COAL 2.0: A Path to Closed Loop Coal
We are here to talk about a dying industry.
Thermal Coal (1882)

- Mine Coal
- Burn Coal
- Electricity
- Ash + CO₂
- CO₂
- SOₓ
- NOₓ
- Storage
- Water
- Atmosphere
Closed Loop Coal: Orefinery (2030)

- Mine Coal
- Burn Coal
- Electricity
- Ash + CO₂

Market

Low Carbon Cement
Gypsum Zeolites
Nanotubes Graphene
Storage

Metals

CO₂

Sequestration

EOR Shale
Synfuels
CCUS
Workers Required to Produce the Same Amount of Electric Power (2016)

**COAL**

- 160,119 coal workers produced 1.24 billion megawatt hours (7,745 per worker)

**NATURAL GAS**

- 362,118 natural gas workers produced 1.38 billion megawatt hours (3,812 per worker)

**SOLAR**

- 373,807 solar workers produced 36.75 million megawatt hours (98 per worker)

The benefit of coal baseloading to humanity

Source: US Department of Energy
No short term path to replace baseloading.
SONOASH: MANUFACTURED COAL ASH

Source variable coal ash
Address environmental liability
Specified product
Uniform small particle size (10<d₉₀<100 µm)
LOI <1%

Stabilizing ash supply markets
SONOASH

Generating Value
Rural Development
Eliminating Liability

Impounded & Production Coal Ash

Low Carbon Fraction

Performance Cement Displacement

High Carbon Fraction

Strategic Metals and REEs

Environmental Liability Reduction
WE KNOW

Re-use of coal ash is locally beneficial:

One ton produced cement releases one ton of $\text{CO}_2$

Using coal ash causes a direct reduction in $\text{CO}_2$ generation.

Increased demand of rare earth metals

Above Ground Mining of rare metals is more cost efficient and environmentally friendly than traditional mining.
Trump signs executive order to expand critical minerals production, says it will end America’s ‘vulnerability’

By Juliet Eilperin December 20, 2017
REE Impacts

Military & Energy: Magnets, motors, sensors, turbines
Demonstration Plant Location

Coronach, SK
Pop. 711

Plant Size = 60,000 ft²
50,000 tpy

FEATURES:
Process wet production & mixed impounded ash
Create space in existing “pond” and “time” closure
Rural job creation
Closed Loop Coal: Puerto Rico (2022)

Storage

Import Coal

Burn Coal

Electricity

Ash + CO2

CO2

Processing

CO2

Sulfuric Acid

Sodium Hydroxide

Low Carbon Cement

Gypsum Zeolites

Export Market

Metals - REE

Low Carbon Cement

Metals - REE

Gypsum Zeolites

Export Market
COAL IS GOOD

CLEAN TECHNOLOGY INNOVATION MINING VALUE FROM COAL ASH
SonoAsh

Patented, scaleable, coal ash beneficiation integration.

A robust, financial incentive path to clean coal.

Rural development and jobs.

Export market development.