

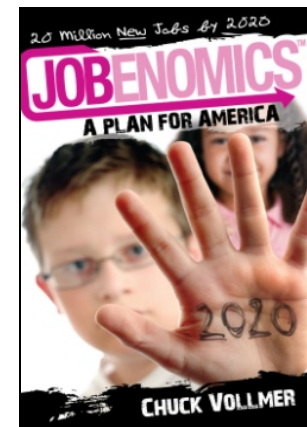
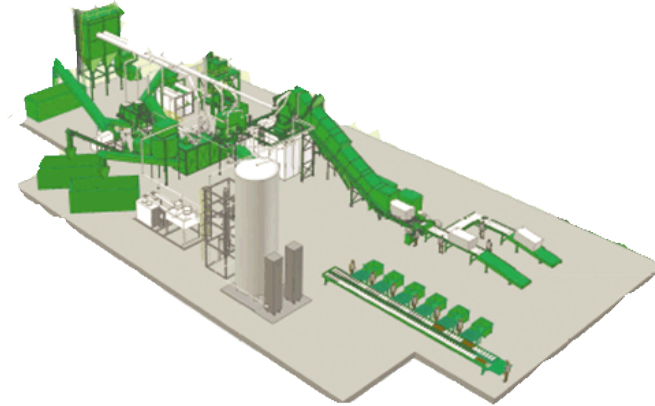
A new approach to urban mining, materials reclamation and business/job creation.

By: Chuck Vollmer and Peter Soriano

5 May 2014

Why Do Communities Pay Recyclers To Haul Away eWaste And Lose Tens Of Millions Of Dollars Of Revenues?

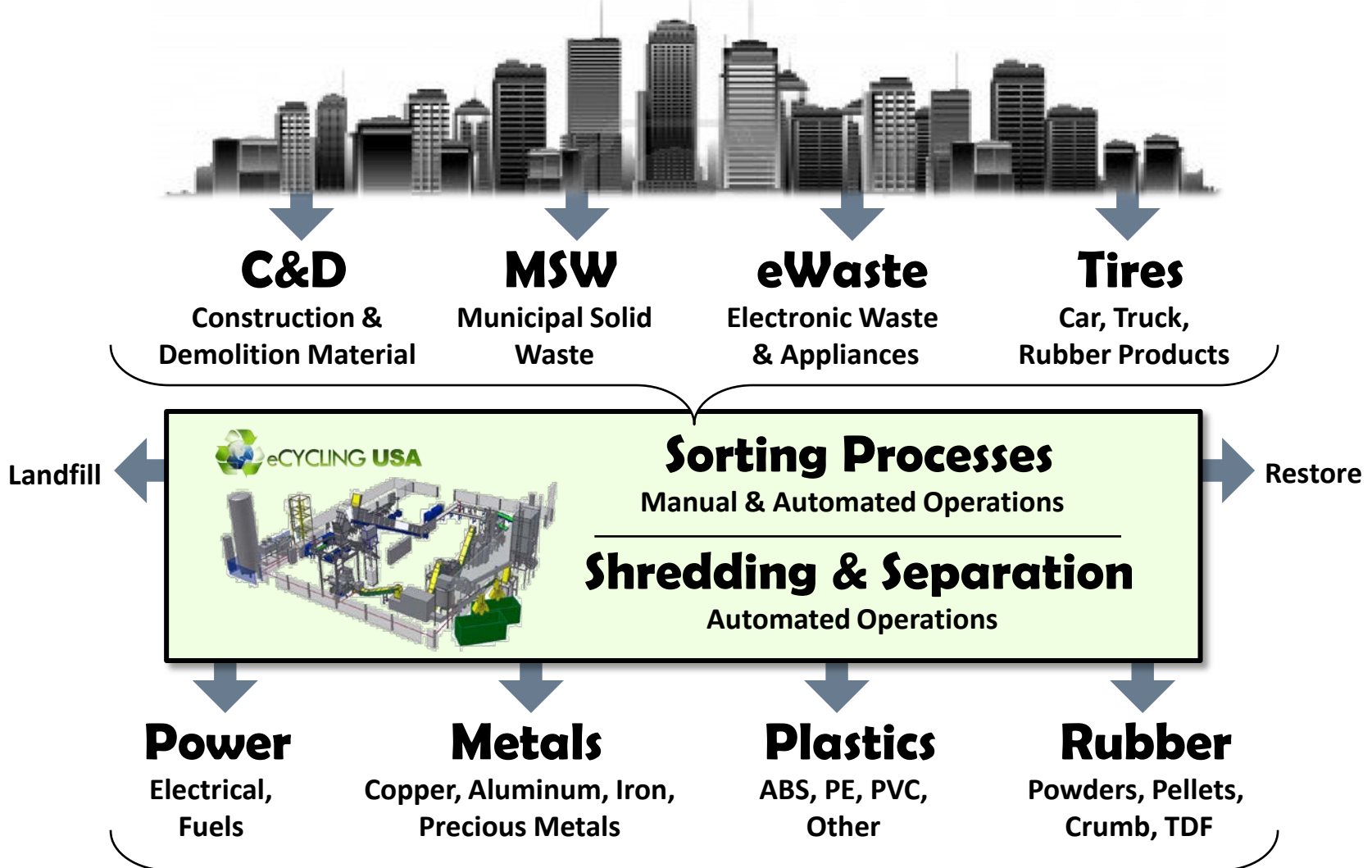
- A typical (10 tons/hour) electronic waste (eWaste) recycling operation generates an annual profit of \$30 million.
- eCyclingUSA designs, implements and supports tailored turnkey solutions for local operations, thereby keeping the majority of the profits and jobs locally.
- Jobenomics Business Generators use a percentage of the eWaste profits to start new local small businesses.
- Jobenomics Urban Mining Initiatives gives cities a way to monetize waste streams.



Most municipal governments do not yet realize the economic value and job creation potential of their community's eWaste inventories.

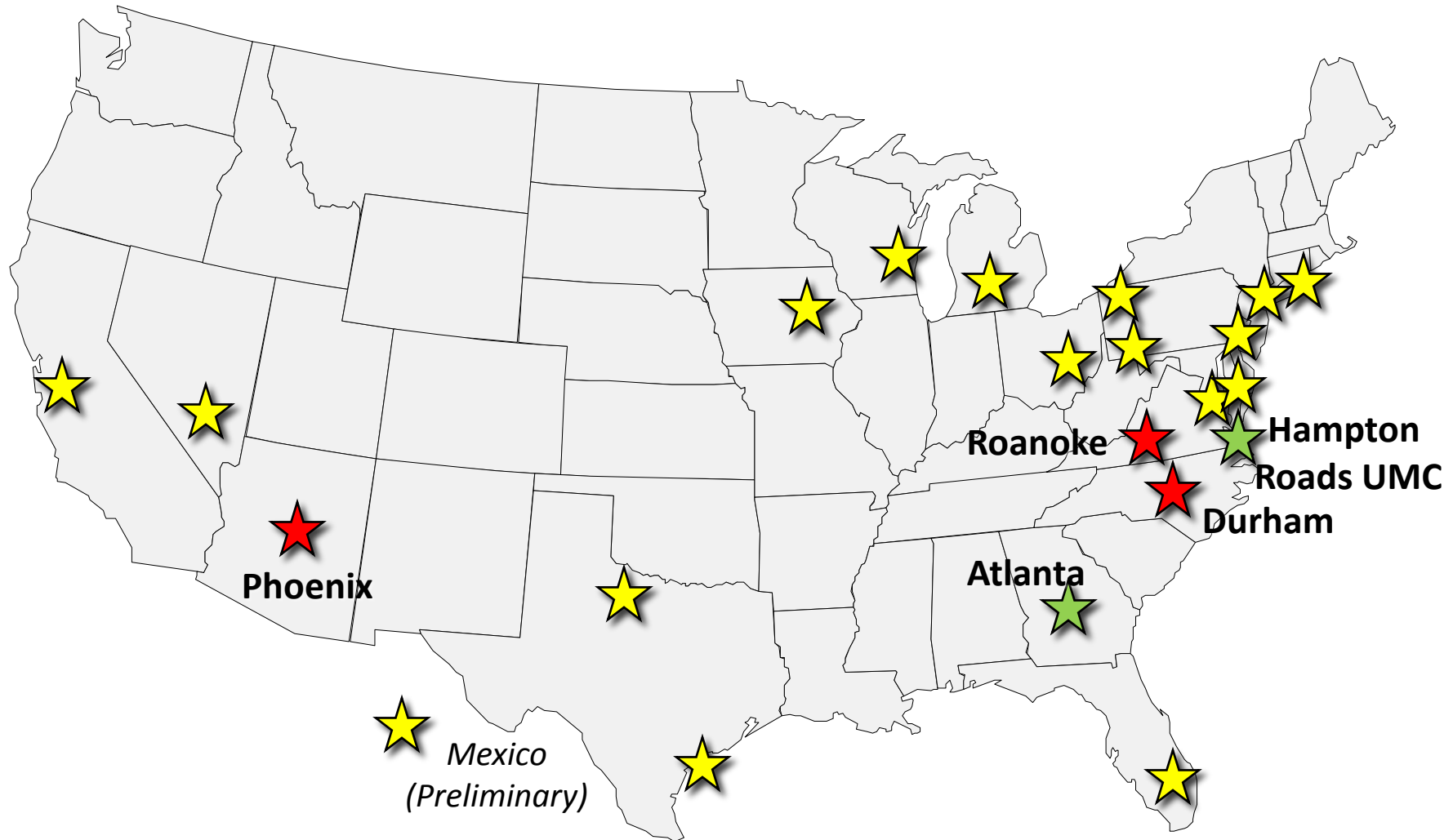
Urban Mining

Goal: Monetize Urban Waste Streams



Jobenomics Urban Mining Center Initiative

Future eCyclingUSA Site Locations

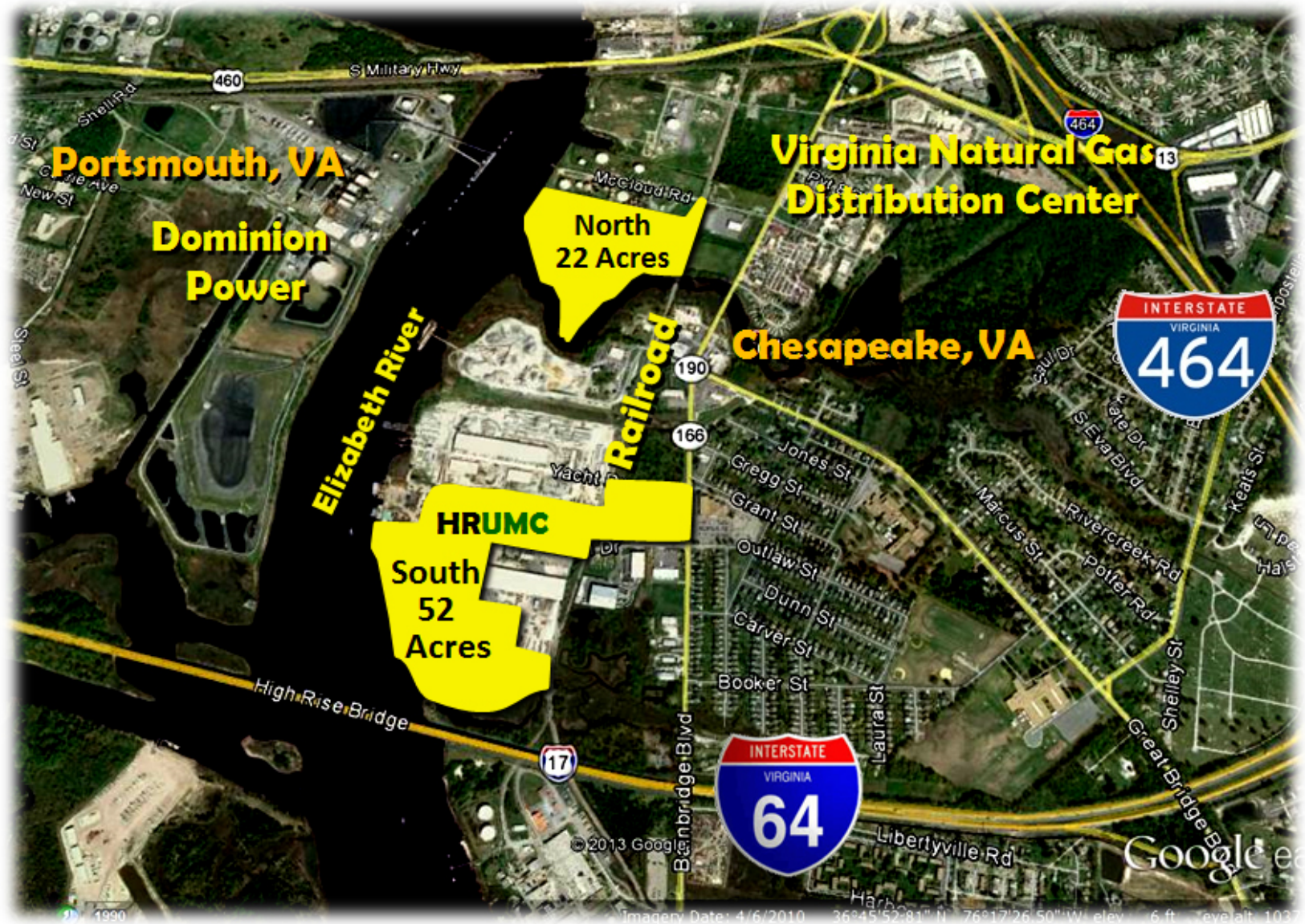


★ Under contract

★ Contracts pending

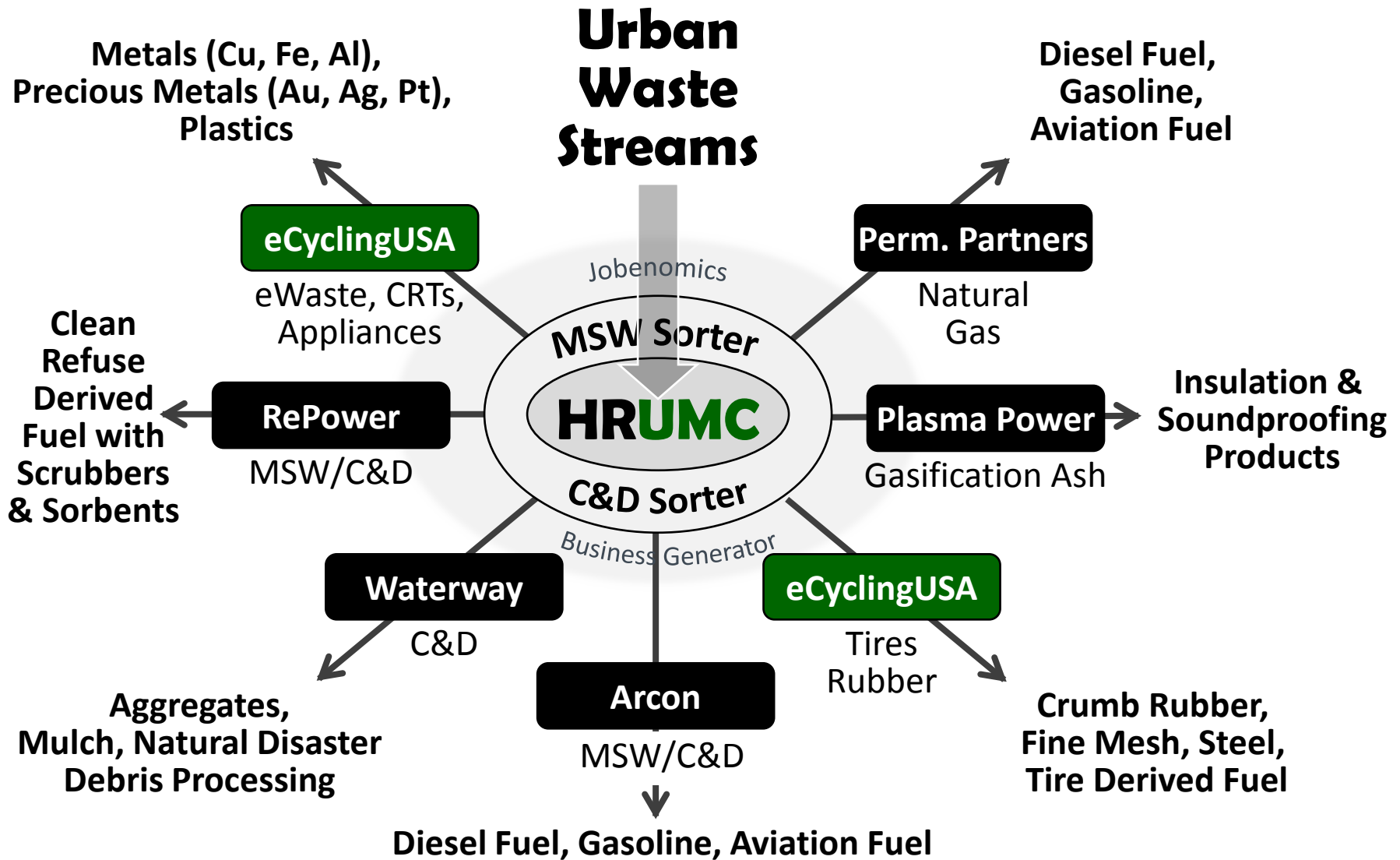
★ In discussion

Hampton Roads Urban Mining Center



Ideal logistics: waterway, rail, highways, power & natural gas.

HRUMC Partners and Technologies



Goal: Zero Landfilling/Waste, Max Material Reclamation/Conversion

HRUMC Community Benefits

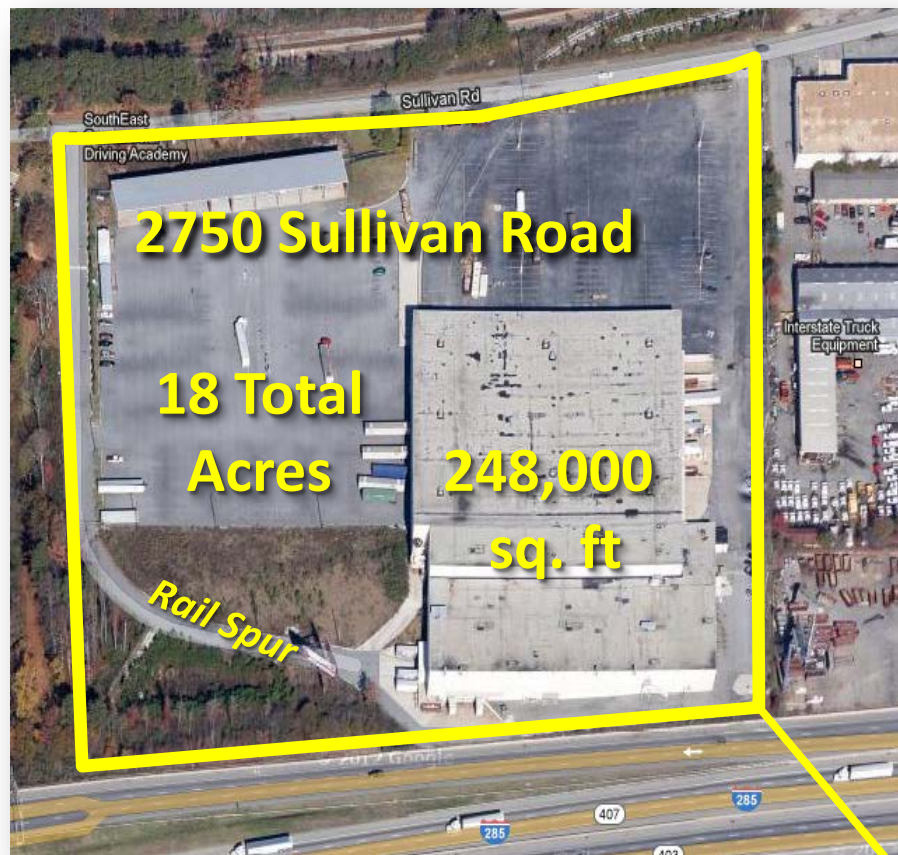


- \$600 million worth of private sector investment.
- 500 new direct jobs with \$25/hour average wage, not counting hundreds of new construction ,transportation and indirect jobs.
- Tax revenue stream on over \$250 million annual revenue (year 3+).
- Environmentally-friendly: negative carbon footprint, no harmful emissions, reduced landfilling and gas emissions, and green jobs.
- Wholesale cost diesel for local community organizations.
- East Coast transfer station and MRF for disaster-related debris processing.
- Magnet for manufacturing industries using low-cost HRUMC materials.
- American energy independence and decentralized fuel production for homeland security and military applications.
- Jobenomics Community-Based Business Generator for training, certification and small business creation. Special programs for veterans, the unemployed, financially distressed and formerly incarcerated.

Urban mining provides raw materials, revenues, businesses and jobs.

College Park (Atlanta), GA

eCyclingUSA eWaste, whiteware, CRT processing facility plus wire stripping and molded plastic products systems



College Park,
Georgia

Atlanta
International
Airport



eCyclingUSA is working with officials to revitalize south Atlanta.



- eCyclingUSA has an exclusive partnership agreement with SYSTEC/CHEMA (Germany) for implementation of turnkey US eWaste and tire plants that can be operational within 10 months.
- SYSTEC has 65 operational state-of-the-art European plants.
- eCyclingUSA has contracts for the first US plants that will be highly profitable and produce up to 200 direct jobs each.
- Of the 3,000 US recycling firms, 70 shred eWaste, but eCyclingUSA alone shreds, granulates, separates and reclaims raw materials without any toxic emissions into the environment.

eCyclingUSA and Jobenomics works with agencies and entities to use eWaste revenues to create local jobs and businesses.

Types of Reclamation Processes

eWaste & Brownware



Whiteware (Refrigeration)



Televisions & CRTs



Tires (Rubber & Steel)



eCyclingUSA uses state-of-the-art materials reclamation technology.

Typical Plant & Equipment

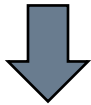


Plants are environmentally with no air or ground emissions.

Basic Operation



**Pre-shredding with
return of oversized
particles**



**Purification and
environmental
protection**



**Granulation
and sorting**

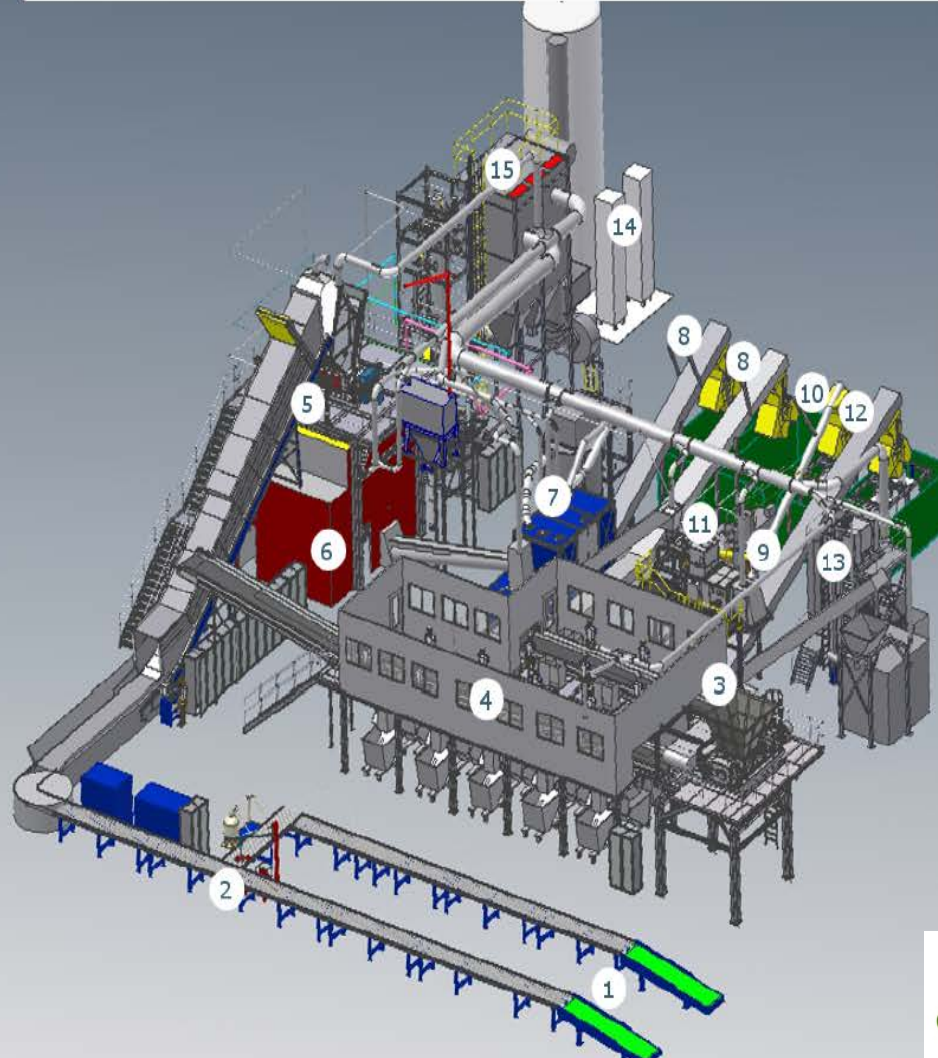


eWaste is processed in a environmentally closed system.

Typical 10 Ton/Hour Plant

Recycling plant for refrigerator and e-scrap Chema WW/ES

- 1 charging transport belt
- 2 suction cooling circuit
- 3 pre-crusher
- 4 sorting cabinet
- 5 rotary shear
- 6 granulator
- 7 PUR & FE separation
- 8 discharge iron
- 9 pelletizer
- 10 discharge PUR-pellets
- 11 NE separation
- 12 discharge plastics
- 13 aluminum/copper separation
- 14 exhaust air abatement
- 15 dust filter



features of the recycling plant:

input material:	refrigerator old electrical appliances
troughput:	50 refrigerator/hour 5 t/hour
power supply:	approx. 1.800 kW

This plant is ideal for communities with over 300,000 people.

Categories Of eCyclingUSA Systems



- Small (\$10 million range):
 - Electronic waste only (computers)
 - One line
 - 3 tons/hour

- Medium (\$15 to \$20 million range)
 - Combination eWaste and whiteware (refrigerators)
 - Two lines
 - 3 tons/hour

- Large (\$30 million range)
 - Combination eWaste, whiteware, CRTs and tires
 - 4 or 5 lines
 - 10 tons/hour

**One year from contract to full operational capability
(6 months to build, 2 months to ship, 4 months initial operation).**

Types of eWaste



- **Commercial Off The Shelf (COTS) Electronics**
 - **IT-Related eWaste** includes computers and assorted peripherals, hardcopy devices, CRTs and mobile devices.
 - **Whiteware eWaste** includes major appliances refrigerators, air conditioners, vending machines, stoves, dishwashers, HVAC systems, water heaters, and whiteware-related ducting, wiring and fixtures.
 - **Brownware eWaste** includes TVs, radios, recorders, telephones, stereo equipment, minor kitchen and home appliances, tools, power equipment, lamps/lighting, and personal electronic devices.
- **Construction & Demolition (C&D) eWaste** includes building materials: copper, aluminum, iron, plastics and foam.
- **Municipal Solid Waste (MSW) eWaste** contains 2% eWaste.
- **Government eWaste.** The USG (not including state and local) spends \$15B/year on mission-related electronics and IT systems.

Americans dispose 20 to 30 million tons annually of COTS, CND, MSW and mission-related eWaste.

Sources of eWaste (USA)



- Sources:
 - **Homes & businesses** (750 million items stockpiled per EPA)
 - **Original equipment manufacturers** (e.g., GE, HP, IBM...)
 - **Major Retailers** (e.g., Home Depot, Best Buy, Sears...)
 - **Government Agencies** (federal, state and local)
 - **Landfills** (100s of millions of tons)
 - **Scrap yards and recyclers**
 - **Exports** from other agencies and municipalities
 - **Natural disasters** (e.g., Hurricanes Katrina and Sandy)
 - **Construction & Demolition** projects (e.g., Detroit, Baltimore)
 - **Municipal Solid Waste** streams
- EPA reports that 75% of US eWaste goes to landfills and 25% is recycled. Of the amount recycled, EPA states that 80% is shipped to foreign countries—mainly China and Nigeria.
- 25 states, plus NYC, now restrict eWaste in landfills. Federal government is beginning to restrict eWaste exports.

Most communities have significant untapped sources of eWaste.

eCyclingUSA Feedstock Requirements



■ Computers or refrigerators per ton.

- 100 personal computers (20 pounds each) = 1 ton
- 6 refrigerators (350 pounds each) = 1 ton

■ Transportation capabilities.

- 40' shipping container and semi-trailer truck = 20 tons
- Railroad boxcar = 140 tons
- Waterway barge = 1,500 tons



■ Feedstock for a 10 ton/hour plant.

- 1 shift (8 hours) = 80 tons per day = 4 truck loads per day
- 3 shift (23 hours) = 230 tons per day = 12 truck loads per day
- 1 week (3 shifts, 6 days) = 1,380 tons = 10 boxcars or 1 barge

US generates enough annual eWaste to support several hundred 10 ton/hour advanced materials reclamation eCyclingUSA plants.

- **eWaste Materials** (IT-related, Whiteware, Brownware)
 - Raw materials reclamation:
 - ✓ Ferrous: iron, steel **≈ \$350/ton**
 - ✓ Nonferrous: copper **≈ \$6,500/ton**, aluminum **≈ \$1,500/ton**, and other precious metals (gold, silver, etc).
 - ✓ Plastic (ABS, PE, PV, etc.) **≈ \$150/ton to \$1600/ton**
 - ✓ Glass (recycled glass contains 70% of the raw materials in making new glass).
 - Refurbished and resold functioning electronic equipment.
- **Recycling Savings:** Energy 75%, Air Pollution 86%, Water Pollution 76%, Water Use 40%, Mining Waste 97% (*source EPA*)

Commodity prices are predicted to remain stable or increase.

Typical eCyclingUSA Income Streams



Income from Materials				
Material	\$/ton	%		Total
Copper	\$6,500	10%		\$650
Aluminum	\$1,500	20%		\$300
Iron	\$350	20%		\$70
Plastic	\$250	45%		\$113
Glass	\$50	5%		\$3

100%

\$1,135

Tipping Fees				
Type	\$/ton	%		Total
Big home appliances	\$1,200	15%	80 each @ \$15 per item	\$180
Cooling appliances	\$1,000	15%	80 each @ \$15 per item	\$150
Computers/Small appliances	\$100	10%	100 each @ \$1 per item	\$10
TV/Monitors/CRTs	\$450	10%	150 each @ \$3 per item	\$45
eScrap	\$250	50%	500 each @ \$0.5 per item	\$125

100%

\$510

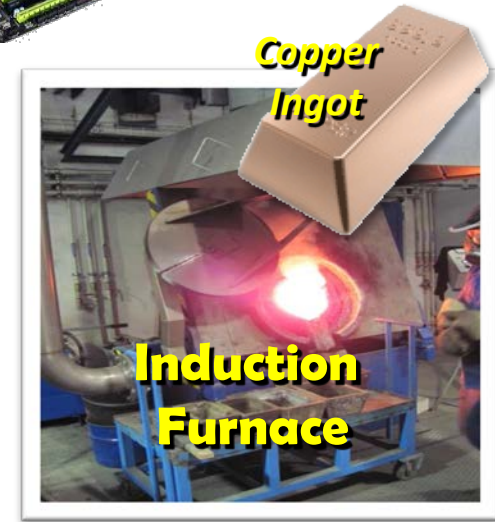
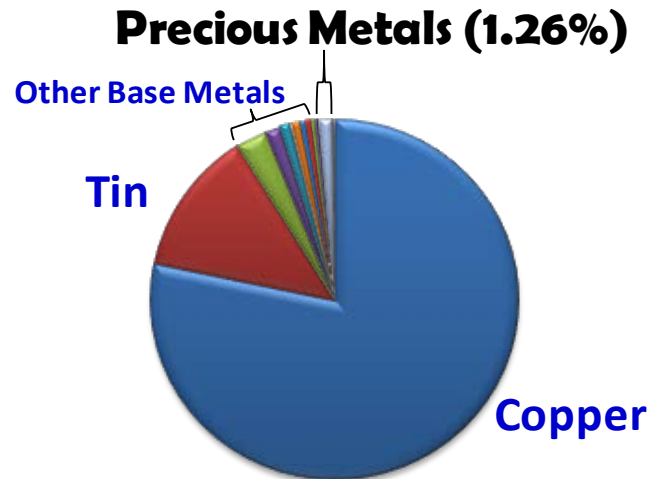
Total per ton **\$1,645**

Maximum Potential Annual Revenue = \$114 million

(\$1,645/ton x 10 tons/hour x 3 shift operation x 300 days per year)

Additional income can be derived from high-value items (cell phones, motherboards), grants and carbon credits.

Precious Metal Extraction (Optional)



Copper (78.2%)

Zinc (1.4%)

Iron (0.5%)

Nickel (0.25%)

Silver (1.17%)

Platinum (0.02%)

Tin (12.9%)

Moly (0.9%)

Manganese (0.5%)

Cobalt (0.06%)

Palladium (0.05%)

Rhodium (0.002%)

Lead (2.8%)

Titanium (0.82%)

Chrome (0.3%)

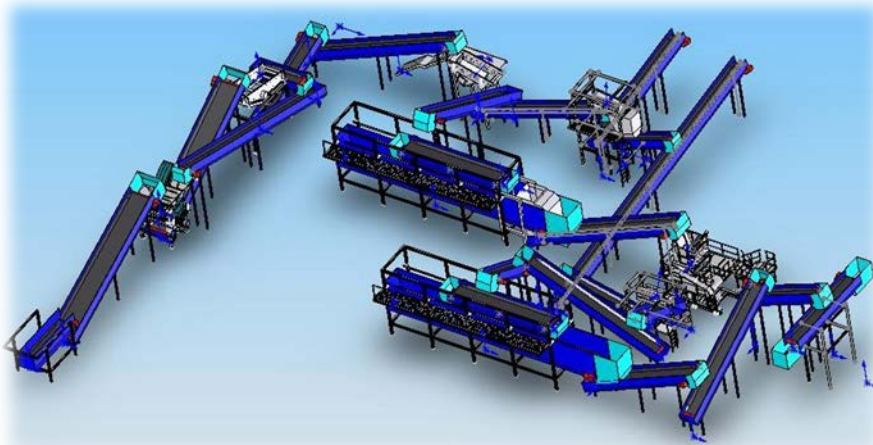
Cadmium (0.04%)

Gold (0.02%)

Precious Metals

**Unprocessed scrap motherboards sell for \$8,000/ton.
At 0.02% content, gold is worth \$900,000/ton.**

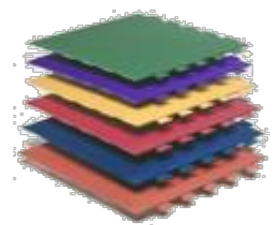
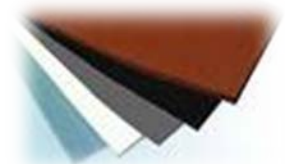
Rubber & Tire Shredding/Cryogenics



**Rubber
Applications**

Steel

Mesh	Applications
4-40 mesh	Playground surface material, mulch, animal bedding, molds, surface materials (playgrounds, racetracks), carpet padding, rubber products, road enhancement material, manufacture of reclaimed rubber, matting, paste and sealing materials, modified rubber products, road pavement
40-120 mesh	Rubber plastic materials, rubber products (such as railway and subway ties), brake pads, modified asphalt, solid tire production
120-200+ mesh	Textile material coating, special paper coatings, painting materials and additives, special rubber products, medical devices, high level water proofing, materials for military uses



eCyclingUSA tire plant can process 3 million tires annually.

Tire Plant Cost/Price Considerations



- Typical Land Fill Tipping Fees: **\$230/ton**

Waste	Per Ton	Per Item
MSW	\$ 57.28	-
CND	\$ 68.38	-
Tires	\$ 231.90	-
Auto Tire		\$ 2.00
Truck Tire		\$ 5.00

- Tire Chips/Shreds: **\$50/ton**
- Ground Rubber:
 - Mulch **\$350/ton**
 - Pellets **\$500 to \$1,500/ton**
 - Powders (60-400 mesh) **\$5,000 to \$8,000/ton**
- Steel: **\$350/ton**

Note: commodities prices are subject to change.

Cost of a eCycling/CHEMA 30,000 ton per year system (about 3 million used tires) is in the \$25 million range.

Direct Employees

Employees for 10 Ton/Hour System

	Per Shift			Total 3 Shift Operation	
	Shift 1	Shift 2	Shift 3	Minimum	Actual *
CHEMA ES (eWaste only)	28	20	16	64	80
CHEMA RR (Whiteware only)	33	25	21	79	99
CHEMA WWES Combi Unit	33	25	21	79	99

**Plus Vacation, Sick, Absentee Allowances*

Optional Equipment eWaste

- CHEMA CRT
- Optical Sorter (Eddy Current)
- Optical Sorter (InfraRed)
- Briquette Granulator
- Single Stream Sorting
- Smelting Unit
- Mobile Pre-Shredding Unit

11	11	11	33	41
1	1	1	3	4
1	1	1	3	4
1	1	1	3	4
10	10	10	30	38
1	1	1	3	4
2	2	2	6	8
Total	27	27	81	101

Tire Recycling

- Ambient (Crumb Rubber)
- Ambient (10 to 30 Mech)
- Cryogenic (200+ Mesh)

10	10	10	30	38
15	15	15	45	56
20	20	20	60	75
Total	45	45	135	169

Does not include direct transportation or construction jobs.

Contact information:

Chuck Vollmer, CEO, eCycling USA,
703-319-2090, cvollmer@jobenomics.com,
cvollmer@eCyclingUSA.com

Peter Soriano, President, eCycling USA,
301-317-3545, p_soriano@verizon.net,
psoriano@eCyclingUSA.com

www.eCyclingUSA.com