BUSCH® SYSTEMS

Let's Recycle Better, Together.

How Data Analytics is Transforming Waste Collections & Recovery

In partnership with:

((SENSONEO))

May 26, 2021

1-800-565-9931 buschsystems.com 81 Rawson Avenue, Barrie, Ontario, Canada L4N 6E5

Today's Panelists

Alec Cooley

Senior Advisor

Busch Systems

Charleston, SC

Mike Baxter

Director of Strategy

Busch Systems

Barrie, ON

Shantanu Pai

Interim Zero Waste Manager

Univ. of IL at Urbana-Champaign

Champaign, IL

Ric Hobby

Senior Advisor

Sensoneo

Dallas-Ft. Worth, TX

Tony Genovese

Chief Technology Officer

Sensoneo

Boston, MA

Use Your Dashboard

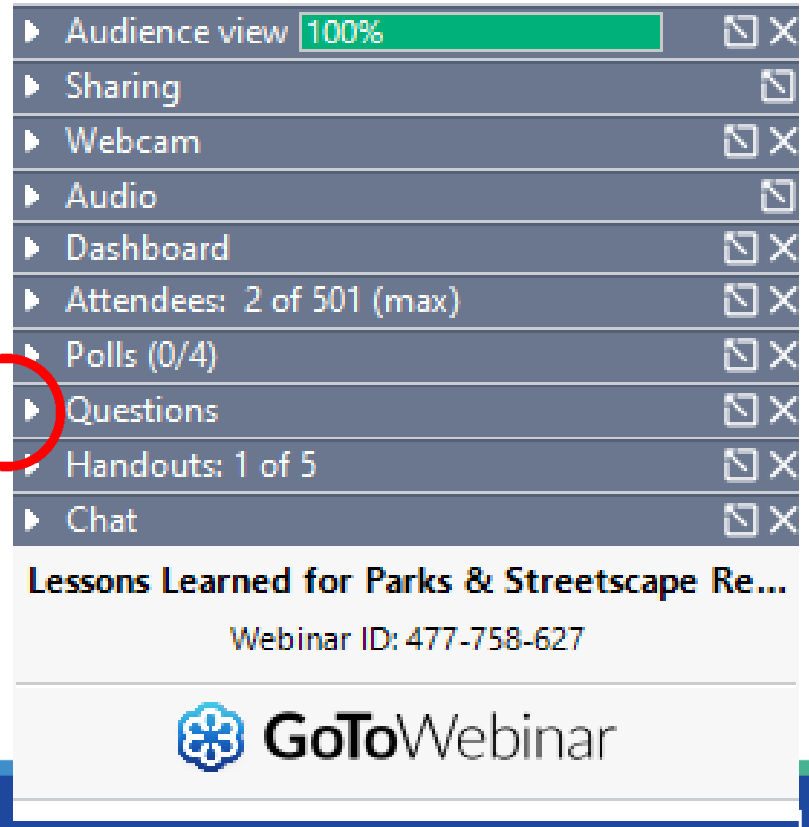
Step 1:

Expand dashboard

Step 2:

Click button to expand

Type direct questions for panelists

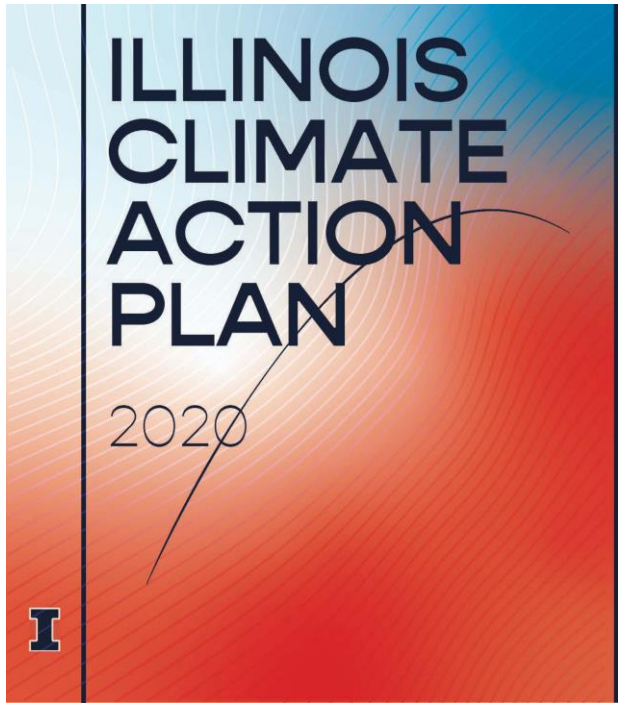


Data analytics in waste collection and recovery

May 26th

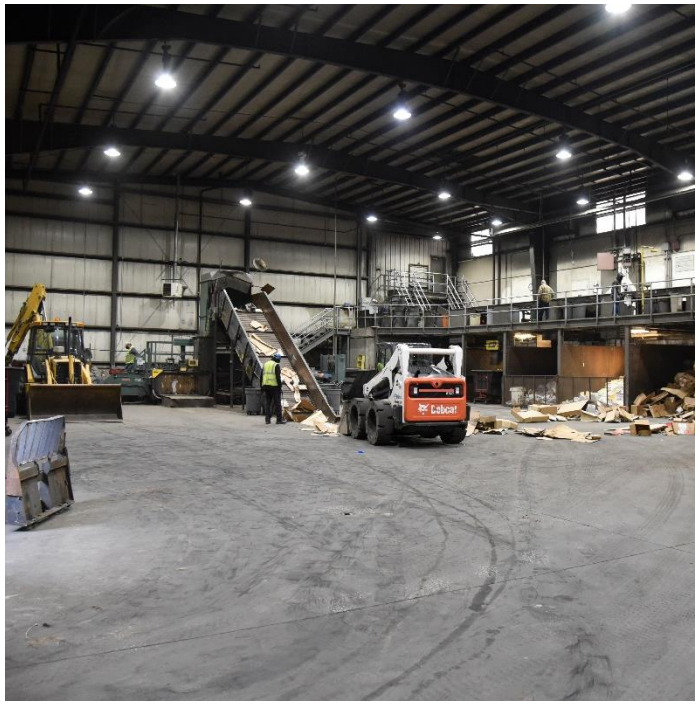
Shantanu Pai | Interim zero waste coordinator (also Assistant Sustainability Researcher at Illinois Sustainable Technology Center)
spai@illinois.edu

ILLINOIS FACILITIES & SERVICES



Reduce the total campus waste going to landfills from by at least 10% by FY24.

Develop a plan to sustainability dispose of all food scraps and other organics by FY24.



Built over 30 years ago as a dirty MRF/transfer station with 4 bunkers.

Over $2M in deferred maintenance.

Why I need data?

Reduce landfill generation

Increase program capacity

Increase engagement

Provide Internal reports

Reduce costs

Participate in the campus as a living laboratory movement

Why I need data?

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MY BOSS LOVES DATA

What data?

What data?


PROCUREMENT
IN-BUILDING COLLECTION
ROUTE COLLECTION
RECOVERY
HAULING

What data?


IN-BUILDING COLLECTION
ROUTE COLLECTION
PROCUREMENT
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What data?


IN-BUILDING COLLECTION
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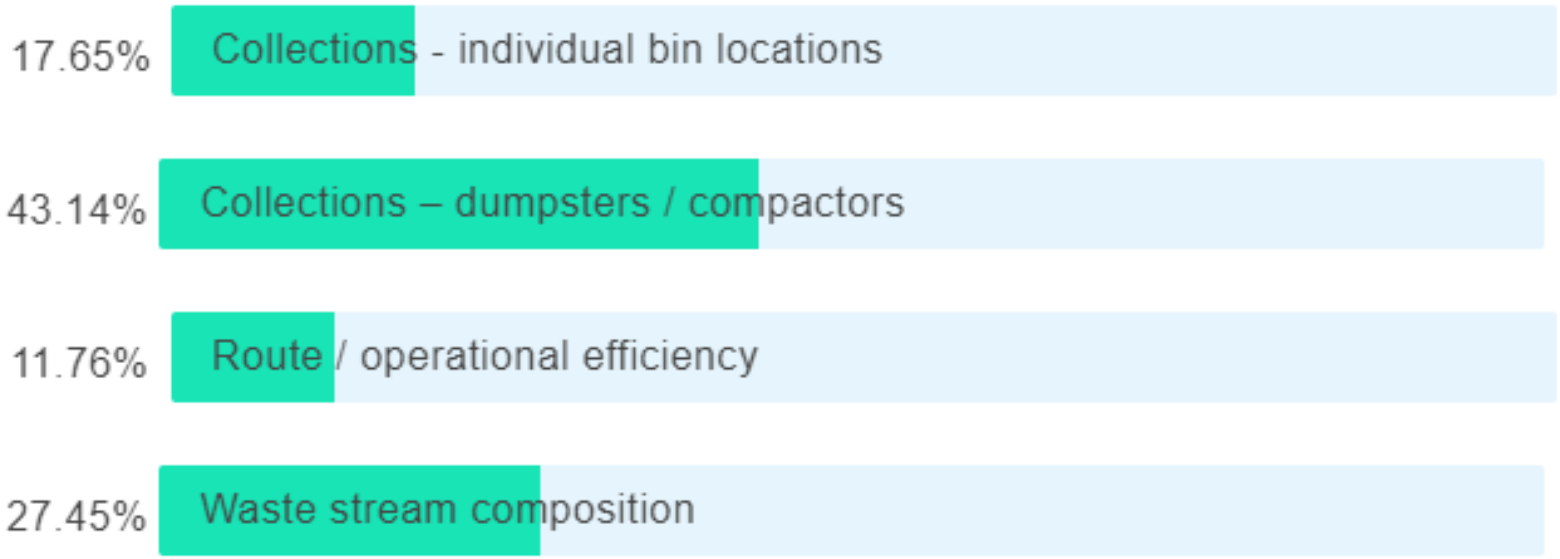
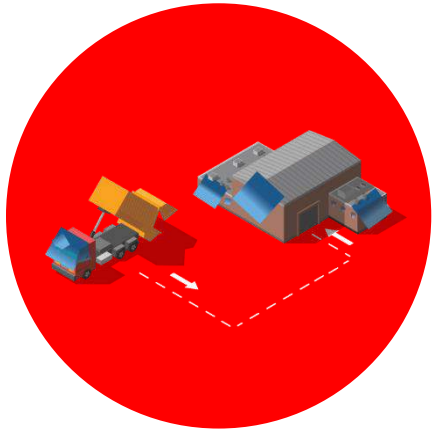
HAULING

Attendee Live Poll Results

Which areas do you currently get sufficient & reliable data to make informed decisions?





HAULING

RECOVERY

Ability to influence outcomes

PROCUREMENT

Ability to collect data

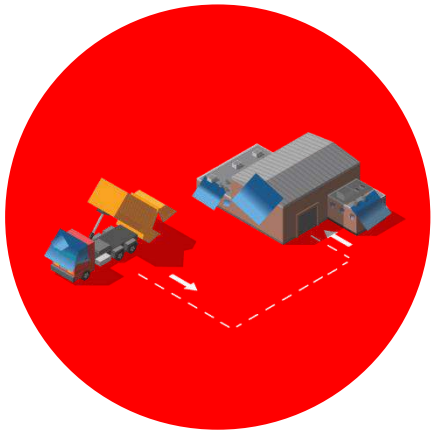
IN-BUILDING COLLECTION

ROUTE COLLECTION

ILLINOIS FACILITIES & SERVICES

IN-BUILDING COLLECTION

ROUTE COLLECTION

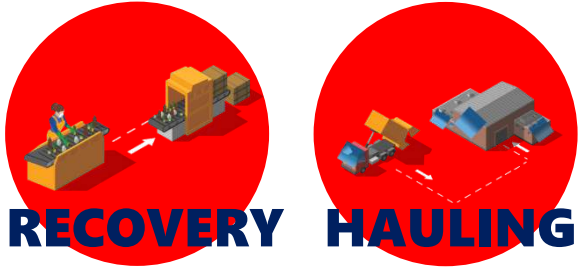


HAULING

RECOVERY

PROCUREMENT

Influence on iCAP goals



Data we already had

05/25/2021 — DOC/ARRA DISPOSAL WORK ORDER TICKET REPORT — Page 1 of 1
05/17/2021 thru 05/23/2021
Account(s): 42-0000334

42-0000335 Bill: UNIV OF ILLINOIS P1999132 — Service: U OF I TRANSFER ST - HAULING
PO BOX 820 — 10 ST MARYS RD
RANTOUL IL 61866 — CHAMPAIGN IL 61820

Svc Date	WO #	WO Status	Ticket	SaChg	Description	Mtrl	Landfill	Quantity TON
05/17/2021	4909971	Inv Pend	0494439	CL/GT	GEN REF/MSW TONS	GENTN	CLI	18.49 TN
05/17/2021	4909156	Inv Pend	0494479	CL/GT	GEN REF/MSW TONS	GENTN	CLI	17.31 TN
05/18/2021	4909835	Inv Pend	0494607	CL/GT	GEN REF/MSW TONS	GENTN	CLI	17.79 TN
05/19/2021	4910493	Inv Pend	0494756	CL/GT	GEN REF/MSW TONS	GENTN	CLI	17.19 TN
		Tickets:	4		Average per Ticket:	17.45 TN		70.73

Data we started collecting

FACILITIES & SERVICES
WASTE TRANSFER STATION
WEIGHT TICKET

DATE: 4/7/21 TIME: 330 AM/PM
EMPLOYEE ID: _____ VEH. ID: 33842-14
ROUTE/LOCATION: _____
MATERIAL: ☐ CARDBOARD ☐ MSW ☑ COMPACTED ☐ PAPER ☐ C&D ☐ SOIL MIX ☐ METAL ☐ TOTES — Wood Scrap
SCHEDULED/ON-CALL (CIRCLE ONE)
WORKORDER: 10858681
TIP LOCATION: ☐ FLOOR ☐ SOUTH BAY ☐ NORTH LINCOLN ☐ NORTH BAY ☑ WALL
WEIGHT IN: 17620 lb. OUT: 16840 lb.
Please complete a separate ticket for each tip. Submit complete forms w/ dispatcher daily.

Campus created a database

UNIVERSITY OF ILLINOIS SYSTEM
Altogether Extraordinary™

Weight Station Tickets Admin Edit Form

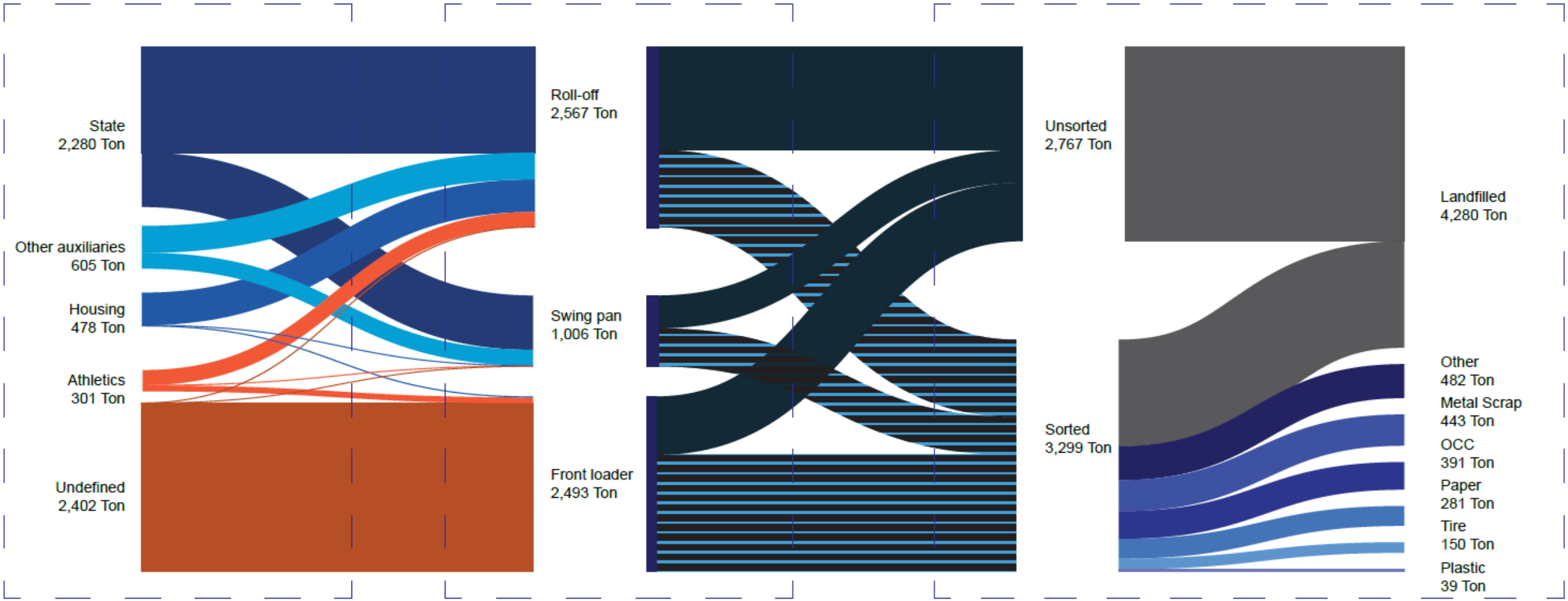
Waste Station Internal Ticket Admin Edit View - Front Loader

Export to Excel | Add | Edit | Delete | Refresh | Save Data Entry Records

Selected Filter: Default — Quick Search: All fields

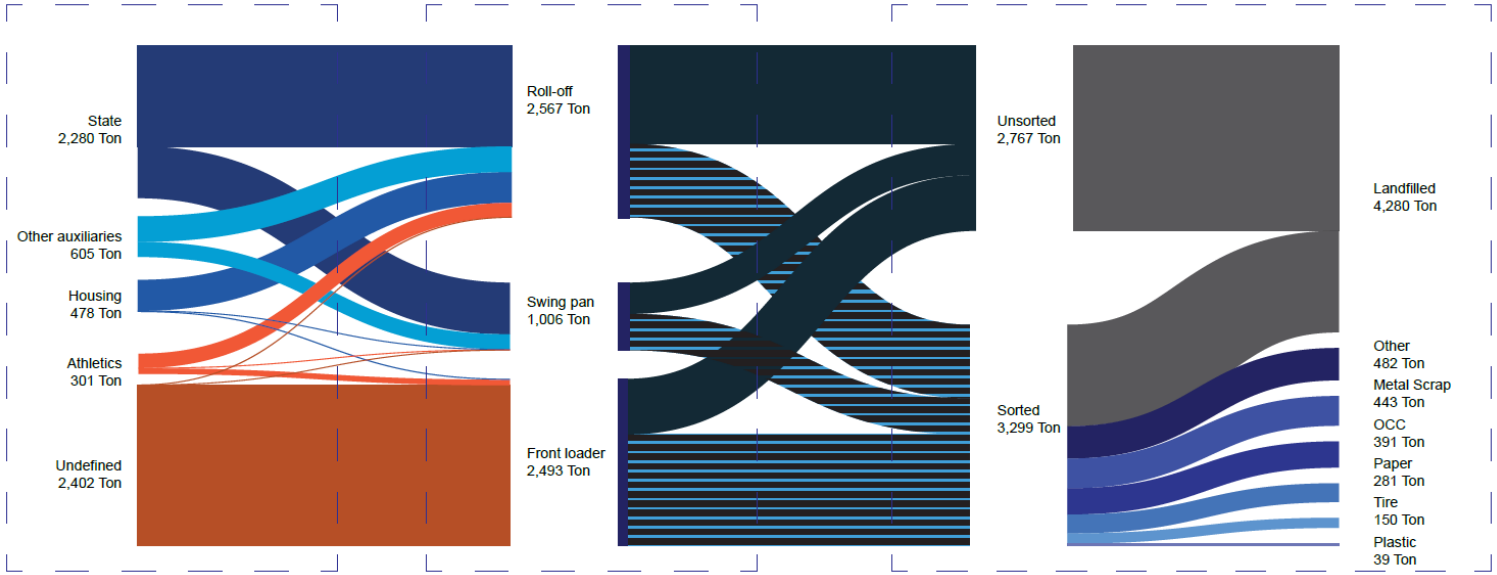
INT_ID	Record Date	Truck Type	Material	Other Material	Route	Other Route	Weight In (lbs)	Weight Out (lbs)	Net Weight (lbs)	Need Admin Review?	Review Notes
879.00	8/26/2020	Front Loader	Cardboard		1		38,640.00	36,600.00	2,040.00	N	
878.00	8/26/2020	Front Loader	MSW		2		40,700.00	36,600.00	4,100.00	N	
877.00	8/26/2020	Front Loader	MSW		1		43,060.00	36,600.00	6,460.00	N	
861.00	8/25/2020	Front Loader	MSW		2		46,340.00	36,400.00	9,940.00	N	
860.00	8/25/2020	Front Loader	MSW		1		41,600.00	36,460.00	5,140.00	N	

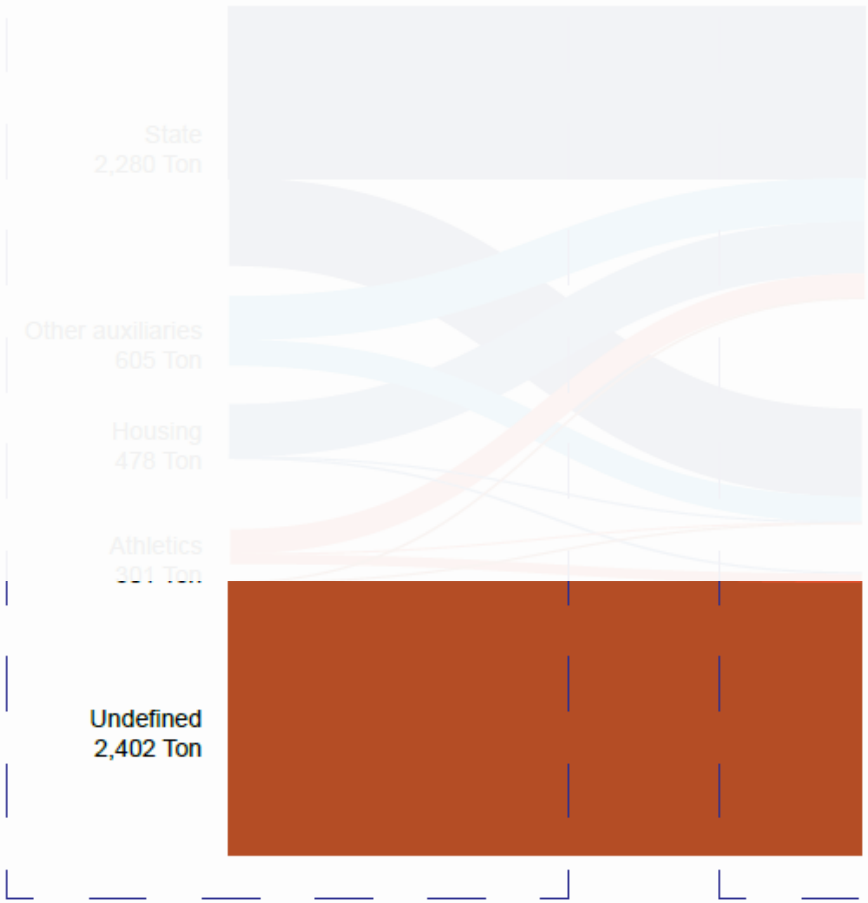
ILLINOIS FACILITIES & SERVICES


State
2,280 Ton
Other auxiliaries
605 Ton
Housing
478 Ton
Athletics
301 Ton
Undefined
2,402 Ton
Roll-off
2,567 Ton
Swing pan
1,006 Ton
Front loader
2,493 Ton
Unsorted
2,767 Ton
Sorted
3,299 Ton
Landfilled
4,280 Ton
Other
482 Ton
Metal Scrap
443 Ton
OCC
391 Ton
Paper
281 Ton
Tire
150 Ton
Plastic
39 Ton

Outcomes

- Reduced daily route stops by about ~20%
  - *Ability to do more with current capacity*
- Identified buildings with low recycling participation
  - *Ability to provide direct assistance*
- Container rightsizing
  - *Ability to add recycling containers in buildings with limited docks*
- “This data thing isn’t all that bad”
  - *Ability to collect more data*
- Re-arranged routes to increase recycling rates.

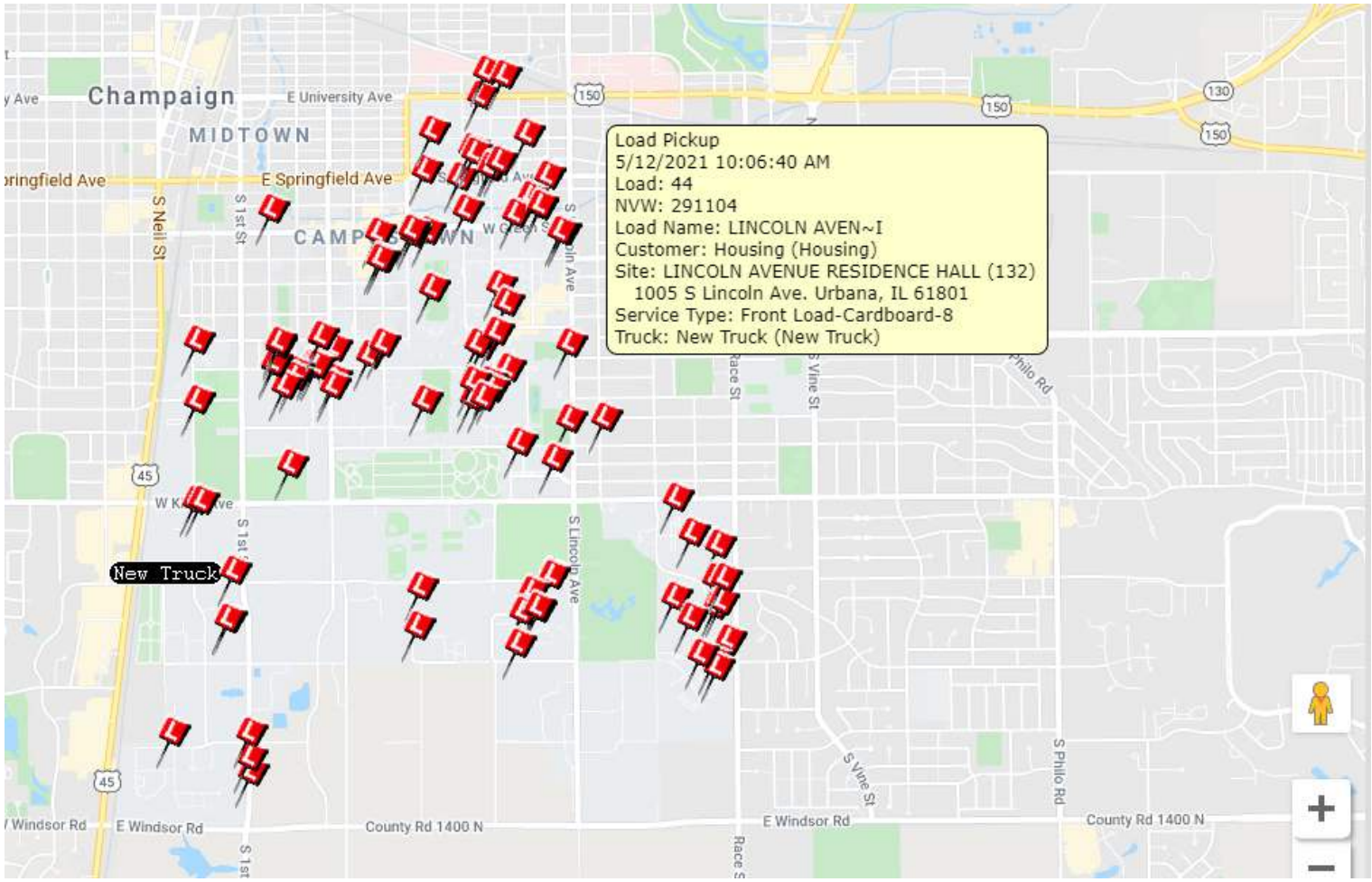




Our program was unable to track ~35% of campus volume from the front load trucks

ROUTE COLLECTION

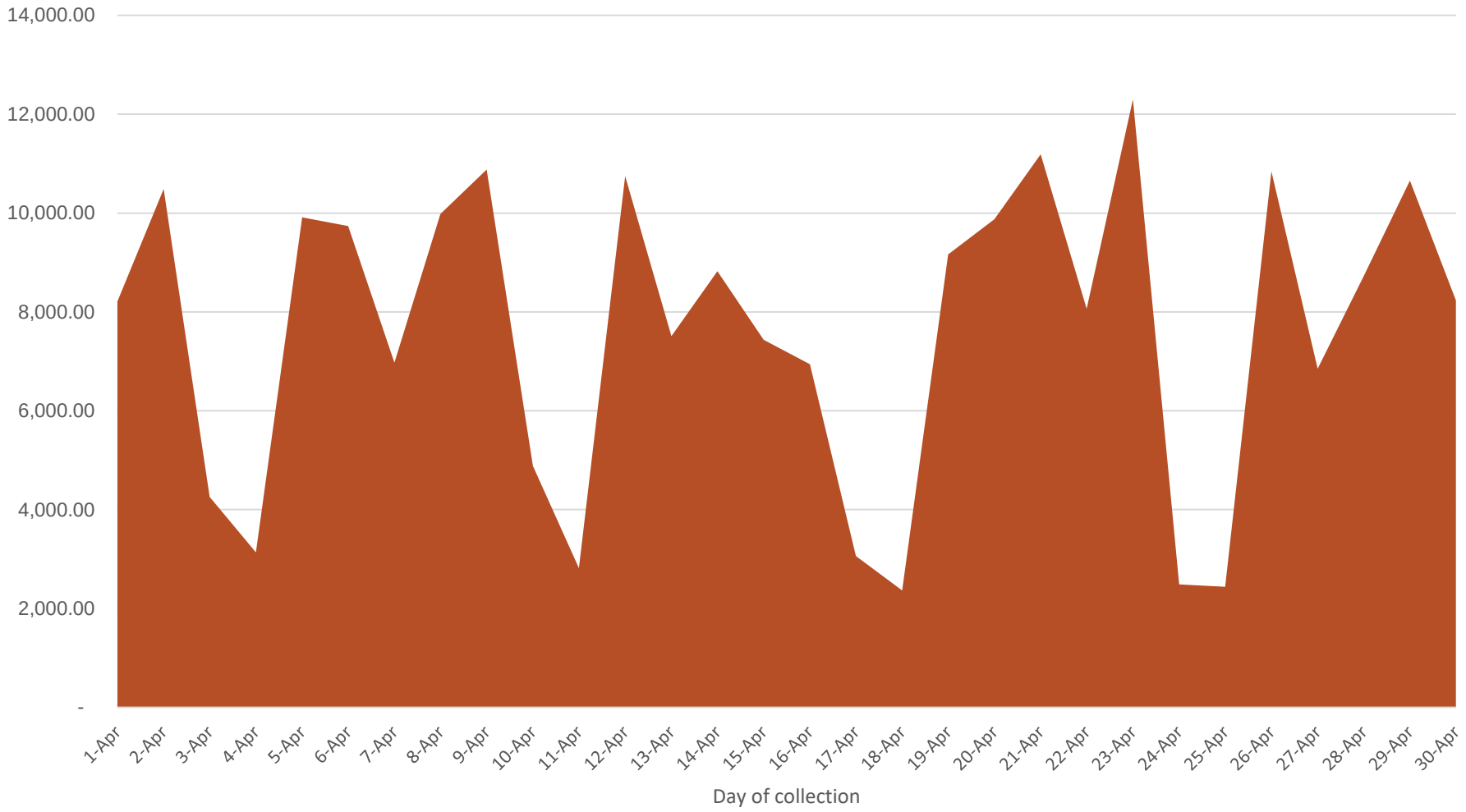
LOADMAN ONBOARD SCALES



ILLINOIS FACILITIES & SERVICES

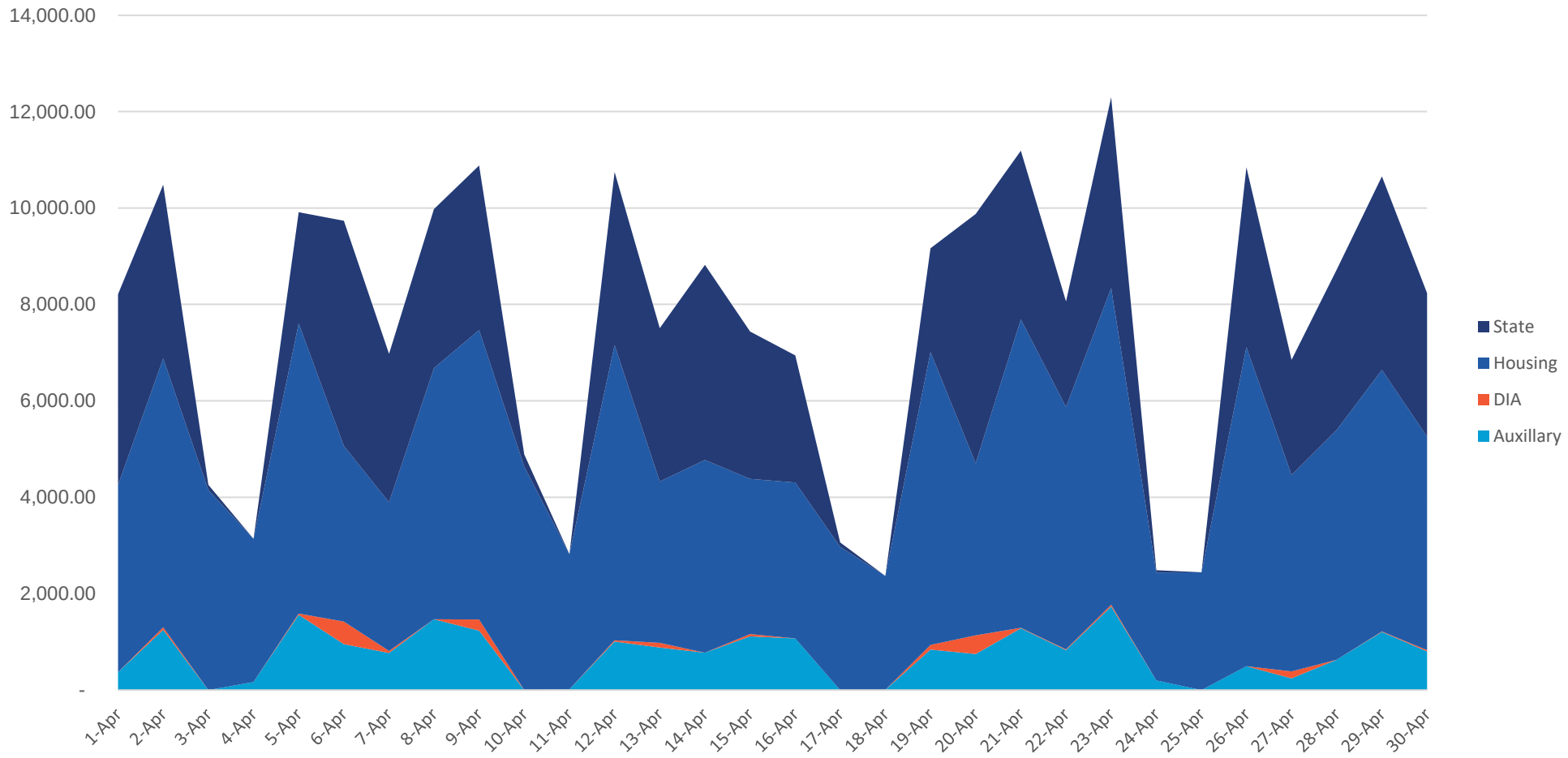
HAULING

Data on undefined portion pre-truck scales



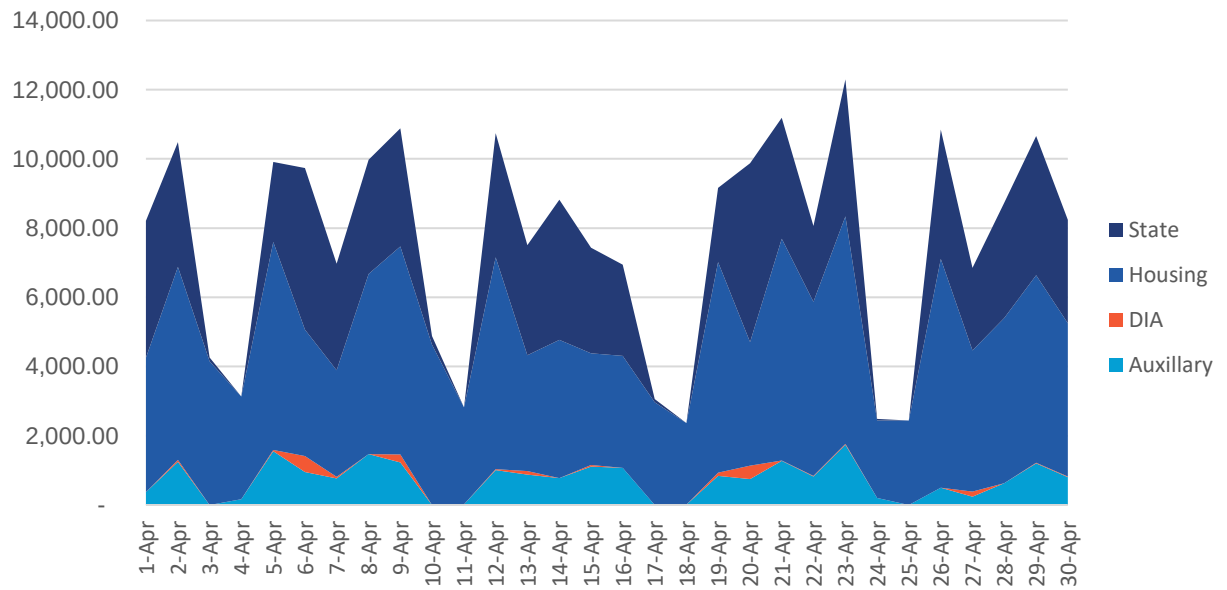
HAULING

Data post-truck scales



Outcomes

- To early to tell…
- Decreased route stops by over 50%
  - *Eliminated one entire truck*
  - *Added three new specialty collections (single use masks, expanded polystyrene, plastic bags)*



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Ability to influence outcomes

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IN-BUILDING COLLECTION

ROUTE COLLECTION

ILLINOIS FACILITIES & SERVICES

IN-BUILDING COLLECTION

Is anyone using this?

Is my engagement working?

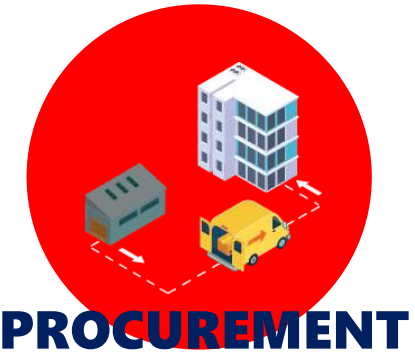
Are contamination rates a function of volume?

Are contamination rates a function of overflow?

Are contamination rates a function of education and outreach?

IN-BUILDING COLLECTION

Anticipated load to be over
30,000 students a day.
Only 14 collection stations.



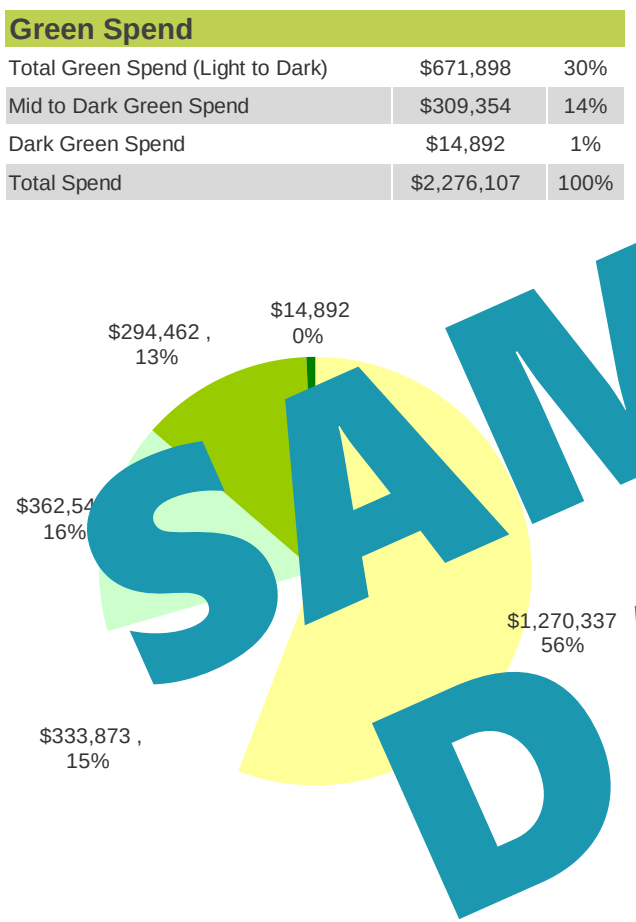
What is campus buying that could be recovered?

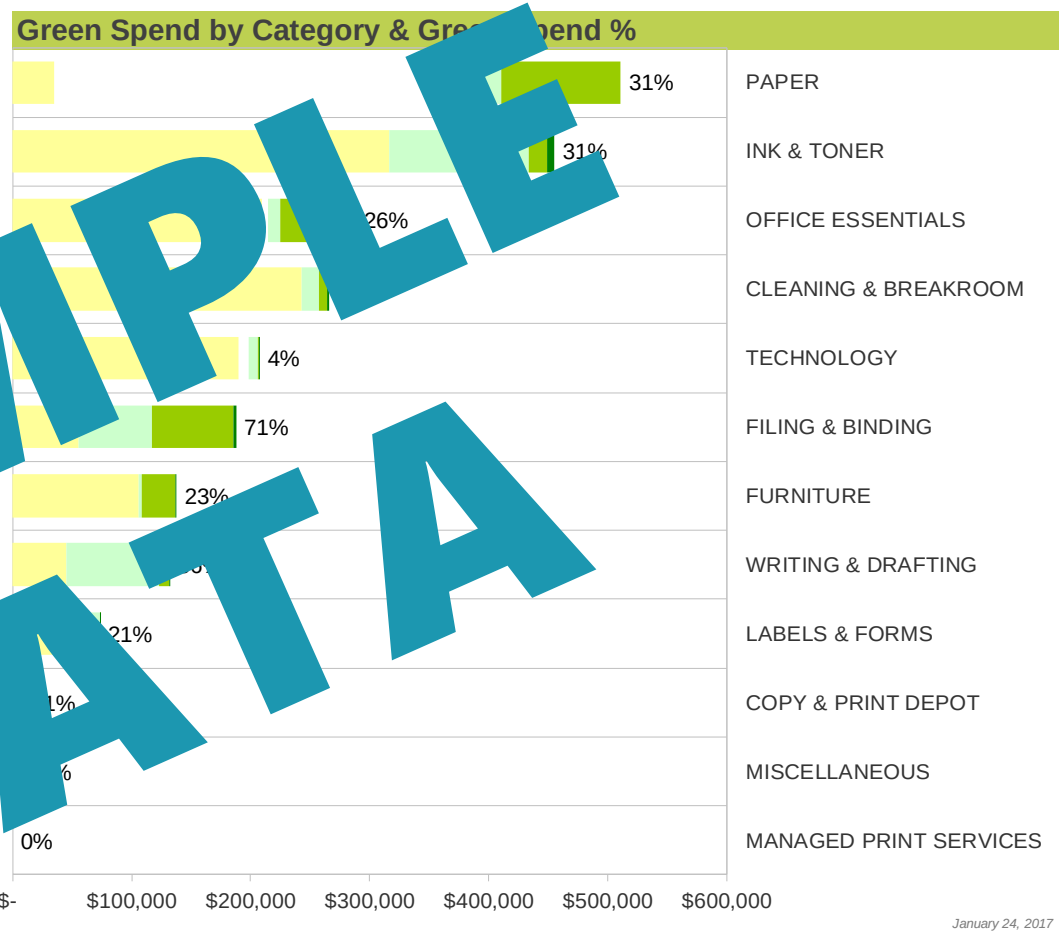
What are we buying that can be replaced with something that is reusable or recyclable?

Who is already buying the good stuff?

Lots more….

Green Spend		
Total Green Spend (Light to Dark)	$671,898	30%
Mid to Dark Green Spend	$309,354	14%
Dark Green Spend	$14,892	1%
Total Spend	$2,276,107	100%





January 24, 2017

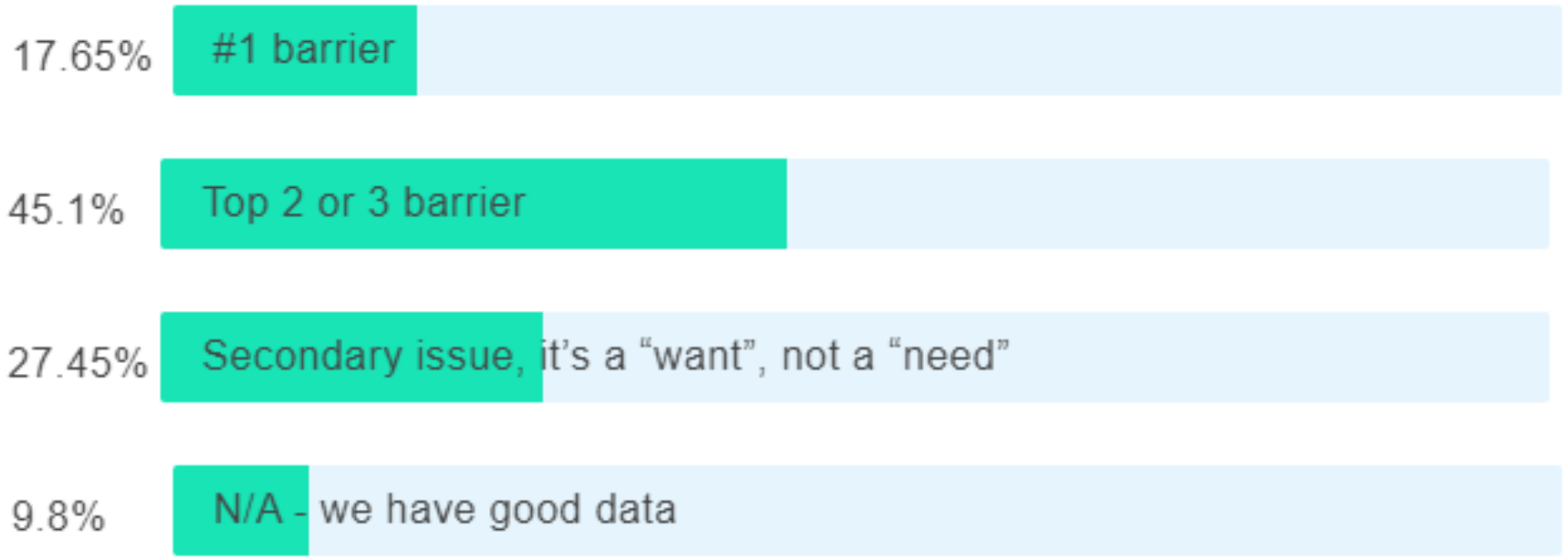
ILLINOIS FACILITIES & SERVICES

Thanks!

Shantanu Pai
spai@illinois.edu

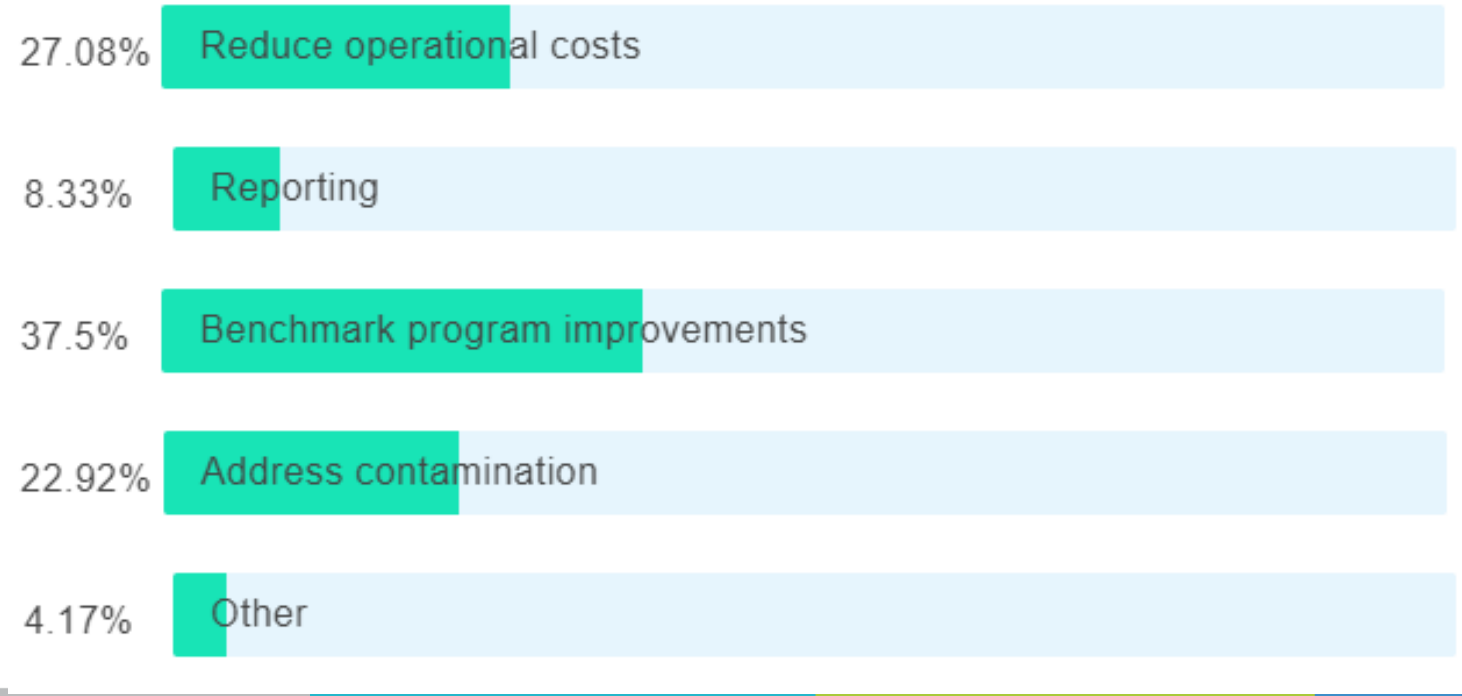
Attendee Live Poll Results

How significant would you rate lack of accurate data to reaching your objectives?



Attendee Live Poll Results

Where do you see the greatest potential gain from better collection data? *(choose 1)*




((SENSONEO))
87%
GLASS
55%
GLASS
15%
PAPER
96%
PAPER
34%
MIXED
18-May-2018 09:05
251
135
142
0.95
16
98.7%
5
36.2%

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Value Proposition

Quality

- Avoid overflows
- Track pick-up times

Efficiency

- Optimize pick-ups
- Stop paying to “haul air”

Safety

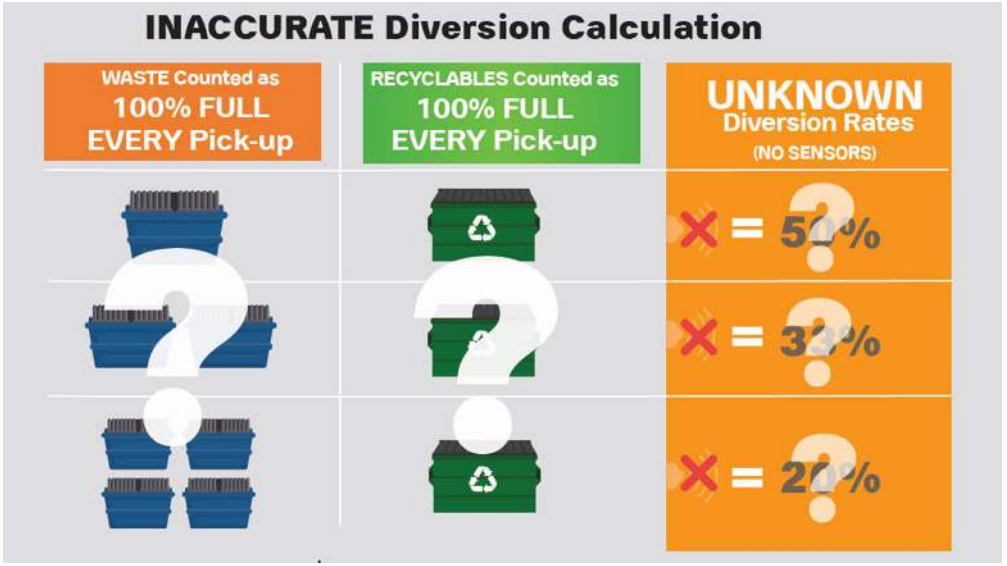
- Dumpster fire detection
- Reduce truck traffic

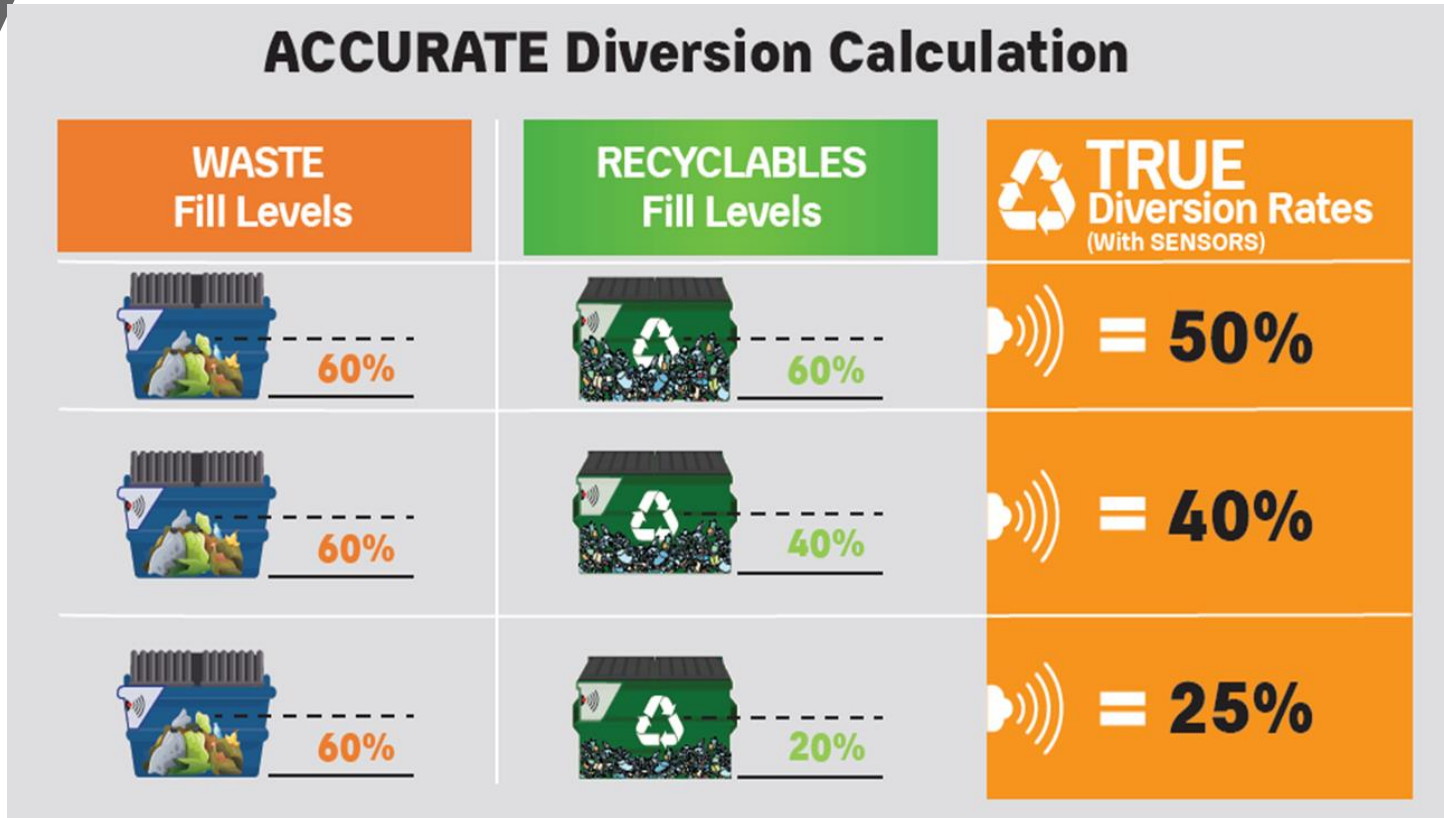
Sustainability

- Accurate sustainability data
- Reduce C02 emissions

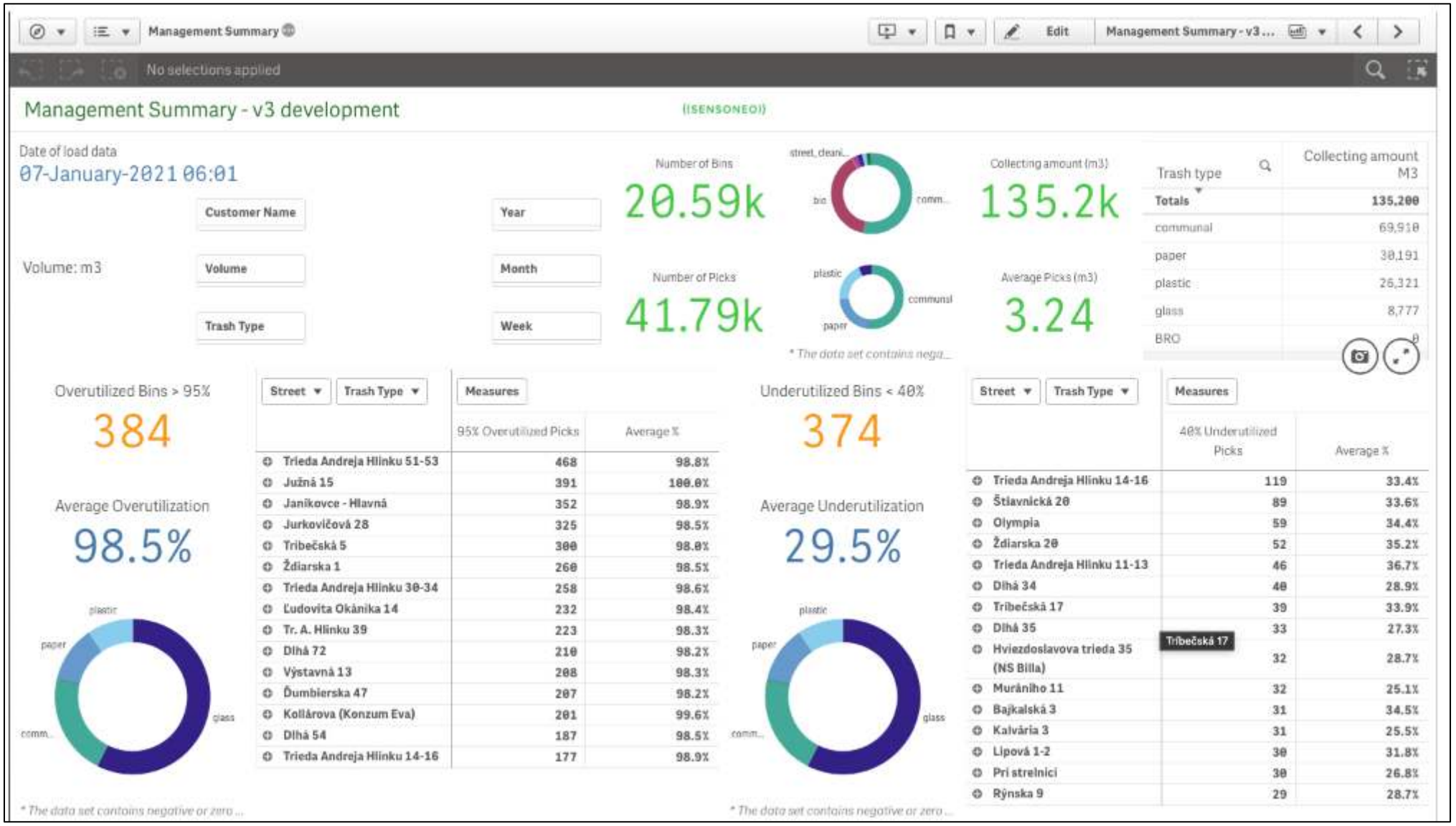
((S))

How to Calculate Diversion?





Data Analytics



Sensoneo Case Study:
University Pilot

The Goal

To right size waste collection on campus and increase efficiency.

The Scope

Performed an initial evaluation using 12 sensors on different sized outdoor waste and recycle bins.

Implementation

Analysis showed

- SAVINGS: ~$4,160 yearly savings opportunity on 12 pilot bins
- PICKUPS: >17 eliminated per month
- BINS: >30% bins required service adjustment
- SERVICE VALIDATION: 74% waste collected on scheduled day
- DIVERSION RATE: 20% increase by using actual data

Conclusion

- University collected valuable data for use in ongoing sustainability efforts.
- The university will see cost savings by adjusting service on just a few containers.
- Due to pilot, university is deploying sensors campus wide.

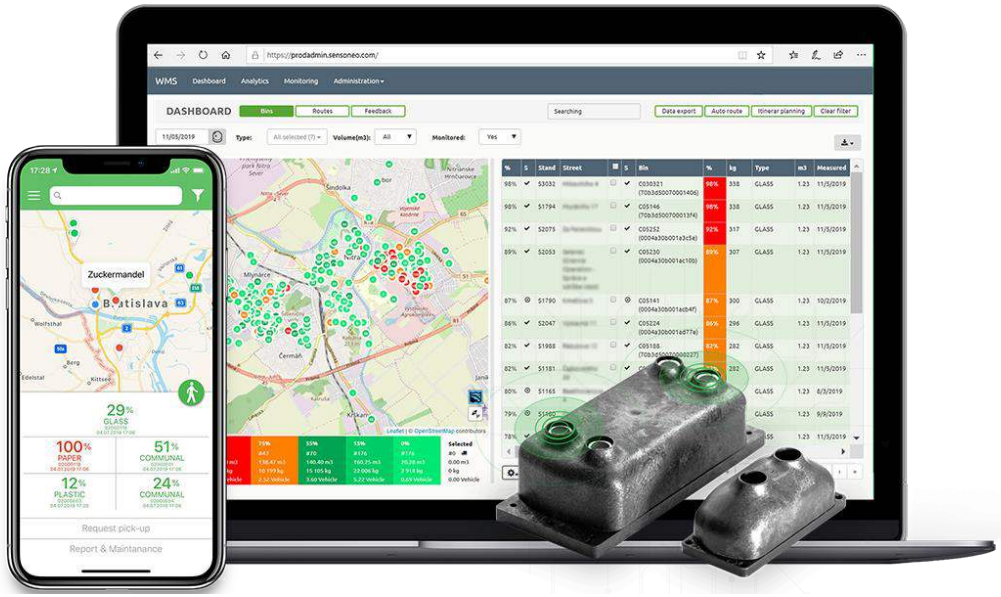
Thanks for listening to the presentation.

For questions, please contact:

Tony Genovese

agenovese@sensoneousa.com

(508) 284-4689



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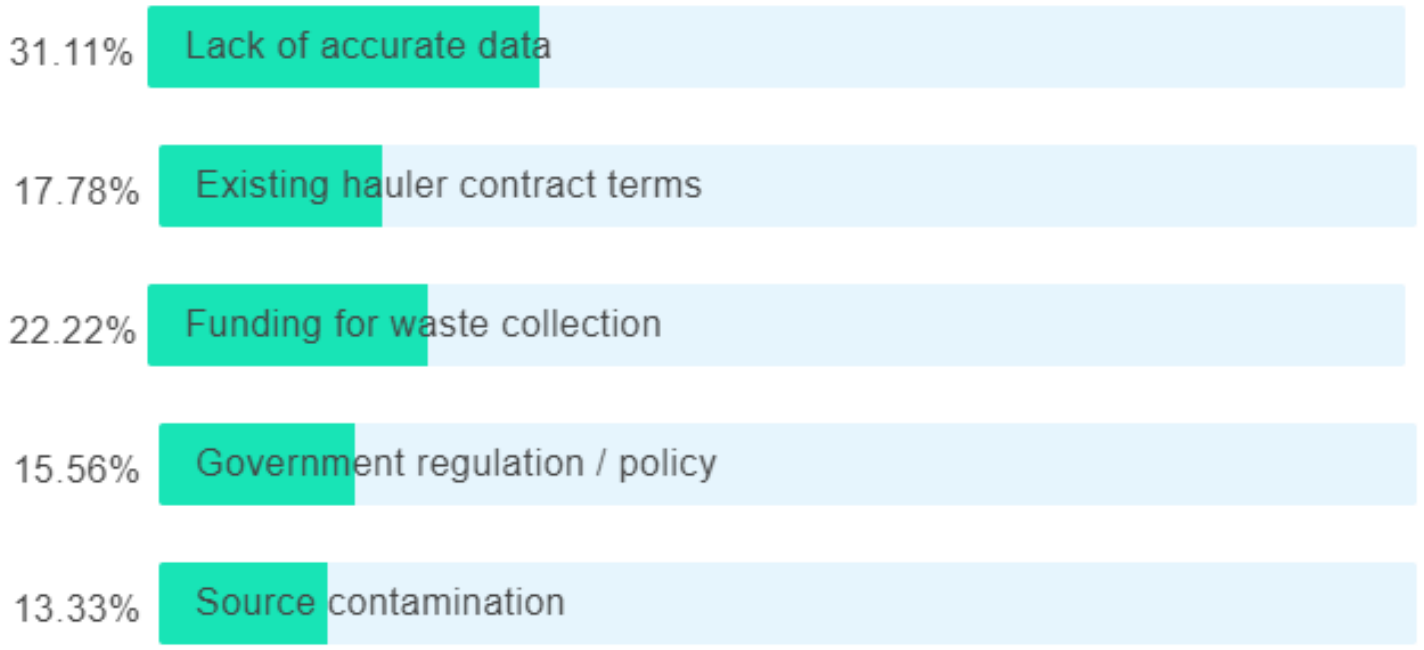
Manage waste smarter

www.Sensoneo.com

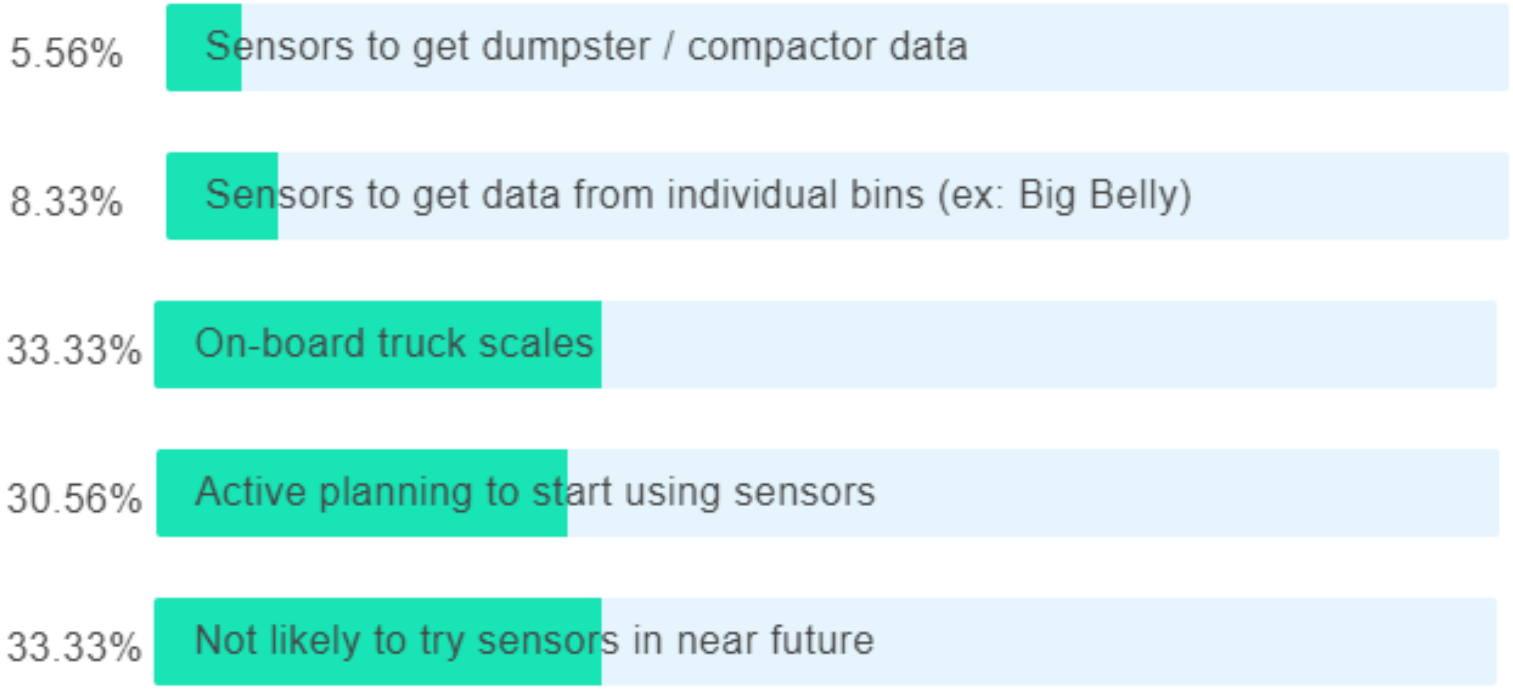
Attendee Live Poll Results

What's the biggest roadblock hindering advancements in waste collection efficiency?



Attendee Live Poll Results

What technology are you currently using to get waste data?



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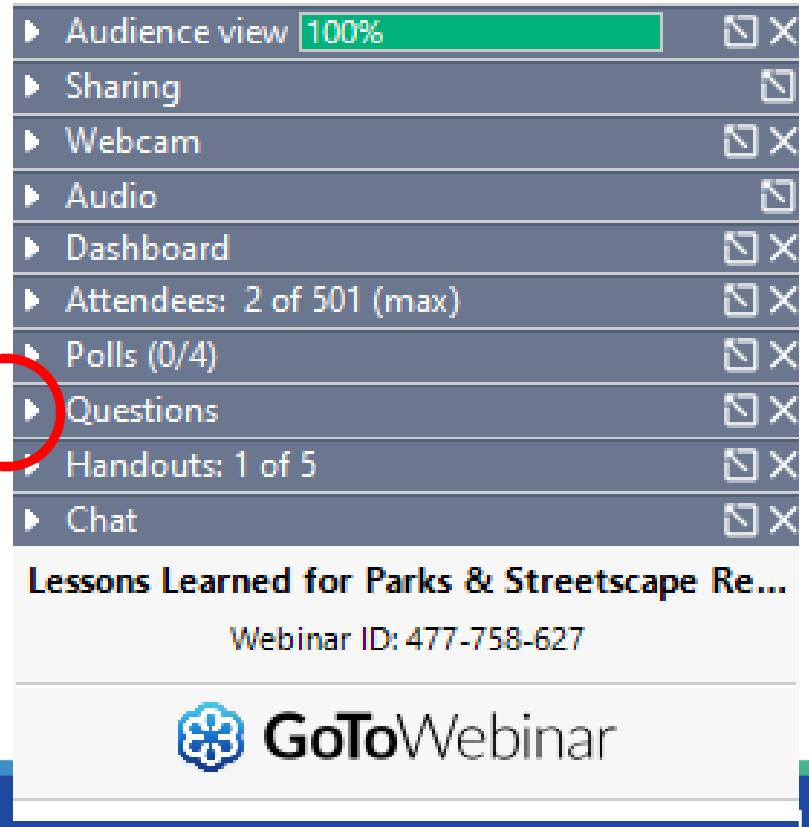

Thank You to Our Panelists

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Ric Hobby

Sensoneo

Tony Genovese

Sensoneo

Thank You to

((SENSONEO))

Busch Systems Resources

Advancing Recycling Blog Series

Other Topics:

- Creating Uniform Bin Standards
- Reducing Contamination in Parks
- How COVID is impacting Campus Recycling Programs
- Implementing Centralized office collections