

# FROM WASTE TO SYNTHETIC FUELS

2023

**IS THERE ANY SOLUTION?**



**IS WASTE YOUR PROBLEM?**



**THIS MIGHT BE THE SOLUTION**

**THE PROBLEM** is the ever-increasing burden on the environment. Especially in poorer countries, there is an urgency to deal with the ever-increasing waste problem. Efforts to date to develop technology capable of efficiently and economically solving the increasing problems with waste in the oceans and on land have failed because of the high costs involved.

**EFFICIENT APPROACH** would be to treat the various waste fractions by recycling and, in particular, recovering the hydrocarbons from the waste products.

**CHALLENGE** is to find a solution that solves the problem but is profitable at the same time.

**OUR SOLUTION** is sustainable and profitable, a win-win situation for the environment and industry. A technology that converts household and industrial waste as well as biomass into synthetic diesel or synthetic kerosene. Our solution is so efficient that one ton of feedstock produces up to 500 liters of diesel or kerosene.

**THE TECHNOLOGY** is a third-generation BTL (biomass-to-liquid) process, i.e., an imitation of nature. Feedstock is mixed with carrier oil and catalyst at around 200°C in the pre-process. In the following main process, a chemical-physical reaction at approx. 280°C-340°C shortens the molecular chains to produce diesel or kerosene.

In a short post-process with desulfurization, the products are adapted to the current EN590/ASTM7655 standards.

**THE ECONOMICITY** of the solution is highly attractive based on our experience. The selling price is more than competitive despite the current market prices. The energy efficiency is between 50-80%, depending on the composition of the input material.

**THE PRODUCT** is a pure "Synthetic Diesel" or a pure "Synthetic Kerosene", which has an unlimited shelf life without additives. Mixing with fossil diesel is possible, but not necessary.

**ADDITIONAL BENEFITS:** Neutral carbon footprint, recycling of all valuable materials, residual 5% "Class2", non-toxic.

## The Technology in Details

### **HSCD (High Speed Catalytic Depolymerization)**

a chemo-technical imitation of nature's process to convert all organic matter into crude oil

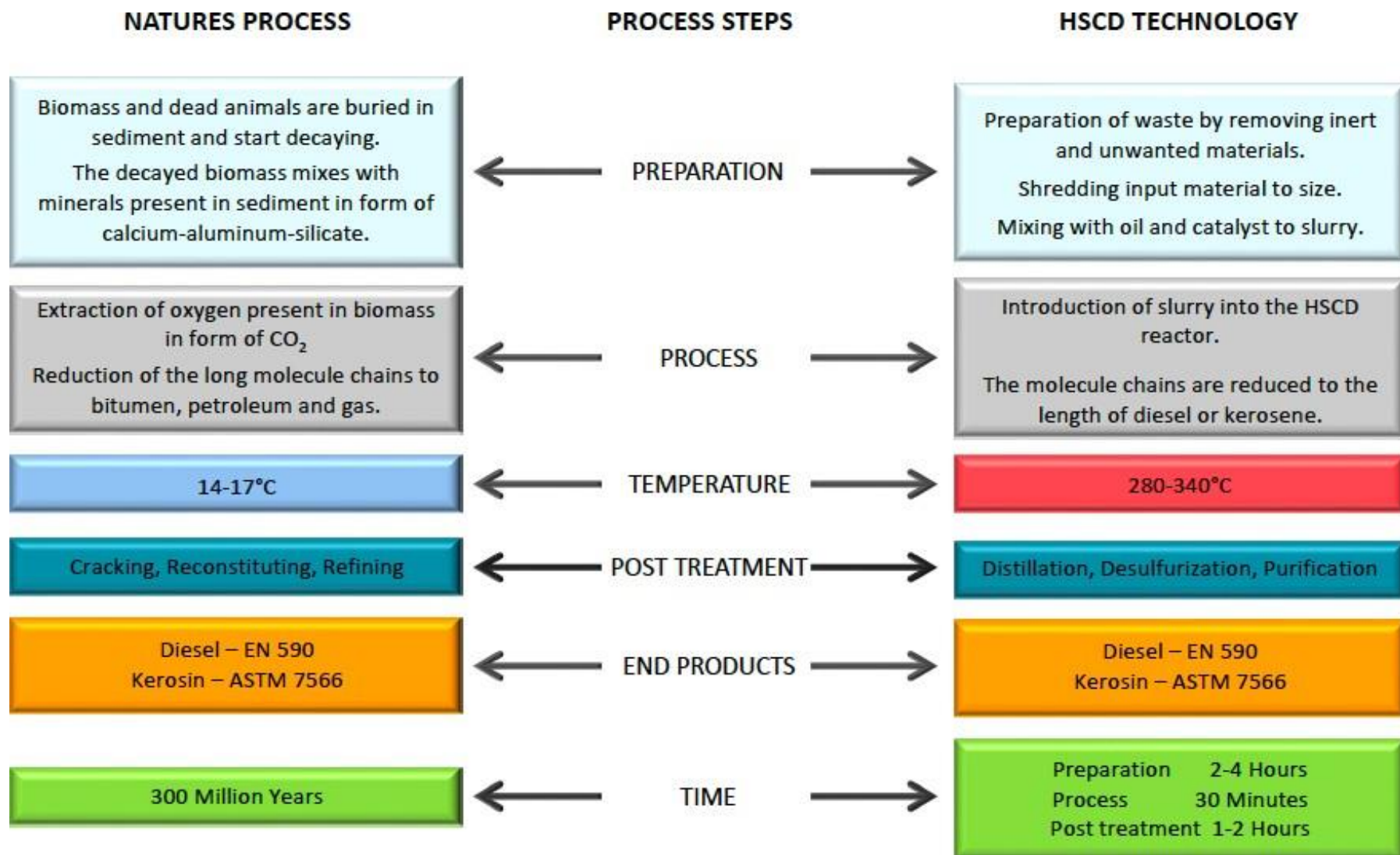
The main difference is the acceleration of nature's process from millions of years to only 30 Minutes.

- By using 100% crystalline catalysts instead of minerals contained in soil
- By raising the temperature to 280°C instead of nature's 14°C –17°C
- By creating an optimized and controlled environment in the HSCD plant

The Final Product is a Synthetic Diesel of High Quality Meeting the Current Norms EN 590 & ASTM 7566.



# Imitation of the nature



## Neutral CO2 balance

The CO2 absorbed by the biomass during growth is released to a small extent during the process. This ensures a neutral balance.



## No emissions

The closed cycle does not emit any emissions.



## No hazardous by-products

Due to the relatively low temperatures of max. 340°C, neither dioxins nor furans are formed.

## No high process pressures

The process operates at a vacuum of around -0.04 bar and ensures safe plant operation.

## High energy recovery

Up to 80% of the energy contained can be recovered.

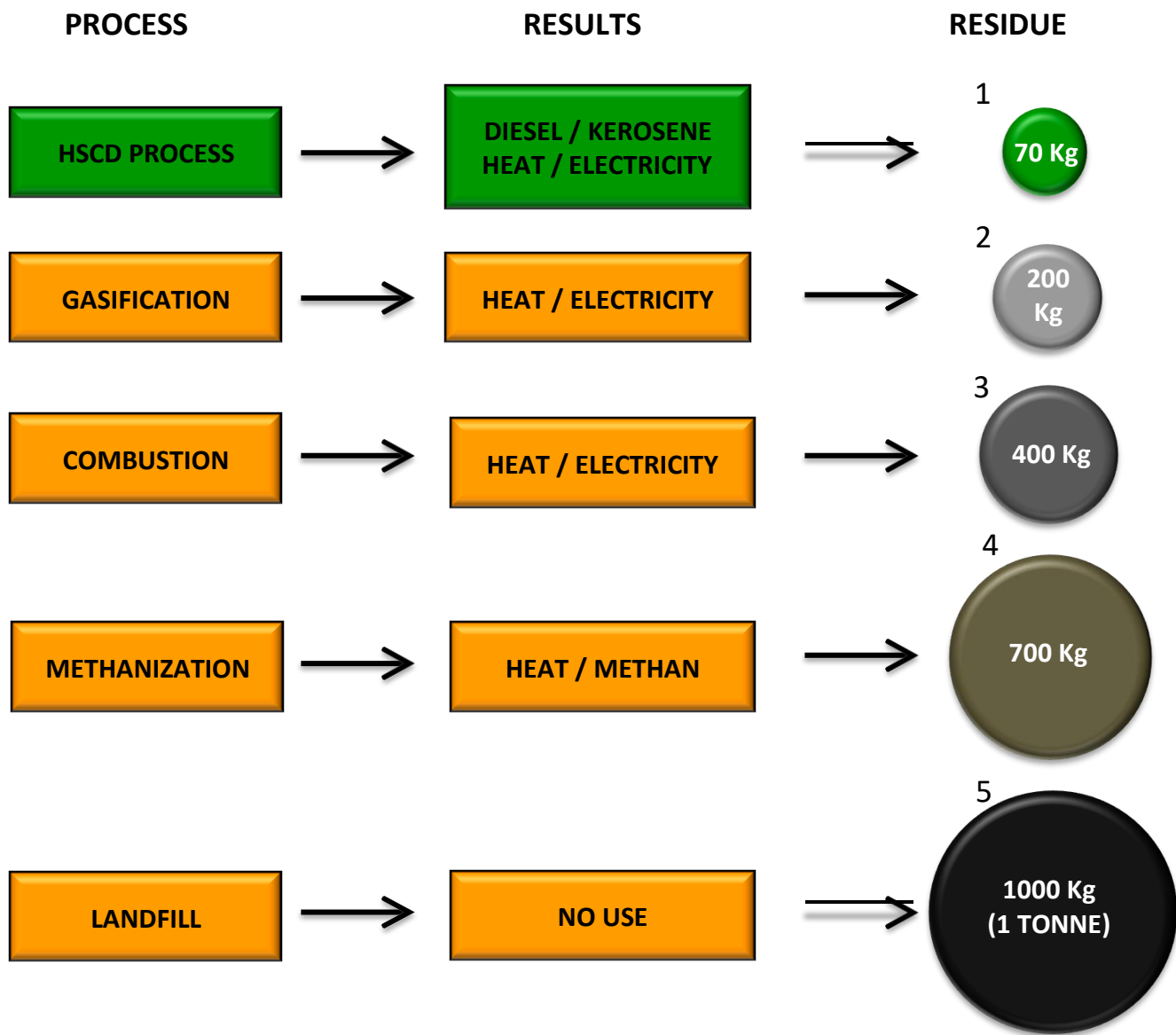
One ton of dried wood or biomass yields approx. 300 liters of diesel

One ton of dried household waste yields approx. 500 liters of diesel





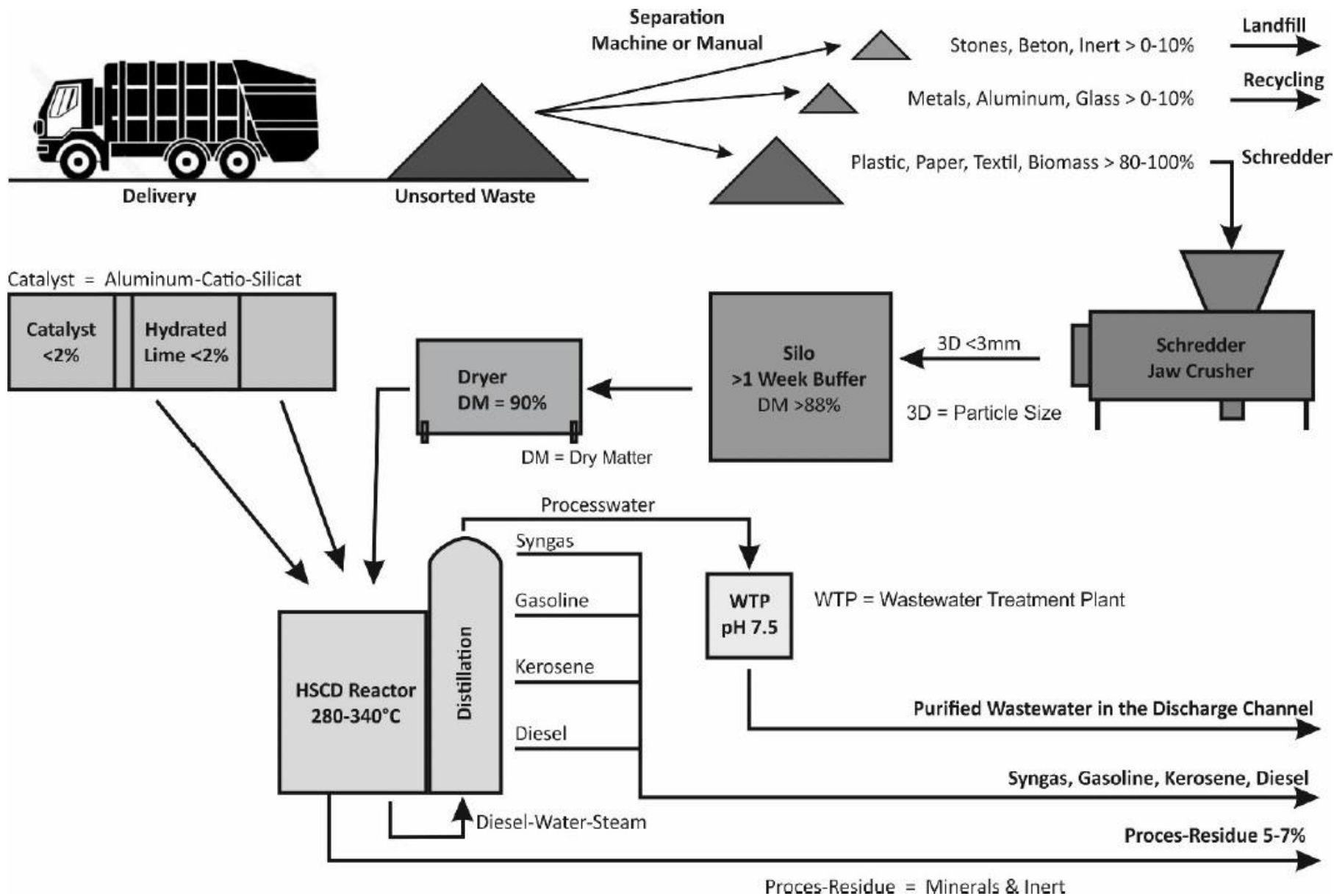
# Residual material volume comparison



Residues from 1 ton of waste with different processes

- 1: Ash
- 2: Ash
- 3: Blast furnace slag / fly ash
- 4: compost/impurities
- 5: mixed waste

# Plant Concept



## KEY DATA AT-HSCD 5000

KEY DATA for AT-HSCD 5000 EURO [€]	CONSTRUCTION & PARTIAL PRODUCTION @ 2'500 HOURS			FULL PRODUCTION @ 8'000 HOURS			
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
Total Revenues	-	15.000.000	48.000.000	48.000.000	48.000.000	48.000.000	48.000.000
Production Cost; 010 €/Liter		1.250.000	4.000.000	4.000.000	4.000.000	4.000.000	4.000.000
EBITDA	-	11.875.000	38.000.000	38.000.000	38.000.000	38.000.000	38.000.000
EBIT							
Return on Investment ROI (%)	-	8,25%	26,39%	26,39%	26,39%	26,39%	26,39%
Cash Flow	-112.000.000	-13.125.000	31.000.000	38.000.000	38.000.000	38.000.000	38.000.000
Liquidity	32.000.000	18.875.000	49.875.000	87.875.000	125.875.000	163.875.000	201.875.000
Capital	144.000.000			0	0	0	0
Investment	112.000.000	25.000.000	7.000.000	-	-	-	-
Amortization							
Finance cost							
facility cost; 015 €/Liter	-	1.875.000	6.000.000	6.000.000	6.000.000	6.000.000	6.000.000
Kerosene Production per Year/Liters	-	12.500.000	40.000.000	40.000.000	40.000.000	40.000.000	40.000.000
Sales Price of Kerosene/Liter	-	1,20	1,20	1,20	1,20	1,20	1,20
Revenues Kerosene	-	15.000.000	48.000.000	48.000.000	48.000.000	48.000.000	48.000.000
Marge/Liter		0,95	0,95	0,95	0,95	0,95	0,95

- AT-HSCD 5000 with minimum 5000 liters/hour @ 8'000 hours/year
- Projected output is 40 Mio. Liters/year
- The Plant includes post treatment (Filtration, Desulfurization, Hydrogenation)
- The sales price of the synthetic kerosene is set at 1.20 EUR/liter
- Manufacturing of the plant will start in Year 1
- Plant will partially start the production in Year 2 with 2.500 hours per year
- At the end of Year 2 the Plant will be fully installed and implemented at the site
- Plant will fully operate from the Year 3 with 8.000 hours per year
- Year 3 is thus the first Year of the full production “Start of Operation of the Plant”

## CASH FLOW AT-HSCD 5000

CASH FLOW for AT-HSCD 5000 EURO [€]	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8
Debt Capital								
<b>Capital</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Revenues from Sales	0	15.000.000	48.000.000	48.000.000	48.000.000	48.000.000	48.000.000	48.000.000
<b>Revenues</b>	<b>0</b>	<b>15.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>
<b>Total Receipt of Payments</b>	<b>0</b>	<b>15.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>	<b>48.000.000</b>
<b>Investment</b>	<b>112.000.000</b>	<b>25.000.000</b>	<b>7.000.000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Production Cost	0	1.250.000	4.000.000	4.000.000	4.000.000	4.000.000	4.000.000	4.000.000
Facility Cost	0	1.875.000	6.000.000	6.000.000	6.000.000	6.000.000	6.000.000	6.000.000
<b>Operating Expenses</b>	<b>0</b>	<b>3.125.000</b>	<b>10.000.000</b>	<b>10.000.000</b>	<b>10.000.000</b>	<b>10.000.000</b>	<b>10.000.000</b>	<b>10.000.000</b>
Interest Debt Capital	0	0	0	0	0	0	0	0
<b>Finance Expenses</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Cash Flow</b>	<b>-112.000.000</b>	<b>-13.125.000</b>	<b>31.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>
Taxes	0	0	0	0	0	0	0	0
<b>Net Cash Flow</b>	<b>-112.000.000</b>	<b>-13.125.000</b>	<b>31.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>	<b>38.000.000</b>
<b>Liquidity</b>	<b>-112.000.000</b>	<b>-125.125.000</b>	<b>-94.125.000</b>	<b>-56.125.000</b>	<b>-18.125.000</b>	<b>19.875.000</b>	<b>57.875.000</b>	<b>95.875.000</b>

## Recommendation for Personnel Requirements AT-HSCD 5000

HSCD								
	position	shifts	MA/shift	MA total	Hr/Shift	Days/Week	Hrs/Week	Hrs/Month
HSCD	Chief Unit	4	1	4	6,0	7	168,0	672,0
HSCD	Machinist	4	1	4	6,0	7	168,0	672,0
HSCD	Assistant	4	2	8	6,0	7	336,0	1.344,0
HSCD	Helper	4	2	8	6,0	7	336,0	1.344,0
Desulfurization	Foreman	4	1	4	6,0	7	168,0	672,0
Laboratory	Lab Technician	1	1	1	8,0	7	56,0	224,0
			<b>8</b>	<b>29</b>				<b>4.928</b>

SURVEILLANCE & SAFETY								
	position	shifts	MA/shift	MA total	Hr/Shift	Days/Week	Hrs/Week	Hrs/Month
	Foreman	4	2	8	6,0	7	336,0	1.344,0
	Assistant	4	2	8	6,0	7	336,0	1.344,0
			<b>4</b>	<b>16</b>				<b>2.688</b>

Workshop/Garage/Maintenance								
	position	shifts	MA/shift	MA total	Hr/Shift	Days/Week	Hrs/Week	Hrs/Month
Workshop	Machinist	2	2	4	8,0	6	192,0	768,0
Garage	Machinist	2	2	4	8,0	6	192,0	768,0
Logistics	Driver	1	1	1	8,0	6	48,0	192,0
			<b>5</b>	<b>9</b>				<b>1.728</b>

ADMINISTRATION LOCAL								
	position	shifts	MA/shift	MA total	Hr/Shift	Days/Week	Hrs/Week	Hrs/Month
	CEO	1	1	1	8,0	5	40,0	160,0
	Secretary	1	1	1	8,0	5	40,0	160,0
	Accountant	1	1	1	8,0	5	40,0	160,0
			<b>3</b>	<b>3</b>				<b>480</b>

WASTE PREPARATION								
	position	shifts	MA/shift	MA total	Hr/Shift	Days/Week	Hrs/Week	Hrs/Month
Receiving/Weighi	Foreman	2	1	2	6,0	7	84,0	336,0
Receiving/Weighi	Assistant	2	2	4	6,0	7	168,0	672,0
Receiving/Weighi	Helper	2	3	6	6,0	7	252,0	1.008,0
Separation	Chief Unit	2	1	2	6,0	7	84,0	336,0
Separation	Machinist	2	1	2	6,0	7	84,0	336,0
Separation	Foreman	2	1	2	6,0	7	84,0	336,0
Separation	Assistant	2	1	2	6,0	7	84,0	336,0
Separation	Helper	2	150	300	6,0	7	12.600,0	50.400,0
Drying	Chief Unit	2	1	2	6,0	7	84,0	336,0
Drying	Machinist	2	1	2	6,0	7	84,0	336,0
Drying	Foreman	2	1	2	6,0	7	84,0	336,0
Drying	Assistant	2	1	2	6,0	7	84,0	336,0
Silo	Foreman	2	1	2	6,0	7	84,0	336,0
Silo	Helper	2	2	4	6,0	7	168,0	672,0
Shredding	Chief Unit	2	1	2	6,0	7	84,0	336,0
Shredding	Machinist	2	1	2	6,0	7	84,0	336,0
Shredding	Foreman	2	1	2	6,0	7	84,0	336,0
Shredding	Helper	2	2	4	6,0	7	168,0	672,0
			<b>172</b>	<b>344</b>				<b>57.792</b>

<b>TOTALS</b>	<b>401</b>
	<b>MA total</b>

<b>67.616</b>
<b>Hrs/Month</b>