Vincent Leray is an Environmental Scientist with the Recovered Materials section of the Division of Solid Waste Management at TDEC. Vincent’s primary responsibilities are to give technical assistance to counties regarding the solid waste and recycling systems. Vincent also manages the Tennessee Materials Marketplace in collaboration with the United States Business Council for Sustainable Development, which aims to find the highest best use for otherwise disposed of waste streams.
Introducing the newly-minted Tennessee Materials Marketplace
The Circular Economy

PRINCIPLE 1
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows. ResOLVE levers: regenerate, virtualise, exchange.

PRINCIPLE 2
Optimise resource yields by circulating products, components, and materials in use at the highest utility at all times in both technical and biological cycles. ResOLVE levers: regenerate, share, optimise, loop.

PRINCIPLE 3
Foster system effectiveness by revealing and designing out negative externalities. All ResOLVE levers.

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input.

Join the Circular Economy in Tennessee

Join the Tennessee Materials Marketplace and divert waste from landfills, generate significant cost savings, energy savings, and create new jobs and business opportunities.

GET INVOLVED

https://tennessee.materialsmarketplace.org
Intent of the Marketplace

Tennessee Materials Marketplace
in a nutshell

Create Value
Reduce CO2
Do Good for the Environment
Stimulate & Inspire Local Jobs
Intent of the Marketplace

Tennessee Materials Marketplace in a nutshell

Monetize Waste Streams

Create Value
Reduce CO2
Do Good for the Environment
Stimulate & Inspire Local Jobs
Materials on the Marketplace

Available Materials

- **Monitors**
  - Available
  - 34040 Bayrampaşa/Istanbul
  - Electronics
  - Electronics (functional)
  - **Quantity 500 Unit**

- **Office desks**
  - Available
  - 34040 Bayrampaşa/Istanbul
  - Business Furniture, Fixture and Equipment
  - Business Furniture
  - **Quantity 100 Unit**

- **Bauxite residual (red mud)**
  - Available
  - 34040 Bayrampaşa/Istanbul
  - Filter Cake and Sludge
  - Sludge
  - **Quantity 1000000 ton (t)**

- **Waste paper**
  - Available
  - 34040 Bayrampaşa/Istanbul
  - Paper and Cardboard
  - **Quantity 20000 ton (t)**

Wanted Materials

- **Lira 50**
- **Lira 250**
Map View
Wanted Materials

- **Aluminum Cans (wanted material)**
  - Post-consumer aluminum cans that can be recycled to make new aluminum.

- **Waste paper (wanted material)**
  - Post-consumer paper wastes that can be recycled to make new paper products.

- **Waste oil (wanted material)**
  - Waste oil that has a calorific value of over 6000 Btu/lb to be reused as alternative fuel in the cement kiln.
Bauxite residual (red mud)

Qty: 1000000 ton (t)

Filter: Cake and Sludge

Sludge

Company
USBCSD

Location
Başak, 34306 Başakşehir/İstanbul, Turkey

Description of the Resource:
Bauxite residue is a by-product in the production of alumina. The resulting residue is high in alkalinity, but can be neutralized.

Frequency
Yearly

Size Description
Components Description
Sodalite: 4-40%, Alumino-geothite: 10-30%, Hematite: 18-30%

Disposal Method
Disposed in red mud pond

Conditions Info

Attachments

Back Add to watchlist Contact
Audience

Add available material

<table>
<thead>
<tr>
<th>Basic Info</th>
<th>Specific Info</th>
<th>Attachments</th>
<th>Price</th>
<th>Audience</th>
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<td>MM users (only MM participants and project staff can view)</td>
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<td>Internal (only users within the company and project staff can view)</td>
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Previous

Save
Starting the Conversation

I want to start the conversation because
I am interested in this material and I need to consult more people

My current role is buyer

Start Cancel

Steel Slag
Price: $14 / ton (t)
Qty: 1000000
User Roles

Conversation

I want to start the conversation because

I am interested in this material and I need to consult more people

My current role is

- buyer
- owner
- facilitator
- processor
- transportation
- expert

Material

Steel Slag

Price: $14 / ton (t)

Qty: 1000000
Discussion and Negotiation

Conversation

**Rui HE** 2016-11-21T21:44:03.000Z
Hello, Campbell. I would like to reuse some of your steel slag in my cement production process. Could you please give me more details on your material? Thanks!

**Campbell McNeill** 2016-11-21T03:48:01.000Z
Ok, we generate 1 million tons of these slag material at our plant in Texas. We know they make perfect cement clinker. You can crush them into finer sizes if you like.

Material

**Steel Slag**
Price: $14 / ton (t)
Qty: 1000000

Transactions

**Quantity**
500000 / 1000000

Pending

**Cancel the transaction**
## Activities

<table>
<thead>
<tr>
<th>ID</th>
<th>Last Update</th>
<th>Material</th>
<th>Participants</th>
<th>Role</th>
<th>Activity Type</th>
<th>Quantity</th>
<th>Action</th>
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<tr>
<td>2</td>
<td>Nov 18, 2016 8:17:37 AM</td>
<td>Steel Slag</td>
<td>Daniel Kietzer (Participant Role: buyer)</td>
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<td></td>
<td>Rui HE (Participant Role: owner)</td>
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<td>3</td>
<td>Nov 21, 2016 2:35:12 PM</td>
<td>Bauxite residual (red mud)</td>
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<td>buyer</td>
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<td>buyer</td>
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<td>Campbell McNeill (Participant Role: owner)</td>
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Showing 1 - 5 of 5 items.
Used Shot Blast Recycling

Timeline: one-time on 01/25/2018
Participants: David Choate, Shiloh Industries (Owner), Queen City Metals (Taker)

Flow Chart

Description
Shiloh Industries manufactures a variety of light-weight automobile parts. Their blasting process uses cast steel abrasive for treating aluminum surfaces. After the abrasive is used, the shot blast residue is mixed with aluminum and is no longer useful. However, the high steel content still makes the material highly desirable for metal recycling. Through the Tennessee Materials Marketplace, Queen City Metals was able to get in touch with Shiloh and recycled all 12 barrels (roughly 12 tons) of the used shot blast that Shiloh had.

Estimated Benefits
Economic: Owner savings: $360\(^1\), Taker Savings: $1440\(^1\).
Environmental: 22 MT CO\(_2\)e emission is avoided\(^2\), which is equivalent to conserving 2,474 gallons of gasoline.
Societal: NA

---

\(^1\) Transportation cost and distance is not considered
\(^2\) Assuming a landfill tipping fee of $30/ton
\(^3\) Assuming a scrap steel price of $0.06/lb (https://rockawayrecycling.com/scrap-metals-prices/)
\(^4\) Based on EPA WARM V.14 (https://www.epa.gov/warm/versions-waste-reduction-model-warm#WARM Tool V14)
Estimated Benefits

Economic: Owner savings: $360, Taker Savings: $1440.
Environmental: 22 MTCO2e emission is avoided, which is equivalent to conserving 2,474 gallons of gasoline.
Societal: NA
Who’s Involved

Akebono Brake Corporation
American Snuff Company
Brigestone
Caraustar
Carbide Industries LLC
Ceradyne, Inc., a 3M company
City of Chattanooga
Complete Recycling
DENSO Manufacturing TN, Inc.
EC Fibers LLC
Fibertronics
First Tennessee Development District
Florim USA, Inc
Fraley and Schilling Inc.
Franklin County Solid Waste Management
General Motors
Hankook Tire Manufacturing, Tennessee LP
Hawkins County Solid Waste
Ideal Clamp Products
Interlocal Solid Waste Authority
La Z Boy
Lucite International, Inc.
McKee Foods Corporation
Memphis-Shelby County Office of Sustainability
Metro Nashville Public Works
Newell Brands
Nissan North America, Inc.
Northwest Tennessee Development District
Owens Corning
Patriot Recycling Inc
Perdue Farms
Peregi
Phoenix Foods
Plum Creek
Plum Creek Environmental
Red Knight Distribution
repurposedMATERIALS
Rockwood Recycling LLC
Suppliers Partnership for the Environment
Tennessee Manufacturing Association/Tennessee Chamber of Commerce & Industry
Tennessee Valley Authority
TN Dept. of Environment and Conservation
Upper Cumberland Development District
Volkswagen
Waste Management Recycle America
WestRock
Yazoo Brewing Company
State Funded but run by USBCSD
State Funded but run by USBCSD

- We do not own the data
State Funded but run by USBCSD

- We do not own the data

- Proprietary information is kept private on marketplace server
State Funded but run by USBCSD

- We do not own the data

- Proprietary information is kept private on marketplace server

- Aggregate data
State Funded but run by USBCSD

- We do not own the data

- Proprietary information is kept private on marketplace server

- Aggregate data
  - Tonnages diverted, economic impacts, value of sales, material types
Reporting to the State

- We do not own the data

- Proprietary information is kept private on marketplace server

- Aggregate data
  - Tonnages diverted, economic impacts, value of sales, material types

- Marketplace Policy Manual is in the works
Opportunities of the Marketplace

• Business
  – Turning costs into revenues
  – Strengthening network and supply chain resilience
  – Meeting corporate sustainability goals

• Local Government
  – Accessing new markets
  – Replacing virgin materials
  – Decreasing reliance on disposal

• State Government
  – Locating market and processing gaps
  – Identifying entrepreneurial and growth opportunities
  – Mining aggregated data to support statewide goals
Opportunities of the Marketplace

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Diverse Involvement

Akebono Brake Corporation
American Snuff Company
Bridge Stone
Caraustar
Carbide Industries LLC
Ceradyne, Inc., a 3M company
City of Chattanooga
Complete Recycling
DENSO Manufacturing TN, Inc.
EC Fibers LLC
Fibertronics
First Tennessee Development District
Florim USA, Inc
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Tennessee Valley Authority
TN Dept. of Environment and Conservation
Upper Cumberland Development District
Volkswagen
Waste Management Recycle America
WestRock
Yazoo Brewing Company
Thank you

• Questions?

Vincent Leray
DSWM – Recovered Materials
Vincent.Leray@tn.gov
615-532-0814

Vaughn Cassidy – contact for Automotive Sector
Office of Policy & Sustainable Practices
vaughn.cassidy@tn.gov
731-512-1343
Lee Smith

- Lee Smith is the Lead Manager of Environmental, Health, Safety and Security at American Snuff Company. He is 40 years old and has been married for 20 years with three sons. Lee has been with American Snuff Company for 19 years with a background in architectural engineering. He spent 11 years in managing in manufacturing, 2 years in quality and 6 years in EHS (current responsibility with company). He enjoys fishing, hunting, and playing music.
American Snuff Clarksville
Sustainability 2014 - 2018

Doing The Right Thing
The Journey

• 2011 - Started recycling program with plastic bottles and aluminum cans
• 2012 - Started recycling cardboard, paper, plastic barrels, and wood
• 2013 - Partnered with a local farmer for trial to compost tobacco waste
• 2014 - Began compost after successful trial, developed EMS, began recycling cellophane waste and plastic banding waste
• 2015 - Energy audit, dust compost and floor clean up trials
• 2016 - Started floor clean up compost, compressed air system upgrades, additional tobacco waste compost trials from Bowling Green plant consolidation and office lighting upgrades
• 2017 - Started consolidation compost, installed light sensors in all offices, started some LED lighting upgrades
Recycled over 10,000,000 lbs. of tobacco stem/dust annually
- Developed Environmental Management System
- Received Tennessee Green Star Partnership
- Received Montgomery County Green Certification
- Received Montgomery County Recycler of the Year Award
- Received 2016 top sustainable business Montgomery County
- Erosion Control Project Completed
- Dumpster Dive Completed
- Bio-Circle Parts Washers Installed
- Energy Audit Completed (replaced desiccant dryer and lighting projects underway)
- Motion light sensors installed in all offices, restrooms and breakrooms
2014 - 2017 Overview

- Community outreach – biannual senior citizen center landscaping and grounds maintenance (all waste trimmings and leaves are used as compost), Habitat for Humanity homes sponsored with sustainability team providing landscaping labor and supplies
- Annual Earth Week celebration – roadside waste cleanup, lights out hour, art contest for children, provide reusable grocery bags and tomato plants to employees, etc.
- Became a member of Materials Marketplace to proceed with our goal of ZWTL
• Targets and objectives
• Energy reduction
• Water reduction
• Waste reduction, reuse and recycling
• Emission tracking and reporting
• Process improvements
• Supplier engagement
Three Star Partnership Celebration

- Employees wearing their celebration t-shirts
- Mugs and tumblers distributed to celebrate the achievement and encourage environmental objectives
Erosion Control Project

- Planted 200 trees with a local arborist to help prevent soil erosion
- Healthy trees slow water runoff and help hold soil in place
- Trees also absorb odors and pollutant gasses, such as ozone and filter particulates
Dumpster Dive

- A proactive approach to identify and categorize recyclable material
- Provides clear visibility of waste that can be recycled
Bio-Circle Parts Washer

- Zero waste, zero hazards, zero VOC emissions
- Bio-remediation process breaks down grease/oil by micro-organisms that produce enzymes which digest the pollutant
Audit Recommendations

• Compressed Air
  – Dryer replacement (sized to meet current needs)
  – Receiver tank capacity increase ($30,000.00 savings annually in energy use)

• Lighting
  – Replacement of metal-halide fixtures (estimated $200,000.00 savings annually in energy use)
• Complete metal halide light replacement with LED
• PET (polyester) strapping replacement project
• Waste plastic can solution
• Air handler reusable filter project
• Long term solution for dust compost
### A Final Look At The Numbers

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<th>Category</th>
<th>Value</th>
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<td>Waste</td>
<td>758,550.00</td>
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<tr>
<td>Recycled/Reused</td>
<td>11,420,092.40</td>
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<td>Combined</td>
<td>12,178,642.40</td>
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<tr>
<td>Percentage Waste</td>
<td>6.23%</td>
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