

A Primary Energy Challenge America Faces Today:



Cleanly Utilizing Coal

The Solution We Deliver to the Coal Industry:

High-Energy Sustainable Fuel



SETM

Sustainable Engineered Fuel

- ✓ High Energy
- ✓ Consistent
- ✓ Clean and Safe

PLUS

- EPA Reviewed
- Thoroughly Tested

Coal Users Told Us What They Needed.



Delivers on All Counts.

- ⦿ **High Energy** – Works in existing coal-fired equipment
 - 9,000 Btu per pound similar to coal (21 GJ/T)
 - Twice the calorific value of refuse derived fuels (RDF)
 - EPA recognizes as replacement for coal or wood fuels
 - Stores and handles similar to coal. (Except should be covered)
- ⦿ **Consistent** – Promotes Efficient Fuel Use
 - Fuel characteristics more consistent than coal
 - Multiple third party analyses to verify consistency
 - Fifteen+ years of production history
- ⦿ **Clean & Safe** – Better for the environment and workers
 - EPA classified Non-Waste Fuel means user is not regulated as an incinerator
 - EPA Non-Hazardous Secondary Material (NHSM) designation minimizes transport and handling regulations
 - SE3 is sterile and odor-free protecting employees and extending shelf-life
 - Also meets European solid recovered fuel (SRF) standards



Clean Fuel The World Needs Converted From Waste The World Doesn't Want





Making Coal Cleaner

- ⦿ Real-world results from actual test on **430MW power unit** co-firing SE3™ and coal
- ⦿ SE3™ avoids methane emissions from landfill creating significant **greenhouse gas reductions** for fuel users
- ⦿ Replacing 21% of the coal with SE3™ reduces coal-fired greenhouse gas emissions to **EPA AVERT** levels as called for in Clean Air Act Plans
- ⦿ **Annual greenhouse gas savings of over 600,000 tons CO_{2e}**

That's equivalent to eliminating more than 123,000 cars from the highway



2019 EPA Comfort Letter

EPA Publishes Letter Designating



1. Non-Waste Fuel

“Accordingly, we would consider this NHSM (non-hazardous secondary material) a non-waste fuel under the 40 Part 241 regulations....”

2. Replace Coal or Wood

“...we believe that your operations... will transform waste into a processed, non-waste fuel appropriate for use in units designed to combust coal or wood and biomass.”

3. Low Contaminants

“Overall, based on this contaminant-to-contaminant comparison, all contaminants in SE3 are comparable to or lower than those contaminants in coal or wood/biomass.”





430 MW Commercial Generation Test Burn

“...a technically acceptable method of reducing CO2 emissions from coal with manageable operational impacts.”

“...minimal adverse effects to

- ✓ heat rate
- ✓ performance
- ✓ fly ash content
- ✓ stack emissions....”





Analysis: Canmet Energy

Reduces GHG emissions

“...diverting refuse (and co-products) from the landfill and then displacing coal from the generating station will result in a considerable reduction in greenhouse gas emissions.”

No impact on combustion

“SE3 could be co-fired with Highvale coal without considerable impact on the overall combustion behaviour of the primary coal.”

Compatible with existing emissions controls

“... there was no obvious impact on emissions of NO_x and SO₂, or dioxins, furans and polynuclear aromatic hydrocarbons (PAHs). Emissions of HCl were found to increase, as expected given the higher concentration of chlorine within the SE3.”



A division of Natural Resources Canada



Analysis: Southern Research Institute

“...NO_x, SO_x and CO₂ reductions are apparent over the coal when introducing 8% by heating value of WastAway fuel”

“...mercury emissions did not increase with the WastAway fuel”

“... a low to moderate potential for slagging”

“... there is no apparent change in Ash Fusion temperatures, which suggests no appreciable change in slagging from Illinois Basin coal alone”



Tests conducted at Southern Company's Combustion Research Facility



Environmental Benefits

- Blue Source calculates 1.7 ton of GHG reductions for every ton of fuel
- 60%+ of thermal content derived from non-fossil constituents
- Avoids harmful methane emissions from landfill
- Measurable reduction of carbon footprint for coal-based power generation
- ERA awarded \$10MM grant and projected CO_{2e} reductions of over 1,000,000 tonnes



Government entity working to accelerate development of innovative technologies that reduce GHG emissions and help Alberta transition to a lower carbon future.



Blue SourceTM

For over 20 years, the Company has been a leader in climate change and low carbon environmental products and services.

WāstAway[®]
Proven. Sustainable. Solutions.

The Solution We Deliver to the Coal Industry:

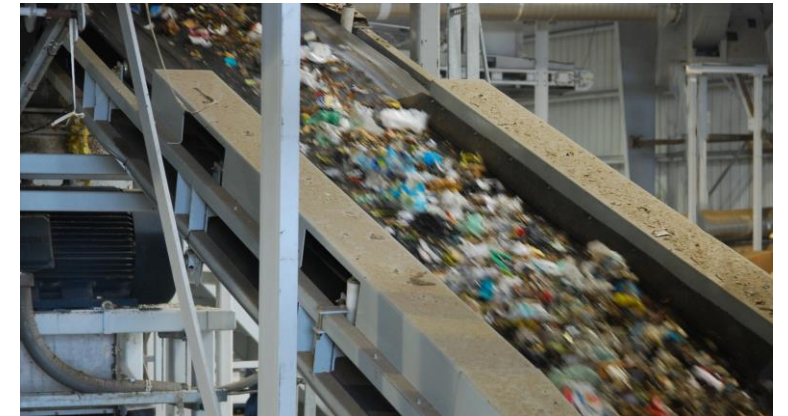
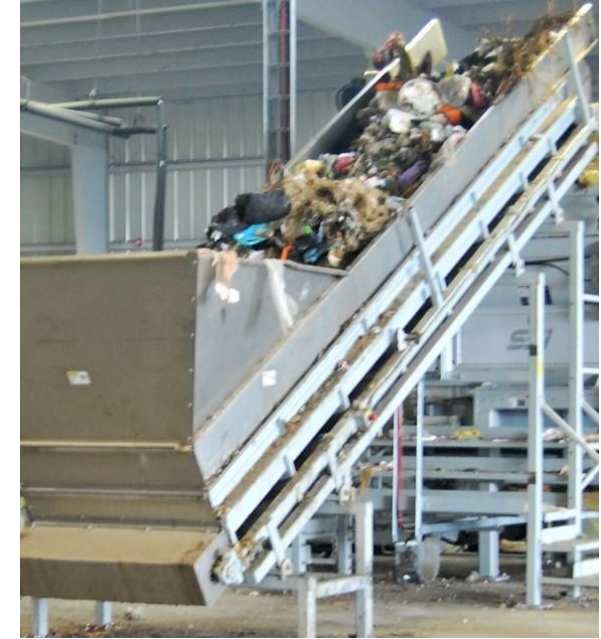
High-Energy Sustainable Fuel





Raw Material: Endless Supply

- System **Diverts 90%** of garbage from landfills
- 70% of garbage is **converted** to sterile, odor-free **SE3™ Fuel**
- BTU value **comparable to coal**
- **Transports easily** and stores safely
- Ready for direct co-firing with **little equipment modification**
- **Very Cost Competitive** with coal and natural gas
- Complies with **EPA and EU standards**
- **Tested and approved** by major cement and power companies





Making Coal Cleaner

	Coal Alone Actual	Coal + 5% SE-3 Actual	Coal + 21% SE-3 Calculated
CO2 Intensity (MT/MW)	.9897	.9491	.8128
Methane Avoidance Bonus	0	.0243	.1058
Effective CO2 Intensity	.9897	.9248	.7070
Annual CO2 Savings	0	141,449	616,971



Five Years of Intensive Testing

2013

**CanmetENERGY
Research**

First extensive testing of co-firing SE-3 and coal

Tetra Tech Review

Review of recommended safe handling practices for SE-3

National Cement

First cement kiln test burn

2014

**Koogler
Engineering**

Concludes SE-3 meets EPA NHSM standards

CEMEX Test

Multi-day cement kiln test burn

**Blue Source
GHG Analysis**

Calculates 1.7 tons of GHG reductions per ton of SE-3

2015

**CCEMC \$10MM
Grant**

Project estimated to save almost 1,000,000 tons of CO_{2e}

Argos Cement

Co-fires SE-3 at 35% displacement

Florida DEP

Approves recycling credits for SE-3

2016

**Southern
Research Test**

Successful test burn co-firing SE-3 and coal

2017

**430 MW Test
Burn**

Successful large-scale co-fire test in pulverized coal power plant

Lehigh Cement

Signs commercial fuel purchase agreement



Technology History

- Began as collaboration with Army Corps of Engineers
- Early research aided by Battelle and Concurrent Technologies
- R&D 100 Winner by R&D Magazine
- Winner US Army Research Product Development Award
- Mitsubishi International Project of the Year Winner
- 23 US and international patents



WastAway®

Proven. Sustainable. Solutions.

- Division of BouldinCorp: 60 year history of automated equipment, military contracts
- WastAway plant in Tennessee has operated commercially for over 15 years
- Successfully built and operated fuel conversion plant in Aruba
- Five years of fuel analysis and testing





Mark Brown
Chief Executive Officer

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