



WASTE TO ENERGY





GARBAGE HANDLING AND MANAGING HAS BECOME A MAJORE GLOBAL PROBLEM. IN MANY COUNTRIES THERE IS STILL NOT A PROPER SOLUTION TO RESOLVE THIS PROBLEM.



FROM WASTE TO ENERGY

- *ENERGY DEMANDS ARE INCREASING.*
- *FOSSIL FUELS ARE RAPIDLY BEING USED UP.*
- *WASTE DISPOSAL IS A GROWING, GLOBAL ENVIRONMENTAL PROBLEM.*

ENERGY FROM WASTE PROVIDES A PROMISING AND IMPORTANT CONTRIBUTION TOWARD THE REDUCTION IN LANDFILL DISPOSAL AND CO₂ EMISSIONS.

THE RECOVERY OF ENERGY FROM WASTE REPLACES FOSSIL FUELS AND REDUCES GREENHOUSE GAS EMISSIONS, WHILE AT THE SAME TIME PROVIDES WASTE MANAGEMENT WITH DURABLE SOLUTIONS.





MANY COUNTRIES HAVE ACCUMULATED MOUNTAINS OF GARBAGE THAT ARE CAUSING MASSIVE HEALTH AND ENVIRONMENTAL PROBLEMS

ARTI has been working on proper reduction of MSW and other waste problems for the last 27 years. ARTI Offers the most advanced total solution to the waste problem. ARTI technologies not only eliminate the waste but converts it into a very profitable environmentally friendly energy source, either in liquid or gaseous form.



Methods of reducing waste:

1. Incineration

- ▶ **High levels of air pollutions**, Production of toxic material, Incomplete combustion

2. Gasification

- ▶ Oxidation of hydrocarbons and production of **high levels of CO2**
- ▶ Production of pollutants during gasification
- ▶ Production of high volumes of gas with very little heating value

3. Plasma Arc

- ▶ Reduction of waste in the presence of very high temperatures
- ▶ High temperatures of 9600°C is hard to manage
- ▶ **High level of energy used for the process**
- ▶ Low level of net energy
- ▶ **Investment does not pay off**

4. Pyrolysis

- ▶ **Conversion of waste in the absence of a flame or oxygen**
- ▶ **No production of pollutants in gas**
- ▶ **High level of gas production**
- ▶ **High level of calorific values of gas**
- ▶ **Gas can be used in a genset to produce high efficiency power**
- ▶ **Clean gas production**



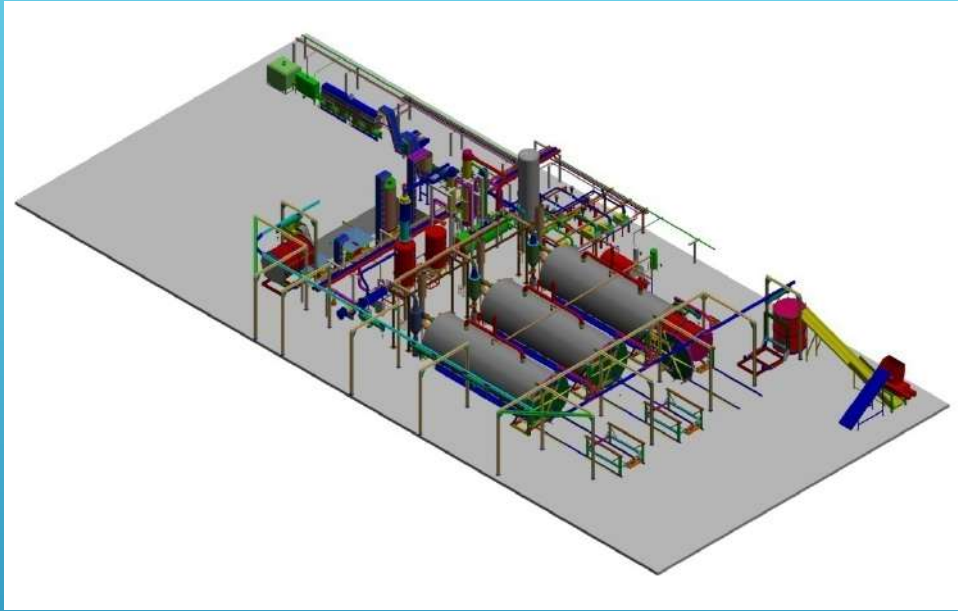


ARTI PYROLYSIS SYSTEM

25 tons/day MSW Processing Unit.



▶ ***Our Patented Process Uses Pyrolysis***



- ▶ ***Converts any Type of Organic or Synthetic Waste into Pyro-fuel***
- ▶ ***Proven and Tested Technology (Several in Operation)***
- ▶ ***Produces Negligible Emissions (Passes SCAQMD)***
- ▶ ***Produces many Useable Products (Very little Waste)***



Air Emissions:

Emissions for Pyrolysis/Gasification Facilities/Technologies

(Values are in mg/Nm³ unless noted.)

	PM	NO _x	CO	VOC	SO ₂	Dioxins/ Furan (ng – TEQ/Nm ³)	HCl	Cd	Pb	Hg
Regulatory Limits										
U.S. EPA Limits	18.4	219.8	89.2		61.2		29.1	0.01533	0.1533	0.0613
ARTI Limits	0	<50	<40		<30	ND	ND	ND	ND	ND

Notes:

PM = particulate matter - NO_x = oxides of nitrogen - CO = carbon monoxide

VOC=volatile organic compounds - SO₂ = sulfur dioxide - Cd = Cadmium,

Pb=Lead – Hg= Mercury



ARTI is the manufacturer of super low emission burners as well as Advanced recycling technology based on pyrolysis/gasification of post consumer waste. Air pollution regulations in California are determined by the capabilities of manufacturers to reduce the level of emission to a safer lower level. This regulation is called Best Available Control Technology (BACT). The state of California at the present and for a long time has been practicing the most stringent air quality rules in the world and these rules have been set by manufacturers. At the present time the highest NOx emission level from any stationary source is below 9 PPM corrected to 3.0% excess oxygen. The last three consecutive years BACT were set by ARTI using patented combustion technologies. This is the highest quality combustion equipment with the lowest emissions and highest efficiency level in the world at the present time.

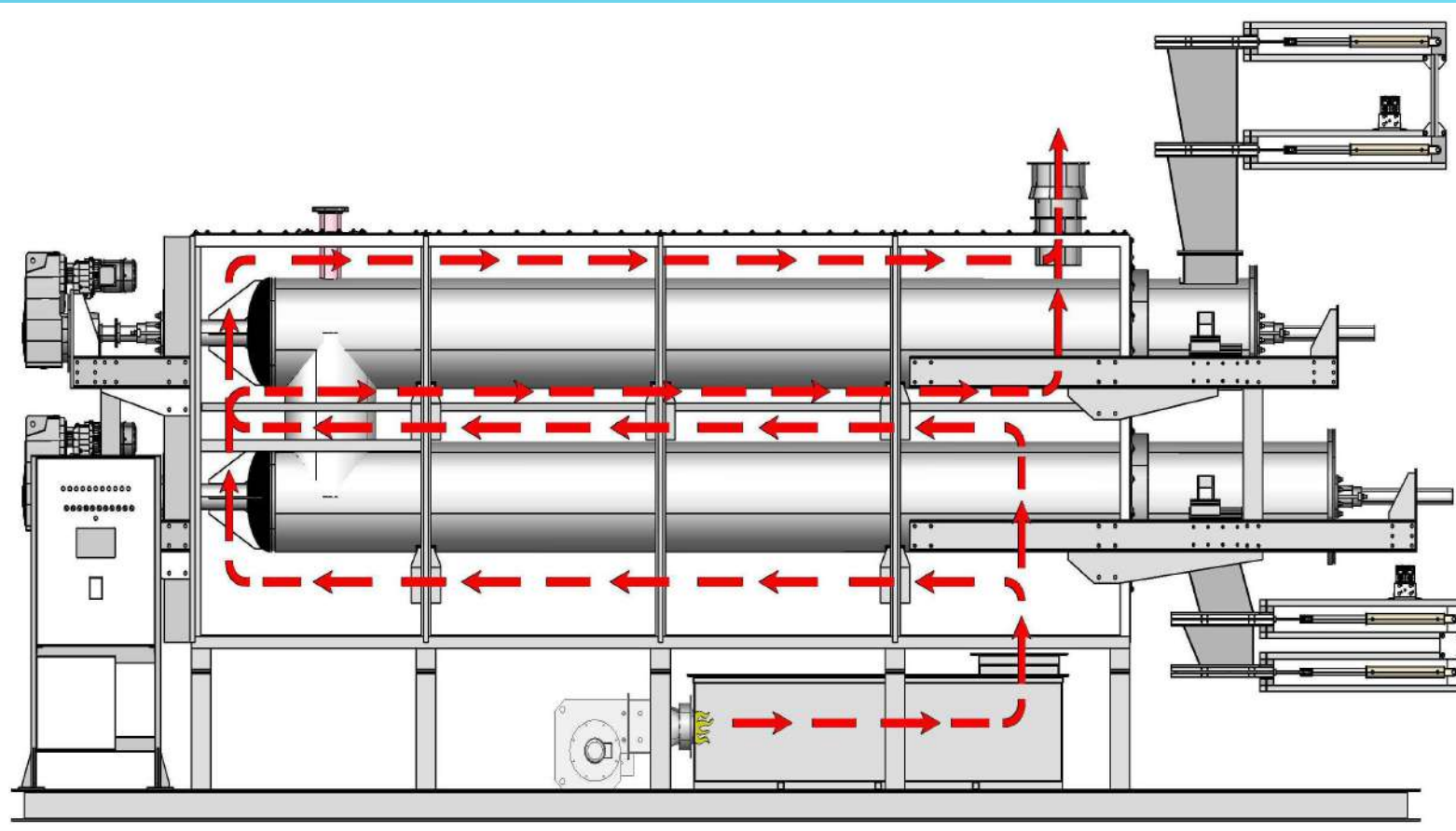
This special qualification has enabled ARTI to be very successful in the recycling field as the thermal distillation technology that processes rubber, plastic, wood, animal waste, and medical waste is also patented. ARTI burners are all regulated by the South Coast Air Quality Management District (SCAQMD). This organization orders a third party to test the burners as soon as they are installed to make sure they comply with the regulations. ARTI products are also UL approved. UL (Underwriter Laboratories) which is a safety regulatory organization controls the quality of every product before it is shipped from our facility.





Our proven Super Low Emission (SLE) burners achieve the lowest NO_x emission levels (5 to 9 PPM) and CO emissions (20 to 50 PPM) in the world with the highest operating efficiency. These very low emission levels are achieved while operating the burners at actual oxygen levels of 3.0% or lower maintaining the highest boiler efficiency performance in the world. Our burners meet all South Coast Air Quality Management (SCAQMD) requirements..

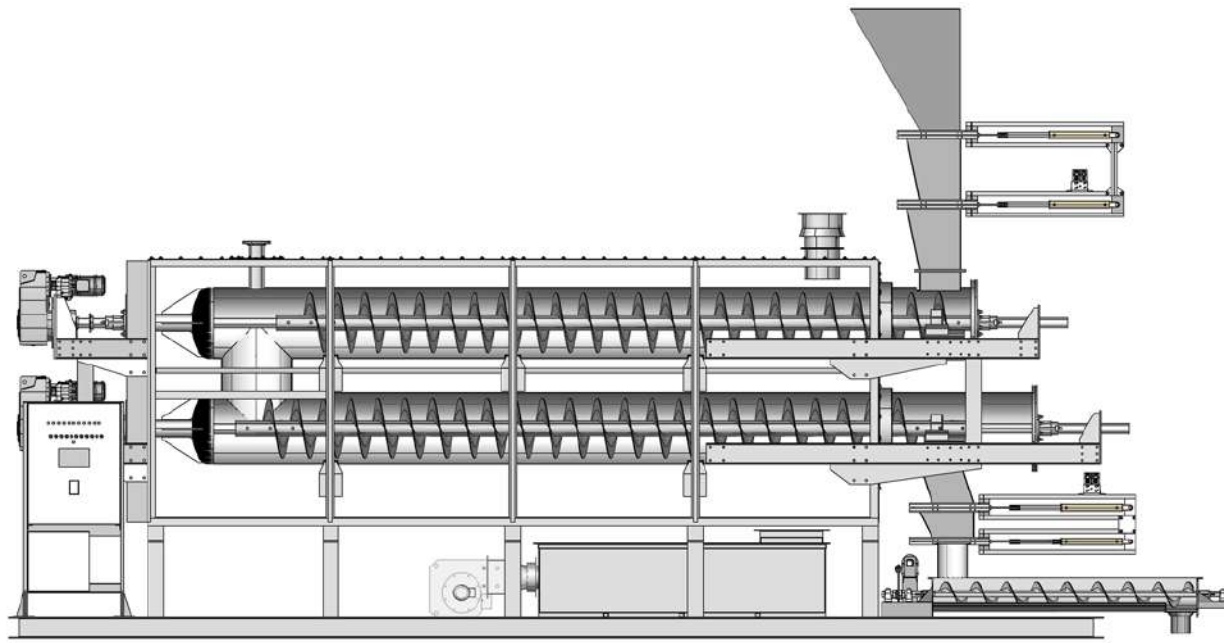




ARTI PYROLYSIS SYSTEM
CONSISTS OF TWO PARTS:
1. BURNER AND FURNACE
2. RETORT SYSTEM

Natural gas or propane or pyro gas is used to heat the ARTI pyro system. Raw material enters the system through the feed air locks and travels through the upper and lower retorts while pyrolysis takes place. Gases exit the system through the lower retort and carbon drops through the exhaust air lock valves. The air lock valves prevent air from entering the system, ensuring that no combustion will take place.

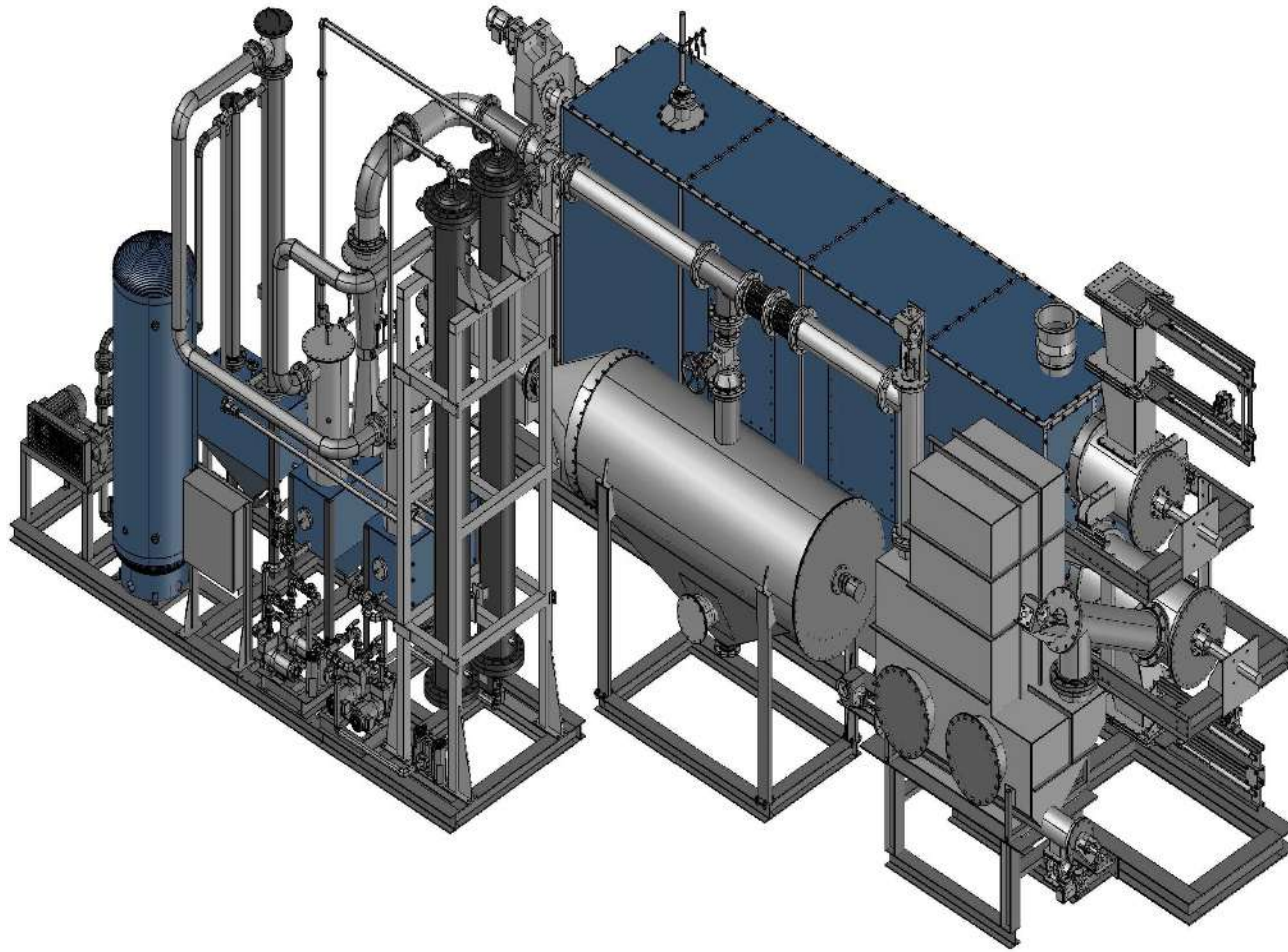




MATERIAL TRAVELS THROUGH THE PYROLYSIS SYSTEM VIA HIGH TEMPERATURE AUGER SYSTEM.

Pyro process will have up to 3.5 hours of residence time depending on the material being processed. The process is total controlled by an automatic control system. Hot carbon is removed from the process using a cooling auger.





ARTI GAS CLEANUP SYSTEM
CONSIST OF A CARBON DROP
BOX, A GAS FILTER SYSTEM, AND
A GAS WASH SYSTEM. THE GAS
WILL BE TRANSFERRED INTO AN
INTERMEDIATE GAS TANK.

Gas is washed with oil and a large cooling system decrease the gas temperature down to below 60 degrees F. Demisters will prevent moistures and oil particles from moving with the gas.





The new densified material now gets transferred to the ARTI pyrolysis system and feed into the system as feed material.



SOLUTION STARTS BY FIRST SEPARATING ORGANIC AND SYNTHETIC MATERIAL FROM THE INORGANICS.



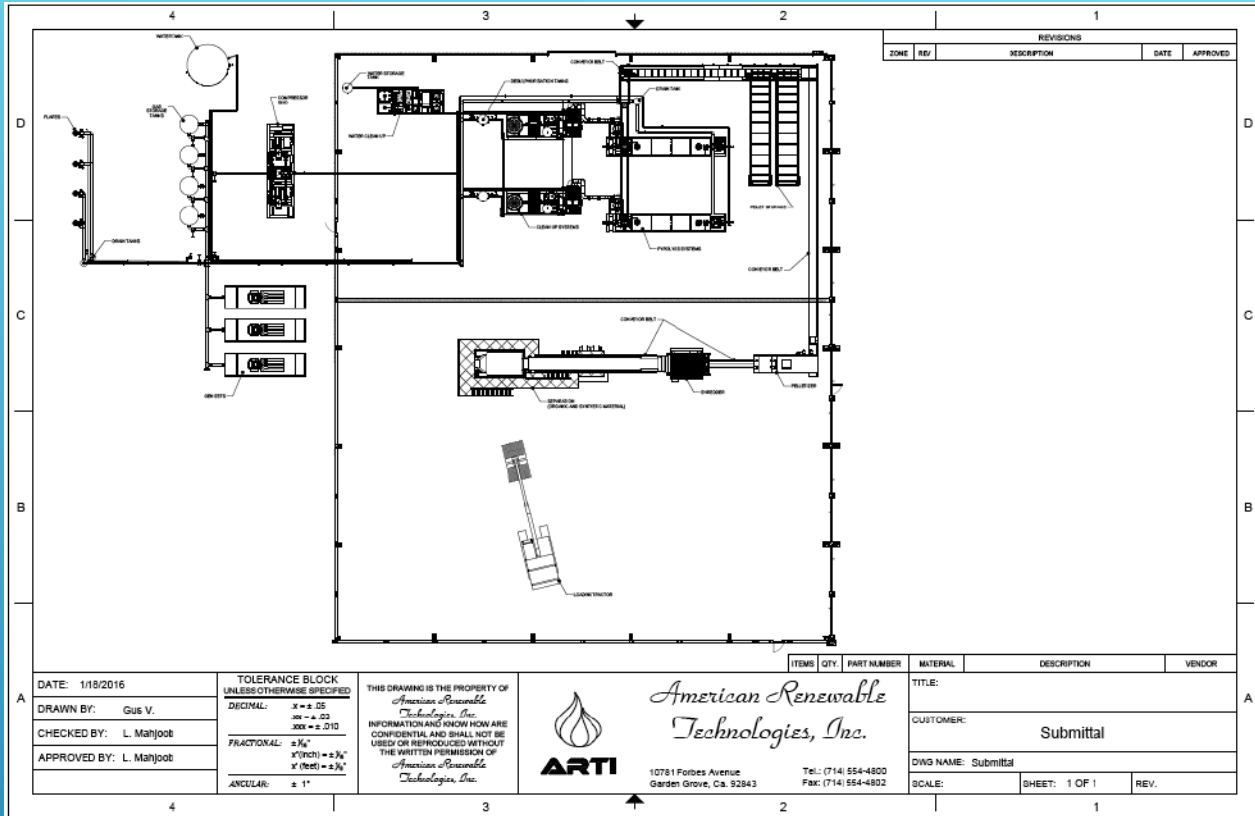
ALL ORGANICS AND SYNTHETICS WILL BE SHREDDED INTO SMALL PARTICLES AND WILL BE DENSIFIED INTO PELLETS TO FORM A UNIFORM FEED STOCK.





MSW WILL BE TRANSFORMED INTO PELLETS USING AN INDUSTRIAL PELLET MILL. THIS MATERIAL WILL BECOME THE FEED STOCK FOR THE PROCESS

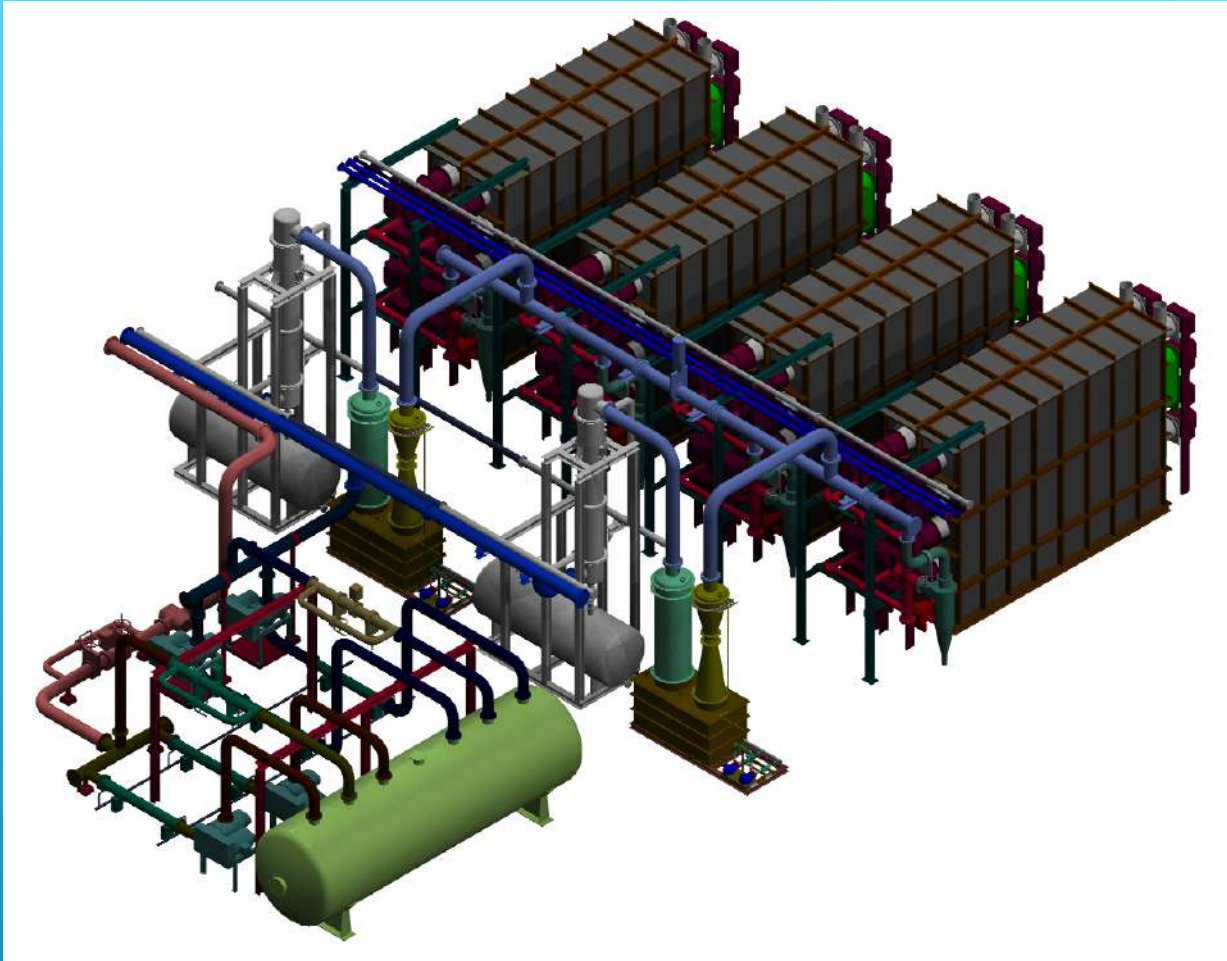




DRAWING IS SIMPLE
 DIAGRAM OF A 50 TONS/DAY
 OF ARTI MSW PLANT SYSTEM.

Gas is compressed using a compressor system and stored in tanks. This gas is later regulated to be used for the process and producing electricity through turbines or generators. A gas flare system is also installed to make sure the gas is combusted during emergency shut downs.





TYPICAL ARTI MULTI UNITS
INSTALLATION SYSTEM

ARTI MODULAR PYROLYSIS
SYSTEMS

Four system can share common gas clean up systems. Capable of running independently, or in parallel scalable, versatile and adaptable. Units can be added or removed on an as needed basis.





100 TONS/DAY OF MSW
PROCESS SYSTEM.

Gas produced was transferred to the power company a couple of miles away from the plant via under ground pipes.



EXAMPLE OF R.O.I - 1

PLASTIC TO DIESEL

2 tons/hr. of plastic produces 450 gallons/hr. of diesel.

450 gallons x \$1.00/gal = \$450.00/hr. x 24 hr. = \$10,800/day

\$10,800 x 360 days = \$3,888,000.00/year for 20 years

Machine Cost : \$11M

2 tons/hr. Pyrolysis for Plastic to Diesel

(WITHOUT installation, feeding system, shredding and pelletizing equipment for plastic- CAN BUY AT A LOCAL COMPANY)



EXAMPLE OF R.O.I -2

PLASTIC TO ELECTRICITY

2 tons/hr. of plastic produces 4MW/hr. of Electricity

$4\text{MW/hr} \times \$100.00/\text{MW} = \$400.00/\text{hr.} \times 24 \text{ hr.} = \$9,600/\text{day}$

$\$9,600/\text{day} \times 360 \text{ days} = \$3,456,000.00/\text{year for 20 years}$

Machine Cost \$9M + 4 X 1MW NATURAL GAS Genset (Made in China)

2 tons/hr. Pyrolysis for Plastic to Electricity

(WITHOUT installation, feeding system, shredding and pelletizing equipment for plastic- CAN BUY AT A LOCAL COMPANY)



Thermal
Distillation
Pyrolysis

Producer
gas

ELECTRICITY

Combustion in gas engine or
Turbine or steam boiler

And
/or

Gas to liquefaction process

Synthetic liquid fuels

(Sulfur-free diesel, petrol and jet fuels)

Inorganic residue
(some with scrap value, or used as an
Aggregate for fertilizer or building material)



Examples of Raw Materials or Feedstock:

- ▶ *Tires*
- ▶ *Municipal Solid Waste*
- ▶ *Coal or Coal Dust*
- ▶ *Raw Sewage*
- ▶ *Farm Manure*
- ▶ *Plastic*
- ▶ *Agricultural Waste*
- ▶ *Medical Waste*



Yield		Feedstock				
		Tires	Olefin Group Plastics	Mixed Plastics	Bio Mass	Coal
#2 Fuel Oil		X	X			X
#4 Fuel Oil		X				X
Methanol	Ethanol				X	
Fuel Gas		*	X	X	X	X
Carbon		X	X	X	X	X
Steel		X				





**NO SMOKE
NO DIOXIN**

ARTI TECHNOLOGY

Carbon Credits

The ARTI Advanced Waste Conversion Technology qualifies for green credits.

This is because the technology is able to capture carbon as a product rather than emit it to atmosphere.

For every pound of feedstock fed to an ARTI system, a mass/energy balance shows most all is Recovery as value added products.

What little emissions are emitted is minute compared to Incinerators, composting and landfills.



Guaranteed high efficiency
Output as methane gas, electricity or liquid fuels
Emissions, far below, US and EU regulations
Zero CO2 emission option possible
Durable and reliable construction
Residual waste ready for recycling
Admission to APX Power-Exchange and the CO2
Emission-Trade (Kyoto Protocol) possible
Turnkey delivery

**ARTI IS LOCATED IN SOUTHERN CALIFORNIA AND HAS BELT MANY ENVIRONMENTAL FRIENDLY
WASTE TO ENERGY PLANTS OPERATING AROUND THE WORLD.**





American Renewable Technologies Inc.
"Pioneering the Frontiers of a Pollution Free World"

MSW with further convention into green energy.

MSW to Power



INTRODUCTION

It has been said that the growth of any country can also be determined to a large extent on the availability of basic services. With a more stable and adequate power supply, we can always be assured that progress will continue, as it will ensure sustained economic growth.

One of the important aspects of today's environmental problems is to find a viable solution to not only eliminate the unwanted waste but turn it into safe and friendly energy.

The world has continuously looked for mechanisms to ensure the adequacy, availability and stability of sustaining solutions to waste problems and help in general the economic growth.

THIS PROJECT

MSW represents one of the biggest environmental problems in the modern world. It contributes by large to global warming and the ozone depletion of the atmosphere. The handling of this problems in a proper way by producing a safe energy from MSW while keeping the environment clean has been a great challenge to mankind. MSW and Biomass contributes as the world's fourth largest energy source today. It is a versatile source of energy that can be readily stored and transformed into electricity and heat. It also has potential for use as a raw material for production of fuel and chemical feedstock.

American Renewable Technologies, Inc. (ARTI), is a leader of consortium of highly professional companies specializes in designing, production and operating of MSW utilization equipment, and has developed a unique technology that not only converts MSW into very clean energy but the system operates and sustains the production of power or liquid fuels for at least 330 days in a year.

GARBAGE AS FUEL TO RUN THE POWER GENERATORS

Admittedly, wind and solar energy continue to be good source of electricity applying renewable energy. Landfill Gas to Energy is a method of harvesting landfill methane for conversion to electricity or for direct use as a fuel for industry or vehicles. It has been proven that this is a long-term contender in the war on man-made greenhouse gases. However, landfill gas contains at least 50% carbon dioxide that does not help the environment. ARTI technologies converts the MSW into gas in the absence of oxygen. This will eliminate the production of gases such as furan or dioxin. It also reduces the formation of Carbon dioxide.

Compared to biomass, the good thing about municipal solid waste is the fact that there is a systematized and established collection for it.

Landfill methane gas is generated by decomposing organic material in municipal solid waste like food, yard waste, leaves, grass, paper, and lumber, and accounts for about a quarter of total man-made methane emissions.

Today the most common problem for landfill owners is the buildup of garbage. However, they cannot simply burn the trash because there are laws like the Clean Air Act that prohibits them from doing it.

With the use of garbage as fuel to power generators, the garbage build up problem can be resolved.

Studies show that beyond the landfill gas' local volatility, due to methane's heat trapping ability, this greenhouse gas warms the earth 23 times more than carbon dioxide. Thus, it only makes sense to use this landfill MSW and convert it into gaseous fuel to either directly run an industrial boiler or kiln, or run a turbine that can generate electricity. This is what takes place by AMERICAN RENEWABLE TECHNOLOGY, INC. (ARTI).

SUMMARIZED STEPS IN PUTTING UP TECHNOLOGIES USING MSW

There are several tasks that have to be addressed to prepare for the use of an ARTI technologies to utilize the waste and produce electricity.

- 1.) Site Identification - Identifying a Suitable Site for building the FULL TECHNOLOGICAL SYSTEM
Note that since we will be using garbage the area should be a little far from residential areas but should have easy access to the roads and the Power Grid.
- 2.) Preliminary Financial Analysis - with inputs like the Land Costs, garbage separation facility, Interconnection possibility with the Power Grid Operator.
- 3.) Land leasing or buying - After Step 2 has passed, then begins the Acquisition of the Land through Lease or Ownership.
- 4.) Basic Engineering Design/Technology Selection – An Engineering Layout is prepared based on the machine to be used.
- 5.) Permitting – Various Permitting Procedures need to be followed in this Step. This is specific to the area where the our technologies will be constructed.
- 6.) Power Purchase Agreement – A Power Purchase Agreement (PPA) needs to be signed with the Power Utility who will buy the Electricity.
- 7.) Financing of the Project needs to be done. Note that Power Plants require a high initial investment with very low operations and manufacturing costs. In general 60-80% of the Project is Debt Financed.
- 8.) Site preparation including infrastructure.
- 9.) Technologies installation
- 10.) Testing and Connection to Grid - After the Power Plant is built, Testing of the Plant has to be done before it is connected to the Power Grid
- 11.) A Power Plant has a life of between 20 to 30 years and requires minimal maintenance and monitoring.

I. PROJECT SUMMARY

The unique point is that (ARTI) brings us its Advanced Thermal Distillation Technology.

This machinery has a two-fold function: First, it will establish another power supply provider that can deliver a stable and reliable supply of electricity using municipal waste and at the same time will resolve waste disposal issue through a process that copes with an acceptable environmental practice.

ARTI manufactures a system of thermo-conversion which is capable of converting a variety of waste materials including municipal solid waste, post-consumer plastics, tires, bio-solids and virtually all other biomass and hydrocarbon based materials into highly valuable commodities including gas and carbon. This system is the result of years of research and development by testing the numerous feed stocks leading to commercialization of the process. Most importantly, the ARTI process has direct operating experience with municipal solid waste, tires, animal wastes and human waste among others.

The combination of proven hardware and system control software allow ARTI to install a system that can be reliably operated in a sustainable way to help solve the problem of solid waste disposal by profitably recycling waste materials into marketable commodities.

The technology consists of a reactor consisting of an upper and lower retorts that are indirectly heated by ARTI Super Low NOx burners. The ARTI patented super low NOx burner system is considered the most efficient in the world for low NOx emissions. The reactor is designed so that no raw gases can be released to the atmosphere

The Shortage of Energy VS Environmental Issues:

One of the ways of showing love for a country is to love the environment. Your country is a country full of environmental laws emanating from the constitutional mandate to maintain a healthful and balanced ecology in accord with the harmony of nature.

Environmental laws are meant to regulate the impact of human activities on the environment. It covers a broad range of activities that affect air, water, land, flora and fauna.

It is sometimes very hard to reconcile the love for the environment with progress through technology, and to cope up with issues such as shortage of electricity supply.

With a more stable and adequate power supply, we can always be assured that progress will continue, as it will ensure sustained economic growth.

Your government has continuously looked for mechanisms to ensure the adequacy, availability and stability of electricity necessary to sustain the country's economic growth and it should be done in a manner that the "love for environment" is not put into compromise.

History of ARTI:

Incorporated in 1990

Over 5,000 Burners designed, Manufactured, and in Operation.

Patented Technology for Super Low Emission Burners.

Set the "Best Available Control Technology" (BACT) for Emissions for times at SCAQMD

Listed by SCAQMD as Approved "Ultra Low NOx Burner Systems"

American Renewable Technologies, Inc. has a long history in reducing and converting waste to energy. Municipal Solid Waste (MSW), is one of the materials that we have processed many times and we have at least one active plant operating with MSW processing 75 tons/day of household garbage in Aruba. The most important by-products from the thermo - conversion of MSW results in carbon-free gas with negligible amounts of moisture; that can be used to produce electricity:

Below please see the analysis of the proposed material and a mass and energy balance to produce power.

MSW Gas Analysis after thermo-conversion:

Table 1: Actual Mass Balance of Thermo Process:

ACTUAL ENERGY BALANCE

DATA FILE ID: MSW

ANALYSIS: ARTI LAB.

DATE: JULY 06, 2017

American Renewable Technologies, Inc.

COMPONENT	NORM MOLE %	HHV	LHV	SG
		Kcal/m ³	Kcal/m ³	
Hydrogen	23.0258	665.8716	563.4298	.01595
CO	17.1075	488.6343	488.6343	.16570
Methane	33.6874	3034.3741	2732.2256	.18659
Ethane	2.05647	324.5782	296.8743	.02135
Propane	0.1529	34.3119	31.5678	.00233
I - Butane	0.6337	183.7922	169.5715	.01272
N – Butane	0.4382	127.4968	117.6671	.00879
I – Pentane	0.1592	56.8069	52.5204	.00396
N – Pentane	0.04223	15.0981	13.9614	.00105
C6+	0	0	0	0
Oxygen	0.9069	0	0	.0100
Nitrogen	6.6777	0	0	.06459
CO2	15.1120	0	0	.2296
Ethylene	0	0	0	0
Total	100 %	4930.9643	4466.4525	.72270

Higher Heating Value (HHV) 4930.9643 KCAL/M³

Lower Heating Value (LHV) 4466.4525 KCAL/M³

SPECIFIC GRAVITY 0.72270

Gas density 0.8889 Kg/M³

Feed-stock Conversion

Biomass which is a carbohydrate can be readily converted to alcohols such as ethanol and methanol. Tires and Plastic which are hydrocarbons produce high quality fuel condensates as well.

Biomass can include municipal solid waste, compost, bio-solids from waste water treatment plants and manure from farm operations.

Feedstock Chart

Yield	Feedstock				
	Tires	Olefin Group Plastics	Mixed Plastics	Bio Mass	Coal
#2 Fuel Oil	X	X			X
#4 Fuel Oil	X				X
Methanol Ethanol				X	
Fuel Gas	*	X	X	X	X
Carbon	X	X	X	X	X
Steel	X				

* Used in Process

BTU Table

	<u>kcal/kg</u>	<u>Fixed Carbon</u>	<u>Moisture</u>	<u>Ash</u>	<u>Volatiles</u>	<u>Btu/dry lb</u>	<u>kJ/kg</u>
Almond Prunings	3,058	21.54%	18.0%	1.63%	58.83%	5,500	12,793
Asphalt Shingles	8,339		5.0%			15,000	34,889
Auto Fluff	7,465	50.00%	18.0%		32.00%	13,428	31,233
Bagasse	4,436	14.95%	20.0%	11.00%	54.05%	7,980	18,561
Barley Straw	4,141	20.90%	14.0%	10.00%	55.10%	7,449	
Bamboo	3,800	20.00%	18.0%		62.00%	6,836	15,900
Brown coal	4,500		18.0%			8,095	18,828
Brown Paper	4,398	9.80%	10.0%	1.10%	79.10%	7,911	18,400
Cacao Shrub	3,298	24.00%	18.0%		58.00%	5,933	13,800
Car tires	8,300		18.0%			14,930	34,726
Cardboard	3,891	12.90%	18.0%	5.40%	63.70%	7,000	16,282
Cardboard corrugated	3,920	12.90%	18.0%	5.40%	63.70%	7,051	16,400
Casuarina	4,483	19.59%	18.0%	1.83%	60.58%	8,064	18,757
CDR	4,058	41.00%	18.0%		41.00%	7,300	16,979
Chicken Manure	3,780	10.30%	27.0%	15.70%	47.00%	6,800	15,816
China grass	4,039	20.00%	18.0%		62.00%	7,266	16,900
Citrus peels	4,500	20.00%	18.0%		62.00%	8,095	18,828
Coal	6,671	10.00%	18.0%		72.00%	12,000	27,911
Coal - Pittsburgh Seam	7,583	55.80%	18.0%	10.30%	15.90%	13,641	31,728
Coconut shell	5,984	32.00%	18.0%		50.00%	6,836	15,900
Coffee bean shells	6,000	10.00%	18.0%		72.00%	10,793	25,103
Commercial Waste	4,447	30.00%	18.0%		52.00%	8,000	18,608
Compost	4,207		18.0%			7,567	17,600
Cork	6,310	8.00%	18.0%		74.00%	11,350	26,399
Corn	4,398	20.00%	18.0%		62.00%	7,911	18,400
Corn Stover	4,405	19.25%	18.0%	5.58%	57.17%	7,924	18,430
Corncobs	4,483	18.54%	18.0%	1.36%	62.10%	8,064	18,757
Cotton gin trash	3,922	15.10%	18.0%	17.60%	49.30%	7,055	16,409
Cotton seeds	3,298	20.00%	18.0%		62.00%	5,933	13,800
Cotton Stalk	4,361	22.43%	18.0%	6.68%	52.89%	7,845	18,247
Cow Manure	4,725	15.00%	20.0%	13.00%	52.00%	8,500	19,771
Electrical Waste	7,154	21.00%	5.0%		74.00%	12,869	29,932
Food Waste	5,001	20.00%	18.0%		62.00%	8,995	20,922
Gin Trash	4,058	24.00%	18.0%		58.00%	7,300	16,979
Green Waste	4,070	20.00%	18.0%		62.00%	7,321	17,028
Hay	3,203	24.00%	18.0%		58.00%	5,761	13,400
Horse Manure	3,058		25.0%	4.00%		5,500	12,793
Hospital waste	5,473	10.00%	20.0%		70.00%	9,845	22,899
Household waste pre-sorted	4,500	10.00%	18.0%		72.00%	8,095	18,828
Human Sludge	6,671	5.00%	25.0%	35.00%	35.00%	12,000	27,911
King Grass	4,392	20.00%	15.0%		65.00%	7,900	18,375
Leather	4,169	8.00%	18.0%		74.00%	7,500	17,445
Lignin	5,059					9,100	21,166

BTU Table

Paper sludge	3,920					7,051	16,400
Macadamia shell	4,826	22.68%	18.0%	0.40%	58.92%	8,681	20,206
Mamure (dried)	3,800		18.0%			6,836	15,900
Meat Waste	5,288	8.00%	18.0%		74.00%	9,512	22,124
Medical Waste	7,138	24.00%	18.0%		58.00%	9,845	22,899
MSW 5.5K	3,058	10.00%	40.0%	12.00%	38.00%	5,500	12,793
MSW 5K	2,780	10.00%	18.0%	12.00%	60.00%	5,000	11,630
MSW 6.5K	3,614	10.00%	18.0%	10.00%	62.00%	6,500	15,119
MSW 6K	3,336	10.00%	20.0%	12.00%	58.00%	6,000	13,956
MSW 7.0	3,891	10.00%	18.0%	12.00%	60.00%	7,000	16,282
MSW High Plastic	5,384	31.00%	15.0%	5.00%	49.00%	9,685	22,526
Natural Gas	8,895		18.0%			16,000	37,215
Neoprene	7,100		18.0%			12,771	29,706
Newspaper	3,920	12.20%	18.0%	1.50%	68.30%	7,051	16,400
Nylon	7,570		18.0%			13,617	31,672
Oat Hulls	3,855	16.55%	10.4%	5.22%	67.80%	6,934	16,128
Oil sludge	8,796		18.0%			15,822	36,800
Palm Oil EFB	4,048	14.00%	18.0%		68.00%	7,282	16,938
Pallet Wood	4,559	18.00%	20.0%	2.00%		8,200	19,073
Paper adhesive coated	4,207	20.00%	10.0%		70.00%	7,567	17,600
Paper Plastic Coated	6,816	15.00%	10.0%	2.00%	73.00%	12,261	28,517
Paper sludge	3,920					7,051	16,400
Paraffin	10,349		18.0%			18,616	43,300
Peach Pits	4,973	19.85%	18.0%	1.03%	61.12%	8,945	20,806
Peanut Hulls	4,450	21.09%	18.0%	5.89%	55.02%	8,005	18,618
Peat, S-H3	5,255	26.87%	18.0%	4.20%	50.93%	9,452	21,985
Pig Mamure	4,466	12.00%	25.0%	25.00%	38.00%	8,034	18,687
Pineapple Waste	4,194	10.00%	10.0%	0.05%	79.95%	7,544	17,547
Plastic Roll	6,500	0.02%	1.46%	0.03%	98.49%	21,000	48,845
Plastics	7,758	1.46%	5.0%	2.00%	91.54%	15,000	34,889
Polyethane foam	9,770	5.00%	5.0%	3.00%	87.00%	17,574	40,877
Polyethylene	10,990	15.00%	5.0%	3.00%	77.00%	19,769	45,981
Polypropylene	11,030		5.0%	3.00%		19,841	46,148
Polystyrol carbon	10,480	30.00%	5.0%	3.00%	62.00%	18,851	43,847
Polystyrol EPS	9,800	30.00%	5.0%	3.00%	62.00%	17,628	41,002
Railroad Ties	4,447	20.00%			80.00%	8,000	18,608
RDF	6,006	41.00%	15.0%		44.00%	10,804	25,128
RGEN MSW	4,308	15.00%	15.0%	5.00%	65.00%	7,750	18,026
Rice Hulls	3,555	10.00%	10.0%	17.90%	62.10%	6,395	14,874
Rubber (Crum	7,500	33.00%			67.00%	13,491	31,379
Sewage sludge (dried)	3,298					5,933	13,800
Soybean Waste	4,169	20.00%	18.0%		62.00%	7,500	17,445
Sudan Grass	4,154	18.60%	18.0%	8.65%	54.75%	7,471	17,378
Sugar Beets	3,242	20.00%	18.0%		62.00%	5,831	13,563
Sugar Cane	6,810	10.00%	18.0%		72.00%	12,250	28,493

The System:

American Renewable Technologies, Inc., (ARTI) thermo-conversion system consists of a compact unit with two retorts. The raw material is received in the upper retort and exhausts from the lower retort. The upper retort acts as a fast thermo- unit, while the lower retort operates at a slightly higher temperature and residence time and will be the slow thermo-conversion system. The residence time for the system can be up to 3.5 hours depending on the material and the temperature requirements.

As the material moves through the system it decomposes into different chemical components. The further process of the material is focused on maximizing the production of gas and minimizing the production of liquid fuels. Liquid fuels are produced only when the system is directed to. In the case of producing liquid fuels, the system will be operated at a lower temperature so the hydrocarbons produced minimize breaking beyond C5's.

The gas produced carries some carbon with it as it exits the system. Trying to capture these carbons before it goes into the wash system, the gas is moved through a carbon capturing box where the gas velocity is reduced from 8.0 Meter /sec. to 0.6 to 0.8 Meters/sec. levels. At these velocities the carbon particles are too heavy for the gas to carry through and they drop in the carbon separation box. The gas moves next through a gas filter system where most of the carbon heavier than 1 micron will get separated from the gas.

Gas moves through 3 more cooling sections.

In the section 1, which is called scrubber #1, the gas is washed with an oil. The water and carbon is separated from the gas. Any heavy condensable gases also turns to liquid. The remaining gases move through the second scrubber and the temperature of the gas is reduced to around 40 °C. From the second scrubber the gas moves through a chilled condenser where the final temperature is no larger than 15 °C. In this case 99% of all condensable gases are removed from the gas and the gas is clean to be used for the operation of the system and for power generation using a gas generator.

The gas at this stage is transferred through high quality blowers. The blowers are designed to operate according to the gas production in the retorts through a pressure control system. The retort pressure is normally kept at a negative level around -50.00 to -100.00 mm of water column.

The clean gas is transferred into an intermediate gas tank from which it is transferred to storage tanks using high pressure compressors.

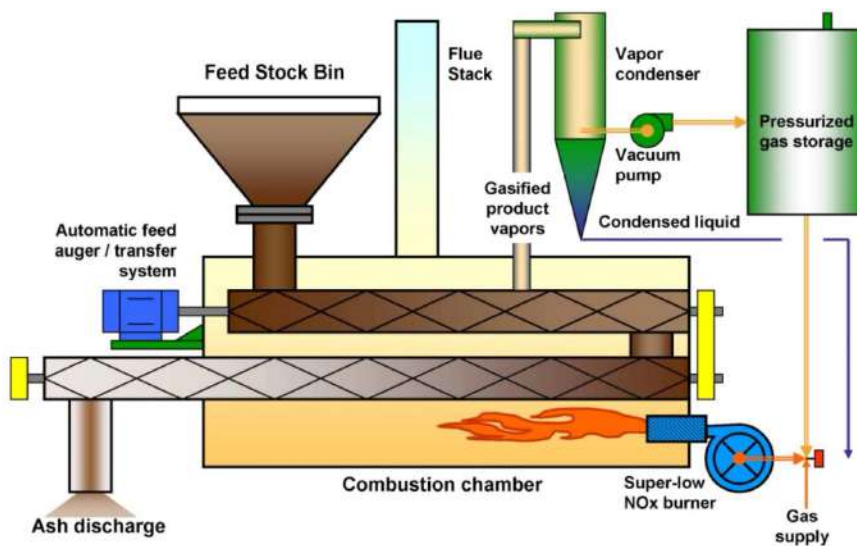
ARTI normally does not supply the Compressors, but as a separate item, can supply the gas compression system and storage tanks including the electronic controls for automatic performance of the system.

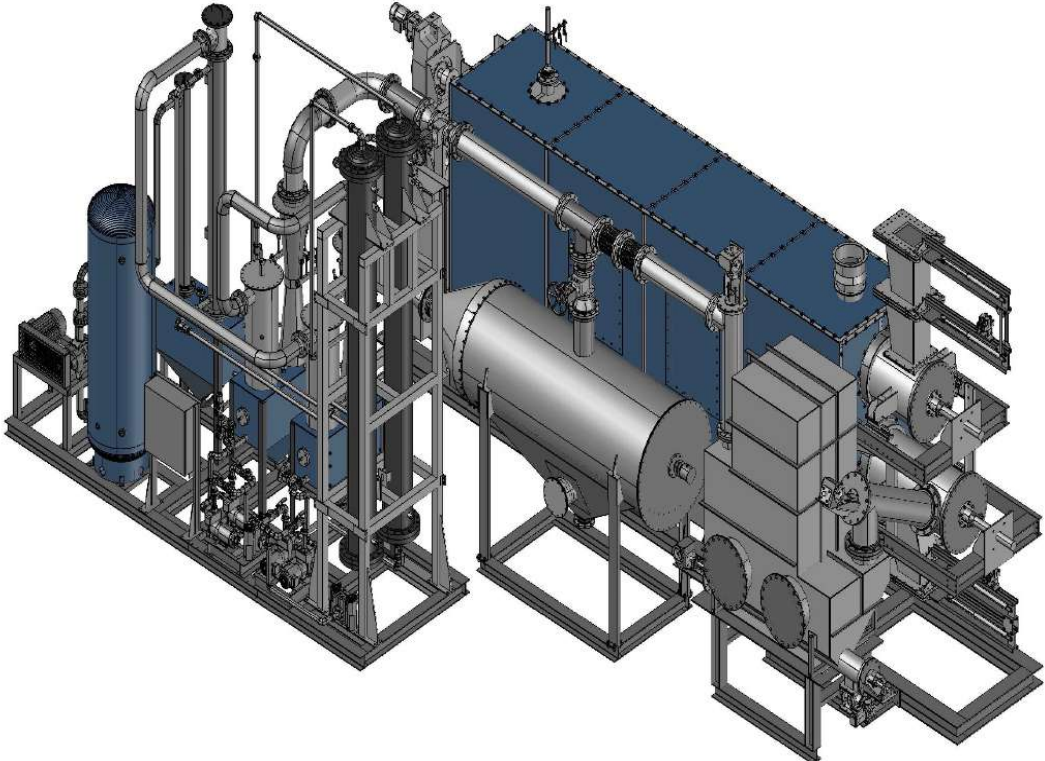
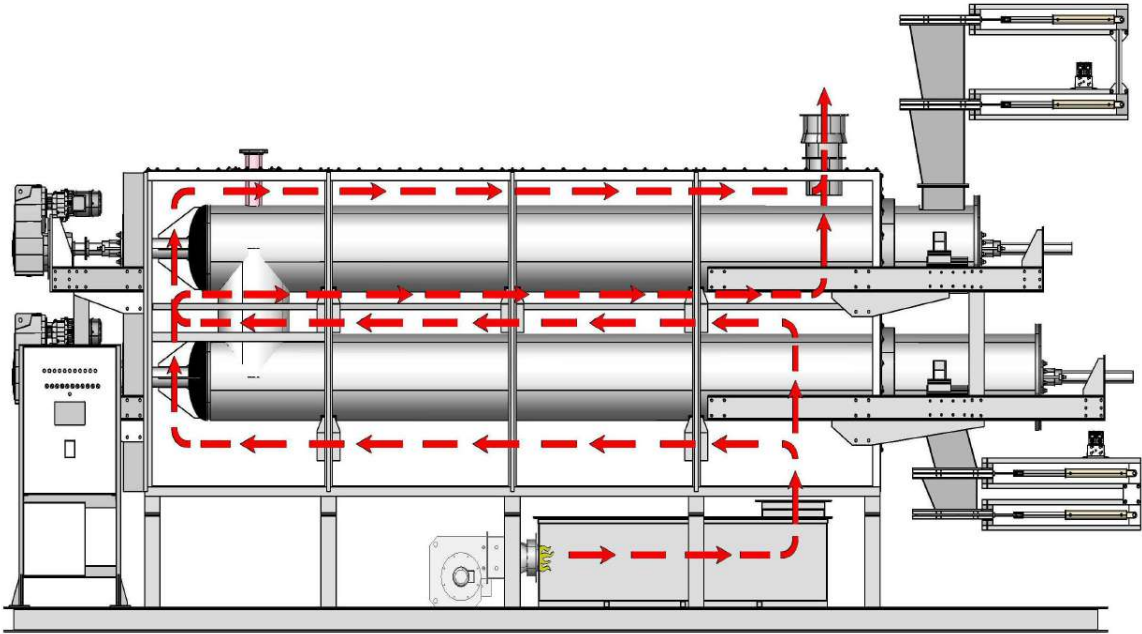
The feed material must be densified to over 320 Kg / M³ for proper operation. Low density material will produce gas at an efficient level. This is the process needed to make the system work.

1. Waste material is processed so it has minimum amount of inorganics such as rocks, metal or glass.
2. Waste material is shredded to fine pieces
3. Waste material is densified to little cubes or higher density pellets.
4. Material is transferred into the system through augers or belts at a rate determined by the controls.
5. Carbon is removed from the bottom through a cooling auger and stored for either sell or removal from the plant.
6. Oil, if any, will be cleaned up through a centrifuge system supplied by ARTI and is recirculated for the cooling purposes. Extra oil is transferred to an oil tank for sale or use purposes.
7. Water is removed and is cleaned up for discharge
8. Carbon is removed and stored for reuse or discharge.
9. Gas is transferred into storage tanks using high efficiency compressors from which they are regulated to be used as fuel for the pyrolysis system and for the production of electricity.
10. High efficiency generators are used to produce power.

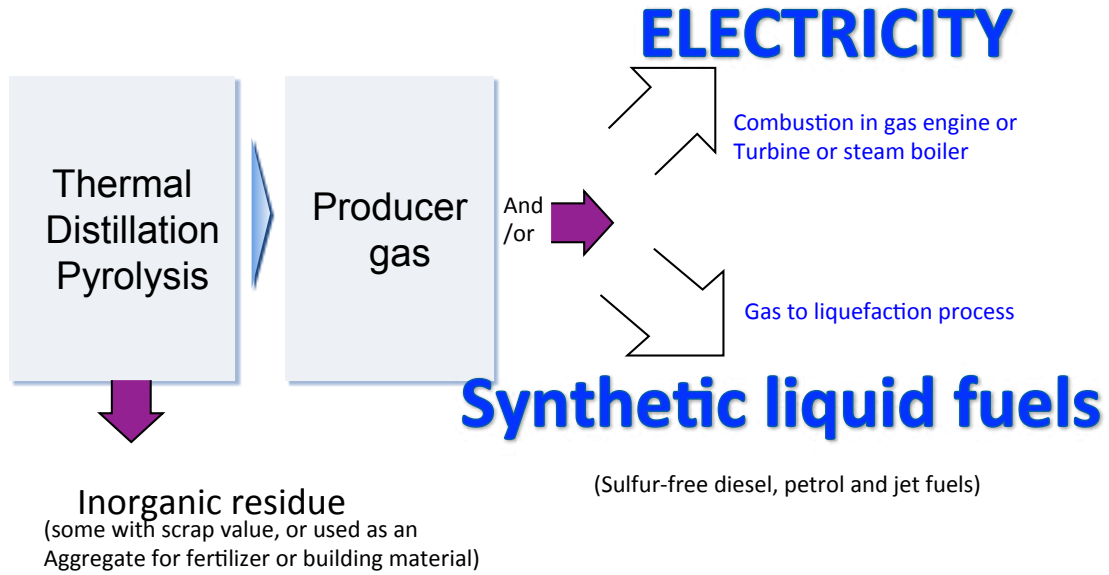
MOST OR ALL OF THESE AUX. EQUIPMENT INCLUDING THE PLANT ENGINEERING CAN BE SUPPLIED BY ARTI.

• **THE THERMAL DISTILLATION TECHNOLOGY**

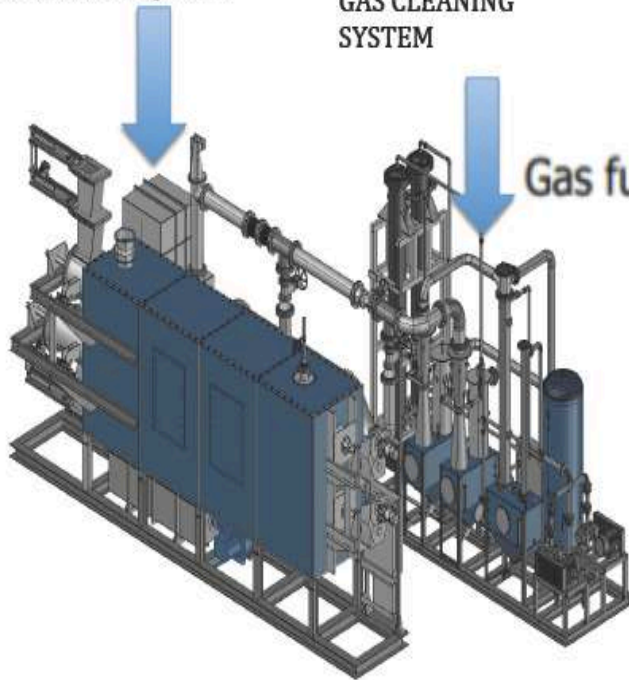




Overview

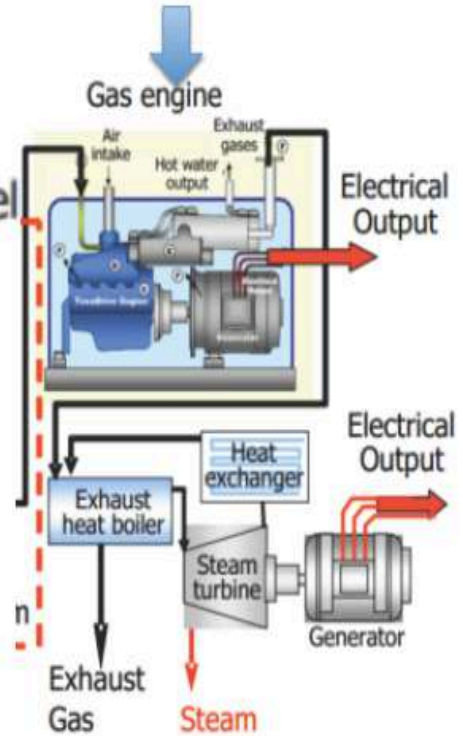


Advanced Thermal Distillation System



GAS CLEANING SYSTEM

COMBINED CYCLE



The thermo- conversion demonstration unit at the site is a skid mounted, self contained unit designed to convert waste into hydrocarbon fuels suitable for clean combustion and generation of electrical power. The unit consists of gas heated retort with internal transport augers, gas cleaning and condensing components, gas and liquid pumps, cooling tower and a storage tank. The following components are the major parts of the thermo-conversion system:

1. The Furnace
2. The Auger
3. The Retort
4. The Burner
5. The Particle Wash System
6. The Condenser
7. The Gas Blower
8. Storage tank
9. The Cooling Tower

1.) The Furnace

An insulated box which contains the waste to energy retort. The retort is isolated from the furnace environment so the gases cannot leak into the retort from the furnace. The furnace is equipped with a burner firing natural gas. The heat from the burner travels through two passes to heat the retort. The flue gas temperature is normally 65 to 95 degrees C above the retort operating temperature. The furnace is designed to allow the retort to easily expand and contract during the operation.

2.) The Retort:

The retort is a sealed stainless steel vessel containing the two transport augers. The feed stock is manually fed to the retort via a double blade air sealed valve. This valve is installed to minimize the passage of air into the retort. The feed stock is fed into the retort when the top blade opens and allows the material to enter the valve. Once the top blade has closed the bottom blade opens to feed the material into the retort. This valve is synchronized with an auger feed into the valve. As the material travels through the retort, it gasifies. The gases are collected under a slight negative pressure and sent out of the retort. As the gasification sequence of the material ends, the carbon ash exits the retort

through a similar double blade valve thus maintaining the slight vacuum during the discharge of this residue. In the case of a tire, it is shredded and fed into the supply bin feeding the retort. After the thermo-conversion process the ash exits the retort into an ash bin. The metal from the tire is separated from the ash and is easily recovered.

3.) The Augers

The retort is equipped with high temperature stainless steel augers which move the material from the inlet, through the retort, and finally to the discharge point. These augers travel at a preset speed determined by the operator. However, the speed of the augers can be changed at the Operator Control Panel to suit the material processed.

4.) The Burner

The burner is a low emission and very efficient burner. The burner can operate at very low levels of excess oxygen if required and can meet the local emission requirement.

The furnace is equipped with a gas burner that is normally fueled with either natural gas or waste gas. The burner is supplied with a flame safeguard control and can modulated to higher firing rate on demand. A temperature control installed on the retort allows the burner to start and to modulate. Once the burner is turned on, it modulates to a firing position where it heats the retort to the pre-set temperature. When the temperature demand is satisfied the burner modulates back to its lower shuts down. During the operation in many cases the material conversion process becomes exothermic and even though the burner has shut down the retort temperature (will remain high) may continue to rise. If the retort temperature falls below the lower set point the burner will automatically start and raise the temperature back to the upper set point.

5.) The Particle Wash system

When the thermo-conversion system is in processing mode, gases travel from the unit to the particle wash system. The PWS is provided with a liquid pump.

The Particle Wash System must contain either light oil or water (200 to 300 liters) depending on the nature of the process. The Wash Pump energizes as the unit starts to operate and recirculate the washing media. This washing process takes place in a venturi and any heavy particles such as tar or wax can be removed from the gas and will be retained within the Particle Wash System.

6.) The Condenser

This is to make sure that the lighter condensable gases liquefy through the condenser. The light liquid collects in the tank installed at the bottom of the condenser and the non-condensable gases travel through a demister separating the last liquid particles before the gas reaches the gas blowers.

7.) The Gas Blower

A gas blower is supplied to remove the gases from the system while maintain the slight negative pressure within the system. It is a Roots-type positive displacement blower. The blower is controlled through the use of a pressure transducer installed on the retort. This transducer senses the rate of gasification. As the gasification process gas flow changes, the retort pressure rises or falls and sends a signal to the blower speed control to compensate. In this way the operating retort vacuum is maintained at a pre-set level. This insures the quality and uniformity of the by-products.

8.) Intermediate Storage Tank

The final gas product travels to an intermediate gas storage tank. This is a small tank and cannot be used as a permanent gas storage tank. This tank must be emptied continuously otherwise it will cause back-pressure on the system.

9.) The Cooling Tower

A cooling tower is supplied to cool and re-circulate cooling water to the Condenser.

- **System Operation**

The burner in the furnace is started and a flame is established monitoring three important items such as furnace temperature, retort temperature and retort pressure. The retort pressure is kept at a slight negative level. This helps to raise the retort temperature faster and ensure a safe operation. As the burner operates, it will increase the temperature of the thermo-unit until the desired temperature is reached. At this point material can be fed to the retort via the air locked valves initiating the thermo-conversion process. Once the preset retort temperature is reached the burner will automatically shut down. The burner will not re-energize until another preset burner starting temperature is reached in the ideal preset operating temperature. As the material begins to gasify, the gases will build a pressure which is higher than the preset negative retort pressure, the pressure transducer senses this change and sends a signal to the gas blower and the blower is programmed to respond to this demand to bring the pressure down to the preset level. The gases are drawn constantly from the retort and washed out of dust, dirt and may be some pollutants such as sulfur compounds. Once the gas is washed, in the next two stages of operation it is important that all condensed liquids are separated from the gas using a condenser and water separators before it reaches the gas blower. The gas blower sends this gas to an immediate tank at a low pressure from which it is drawn and kept in a higher pressure tank.

The condenser is cooled using a cooling tower, which recirculates the water as a cooling media to the condenser and the gas washing heat exchanger.

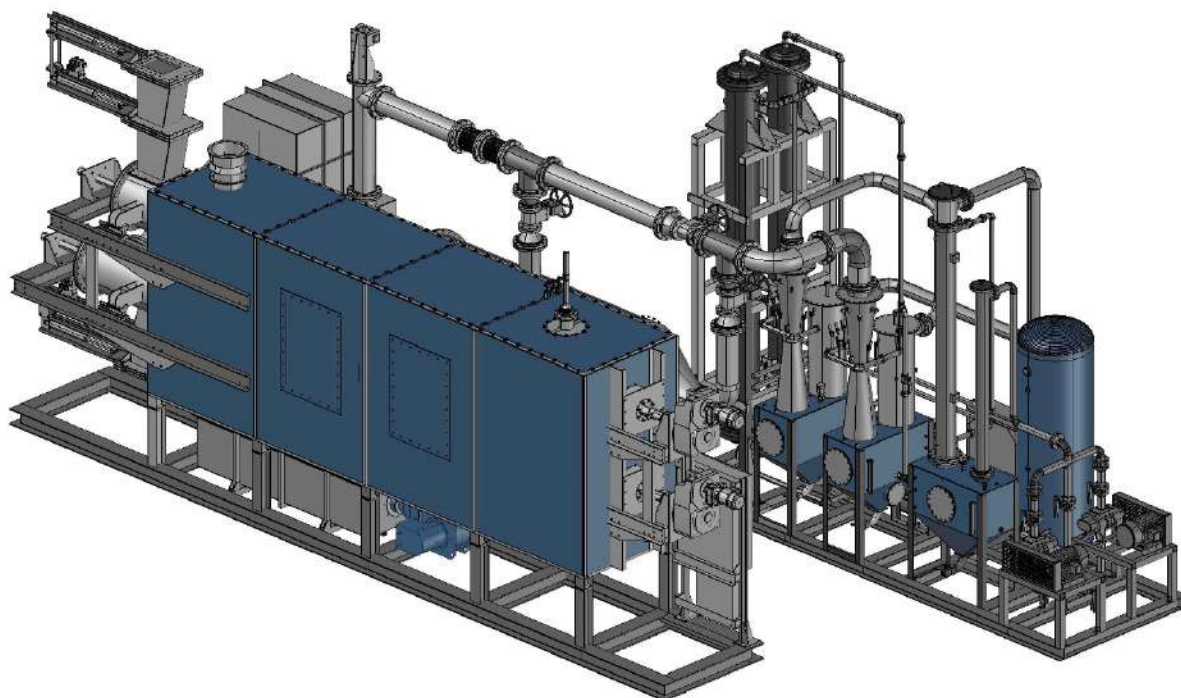
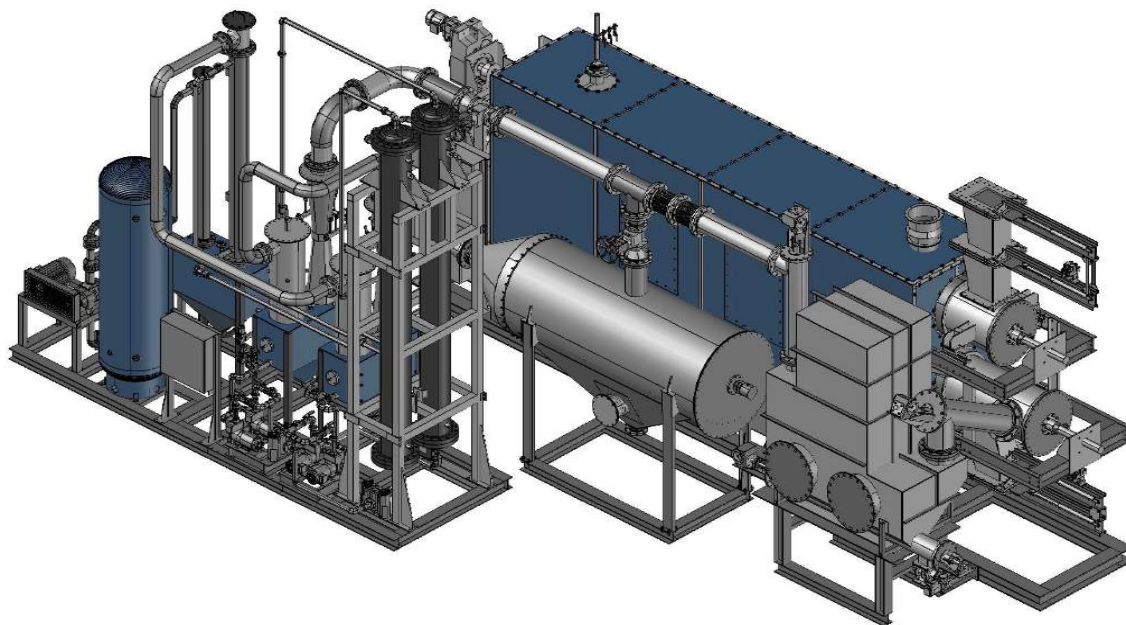
Once the thermo-conversion process is completely finished, the unit has to run for at least another hour in order to gasify the material that was just introduced to the unit. It is important that the furnace temperature is monitored to make sure the flame temperature does not increase beyond 1050 °C. Although the retort is manufactured using high temperature alloys, it is important that too high temperatures are avoided at all time. This will insure a long retort life.

American Renewable Technologies, Inc.

THE MACHINE THAT WILL BE USED



2 Tons/hr. ARTI system



ARTI Patented Process to Use Thermo-conversion.

Converts any Type of Organic or Synthetic Waste into Pyro-fuel

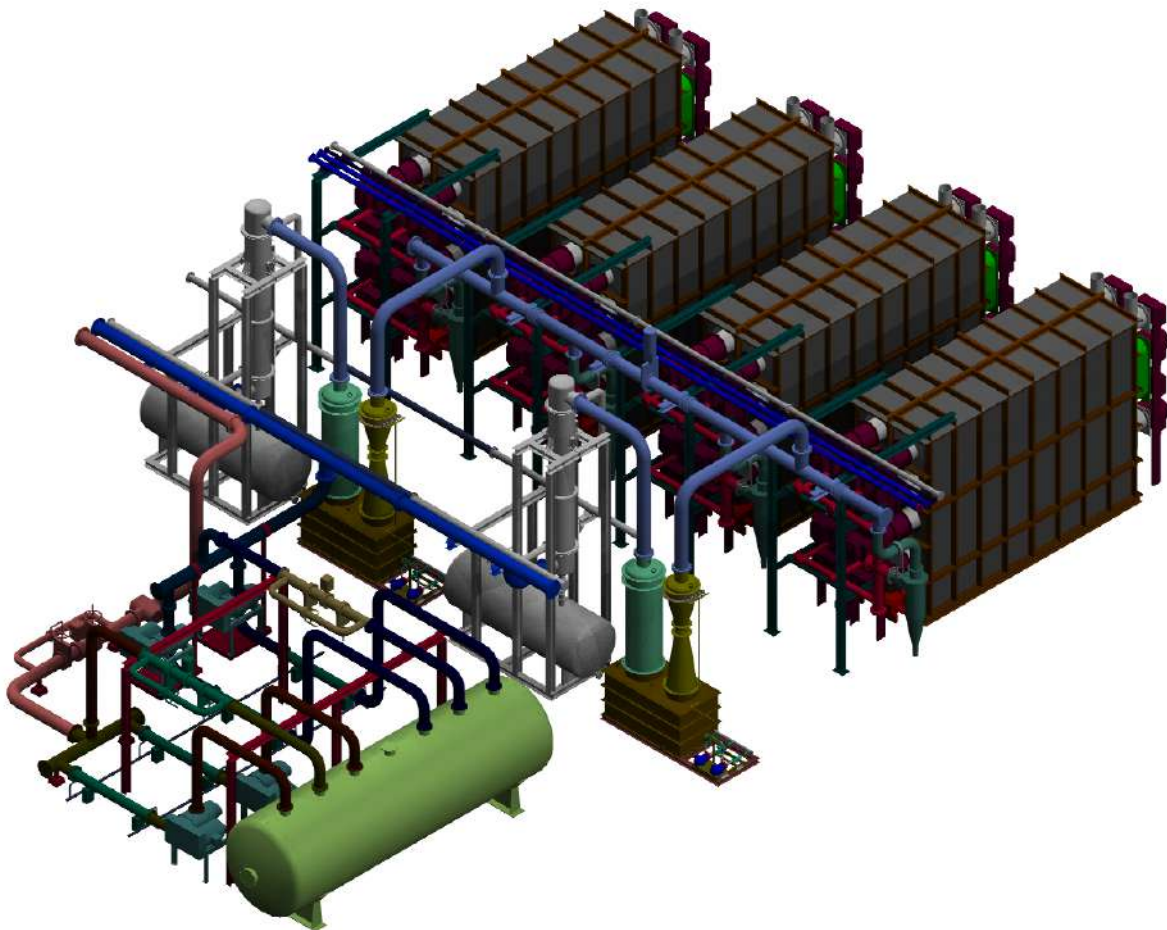
ARTI Modular systems are:

Fixed Capacity Units

Capable of running independently, or in parallel

Scalable, versatile and adaptable

Units can be added or removed on an as needed basis



Air Emissions:

Emissions for Pyrolysis/Gasification Facilities/Technologies

(Values are in mg/Nm³ unless noted.)

	PM	NO _x	CO	VOC	SO ₂	Dioxins/ Furan (ng – TEQ/Nm ³)	HCl	Cd	Pb	Hg
Regulatory Limits										
U.S. EPA Limits	18.4	219.8	89.2		61.2		29.1	0.01533	0.1533	0.0613
ARTI Limits	0	<50	<40		<30	ND	ND	ND	ND	ND

Notes:

PM = particulate matter - NO_x = oxides of nitrogen - CO = carbon monoxide

VOC=volatile organic compounds - SO₂ = sulfur dioxide - Cd = Cadmium,

Pb=Lead – Hg= Mercury

ARTI is the manufacturer of super low emission burners as well as Advanced recycling technology based on pyrolysis/gasification of post consumer waste. Air pollution regulations in California are determined by the capabilities of manufacturers to reduce the level of emission to a safer lower level. This regulation is called Best Available Control Technology (BACT). The state of California at the present and for a long time has been practicing the most stringent air quality rules in the world and these rules have been set by manufacturers. At the present time the highest NO_x emission level from any stationary source is below 9 PPM corrected to 3.0% excess oxygen. The last three consecutive years BACT were set by ARTI using patented combustion technologies. This is the highest quality combustion equipment with the lowest emissions and highest efficiency level in the world at the present time.

This special qualification has enabled ARTI to be very successful in the recycling field as the thermal distillation technology that processes rubber, plastic, wood, animal waste, and medical waste is also patented. ARTI burners are all regulated by the South Coast Air Quality Management District (SCAQMD). This organization orders a third party to test the burners as soon as they are installed to make sure they comply with the regulations. ARTI products are also UL approved. UL (Underwriter Laboratories) which is a safety regulatory organization controls the quality of every product before it is shipped from our facility.

Typical Equipment Proposal for a 1 tons/hr. units:

The "Equipment" shall mean the equipment listed in Exhibit A to this document.

Words not otherwise defined herein shall have meanings as commonly used in the English language. Words that have well-known and generally accepted technical or trade meanings are used in this document in accordance with such recognized meanings.

- 1. PURCHASE PRICE AND DELIVERY OF EQUIPMENT.** The total purchase price is as indicated in EXHIBIT B. Payments shall be made in accordance with the schedule set forth in Exhibit B. If Purchaser should fail to pay Seller at the time any payment of any undisputed amount that becomes due, Seller may, at its option, stop the design, manufacture, or shipment of the Equipment until payment of the undisputed amount owing has been received.

Equipment shall be manufactured and ready for shipment FOB from Seller's location in USA no later than Twelve(12) months after Initial Payment from Purchaser is received.

PERMITTED USE. The Equipment shall be used by Purchaser and/or its client for who it is acting as the EPC for the purpose of producing carbon, oil, and gas from MSW. The shredded MSW will be densified into pellets of a density of over 320 Kg/cubic meter. The pellet sizes should not exceed 35 mm X 35 mm. In connection therewith, no changes or modifications to the Equipment or to the use to be made of the Equipment may be made by any individual or entity during the Warranty Period without the prior written consent of Seller, of which will not be unreasonably withheld, except for any such changes or modifications as Purchaser or its client deems necessary for the operation of the Equipment for its intended purpose. To the extent that Purchaser or its client intends to use feedstock other than specified, Purchaser or its client must notify Seller in writing as the use of other feedstock may require adjustments to the unit and/or additional equipment, which Seller shall work with Purchaser or its client to provide in good faith and at Purchaser's or its client's expense. Failure to notify Seller prior to using feedstock other than coal in the Equipment shall void any express or implied warranties regarding the Equipment.

DESIGNATED ENGINEERING COMPANY. Purchaser shall hire or act as the EPC on the Project and shall coordinate with Seller with respect to all technical specifications of the Equipment and shall assume complete responsibility, in conjunction with Seller as set forth in Exhibit C, for installation of the Equipment at Purchaser's client's designated facility.

ITEMS COVERED BY PURCHASE PRICE. The Agreement contemplates that Seller will provide the Equipment as set forth in Exhibit A. The Purchase Price **DOES NOT** include the engineering of the facility or the installation of the Equipment at Purchaser's client's facility.

In addition, the purchase price **DOES NOT** include the following:

- The engineering, construction or buildout of Purchaser's client's facility per the specifications provided by Seller
- Permits, fees, or other expenses required to build the facility
- Shipping and handling costs of the Equipment from Seller's facility to the Project site
- Supply of feedstock
- Spare parts (recommended list will be provided and will include pricing for the major components in the list)
- Gas supply for cold startup, electrical supply for startup
- Refining and/or oil or carbon finishing equipment.

PERMITS. All permits, licenses or authorizations, including environmental permits, or variances necessary to comply with land use requirements or licenses or other governmental or corporate governance authorizations needed to operate the Project shall be the sole responsibility of Purchaser and/or its client and performance and payment to Seller is not in any way conditioned on Purchaser and/or its client securing or ability to secure any permits, licenses or public or private authorizations needed to construct, operate or maintain of the Project.

INSTALLATION OF EQUIPMENT. As set forth in the Exhibit C to this Agreement, Purchaser assumes all responsibility for the installation of the Equipment. Consistent with its obligations as set forth in Exhibit C, Seller shall provide a representative on-site to consult regarding the installation of the Equipment. However, in a separate agreement seller may take the responsibility of installation and plant engineering. This will make all the responsibilities to fall on only one supplier.

COMMISSION OF SYSTEM AND PERFORMANCE TEST. Upon completion of the installation of the system, Seller shall notify Purchaser in writing that it is ready to commence the start-up and commission of the system. Seller, in conjunction with Purchaser, shall then start the Equipment and run it for a period of ten days at low, medium, and full loads (full load meaning maximum specified capacity of each unit in this case). The Parties shall jointly maintain a log of the operation of the system including the feed input, the qualities of the feed, the amount of

carbon, oil, and gas produced, and the qualities of the gas, coal, and carbon. Upon 10 days of operation, the performance test shall be deemed completed. In the event that the parties dispute the completion of the performance test, they shall work in good faith to agree upon an independent third party to monitor and determine the completion of the performance test.

PURCHASER'S RESPONSIBILITIES. In addition to any items otherwise delineated in this Agreement and the accompanying Exhibits, Purchaser and/or its client shall be responsible for the following items:

The payment for all necessary utilities, building permits, public inspections, licenses, air quality testing, permitting fees, application fees, insurance charges and all other reasonable costs for the operation of the system, etc.

Purchaser is also responsible for all costs associated with roads, utilities, shipping and handling, storage and/or warehousing of finished product, administrative facilities, R&D facilities, machine shop, tools, spare parts and any other costs associated with the ongoing operation of the facility.

The Installation of the Equipment and other related items as set forth in Exhibit C.

Purchaser shall be responsible for the capacity, productivity, or suitability for its intended use of any equipment not supplied by Seller including any supporting equipment. Moreover, Purchaser shall be responsible for identifying, procuring, and constructing all equipment necessary for the operation of the Project outside those specifically identified in Exhibit A.

Purchaser and/or its client shall be responsible for supplying MSW feed stock with the minimum characteristics set forth in Exhibit D. Purchaser shall install and maintain a system that continuously measures the qualities of the feed that is input into the system including but not limited to the size, chemical composition, and the Calorific values.

Purchaser acknowledges that the Equipment will produce a mixture of some liquid fuel and gas from the feed. Purchaser acknowledges that the qualities of the mixture oil will be dependent on a number of factors including the composition of the feed. Seller makes no representations as to the suitability of such oil as to Purchaser's desired end products or energy requirements. Seller can provide distillation equipment to provide clean oil. Purchaser and/or its client shall be responsible for any finishing, or other processes necessary to convert the oil by the Equipment to its desired end products.

SELLER'S RESPONSIBILITIES. In addition to providing the Equipment set forth in Exhibit A and supervision of the installation and commissioning the system as set forth in Exhibit C, Seller shall provide the following items:

Minimum of four weeks of training for Purchaser personnel for the operation of the Equipment system either at Seller's Los Angeles facility or at Purchaser and/or its client's location.

A complete set of operation manuals for the operation of the system. These manuals will be issued after the completion of the training.

SPARE PARTS. The cost of spare parts is not included in the Purchase Price. Upon request by Purchaser, Seller shall provide Purchaser with a recommended list of spare parts and the price for such parts.

CHANGE ORDERS. Requests by Purchaser for any major modifications or changes to the Order, including, without limitation, changes in specifications, quantities, delivery obligations and terms of payment, must be made in writing. All such requests are subject to Seller's written acceptance and may result in adjustments to price and/or delivery schedule.

EQUIPMENT WARRANTY.

All equipment included in this contract is warranted by its respective manufacturer. Seller will, for a period of one (1) year following initial start-up and acceptance by Purchaser, warranty all products to be free of defects in material and workmanship when properly installed and operated. Defects or failures caused by damage in shipment, misuse, negligence, lack of proper maintenance, or operator errors are not covered by this warranty. Seller will provide training to Purchaser personnel sufficient to allow them to be qualified by Seller as "skilled". This warranty becomes void if Seller's instructions are not followed or unapproved feedstocks are processed. Written notice of any defect or abnormality must be given to Seller in a reasonable time following its discovery. Defective parts or products must be returned, prepaid, to Seller at Purchaser's expense. They will be repaired or replaced and returned prepaid to the Purchaser's plant.

The exclusive remedy for defects is the repair or replacement of products or parts, which upon inspection by Seller, are found to be defective. In the case of field repair required on weldments, retorts or other fabricated structures which are too large or impractical for return to Seller, Purchaser must first contact Seller. Arrangements will then be made to have a representative of Seller inspect the damaged area and assess the most expedient and cost effective method of repair. If it is determined that Seller is at fault, a field repair will be

made by Seller or an authorized qualified local contractor will make the repair under the supervision of Seller. No such repairs are to be allowed or paid for by Purchaser without the prior written approval of Seller.

This system is to be operated and maintained by qualified personnel. Purchaser must comply with all instructions and warnings shipped by Seller with the unit. Seller will in no event be liable for incidental or consequential damages of any kind whatsoever.

Purchaser shall not retain or otherwise employ any consultants or experts to make modifications, alterations, or other changes to the Equipment without the express written consent of Seller. Failure to obtain written consent shall void all warranties.

Under adverse ambient conditions, such as when outdoors or subject to radiant heat or exposed to corrosive or any other deleterious environments or conditions, Purchaser, or the user shall provide special protection and special maintenance as may be required to assure proper protection of the unit and proper operation.

INTELLECTUAL PROPERTY AND OTHER PROPRIETARY INTERESTS OF SELLER.

Purchaser agrees that all concepts, technologies, designs and ideas which are a part of, or are related to, the Equipment are and shall remain the sole property of Seller. Purchaser covenants not to copy, duplicate, convert, transfer, assign or sell those proprietary interests in any manner or for any purpose. Purchaser also covenants not to provide anyone with access to the Equipment for the purpose of copying, duplicating, converting, or otherwise trading on Seller's propriety technology.

Purchaser shall not manufacture a Pyrolysis System or associated equipment using the technology developed by Seller, or using the concepts or designs described in any of Seller's patents issued or pending. Engaging in any such actions, or related actions, will lead to an immediate material breach of this contract. Purchaser shall also not provide the concepts, designs, plans, or other information regarding the Equipment to any third party with the express written consent of Seller.

Patent Infringement: Seller will defend, indemnify and hold Purchaser harmless from any claim that the goods infringe upon a third party's rights in a registered United States patent or trademark, provided (i) Purchaser promptly notifies Seller in writing of any such claim, (ii) Purchaser gives Seller the sole right to defend, settle and control the defense of the suit or proceeding, (iii) Purchaser provides all necessary

information and assistance for such defense or settlement, and (iv) Purchaser takes no position that is material and adverse to Seller's defense of such claim. In the event Seller is obligated to defend such suit or proceeding, Seller will pay costs and damages finally awarded or agreed upon by Seller that are directly related thereto. Seller may, at Seller's own discretion and expense: (i) procure for Purchaser the right to continue using the goods, (ii) replace the goods with non-infringing goods, or (iii) modify the goods to make them non-infringing. Seller will have no liability or obligation to defend if the claim, suit or proceeding is based on or arises out of a configuration, modification or any change to the goods that is made, specified or requested by Purchaser. The foregoing indemnity constitutes Seller's sole responsibility for infringement claims. Notwithstanding the above, Purchaser agrees to defend, indemnify and hold Seller harmless from any claim of infringement for goods designed or manufactured to Purchaser's specifications if such design, manufacture or specification constitutes the basis for such actual or alleged infringement claim.

RESALE OF ARTI SYSTEM PROHIBITED WITHOUT CONSENT. Purchaser agrees that it shall not resale the Equipment to another party, without the express written consent of Seller, which shall not be unreasonably withheld. Purchaser warrants that its contract with new buyer for the sale or transfer of any ownership interest in the Equipment shall contain an express prohibition on further sales or transfer of the Equipment to any other party without the express written consent of Seller.

LIMITED LICENSE TO OPERATE THE EQUIPMENT. Seller is hereby providing Purchaser and/or his/her assignee with a limited, non-exclusive license to use its proprietary and patented technology in the operation of the Equipment units for as long as Purchaser owns and maintains such Equipment. Purchaser acknowledges that such license may not be assigned, transferred, sold, or otherwise provided to any third Parties without the express written consent of Seller. Moreover, any sale or transfer of the Equipment shall require the acquiring party to obtain a license from Seller to exploit Seller's proprietary technology and operate the Equipment.

UNKNOWN OR CONCEALED CONDITIONS. Should concealed or unknown conditions be encountered that vary from the conditions indicated by the drawings, specifications, or Seller furnished information, or should concealed or unknown conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the

character provided for in this Agreement be encountered, the Purchase Price and the Project Schedule shall be equitably adjusted by Change Order upon claim by either party within a reasonable time after the first observance of the conditions.

TITLE. Title to all materials, equipment, supplies related to the Equipment shall pass to Purchaser upon receipt of the full payment for the Equipment.

APPLICABLE LAW. All Purchase Agreements and the rights of the Parties hereunder shall be governed by and interpreted in accordance with the internal laws of the State of California, without regard to its conflict of laws rules or choice of law principles. Each party hereto (i) agrees that, subject to the agreed requirement for arbitration, any suit, action or other legal proceeding relating hereto shall be brought within the State of California, (ii) consents to the exclusive jurisdiction of the aforesaid courts in any such suit, action or proceeding, and (iii) waives any objection such party may have to the laying of venue in any such suit, action or proceeding in either such court.

LIMITATION OF LIABILITY. To the maximum extent permitted by law, neither Purchaser nor Seller or their affiliates, subcontractors, agents and/or employees shall be liable for any loss of use, loss of profit, losses resulting from or related to downtime or the cost of replacement units, special, indirect, punitive, exemplary, incidental, or consequential loss or damages of any nature, howsoever caused and whether based on warranty, contract, tort (including negligence), fraud, strict liability or any other theory of the law regardless of whether a party had advance notice of the potential of any such damages.

To the maximum extent permitted by law, the total liability of Seller, its affiliates, subcontractors, agents and employees arising out of the performance or nonperformance of the Agreement or any of its obligations (including, without limitation, obligations in connection with the design, manufacture, sale, delivery, storage, erection or use of the goods or the rendition of any work or other services in connection therewith), whether based on warranty, contract, tort (including negligence), fraud, strict liability or any other theory of the law, shall not exceed in the aggregate a sum equal to Purchase Price of on the Agreement.

Prior to entering into this an Agreement, Purchaser has the opportunity to conduct all necessary due diligence on Seller and the Equipment. Except as otherwise expressly set forth in the Agreement, Seller does not make, and expressly disclaims, any representation or warranty, express or implied regarding the Equipment. Purchasers acknowledges that it has not relied on any express or implied representations in entering into this Agreement other than those expressly set forth herein.

INSPECTION. Purchaser shall install cameras at the facility to monitor the various operations of the system. In addition, Purchaser agrees to provide Seller with contemporaneous access to all data logs regarding the operation of the Equipment. For two (2) years following the execution of the Agreement, Purchaser agrees to allow Seller to (a) view the Equipment in operation and (b) show the Equipment in operation to prospective purchasers of other reasonably similar systems from Seller; *provided, however*, that such viewing and/or showing shall be during reasonable business hours, upon reasonable advance notice by Seller and shall not disrupt Purchaser's operation of the Facility.

ASSIGNMENT. Neither the Purchase Agreement nor any of the rights or obligations hereunder shall be assigned or subcontracted by either party without the prior written consent of the other party. Any attempted assignment or attempt to subcontract in violation of the terms of this Section shall be null and void, *ab initio*.

TERMINATION, CANCELLATION OR BREACH. In the event of termination or cancellation of the Order by Purchaser (other than due to a material breach by Seller), Purchaser shall provide written notice of the termination to the Seller and shall be liable for all costs incurred to the date of termination by the Seller. Purchaser shall be entitled to a partial refund on the following schedule.

The initial payment shall be non-refundable in the event of cancellation of the Project by Purchaser.

Cancellation within 30 days of second payment – 50% refund of second payment minus any costs incurred.

In the event of a material breach of the Agreement by Seller, Purchaser shall be entitled to cancel the Agreement. The Purchaser must give written notice of the breach to Seller and the Seller shall have 30 days to correct such breach.

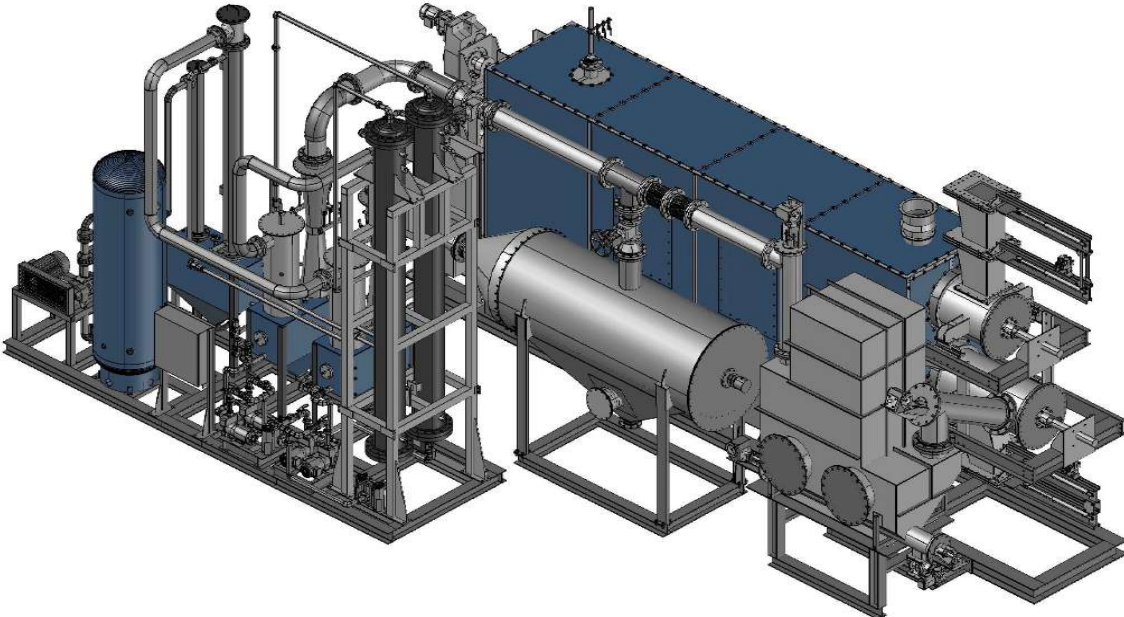
In the event of a material breach by Purchaser, Seller shall be entitled to take possession of the Equipment, without demand or notice, wherever same may be located, and without any court or other judicial order or other process of law. Seller agrees that in the event of a dispute with respect to whether Purchaser materially breached the Agreement, Purchaser must surrender any Equipment provided by Seller, which Seller will remove at Seller's expense. Purchaser may then seek recourse through the dispute resolution mechanism set forth in Paragraph 28.

CAPACITY TO ENTER INTO AGREEMENT. The individuals signing below hereby represent and warrant that they are duly authorized and have legal capacity to execute and deliver this Agreement on behalf of their respective Parties. Each party represents and warrants that the execution and delivery of the Agreement and the performance of such party's obligations hereunder have been duly authorized and that the Agreement is a valid ad legal contract binding upon such party and enforceable in accordance with its terms.

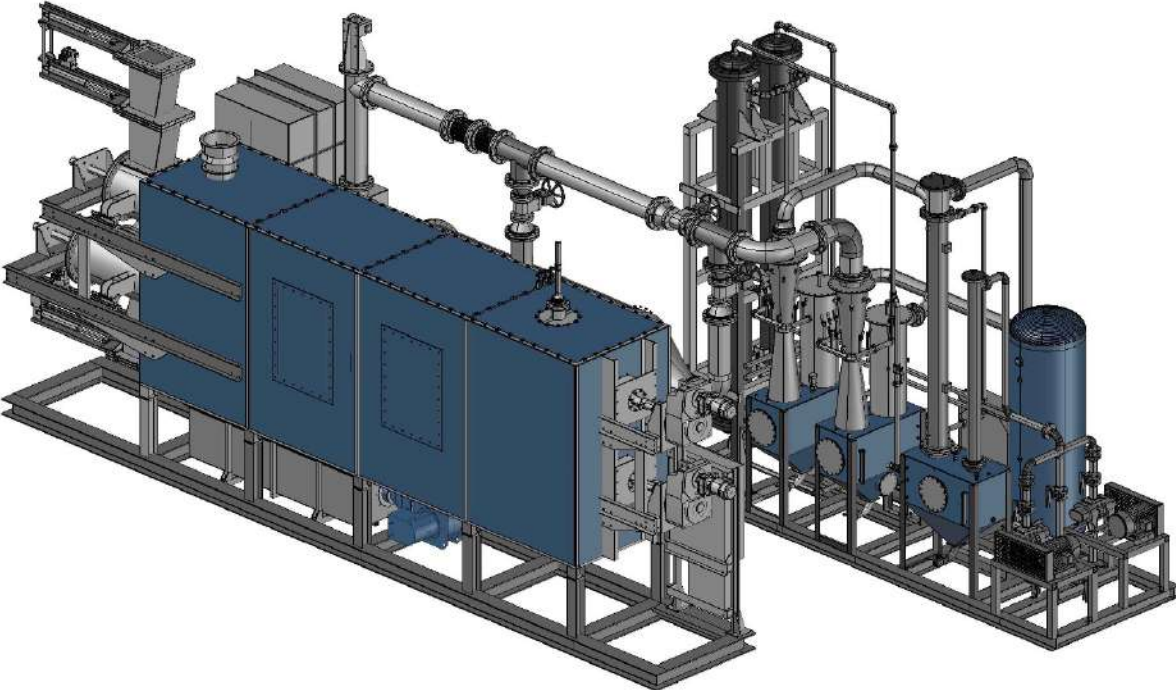
PREPARATION OF AGREEMENT. The Agreement will be negotiated and prepared by both Parties with advice of counsel to the extent deemed necessary by each Party. The Parties will have to agree to the wording of the Agreement and none of the provisions of the Agreement shall be construed against one Party on the ground that such Party is the author of the Agreement or any part of it.

INDEMNITY. Purchaser shall indemnify and hold Seller harmless from and against any and all claims, suits, demands, liabilities, losses, damages, costs, and expense Seller may suffer or pay out as a consequence of the negligent, acts, errors or omissions of Purchaser its agents, employees or contractors (other than Seller).

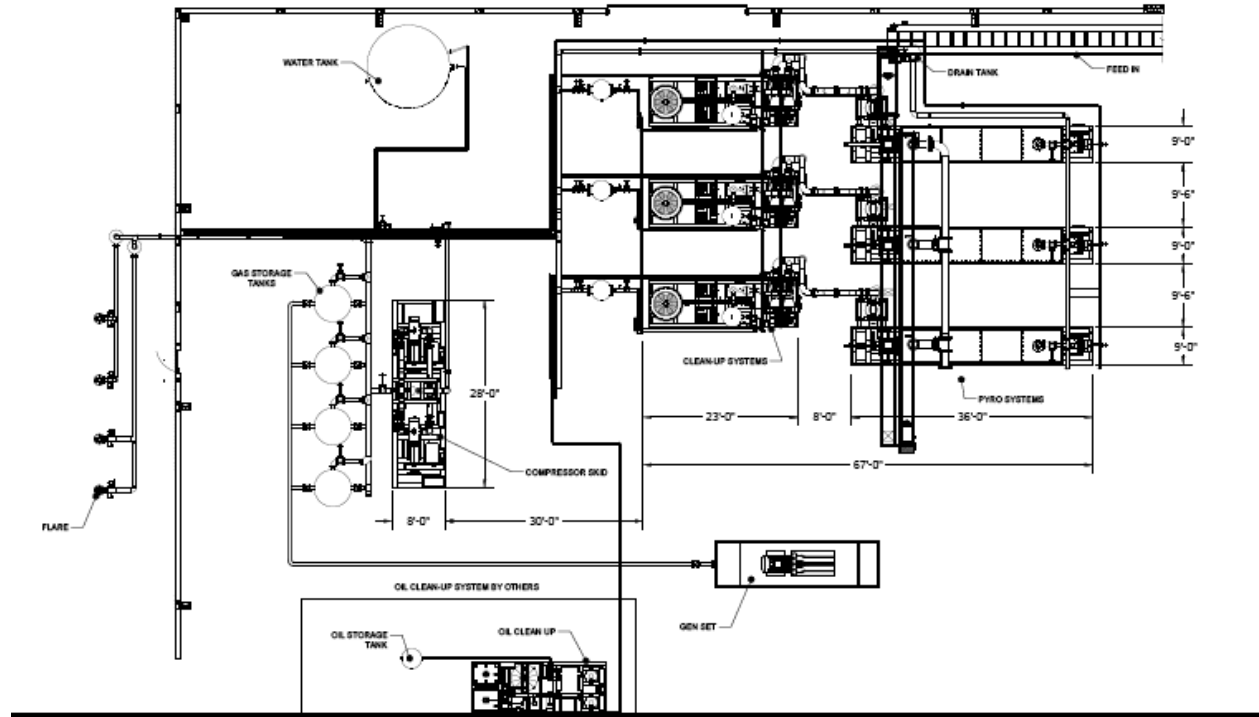
LANGUAGE. The language of negotiation of the Agreement has to be English, the Agreement has to be executed in English, and the English text shall prevail for the purposes of determining the intention of the Parties and in any construction of the Agreement.



2 MT/hr. ARTI Advanced Pyrolysis system.



Dimensional Drawing for an ARTI 3 units 2tons/hr. Pyrolysis.



Projects Through the Years

Year : 2004 - 1500 tons capacity per year in Chino, CA

Feedstock : Cow Manure



Year : 2006 - 1,000 tons capacity per year in Milan , Italy

Feddstock : Waste Plastic



American Renewable Technologies, Inc.

Year : 2007 - 1,000 tons/ year capacity in Tennessee

Feedstock : Material Solid Waste



Year : 2007 – 500 lbs. per hour capacity Biomass facility in Tacoma, WA

Feedstock : Tires

Yield : Oil and Carbon



American Renewable Technologies, Inc.

Year 2008 - 250 lbs per hour Process : Gas to Liquid in Carson CA

Feedstock : Biosolid



Year 2008 : 250lbs / hr Process: Pyrolysis in Carson, CA

Feedstock : Biosolid Yield : 3,000 gallons diesel per year



American Renewable Technologies, Inc.

Year 2012 : 16,000 tons per yr capacity in Brisbane, Australia

Feedstock : Coal



Year 2012 : 8,000 tons per yr. in Portland PA

Feedstock: plastic



American Renewable Technologies, Inc.

Year 2012 : 15,000 tons Process : Gas to Liquid in Chino CA

Feedstock : Cow Manure



Year 2012 : 15,000 tons per year Process: Pyrolysis in Chino CA

Feedstock : Cow Manure



American Renewable Technologies, Inc.

Year 2013 : 8,400 tons per yr. in Bristita , Romania

Feedstock : MSW and Tires



Year 2013 52,000 tons per year in Hudson Co

Feedstock : Tires



American Renewable Technologies, Inc.

Year 2014 : 12,500 tons per year in Turkey

Feedstock : Chicken Manure



Year 2014 : 26,200 tons per year in Aruba

Feedstock : MSW



American Renewable Technologies, Inc.

Year 2015 : 8,000 tons per year in Slovakia

Feedstock : Biomass



Year 2015 : 24,000 tons per year in Los Angeles, California

Feedstock : Sewage sludge



	TECHNICKÝ SKÚŠOBNÝ ÚSTAV PIEŠŤANY, s.p. Krajinská cesta 2929/9 921 01 Piešťany, Slovenská republika	 Reg. No. 009P-018
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CERTIFIKÁT ZHODY CONFORMITY CERTIFICATE č./No. 131299065

Výrobca <i>Manufacturer</i>	American Combustion Technologies, Inc. 7350, Adams Street, Paramount, 90723, California, USA
Ziadateľ <i>Applicant</i>	KUPRED s.r.o., Bratislavská 2077/30, 911 01 Trnecín, Slovenská republika / Slovak Republic
Výrobok <i>Product</i>	Zariadenie na pyrolytické splyňovanie materiálov na uhľovodíkovej báze <i>Equipment for thermal decomposition of carbon based feedstock</i>
Typ <i>Type</i>	ACGF 25 (výr. číslo 00226) <i>ACGF 25 (Ser. No. 00226)</i>
Podklad pre vydanie certifikátu <i>Basis of certificate</i>	Záverečný protokol č. 130500033 zo dňa 08. 10. 2013 <i>Final report No. 130500033 of 08. 10. 2013</i>

Týmto certifikátom zhody potvrdzuje, že výrobok spĺňa základné požiadavky na bezpečnosť podľa nasledovných smerníc ES nového prístupu (nariadenia vlády Slovenskej republiky) v ich platnom znení:
This conformity certificate confirms the conformity of the product with essential safety requirements of the following EC New Approach Directives (Governmental Ordinances of Slovak Republic) as amended:

Smernica o bezpečnosti strojov 2006/42/EC (Nariadenie vlády SR č. 436/2008 Z.z.)
Machinery Directive 2006/42/EC (Governmental Ordinance of Slovak Republic No. 436/2008 Coll.)

Smernica o nízkom napätí 2006/95/EC (Nariadenie vlády SR č. 308/2004 Z.z.)
Low Voltage Directive 2006/95/EC (Governmental Ordinance of Slovak Republic No. 308/2004 Coll.)

Smernica o EMC 2004/108/EC (Nariadenie vlády SR č. 194/2005 Z.z.)
EMC Directive 2004/108/EC (Governmental Ordinance of Slovak Republic No. 194/2005 Coll.)

CE označenie môže byť použité iba v prípade, že je požadovaná zhoda so všetkými príslušnými smernicami Európskej komisie.
Akékoľvek významné zmeny v zhotovení alebo konštrukcii výrobku, systéme kvality a dodatky k hore uvedeným technickým a právny predpisom môžu viesť k neplatnosti certifikátu. Zodpovednosť za výrobok zostáva na výrobcovi alebo jeho splnomocnenom zástupcovi.

CE mark can be used only in the case of conformity assessment according to all relevant Directives of the European Commission.
Any significant change in product's form or construction, system of quality and supplements to above mentioned technical and legal provisions can result in invalidity of the certificate. Producer or his representative is responsible for the product.

Vydaný dňa: 09. 10. 2013
Date of issue: 09. 10. 2013


Ing. Janka LÉVICKÁ
vedúca certifikačného orgánu certifikujúceho výrobky
Head of Product Certification Body

