	Anaerobic Digestion	50-60	40-45	▪ Biogas ▪ Digestale ▪ Stab Fraction	40%-45%	No	No	No	Mod	No	Low	Mod	High	Low to Mod	Operational Challenges		▪ Odors
4	Incineration	<1	800-1200	▪ Gases (CO_2, NO_x, Dioxins, Furans) ▪ Bottom Ash ▪ Flyash ▪ Liquid Waste	15%-25%	Yes	No	No (due to sporification)	Mod to High	No	High	High	Mod	High	High Initial Moisture		▪ Minimum Calorific Values ▪ Control and monitoring of gas emissions ▪ Disposal of Bottom and Fly Ash ▪ Exhaust Gas Dispersion ▪ Skilled Staff is needed ▪ Operational challenges
5	Pyrolysis	<1	350-600	▪ Gases ▪ Char ▪ Bio-Oil	15%-25%	Yes	No	Yes	High	High	Mod	High	Mod	Mod	High Initial Moisture	Pacific Pyrolysis	▪ Gas control ▪ Tars ▪ Heavy Metals ▪ Skilled Staff ▪ Operational challenge
6	Gasification	<1	800-1200	▪ Syngas ▪ Char	15%-25%	Yes	N/A	Yes	High	High	Mod	High	Mod	Mod	High Initial Moisture		▪ Gas control ▪ Tars ▪ Heavy Metals ▪ Skilled Staff ▪ Operational challenges
7	Plasma Hi Temp Gasification	4 hrs	2200	▪ Syngas ▪ Char	15%-25%	Yes	N/A	Yes	High	High	Mod	Very High	Mod	High	High Initial Moisture	Plasma Waste Disposal	▪ Gas control ▪ Tars ▪ Heavy Metals ▪ Skilled Staff ▪ Operational challenges
8	Dehydration	12-18 hours	80	▪ Desiccated Food Waste	45%	Yes	Yes	No	High	No	None	Low	Mod	None	High Initial Moisture	Somat	▪ Finding uses for the desiccated food waste. With addition of humidity and moisture it becomes putrid again.
9	**Geodyn Solutions™**	<1 hour (Real Time)	120-240 (very low)	▪ RDF Pellets ▪ Filtrated Liquid Waste ▪ Pellets used for steam/electricy	5%-10%	Yes	Yes	Yes	Moderate Also, self generation is possible	High	Highest % of conversion	Lowest	Minimum	Very Low		Technology	▪ System designed to be run by unskilled workers ▪ Produces power which can be used to run the machine ▪ Pellets can be transported to central station for power/steam production

COMPARISON OF VARIOUS TECHNOLOGIES TO HANDLE ORGANIC MUNICIPAL WASTE (2)

No	Technology	By-Product	Capacity	Zero Landfill	Processing Time	Processing MSW to Pellets	Pathogen End Free Product	Odor Free end Product	Humidity Control	Indirect Heat Controlled Cooker	Indirect Heat Controlled Drying	Pelletizing Option	High Kcal Output	Liquid Separation/
1	Organic Waste Recycling Processor	Fertilizer/Food Fuel Pellets and water recovery	Up to 42 TPH	Yes	21 mins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Kcal Pellets	Filtration
2	Tunnel Composting	Compost	Various	No	7-30 Days	No	No	No	No	No	No	No	No	Yes
3	Dry Fermentation Digester	Biogas	Various	No	21-28 Days	No	No	No	No	No	No	No	No	No
4	Tunnel Composting	Compost	Various	No	7-30 Days	No	No	No	No	No	No	No	No	No
5	In Vessel Composting System	Compost	40-50 Yds	No	14-21 Days	No	No	No	No	No	No	No	No	No
6	Plasma Waste Disposal	PCG (Plasma Converted Gas)	10-500 TPD	No		No	Yes	Yes	No	No	No	No	Yes kCal Gas	No
7	Dehydration System	Dehydrated Food Waste	110-220 lbs/Day	No	12-18 Hrs	No	No	Yes	Yes	No	No	No	No	No
8	In Vessel Composting System	Compost	75 Tons	No	4-7 Days	No	No	Yes	No	No	No	No	No	No

CREATING CLEAN ENERGY IN ORDER TO BUILD A RESILIENT FUTURE

ENVIRONMENT

- CO_2 Control
- DXNs Control
- Emission Control
- Landfill Control

ECONOMY

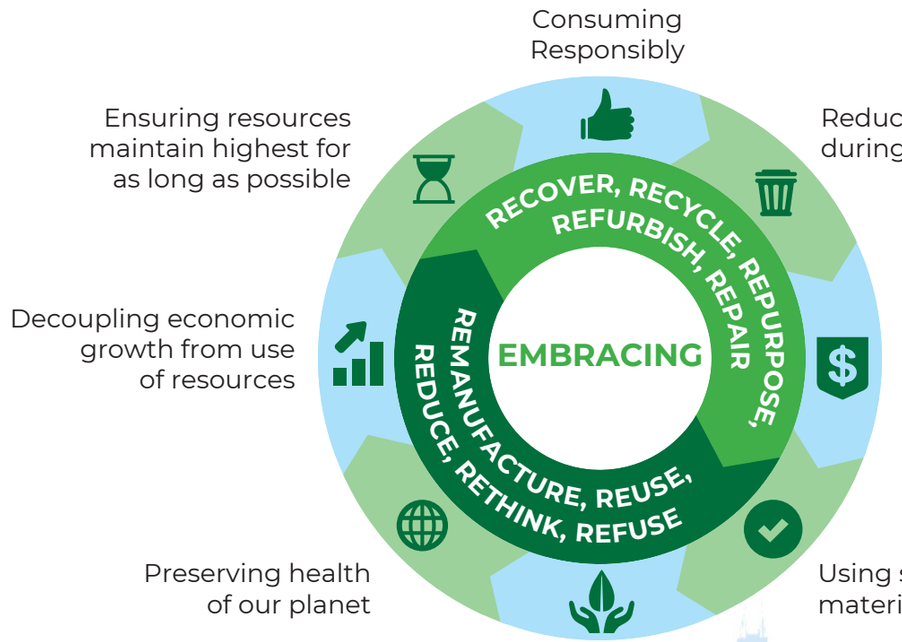
- Cost Control
- Profit
- Growth

ENERGY

- Energy Recovery
- High Efficiency
- Utilization I Sale

WASTE CHARACTERISTICS

- Waste type
- Waste quality
- Waste content



HEALTHY PLANET HEALTHY PEOPLE


The United States of America

The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of the patent or twenty years from the earliest effective U.S. filing date of the application subject to any statutory extension.

If this application was filed on
1995, the term of this patent is
the U.S. filing date, subject t
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DEPARTMENT OF COMMERCE

To summarize, with the patented Geodyn Solutions Technologies equipment and process, benifits range from

- A time-proven process more advanced in drastically less time than competition.
- Enhanced by innovations optimizing the handling solid waste management.
- Is durable and simple to operate and maintain
- Substantially reduces greenhouse gasses
- Eliminates landfill requirements
- Kills all harmful bacteria and foul odors
- Significantly reduces health risks and
- Reduces community/social costs of solid waste
- Eliminates the waste disposal method, as it provides a zero waste alternative by transforming the organic waste into marketable byproducts and credits.

PRODUCT WARRANTY & COVERAGE:

100% PARTS AND LABOR ON YEAR 1
50% PARTS AND LABOR ON YEAR 2
40% PARTS AND LABOR ON YEAR 3
30% PARTS AND LABOR ON YEAR 4
20% PARTS AND LABOR ON YEAR 5
(Warranty excludes standard wear and tear)

ZERO-WASTE MODERNIZATION

YOUR PARTNER AND ADVISOR FOR TOMORROW.

Embracing new technologies and protecting the environment goes hand in hand. At the heart of what The waste Agency and Geodyn Solutions Technologies deliver an eco-friendly disposal solution that zeros out negative environmental impact – wherever possible.

GEODYNSOLUTIONS.COM