SENS Systemic Environmental Solutions

WASTE TO VALUE · MUNICIPAL SOLID WASTE

A city's waste, returned to value.

One proprietary low-temperature process converts a city's sorted municipal solid waste into industrial carbon, fuel oil, and potable water, with nothing sent to landfill.

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THE OPPORTUNITY

A liability on one side. Carbon demand on the other.

A city of one million people generates about 1.22 million tons of municipal solid waste each year, and pays to bury it. Landfills are one of the largest anthropogenic methane sources.

At the same time, demand for industrial carbon and fuel keeps climbing. The same waste a city pays to dispose of is a dense carbon carrier.

TiPs turns that liability into product. Tipping fees a city already pays become an input-side revenue line that neither tires nor coal can offer.

1.22M

Tons of municipal solid waste generated each year by a city of one million.

2B+

Tons of MSW generated worldwide each year, heading to 3.8 billion by 2050.

270K

Tons of carbon recovered each year for concrete and steel.

337M

Litres of potable water recovered each year, returned to the city.

A city pays to bury this waste. TiPs turns that liability into carbon, fuel, and water.

ONE PROCESS, THREE PRODUCT FAMILIES

Carbon

Industrial carbon for advanced concrete, soil enrichment, and metallurgical carbon for steel.

Fuel oil

Industrial oil from the hydrocarbon fraction, with offtake from heating to marine fuel to refining.

Water & minerals

Potable water returned to the city, with mineral residue to cement and aggregate.

THE TECHNOLOGY

One process. Every carbon feedstock.

The Thermal-static internal Pyrophinic system (TiPs) is a sealed, low-temperature, vacuum-driven thermal mechanical depolymerization process. After sorting and drying, it converts municipal waste into carbon, fuel oil, and potable water.

Feedstock

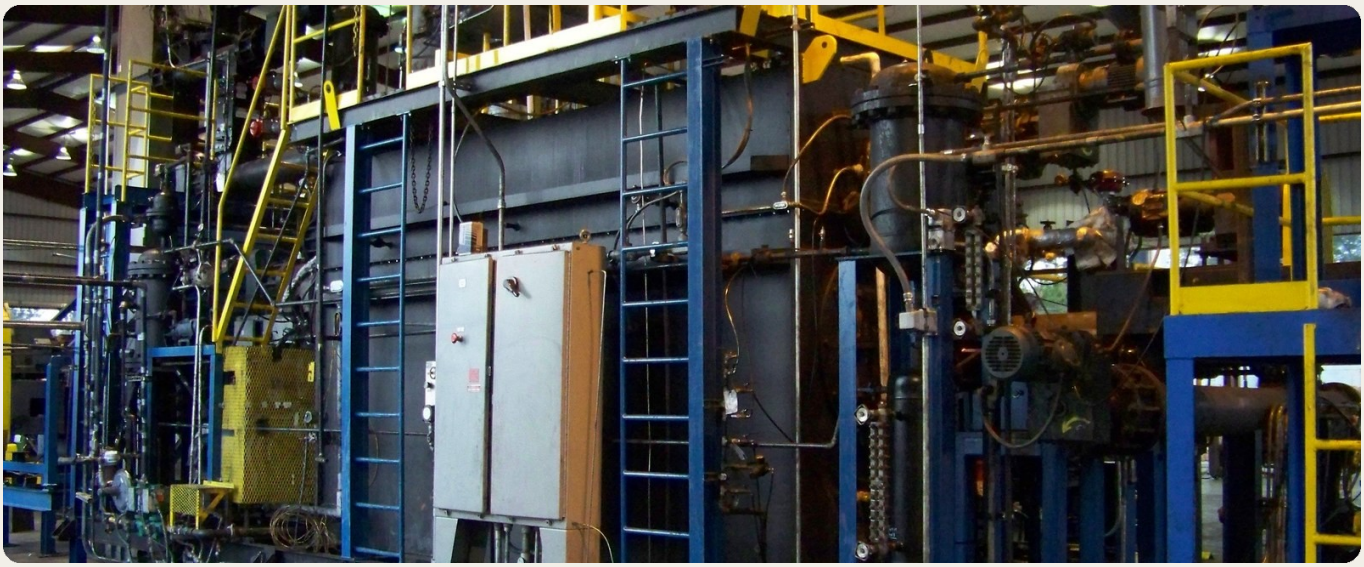
Sorted and dried municipal solid waste

TiPs processing

Sealed low-temperature depolymerization under vacuum.

Outputs

Industrial carbon, fuel oil, syngas, potable water, mineral residue



TiPs processing unit

10,000+

Hours operated at full scale across feedstocks: tires, coal, oil sands. TRL 8.

24/7

Continuous feed operation, self-powered after a one-time grid startup.

100%

Of every ton of feedstock becomes product, recovered water, or sold residue.

Zero

Material to landfill. Every fraction is sold, recovered, or used internally.

FEEDSTOCK · MUNICIPAL SOLID WASTE

A city's waste, returned to value.

A city of one million people generates about 1.22 million tons of municipal solid waste each year. Fed to a single six-unit TiPs facility, after sorting and drying, 880,000 tons of dry feedstock becomes carbon, fuel oil, and potable water. Nothing is landfilled.

Landfills are one of the largest anthropogenic methane sources. TiPs takes that material out of the ground entirely, with syngas running the dryer and the unit in a closed loop.

OFFTAKE USE CASES

Carbon

Advanced concrete, soil enrichment and agriculture, metallurgical carbon for steel.

Fuel oil

Industrial heating, marine and bunker fuel, refining and diluent blending.

Water & minerals

Potable water returned to the city, mineral residue to cement and aggregate.

270K

Tons of carbon recovered each year for concrete and steel.

61M

Gallons of industrial fuel oil produced each year.

337M

Litres of potable water recovered each year and returned to the city.

56.2%

Project IRR. First revenue Year 2, payback end of Year 3.

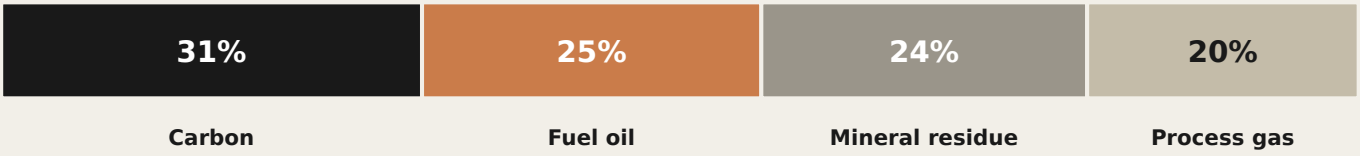
Outputs: industrial carbon, 61M gallons of fuel oil, 337M litres of potable water, and mineral residue to cement. Modular and distributed, deployable at one landfill site or several, sized to the city.

THE PRODUCTS

Three product streams from one facility.

TiPs recovers commercial-grade products from a mixed feedstock. Because municipal waste carries contamination, the carbon and oil are sold as robust industrial grades rather than tire or coal grades. The model is built on product value.

WHAT A TON OF DRY MSW BECOMES



Modeled output for sorted, dried municipal waste, before recovered moisture. Composition varies widely by city and sorting; each project is built on the actual waste characterization.

Carbon

Industrial carbon from the dry feedstock, sold into bulk materials markets.

Markets & uses

- Advanced concrete
- Soil enrichment and agriculture
- Metallurgical carbon for steel
- Bulk industrial carbon

Fuel oil

Industrial oil from the hydrocarbon fraction, with established offtake markets.

Markets & uses

- Industrial heating
- Marine and bunker fuel
- Refining feedstock
- Diluent blending

Water & minerals

Potable water captured from the feedstock moisture, plus mineral residue.

Markets & uses

- Potable water to the city
- Mineral residue to cement
- Aggregate
- Closed-loop process gas

Where the feedstock carries moisture, TiPs captures it and returns it as potable water rather than venting it.

THE COMPARISON

How TiPs compares.

Municipal waste has two incumbent routes: burn it or bury it. TiPs replaces both with material recovery and recovered water.

	TiPs	Pyrolysis	Mass-burn incineration	Landfill
Process	Sealed, low-temperature depolymerization of sorted, dried waste.	High-temperature thermochemical cracking, 400 to 800C.	High-temperature combustion, 850C and above.	No processing. Waste buried in the ground.
Products	Carbon, fuel oil, potable water, mineral residue.	Fuel oil, low-grade char, syngas.	Heat and power, with fly ash and bottom ash.	None. The material value is lost.
Material value	Preserved and sold into industrial markets.	Partially destroyed, lower-value byproducts.	Destroyed in combustion.	Stranded and lost.
Environmental	Zero waste to landfill, water recovered, no combustion.	Energy-intensive, char disposal issues.	Dioxin and NOx emissions, hazardous fly ash.	Methane, leachate, and permanent land use.
Deployment	Modular, distributed, at one landfill or several.	Large centralized plants.	Large centralized plants.	Permanent land use and long-term liability.

880K t/yr

Dry feedstock processed across six TiPs units at one facility.

TRL 8

Technology readiness proven across 10,000+ hours of full-scale operation.

Modular

Deployable at one landfill site or several, sized to the city.

THE ECONOMICS

The project economics.

Independent revenue lines from products, plus tipping fees a city already pays. The project is financed against a 3x collateralized investment with the balance mobilized through the SENS and ISCM structure.

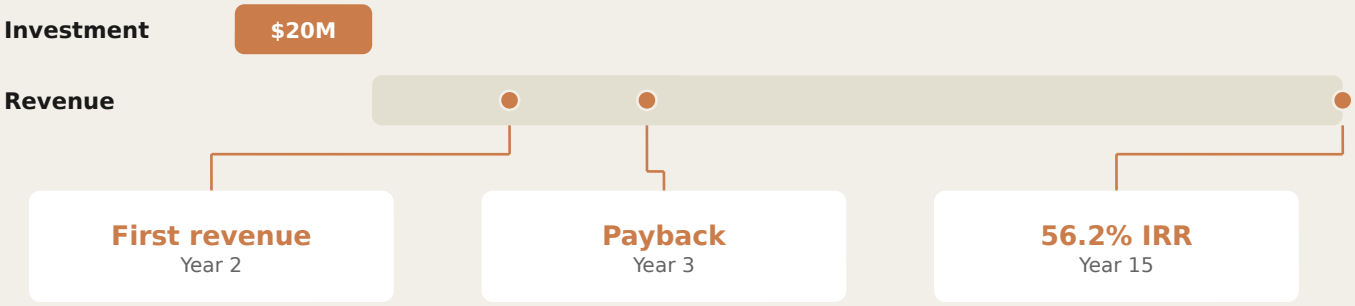
$136M
Total project capex.

$20M
Minimum investment.

6
TiPs units.

56.2%
Project IRR.

PROJECT TIMELINE



Project at a glance	MSW · City of ~1M
Location	City of ~1M people
Annual feedstock	880,000 tons dry MSW (from ~1.22M tons as-received)
Key outputs	Industrial carbon, 61M gal fuel oil, 337M litres potable water
Tipping fees & credits	Upside, not included in the base case
Collateralization	3x

Indicative figures, subject to business case validation and feedstock profile. Municipal tipping fees and carbon credits are not included in the base case.

Every project is built on product value from day one. Subsidies, credits, and premiums are upside, never the base case.

PARTNER WITH US

Build this in your region.

SENS delivers waste-to-value solutions at scale. Whether you represent a municipality, a government, a waste operator, or an investment fund, we invite you to explore what TiPs can do with municipal solid waste in your region.

SENS

Technology, project development, and delivery of TiPs facilities worldwide.

ISCM Foundation

20+ years of governance oversight and research integrity from Brussels.

ISCM Investments

The Foundation's dedicated fundraising and investment governance arm, mobilizing private and institutional capital.

THE TEAM

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Systemic Environmental Solutions is an initiative of the ISCM Foundation.