Engineering the Redding Closed Loop

CITY OF REDDING CALIFORNIA

A definitive solution to California's biosolids challenge through self-sustaining pyrolysis technology.

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The Imminent Regulatory Squeeze

- State mandate to reduce organics in landfills by 75% by January 1, 2025.
- Revocation of Alternative Daily Cover credit; biosolids are strictly organic waste. Landfilling is a dying option.

- Rapidly tightening restrictions on Per- and Polyfluoroalkyl Substances (PFAS).
- Elevated PFAS levels in biosolids threaten existing NPDES permits and future land application.

The status quo is obsolete. Redding desires a technology that simultaneously diverts organics from landfills and guarantees the absolute destruction of forever chemicals.

Forging a New Pathway for Biosolids

	The Old Process	The Redding Process
Final Destination	**Local Landfill** (Expiring option)	**Upcycled into OurCarbon® Biochar**
Hauling Logistics	100% volume requires constant trucking	**90% volume reduction**
Methane Emissions	**High** (Decaying organics in landfill)	**Carbon Negative** (Sequestered for millennia)
PFAS Fate	Leach back into groundwater	**Destroyed** at 1,600°F
Economic Model	Unpredictable, escalating disposal fees	**$0 disposal fees + profit sharing**

The Clear Creek WWTP Phases I/II

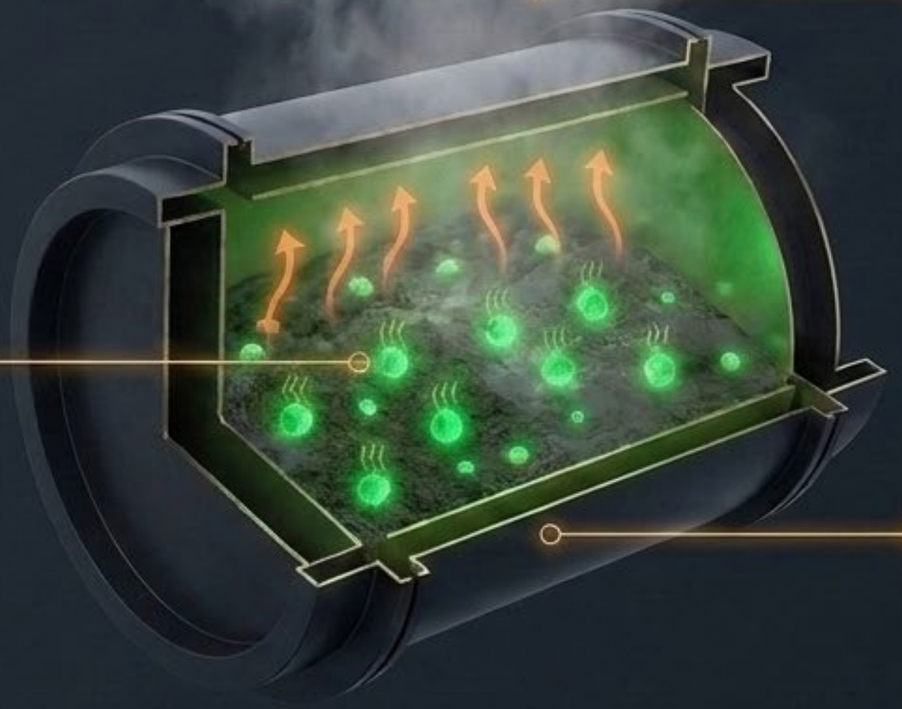
To meet the 2025 mandates, the City is deploying a proven, full-scale biosolids drying and pyrolysis ecosystem from Bioforcetech (BFT).

Current Investment to Date: $13M to double processing capacity.

Input Capability: Up to 3,000 wet tons/year of municipal biosolids.

EPA Status: Officially approved by the USEPA as a non-incineration (non-SSI) process.

The Biological Heat Engine



1

The Biological Engine:

Naturally occurring bacteria in the biosolids consume carbon compounds and oxygen.

2

Metabolic Heat:

The bacteria generate extreme metabolic waste heat.

3

Moisture Evaporation:

This free, biological heat is captured to drive off water content, transitioning the material from 20% to 75-90% Total Solids in just 60 hours.

Up to 70% reduction in energy costs

compared to fossil-fuel-dependent belt or paddle dryers

The Self-Sustaining Crucible

The dried biosolids enter the Pyrolysis reactor—a thermochemical decomposition environment completely devoid of oxygen.

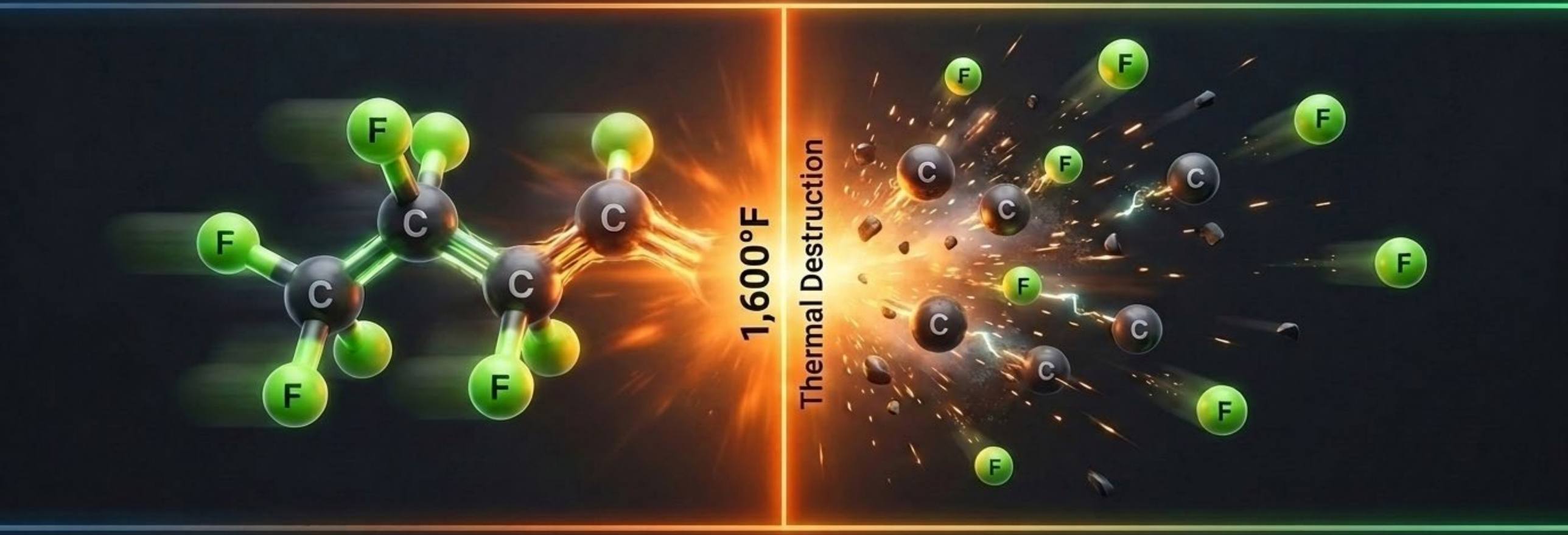
Ignition: The reactor reaches operating temperatures between 660°F and 1,600°F.

Syngas Generation: Biosolids convert into synthesis gas and char.

Heat Recirculation: Exhaust gases flow through the outer casing, maintaining the 1,600°F temperature 24/7 without external fossil fuels. Excess thermal energy is piped directly back to the Biodryers.

Flameless Combustion: The syngas is instantly burned in a patented flameless vacuum reactor, eliminating harmful NOx emissions.

Shattering the Unbreakable Bond



The Challenge:
PFAS ("Forever Chemicals") survive traditional water treatment and persist in digested sludge.

The Science:
Research dictates that the exceptionally strong C-F bonds in PFAS begin to thermally destroy at high temperatures. The Pyrolysis unit subjects the material to a sustained, oxygen-free 1,600°F environment, definitively breaking the chemical chain.

Empirical Proof of Eradication

Input: Contaminated Biosolids	Output: OurCarbon Biochar
PFBA 3:3 FTCA PFPeA PFBS 4:2 FTS PFHxA PFPeS HFPO-DA 5:3 FTCA PFHpA ADONA PFHxS 6:2 FTS **PFOA** PFHpS 7:3 FTCA PFNA **PFOSA PFOS** 9Cl-PF3ONS **PFDA** 8:2 FTS PFDS PFNS MeFOSAA EtFOSAA PFUnA 11Cl-PF3OUdS 10:2 FTS PFDoA MeFOSA PFTrDA PFTeDA EtFOSA PFHxDA PFODA MeFOSE EtFOSE	**NON-DETECT**

- Results verified through extensive testing with the U.S. Environmental Protection Agency (EPA).
- Program managed by Eben Thoma, Ph.D., EPA Physical Scientist.
- Confirmed across two independent laboratories.

A 90% Reduction in Physical Logistics

The Output Constraint:

The Biodryer and Pyrolysis combination results in a staggering 90% reduction in total material volume.

Emissions Impact:

Eliminates 90% of the heavy-duty trucking required to haul waste out of the Clear Creek WWTP, vastly reducing diesel emissions, road wear, and associated logistical costs.

From Municipal Waste to OurCarbon

WASTEWATER

BIOSOLID
20% Solid Content

DRY BIOSOLID
80% Solid Content
Biodryer Result

BIOCHAR
Pyrolysis Result

The final product is a PFAS-free, hydrocarbon-free, CDFA-certified biochar.
It is no longer legally classified as a biosolid.

Carbon Sequestration

Endures in the soil for thousands of years, actively mitigating climate change.

Soil Fertility

Replaces chemical fertilizers, increases water retention, and reduces nutrient runoff.

Industrial Upcycling

Replaces fossil-fuel carbon in the manufacturing of plastics, paints, inks, and asphalt.

Reframing a Cost Center into an **Economic Asset**

Traditionally, biosolids represent a massive, unpredictable line item in municipal budgets due to escalating landfill tipping fees. Bioforcetech's "Value Back" Program guarantees a paradigm shift.

$0 Disposal Fee

BFT includes a complete off-take agreement for the biochar produced. The City pays absolutely nothing for its removal.

Profit Share

Redding receives a share of the net sale profits when the OurCarbon material is sold into industrial and agricultural markets.

Future-Proofing

Shields the City from punitive state fines regarding SB 1383 non-compliance and isolates the budget from unpredictable landfill rate hikes.

Thank You

Questions

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