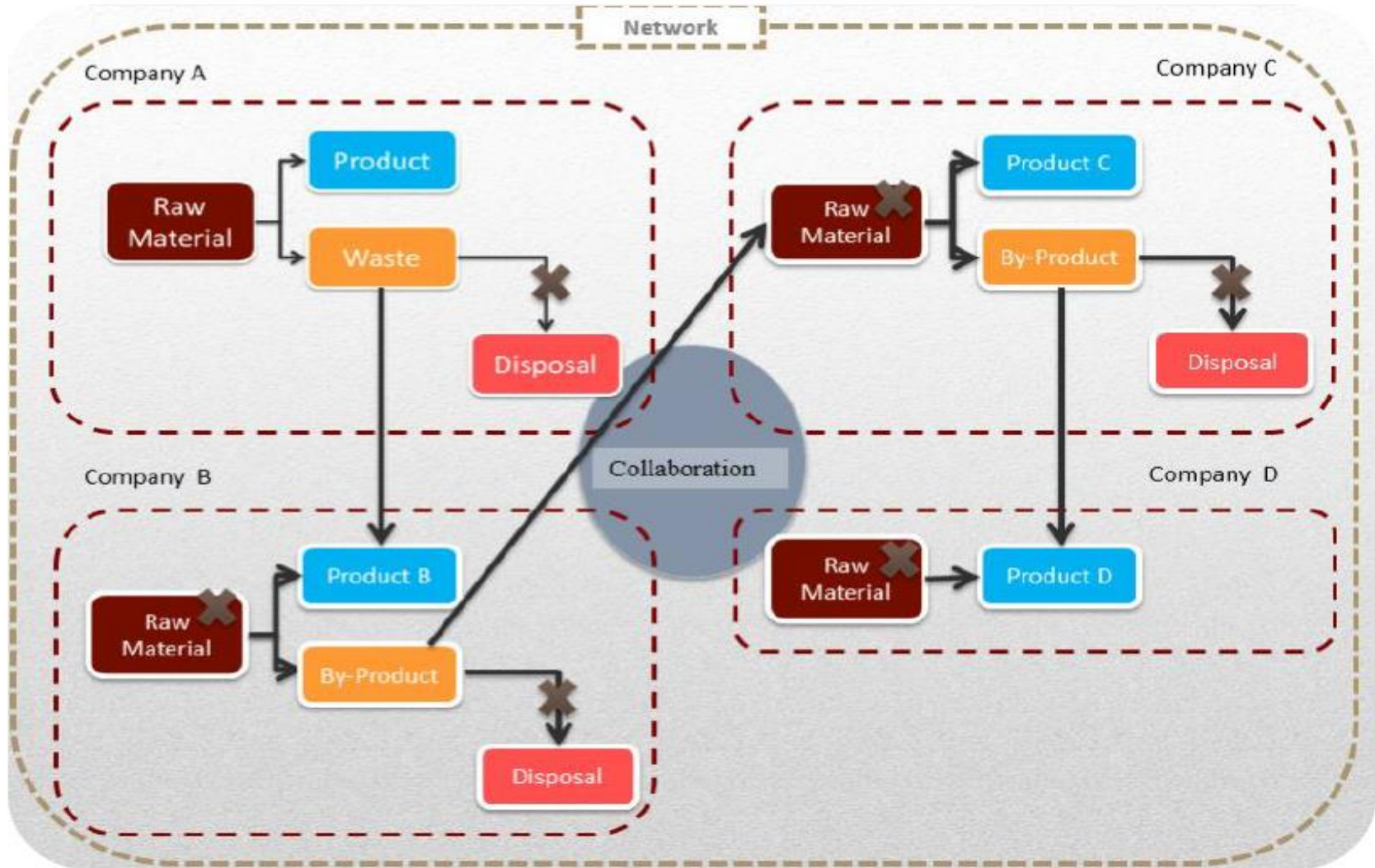




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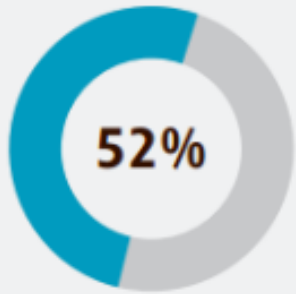
Closing the Loop in Tennessee: Creating an Interactive Materials Exchange in Tennessee

The Industrial Ecology of Material Re-Use

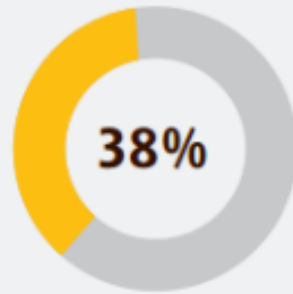


Circular Economy: What does it mean?

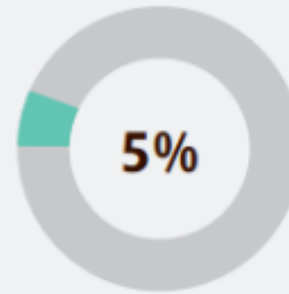
How familiar are you with the term Circular Economy?



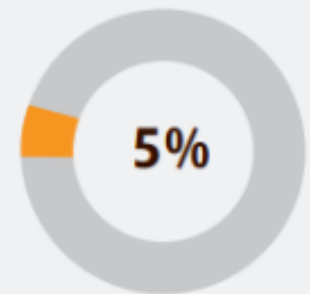
I could easily define this term and provide examples



I think I know what this term means, but I'm not entirely certain of what it encompasses



I am completely unfamiliar with this term



I've heard the term before, but I don't know what it means

A 2016 online survey of sustainability professionals conducted by Green Biz Magazine reveals that this is a relatively new term.

A Goal of the 2025 Solid Waste Plan

- 1. TDEC will facilitate the development/enhancement of online materials exchanges and/or opportunities for cooperative marketing of recycled materials.***
- 2. TDEC will develop or oversee the development of a user-friendly online tool/website to help generators identify materials processors in Tennessee.***
- 3. TDEC will research and, as appropriate, provide information about third-party organizations that provide recycling on the TDEC website.***

The Hurdles of Materials Networking

- ✓ Lack of Relationships: A loose industrial coupling
- ✓ Lack of Interest: Supplier Commitment
- ✓ Lack of Trust: Buyer Uncertainty



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Repurposing Materials and Waste through Online Exchanges: Overcoming the Last Hurdle

Suvrat Dhanorkar

Smeal College of Business, The Pennsylvania State University, University Park, Pennsylvania 16802, USA, dhanorkarsuvrat@gmail.com

Karen Donohue, Kevin Linderman

Carlson School of Management, University of Minnesota, 321 19th Avenue South, Minneapolis, Minnesota 55455, USA, donoh008@umn.edu, linde037@umn.edu

Online material and waste exchanges (OMWEs) provide online channels to repurpose by-products, unused materials and waste from industrial and commercial facilities. Unfortunately, OMWEs also have challenges. First, sellers may have access to other disposal options and, as a result, may not fully commit to the exchange. Second, buyers can face high uncertainty about the product exchanged and the transaction being undertaken. Overcoming these challenges is the “last hurdle” to making OMWEs successful. This study investigates the factors that reduce the *buyers’ uncertainty* and increase the *sellers’ commitment* to the OMWE. We analyze novel transaction-level data from an online exchange (MNExchange.org) combined with other archival public records on county-level repurposing and disposal statistics. First, we find that regional *repurposing* policies and alternatives have a complementary effect on sellers’ commitment toward OMWEs, resulting in increased OMWE exchanges. However, regional *disposal* policies and alternatives have a substitution effect on sellers’ *commitment*, resulting in reduced exchange success. Further, greater product and transaction information reduce the buyer’s uncertainty and increase exchange success. Finally, the analysis shows that users’ (buyers and sellers) heavily rely on their prior experience with OMWEs. Specifically, higher familiarity between the buyer–seller pair and familiarity with the OMWE system leads to higher likelihood of exchange success. This study lays the foundation for understanding OMWEs and has important implications for developing policies and operations to increase online transactions of by-products, materials and wastes.

10.87 in

Technical Advances are also needed

Across the nation, all 25 existing online materials exchanges are in serious need of an upgrade.



The Upgrade We Needed

austin
**materials
marketplace**

facilitating business-to-business material reuse in Austin, Texas



[About](#) [Sign Up](#) [Blog](#) [Events](#) [Who's Involved](#) [Success Stories](#) [Materials Available](#) [Materials Wanted](#) [Login](#)



United States Business Council
for Sustainable Development



The Partnership begins



United States Business Council
for Sustainable Development



The US BCSD is an action-oriented and member-led nonprofit business association, founded in 1992 to give leading US businesses a platform to mobilize boots on the ground and work together to design, implement and scale sustainability solutions. The US BCSD is a Global Network partner of the World Business Council for Sustainable Development.

Questions?

On a planet of finite resources, the circular economy is not optional, it is inevitable.

— Hermann Erdmann, CEO, REDISA

From the recent report Growth Within: A Circular Economy Vision for a Competitive Europe



Department of
**Environment &
Conservation**

TN Materials Marketplace

A Brief Walk-through

Module 1: Browsing Materials

Grid View

Try to search the material name, zip code, city name, company name...



Grid view List view Map view

Available Materials

Wanted Materials



Lira 50

Monitors

Available
34040 Bayrampaşa/Istanbul

Electronics

Electronics (functional)

Quantity 500 Unit



Lira 250

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)



List View



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Try to search the material name, zip code, city name, company name...



Grid view

List view

Map view

Material Category

- Electronics
- Business Furniture, Fixture and Equipment
- Filter Cake and Sludge
- Metals and Metal Sludge
- Paper and Cardboard
- Plastics
- Inorganic Chemicals
- Ash and Slag
- Oils and Waxes
- Organic Residual
- Textiles and Leather

Hazardous

- Yes
- No

Location

- Austin, TX
- Houston, TX
- Pasadena, TX
- Y State, Y State
- Zip code, Zip code
- TX, TX
- Levent, istanbul

Price

- Free
- \$0 - \$100

Material Category

Name

Address

Electronics/Electronics (functional)	Monitors	3	500
Business Furniture, Fixture and Equipment/Business Furniture	Office desks	4	100
Filter Cake and Sludge/Sludge	Bauxite residual (red mud)	5	1000000
Paper and Cardboard/	Waste paper	7	20000
Plastics/	PET water bottles	8	5000
Inorganic Chemicals/	Spent Caustic	9	500
Filter Cake and Sludge/Sludge	Deinking sludge	10	2000
Ash and Slag/Coal Ash	Fly Ash	12	1000
Organic Residual/	Food Scrap	14	1
Textiles and Leather/	Used bed sheets	15	4
Ash and Slag/Slag	Steel Slag	16	1000000
Business Furniture, Fixture and Equipment/Office Appliances	2012 MacBook Pro	17	1
Ash and Slag/Slag	Steel Slag	18	1000000
/	Suni Deri	19	100

TN

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Map View



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Try to search the material name, zip code, city name, company name...



Grid view

List view

Map view

Material Category

- Electronics
- Business Furniture, Fixture and Equipment
- Filter Cake and Sludge
- Metals and Metal Sludge
- Paper and Cardboard
- Plastics
- Inorganic Chemicals
- Ash and Slag
- Oils and Waxes
- Organic Residual
- Textiles and Leather

Hazardous

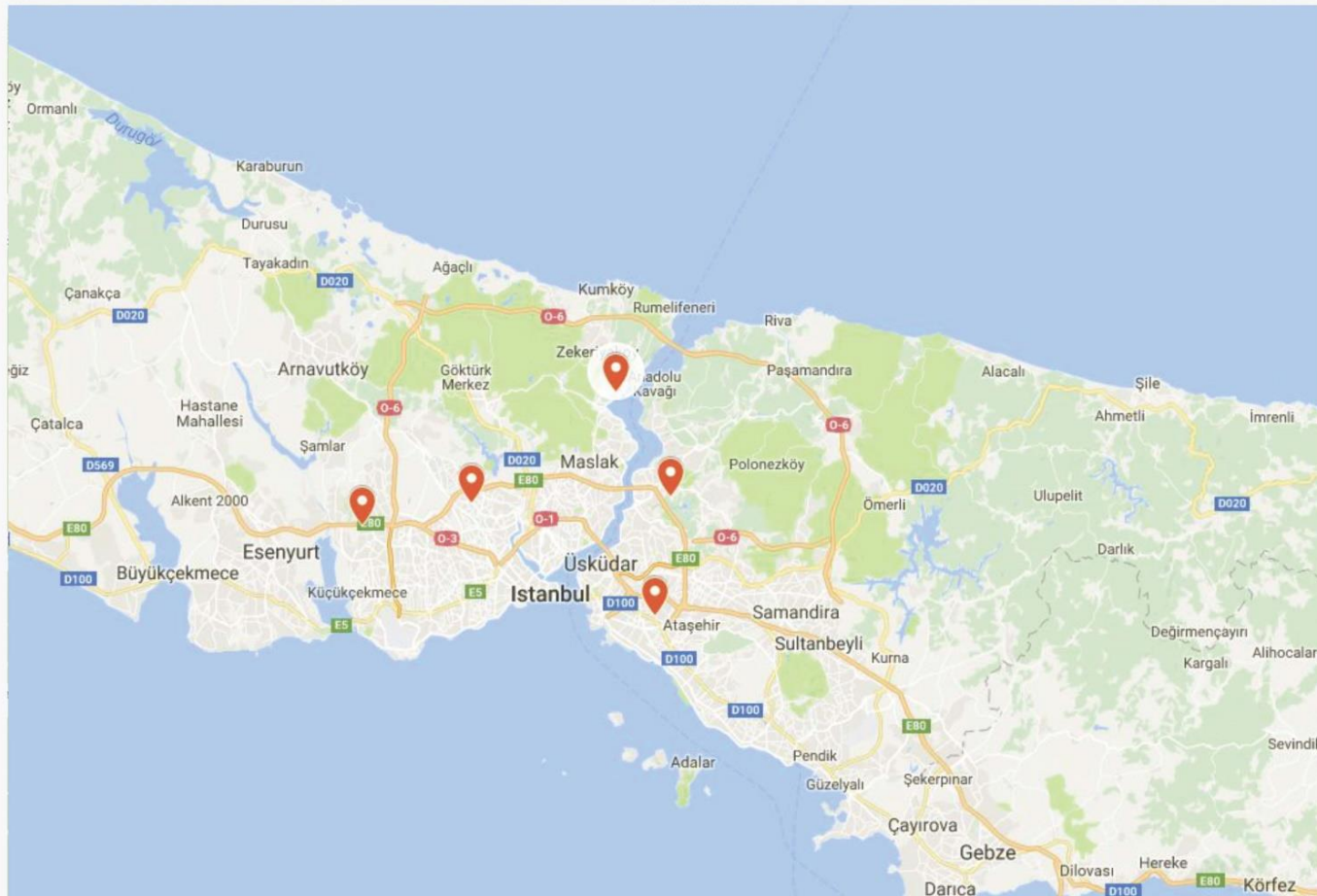
- Yes
- No

Location

- Austin, TX
- Houston, TX
- Pasadena, TX
- Y State, Y State
- Zip code, Zip code
- TX, TX
- Levent, İstanbul

Price

- Free
- \$0 - \$100
- over \$100



Wanted Materials

[Home](#)[Materials](#)[My Materials](#)[Add Material](#)[My Activities](#)[Users](#)[Settings](#)[Language](#)

Welcome, Rui

[Log out](#)[Grid view](#)[List view](#)[Map view](#)[Available Materials](#)[Wanted Materials](#)

Wanted

Aluminum Cans (wanted material)

Post-consumer aluminum cans that can be recycled to make new aluminum.

[Info](#)

Wanted

Waste paper (wanted material)

Post-consumer paper wastes that can be recycled to make new paper products

[Info](#)

Wanted

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

[Info](#)

Searching



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

sludge



Grid view

List view

Map view

Available Materials

Wanted Materials



Deinking sludge

Available
34040 Bayrampaşa/İstanbul

Filter Cake and Sludge

Sludge

Quantity 2000 ton (t)



Bauxite residual (red mud)

Available
34040 Bayrampaşa/İstanbul

Filter Cake and Sludge

Sludge

Quantity 1000000 ton (t)

Showing 1 - 3 of 3 items.

Previous 1 Next

Detailed View

[Home](#)[Materials](#)[My Materials](#)[Add Material](#)[My Activities](#)[Users](#)[Settings](#)[Language](#)

Welcome, Rui

[Log out](#)

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: 10-30%

Disposal Method

Disposed in red mud pond

Conditions Info

Attachments

[← Back](#)[Add to watchlist](#)[Contact](#)

Module 2: Uploading Materials

Basic Info



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Available material

Wanted material

Upload materials from file

Add available material

Basic Info

Specific

Attachments

Price

Audience

Name

This field is required.

Hazardous

Yes

No

Material Category

Description

Rich text editor toolbar with icons for bold, italic, underline, font color, background color, bulleted list, numbered list, indent, table, link, unlink, image, video, fullscreen, source code, and help.

This field is required.

Specific Info



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Add available material

Basic Info

Specific Info

Attachments

Price

Audience

Size Description

Components
Description

Disposal Method

Conditions Info

Previous

Next

Attachments



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Add available material

Basic Info

Specific Info

Attachments

Price

Audience

MSDS:

Drop MSDS file to upload or click here

Images:

Drop images to upload or click here

Files:

Drop files to upload or click here

Previous

Next

Price



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Add available material

Basic Info

Specific Info

Attachments

Price

Audience

Price

Currency

Previous

Next

Audience



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Add available material

Basic Info

Specific Info

Attachments

Price

Audience

Audience

- Public (viewable to everyone)
- MM users (only MM participants and project staff can view)
- Internal (only users within the company and project staff can view)

Previous

Save

Module 3: Transaction

Starting the Conversation



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Conversation

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

Material



Steel Slag

Price: \$14 / ton (t)

Qty: 1000000

User Roles



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Conversation

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



Home

Materials

My Materials

Add Material

My Activities

Users

Settings



Language

Welcome, Rui

Log out

Conversation

Conversation

+Invite



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!



Rui HE (buyer)
(you)



Campbell McNeill
(owner)

2016-11-25T03:48:01.000Z

Campbell McNeill



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.

Enter message text

Send

Material



Steel Slag

Price: \$14 / ton (t)

Qty: 1000000

Transactions

Quantity

500000 / 1000000

Pending

Cancel the transaction

Activities

[Home](#)[Materials](#)[My Materials](#)[Add Material](#)[My Activities](#)[Users](#)[Settings](#)[Language](#)

Welcome, Rui

[Log out](#)[Ongoing Conversation](#)[Conversation Invites](#)[Recommendation](#)[Completed Transaction](#)[Cancelled Transaction](#)[Watch List](#)

ID	Last Update	Material	Participants	Role	Activity Type	Quantity	Action
2	Nov 18, 2016 8:17:37 AM	Steel Slag	Daniel Kietzer (Participant Role: buyer) Rui HE (Participant Role: owner)	owner	Conversation Invites	2	View
3	Nov 21, 2016 2:35:12 PM	Bauxite residual (red mud)	Rui HE (Participant Role: buyer) Campbell McNeill (Participant Role: owner)	buyer	Conversation Invites	500000	View
5	Nov 21, 2016 3:43:09 PM	Steel Slag	Rui HE (Participant Role: buyer) Campbell McNeill (Participant Role: owner)	buyer	Conversation Invites	500000	View

Showing 1 - 5 of 5 items.

[Previous](#) [1](#) [Next](#)

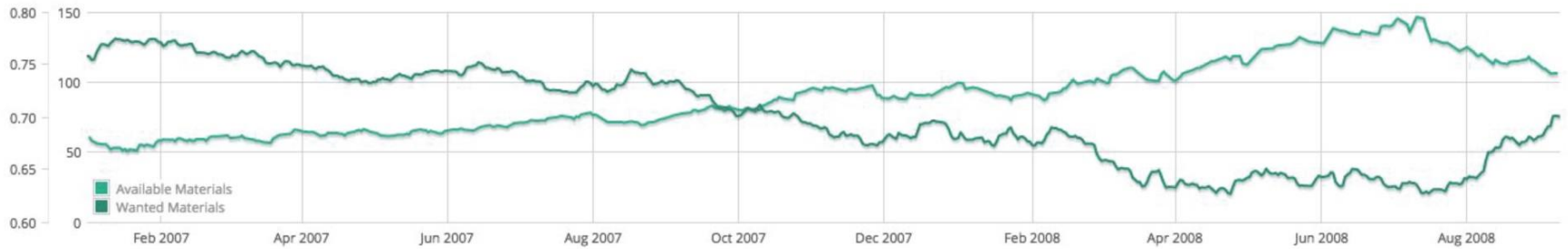
Module 4: Reporting

General reports



Materials

Material Overview



Material Status Report



Specific Report



Activities

Activity Report

Show 10 entries

Search: Copy CSV Excel PDF Print

Showing 1 to 8 of 8 entries

ID	Last Update	User Id	Activity Type	Quantity	Cancel Reason	Material
1	Nov 17, 2016 3:19:42 PM	10	Conversation Invites	30		2
2	Nov 18, 2016 8:17:37 AM	10	Conversation Invites	2		16
3	Nov 21, 2016 2:35:12 PM	43	Conversation Invites	500000		3
4	Nov 21, 2016 2:38:36 PM	7	Ongoing Conversation			3
5	Nov 21, 2016 3:43:09 PM	43	Completed Transaction	500000		14
6	Nov 29, 2016 1:05:26 AM	44	Ongoing Conversation			1
7	Nov 29, 2016 1:21:13 AM	44	Recommendation			2
8	Nov 29, 2016 3:01:17 PM	10	Recommendation			1

Previous 1 Next

Reporting to the State

Reporting to the State

- We do not own the data

Reporting to the State

- We do not own the data
- Proprietary information is kept private on marketplace server

Reporting to the State

- We do not own the data
- Proprietary information is kept private on marketplace server
- Aggregate data

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

Relevance to Supplier's Partnership

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey
 - 81 respondents across TN industries

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey
 - 81 respondents across TN industries
 - 8% are zero waste facilities

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey
 - 81 respondents across TN industries
 - 8% are zero waste facilities
 - 62% recycle in-state

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey
 - 81 respondents across TN industries
 - 8% are zero waste facilities
 - 62% recycle in-state
 - 51% produce special waste

Relevance to Supplier's Partnership

- 2017 Tennessee Industry Survey
 - 81 respondents across TN industries
 - 8% are zero waste facilities
 - 62% recycle in-state
 - 51% produce special waste
 - 44% want assistance with beneficial end-use

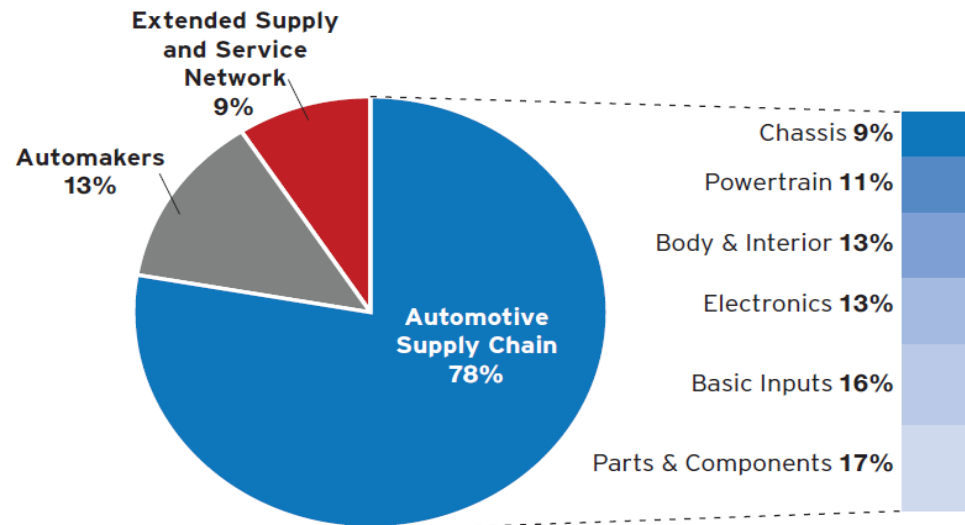
Relevance to Supplier's Partnership

- 2013: **THE BROOKINGS INSTITUTION** | DRIVE! MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

Relevance to Supplier's Partnership

- 2013: **THE BROOKINGS INSTITUTION** | DRIVE! MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

The automotive supply chain accounts for more than three-quarters of industry jobs in Tennessee, building all systems of the car

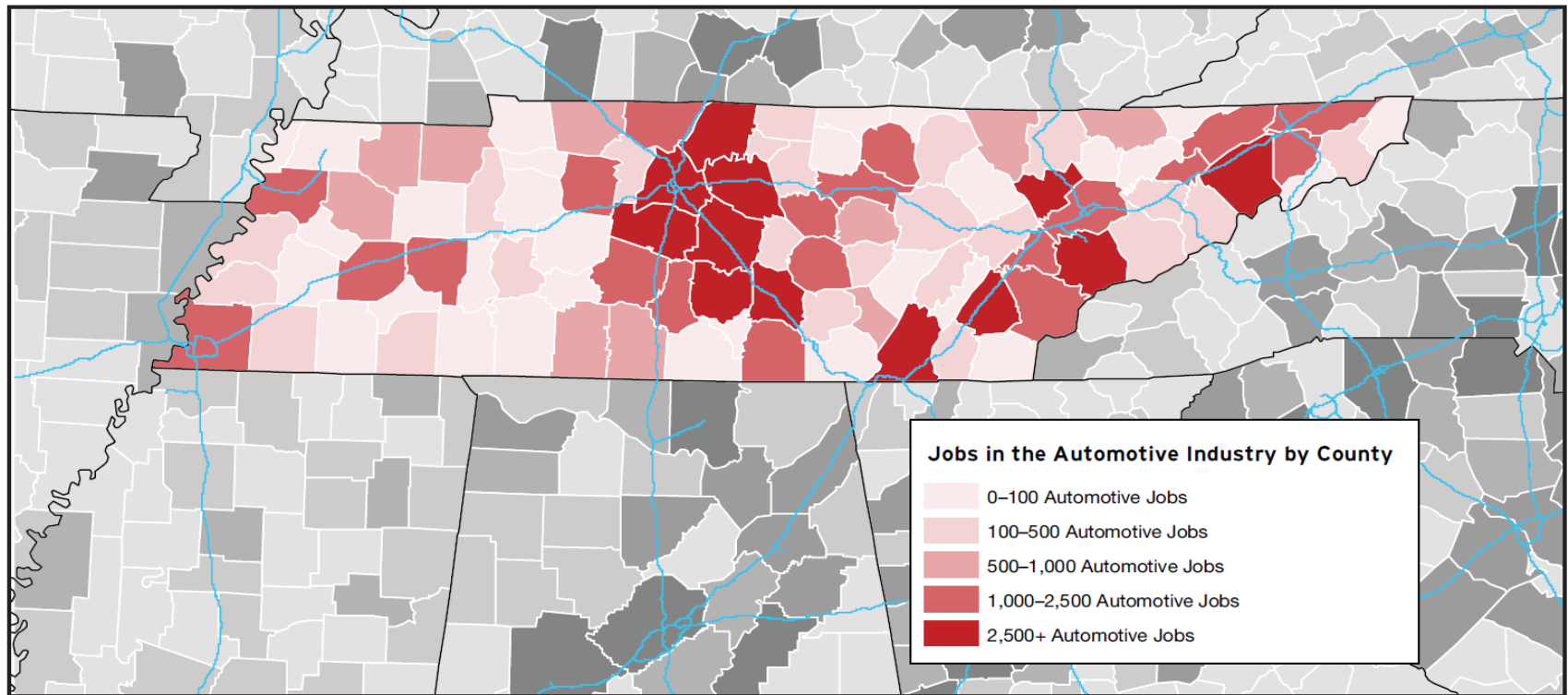


Source: Brookings analysis of data from Dun & Bradstreet, ELM Analytics, and MarkLines

Relevance to Supplier's Partnership

- 2013: **THE BROOKINGS INSTITUTION** | DRIVE! MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

The automotive industry touches every corner of the state



Source: Brookings analysis of data from Dun & Bradstreet, ELM Analytics, and MarkLines

Relevance to Supplier's Partnership

- 2013: **THE BROOKINGS INSTITUTION** | DRIVE! MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

“Taken together, these indicators confirm that Tennessee has emerged as one of the industry's most important supplier hubs not just in the region, but nationally and globally”

Thank you

- Questions?

Vaughn Cassidy
Office of Sustainable Practices
vaughn.cassidy@tn.gov
731-512-1343

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