

2024 Campus Race to Zero Waste Case Study Kent State University

Please respond to the following questions.

Contact info (name, department, school, email, phone)

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Focus of Case study:

Kent State University expands food waste diverted to anaerobic digestion facilities, reducing waste to landfills: 25 tons in 8 weeks; 137 tons in one year.

Detailed description of campaign or effort:

According to the E.P.A. food waste is the single most common material landfilled or incinerated in the U.S.. Anaerobic Digestion is one process listed on the E.P.A's Wasted Food Scale to avoid food waste from being landfilled or incinerated. In the 2024 Campus Race to Zero Waste Competition Period from January 28 through March 23, 2024 Kent State prevented 25.3 tons of food waste from being landfilled by using two Grind2Energy systems on campus to capture inedible food waste for diversion to an anaerobic digestion facility, avoiding the production of 2.34 MTCO2E (EPA WARM v 16) and winning the Food Organics Competition Category for Large Schools in the 2024 Campus Race to Zero Waste Competition. In one year from June 1, 2023, to June 1, 2024, the Grind2Energy system prevented 136.8 tons of food waste from being sent to the landfill, avoiding 12.67 MTCO2E. From August 2020 through May 2024 360.3 tons of food waste was prevented from landfilled, avoiding 33.36 MTCO2E.

The Grind2Energy program provides a unique solution for diverting food waste from the landfill. The system includes a food-waste grinder and a storage tank. The system's grinder is designed to process most food waste, including meat, bones, and oils, and accepts both pre-consumer (kitchen scraps) and postconsumer (food waste returned on plates) food waste. The ground food is combined with water to make a slurry, which is pumped into

the tank where it is stored without odors that could attract rodents and pests. When the tank is full, a third-party contractor pumps out the tank and transports the slurry to an off-site location for anaerobic digestion.

Diverting this food waste to anaerobic digestion has multiple benefits. It helps Kent State University advance its goal of achieving a 50% diversion rate. It saves landfill space at the Countywide Landfill, which receives Kent State's waste. It supports Ohio-based business Quasar Energy Group, produces electricity from renewable methane, and generates fertilizer to return nutrients to Ohio farm fields.

Planning steps & timeline to implement:

DESIGN INNOVATION HUB (DI HUB) GRIND2ENERGY SYSTEM

- 2018: 10 year facility Master Plan adopted by the Board of Trustees. The DI Hub is among the major milestones in phase one of the university's Gateway to a Distinctive Kent State, a \$1 billion facilities master plan. In addition, the DI Hub will include a new, large dining venue that will seat about 350 people and offer unique menu items.
- 2018-2019: Office of University Architect begins redesigning the Art Building into a 24/7 maker's space and with a new dining facility. Solutions are sought to make building more sustainable and fit with theme of an interdisciplinary solution-seeking space. University Dining Services collects, and shares data of food scraps collected at similar sized dining locations. Proposals and RFPs for food scrap solutions to fit within building space are conducted. Updated Office of University Architect building plans.
- 2019: Construction launch of Design Innovation Hub
- 2020: Grind2Energy system in the DI Hub begins collecting food scraps in late August. Collecting 18 tons of food in the first 6 months of use. DI Hub's a new, large dining venue seats about 350 people and offers unique menu items.
- 2020: Virtual Grand Opening of the DI Hub
- **2021- Present**: ongoing pre- and post-consumer food scrap collection.

EASTWAY DINING FACILITY GRIND2ENERGY SYSTEM

- November 2020: Kent State drafts application for Ohio EPA Recycle Ohio Grant under Education-Community and Litter.
- **February 2021:** Kent State applies for Ohio EPA Recycle Ohio Grant. Total Budget: \$117,985.00; \$94,388.00 Project Grant Funds Requested; \$23,597.00 Match Funds Required for purchase and installation of Grind2Energy system at Eastway Dining Facility. Matching funds were provided by Dining Services. Eastway is the largest dining facility at Kent State serving about 6,500 patrons per day (preCOVID 19). This represents 56% of meals served in Kent Campus dining halls.
- May 2021: Kent State was awarded Ohio EPA Recycle Ohio Grant.
- **July 2021**: Grind2Energy System is ordered.
- **September/October 2021**: Installation of the Grind2Energy System at Eastway.
- October 2021: Eastway Grind2Energy System begins collecting pre- and post-consumer food scraps at Eastway Dining Facility.

- **February and March 2022**: Information about the Eastway Grind2Energy System was shared with the campus community as part of Kent State's participation in the Campus Race to Zero Waste competition (formerly RecycleMania).
- April 2022: Promotion of the Eastway Grind2Energy System was shared as part of 2022 Earth Month events and celebration.
- October 2021 Present: Awareness strategies including education about food waste and the Eastway
 Grind2Energy system. Information shared in the Eastway Dining facility on digital screens, on the Dining
 Services website, the Kent State Office of Sustainability Website, the Kent State Office of Sustainability
 Newsletter, and through press releases. Pre- and post-consumer food scrap collection continues.

Resources and stakeholders involved:

DESIGN INNOVATION HUB (DI HUB) GRIND2ENERGY SYSTEM STAFF

- Office of the University Architect Interim Executive Director and University Architect, Jay Graham
- Office of the University Architect, Project Manager II, Mike Wasowski
- Office of the University Architect, Engineering Assistant Director, Jerry Eveleth
- Office of the University Architect, Electrical Engineer II, Carmine Ricchetti
- Office of the University Architect, Physical Facilities Planner, Kerry Gernert
- Office of the University Architect Mechanical Engineer, Project Manager II, Keith Bush
- Design and Innovation Initiative Executive Director, J.R. Campbell
- Design Innovation Hub Special Assistant, Amy Nethken
- Sustainability Manager, Melanie Knowles
- Outreach Recycling Coordinator, Leah Graham
- University Dining Services, Student Services Assistant Vice President, Gary Goldberg
- University Dining Services, Aramark Sustainability Coordinator, Kristeena Blaser
- University Facilities Management Custodial Supervisor, Lisa Ferrell
- InSinkErator Grind2Energy Business Development Lead, Heather Dougherty
- Grounds Manager, Rebekkah Berryhill

Design Innovation Hub project budget covered the cost of the InSinkerator Grind2Energy System for food scraps.

EASTWAY DINING FACILITY GRIND2ENERGY SYSTEM STAFF

- Office of the University Architect, Project Manager II, Mike Wasowski
- Sustainability Manager, Melanie Knowles
- Business Development Lead Grind2Energy by InSinkErator, Heather Dougherty
- Sponsored Programs Administrator, Monica Morson
- Sponsored Programs Director, Lori Burchard
- University Housing and Culinary Services Sustainability and Purchasing Assistant Director, Casey Crane
- Ohio EPA Grants Administrator, Marie Barnett
- Assistant Vice President, Student Services, Gary Goldberg,
- Senior Director, Finance and Technology, Michael O'Karma
- Grounds Manager, Rebekkah Berryhill

Kent State University was awarded the Ohio EPA Recycle Ohio Grant, covering the purchase and installation of Grind2Energy system at Eastway Dining Facility.

- Total Requested Funds: \$117,985.00
 - \$94,388.00 Project Grant Funds Requested
 - \$23,597.00 Match Funds Required (provided by Culinary Services)

Describe the Results of this campaign component:

Kent State has lessened its ecological footprint by diverting food scraps from the landfill into the Grind2Energy system at the DI Hub and at Eastway Dining Facility for anaerobic digestion off-site. In the 2024 Campus Race to Zero Waste Competition Period from January 28 through March 23, 2024, Kent State prevented 25.3 tons of food waste from being landfilled by using two Grind2Energy systems on campus to divert inedible food waste for anaerobic digestion, avoiding the production of 2.34 MTCO2E (EPA WARM v 16). In one year from June 1, 2023, to June 1, 2024 the Grind2Energy system prevented 136.8 tons of food waste from being sent to the landfill, avoiding 12.67 MTCO2E. From August 2020 through May 2024 360.3 tons of food waste was prevented from being landfilled, avoiding 33.36 MTCO2E. Since both systems were installed, 360.3 tons of food scraps have been turned into forms of electricity, heat or compressed natural gas, and fertilizer.

Grind2Energy Total Waste Processed in Tons									
	2020	2021	2022	2023	2024				
	AugDec.	Jan Dec.	Jan Dec.	Jan Dec.	Jan May.	TOTALS			
DI Hub	12.8	24.8	44.9	51	20	153.5			
Eastway	N/A	13.9 (Oct-Dec)	76	91.5	25.4	206.8			
TOTALS	12.8	38.7	120.9	142.5	45.4	360.3			

Reducing and diverting food waste is important to students at Kent State. Indeed, food scraps and food waste are among the most common concerns brought forward by students to the Office of Sustainability. Fortunately, opportunities arose to continue to divert waste from the landfill and lessen our ecological footprint through Kent State's Grind2Energy Systems at DI Hub and Eastway Dining Facilities. DI Hub dining venue seats about 350 people. Eastway is the largest dining facility at Kent State serving about 6,500 patrons per day (preCOVID 19). This represents 56% of meals served in Kent Campus dining halls. At both DI Hub and Eastway dining facilities, food scraps are diverted from the landfill and used to create electrical energy, compressed natural gas or heat, and fertilizer.

In 2024, Kent State University won first place in the Food Organics Category for Large Schools in the Campus Race to Zero Waste Competition. The total food organics collected during 2024 CR2ZW, included 25.3 tons (50,600 pounds) of pre- and postconsumer food scraps at the DI Hub and Eastway, were captured with Grind2Energy

systems and diverted for anaerobic digestion off-site, turning food scraps into energy; 3.8 tons (7,728 pounds) of recycled cooking oil by Culinary Services; and 501 pounds of campus generated food was donated to people by Flashes Fighting Hunger; and Culinary Services' sustainable practices contributed to Kent State's first place standing.

DI Hub's Grind2Energy successful operation was explained by Melanie Knowles, Sustainability Manager, at the AASHE 2020 Conference through a presentation entitled "Converting Food Scraps into Renewable Energy: Supporting a Circular Economy," as well as to Kent State's Vice President of the Division of Finance and Administration. Heather Dougherty and Amanda Woodyard presented at "Garden to Energy: Kent Sustainable Food Systems" on the April 6, 2021 Earth Month event.

Kent State University's DI Hub Grind2Energy system attracted the attention of local newspapers including Public Radio News for Northeast Ohio WKSU February 20, 2020 "Kent State's Food Waste is Quasar's Specialty," and February 15, 2020 "Kent State to Keep Food Scraps Out of Landfills." Kent State Dining Services News published online on February 21, 2021 "Grind2Energy Food Waste Recycling System at the DI Hub". A total of 14 news articles have included Kent State's Grind2Energy system.

What would you do differently in the future?

We are looking at ways to divert more food waste to the Grind2Energy system by possibly transporting food waste from smaller nearby venues on campus.

What advice would you give to another college that wanted to do a similar effort?

DESIGN INNOVATION HUB (DI HUB) GRIND2ENERGY SYSTEM

Consider the way pre-consumer and post-consumer food waste is handled to design a system where the diversion of food waste to the Grind2Energy system is automatic. At the DI Hub, pre-consumer food waste is collected at each food prep station and goes into the system as part of clean up at the end of each shift. Post-consumer food waste comes back to the dish room on a conveyer along with reusable plates and cutlery and is scraped into bins for transportation to the Grind2Energy system.

EASTWAY DINING FACILITY GRIND2ENERGY SYSTEM

Consider a way to import food scraps from nearby buildings or events into the system. We frequently get asked if the system will expand or be able to take food scraps from Residence Halls, events, or nearby buildings and even the community.

Photos and Graphics



Casey Crane, University Housing and Culinary Services Sustainability and Purchasing Assistant Director, describes how Grind2Energy works on a tour at the facility. A Culinary Services Banner is displayed at the DI Hub cafeteria where students return their plates and cutlery after eating. Photo by Leah Graham.



Casey Crane, University Housing and Culinary Services Sustainability and Purchasing Assistant Director, describes how Grind2Energy works on a tour at the facility. Photo by Leah Graham.



The system's grinder is designed to process most food waste, including meat, bones, and oils, and accepts both pre-consumer (kitchen scraps) and postconsumer (food waste returned on plates) food waste. Photo by Leah Graham.



The system's grinder is designed to process most food waste, including meat, bones, and oils, and accepts both pre-consumer (kitchen scraps) and postconsumer (food waste returned on plates) food waste. Photo by Leah Graham.



The system's grinder is designed to process most food waste, including meat, bones, and oils, and accepts both pre-consumer (kitchen scraps) and postconsumer (food waste returned on plates) food waste. Photo by Leah Graham.



Grind2Energy system at DI Hub. Photo by Leah Graham.



Casey Crane, University Housing and Culinary Services Sustainability and Purchasing Assistant Director, describes how Grind2Energy works on a tour at the facility. Photo by Leah Graham.



A group takes a tour of the DI Hub Grind2Energy system. Photo by Leah Graham.



DI Hub's storage tank. The ground food is combined with water to make a slurry, which is pumped into the tank where it is stored without odors that could attract rodents and pests. When the tank is full, a third-party contractor pumps out the tank and transports the slurry to an off-site location for anaerobic digestion. Photo by Leah Graham.



Grind2Energy graphic by Kent State Culinary Services on websites, news articles, and in the cafeteria.

https://www.kent.edu/dining/grind2energy-0

https://www.kent.edu/sustainability/food

Sustainability Report

PREPARED FOR: Kent State University - Kent PERIOD: 2024 (through May)

LOCATION(S):

KSU - Eastway Dining Hall (2021 - 2024) (17 Eastway Dr., Ken...) KSU - Eastway Dining Hall (2024 -) (17 Eastway Dr., Kent, O...) KSU - Design and Innovation Hub (400 Janik Dr., Kent, Ohio 4...)





Energy

Your slurry was used to generate 8,272 kWh of additional electrical power

CO2 Reduction

By diverting your waste from landfills, you reduced carbon emissions by 31 tCO2e





Bio-solids for Fertilizer

The remainder of the slurry after extracting the energy yielded 2.6 tons of fertilizer

- Technical References:
 Carbon emissions and heat generated from EPA Waste Reduction Model (WARM), assuming national average for landfill gas recovery, no curing of digestate after digestion and digestate land application
 Typical food waste mix adopted: Beef 9%, Poultry 11%, Grains 13%, Fruits and Vegetables 49%, Dairy Products 18%
 Miles from EPA's Greenhouse Gases Equivalencies Calculator
 Heat to electricity conversion efficiency adopted of 44%
 Average Household consumption from U.S. Energy Information Administration (EIA)
 Fertilizer based on 0.19gTS/gTSfw & 30%TS, Kim et al. 2016. Synergism of co-digestion of food wastes with municipal wastewater treatment biosolids. Waste Management.

62023 GrindZEnergy - The logo is a trademark and a service mark of inShikErstor LLC, GrindZEnergy may make improvements and/or changes in the specification at any time, in its sole discretion, without notice or obligation and further reserves the right to change or discontinue models.



Grind2Energy Sustainability Report for waste processed from January 2024- May 2024. Kent State University Screenshot

SOCIAL MEDIA

Office of Sustainability Instagram
Office of Sustainability Twitter
Office of Sustainability Facebook
Culinary Services Instagram
Culinary Services Twitter
Culinary Services Facebook

WEBSITE LINKS

Kent State University Sustainability: Food https://www.kent.edu/sustainability/food
Kent State University Culinary Services https://www.kent.edu/dining/sustainability
Kent State YouTube: Sustainability at Kent State: Grind2Energy https://www.youtube.com/watch?v=Ms3 eop9q-s

NEWS ARTICLES

February 15, 2020 Kent State to Keep Food Scraps Out of Landfills; Idea Stream Public Media https://www.ideastream.org/news/community/2020-02-15/kent-state-to-keep-food-scraps-out-of-landfill

February 19, 2021 Kent State Culinary Services Grind2Energy Food Waste Recycling at DI Hub; Kent State Today https://www.kent.edu/dining/news/grind2energy-food-waste-recycling-system-di-hub

February 22, 2020 Kent State's Food Waste is Quasar's Specialty; WKSU https://www.kent.edu/sustainability/news/kent-states-food-waste-quasars-specialty-wksu-february-22-2020

July 9, 2021 Kent State wins two awards in Campus Race to Zero Waste Contest; Kent State Today https://www.kent.edu/sustainability/news/kent-state-wins-two-awards-campus-race-zero-waste-contest-kent-state-today-july

July 13, 2021 Kent State wins awards in Campus Race to Zero Waste contest; Record Courier https://www.kent.edu/sustainability/news/kent-state-wins-awards-campus-race-zero-waste-contest-record-courier-july-13

July 13, 2021 Kent State wins awards in Campus Race to Zero Waste contest; Akron Beacon Journal https://www.kent.edu/sustainability/news/kent-state-wins-awards-campus-race-zero-waste-contest-akron-beacon-journal-july

September 21, 2021 2021 Campus Race to Zero Waste Caste Study Competition Winners Revealed; National Wildlife Federation Press Release; September 21, 2021 https://www.kent.edu/sustainability/news/2021-campus-race-zero-waste-caste-study-competition-winners-revealed-national

September 13, 2021 Kent State Wins First Place for Food Waste Reduction Study; Kent State Today https://www.kent.edu/today/news/kent-state-wins-first-place-food-waste-reduction-case-study

March 17, 2022 Why KSU's new Grind2Energy system is important for Cleveland businesses; The Land Cle; March

17, 2022 https://www.kent.edu/sustainability/news/why-ksus-new-grind2energy-system-important-cleveland-businesses-land-cle-march

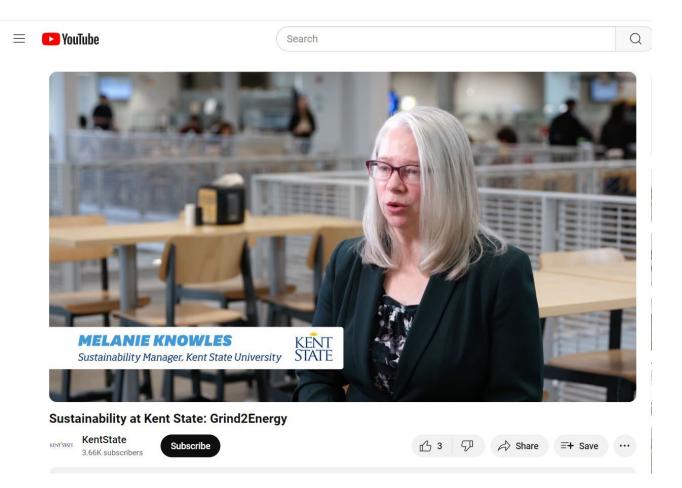
April 28, 2022 Campus Grind2Energy Systems are a Key Component in Kent State's Sustainability Future; Kent State Today https://www.kent.edu/sustainability/news/campus-grind2energy-systems-are-key-component-kent-states-sustainability-0

August 22, 2022 Kent State YouTube: Sustainability at Kent State: Grind2Energy https://www.youtube.com/watch?v=Ms3 eop9q-s

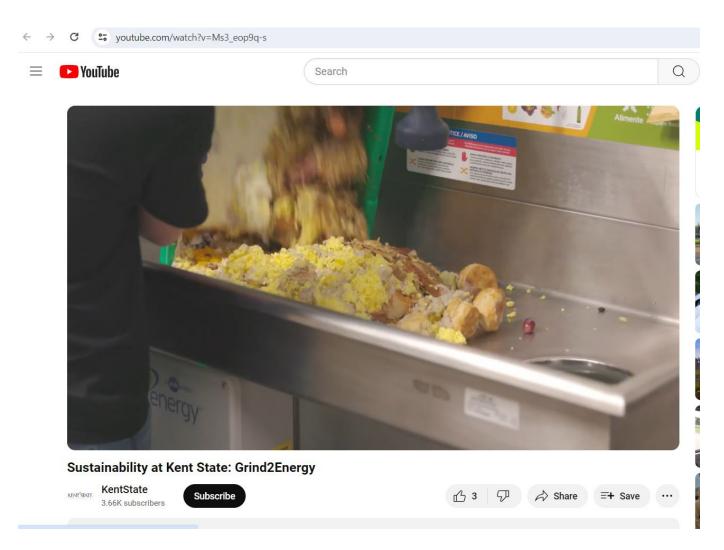
February 2023 Kent State HR Faculty/Staff News; Kent State Competes in Campus Race to Zero Waste for the 14th Year https://www.kent.edu/hr/faculty-staff-news/news/news/kent-state-competes-campus-race-zero-waste-14th-year

May 14, 2024 Campuses Divert 105 Million Single-Use Plastics from Landfill During 2024 Campus Race to Zero Waste Competition; National Wildlife Federation https://www.nwf.org/Home/Latest-News/Press-Releases/2024/5-14-24-Race-To-Zero-Waste-Winners-2024

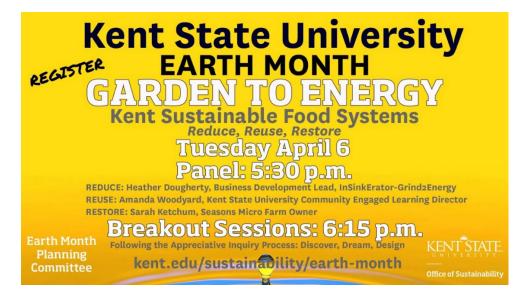
June 3, 2024 Kent State Places First in National Sustainability Competition; Kent State Today https://www.kent.edu/sustainability/news/kent-state-places-first-national-sustainability-competition-kent-state-today



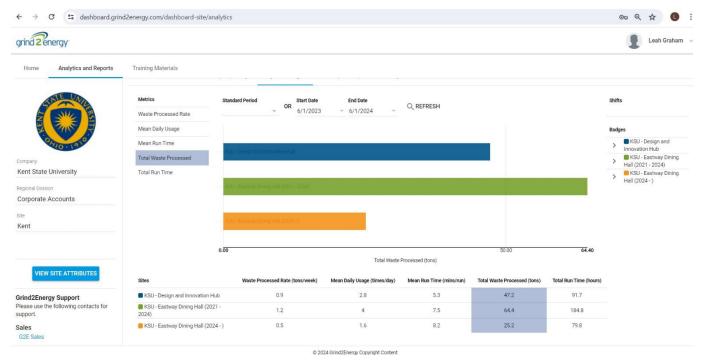
Screenshot by Leah Graham from Kent State YouTube August 22, 2022: Sustainability at Kent State: Grind2Energy https://www.youtube.com/watch?v=Ms3 eop9q-s



Screenshot by Leah Graham from Kent State YouTube August 22, 2022: Sustainability at Kent State: Grind2Energy https://www.youtube.com/watch?v=Ms3 eop9q-s



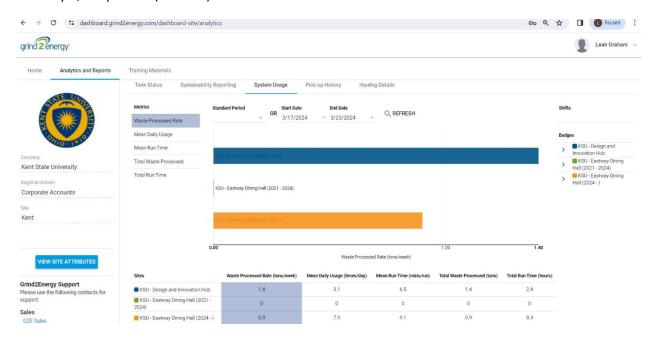
Kent State University Earth Month Graphic for "Garden to Energy: Kent Sustainable Food Systems" panel discussion.



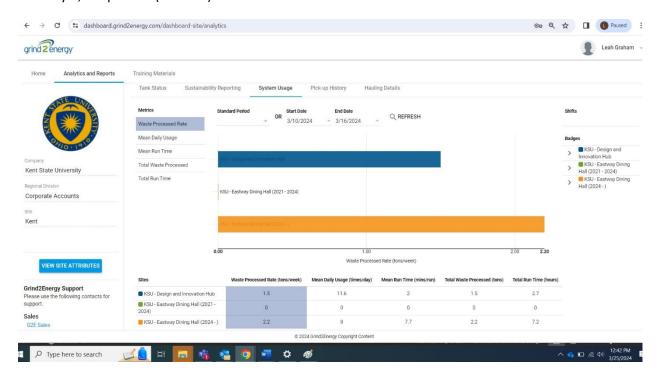
Grind2Energy Dashboard: total waste processed in one year from June 1, 2023 - June 1, 2024 for DI Hub and Eastway: DI Hub 47.2 tons total; Eastway 89.6 tons. Screenshot by Leah Graham.

G2E CR2ZW WEEK 8

Design Innovation 2,800 pounds (1.4 tons) Eastway 1,800 pounds (0.9 tons)

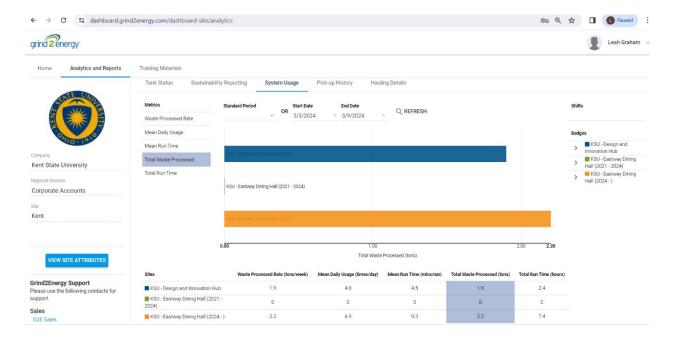


G2E CR2ZW WEEK 7 DI Hub 3,000 pounds (1.5 tons) Eastway 4,400 pounds (2.2 tons)

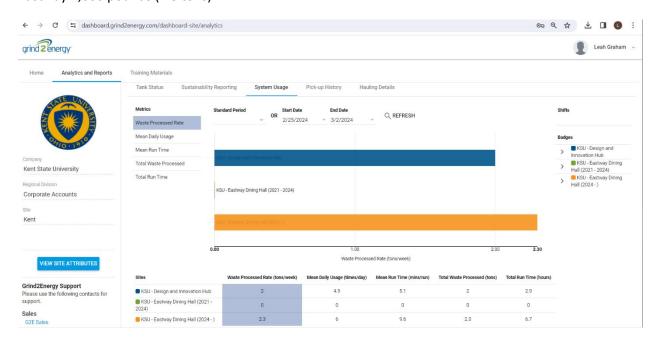


Screenshot by Leah Graham

G2E CR2ZW WEEK 6
DI Hub 3,800 pounds (1.9 tons)
Eastway 4,400 pounds (2.2 tons)

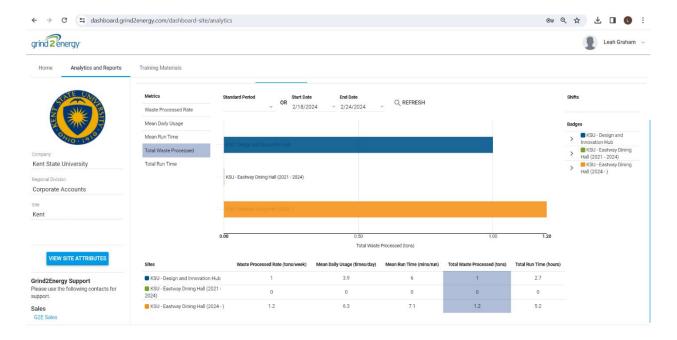


G2E CR2ZW WEEK 5
DI Hub 4,000 pounds (2 tons)
Eastway 4,600 pounds (2.3 tons)



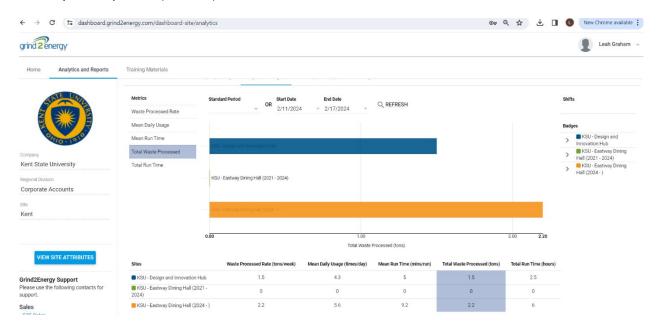
Screenshot by Leah Graham

G2E CR2ZW WEEK 4
DI Hub 2,000 pounds (1 ton)
Eastway 2,400 pounds (1.2 tons)



G2E CR2ZW WEEK 3

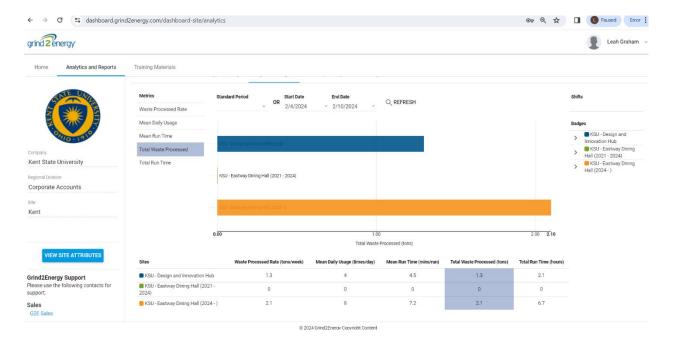
DI Hub: 3,000 pounds (1.5 tons) Eastway: 4,400 pounds (2.2 tons)



Screenshot by Leah Graham

G2E CR2ZW WEEK 2

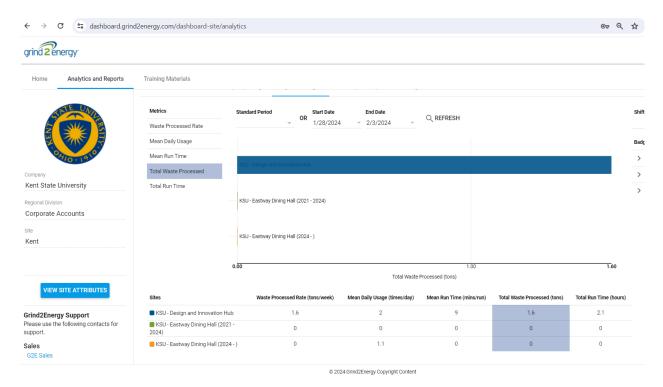
DI Hub: 2,600 pounds (1.3tons) Eastway: 4,200 pounds (2.1 tons)



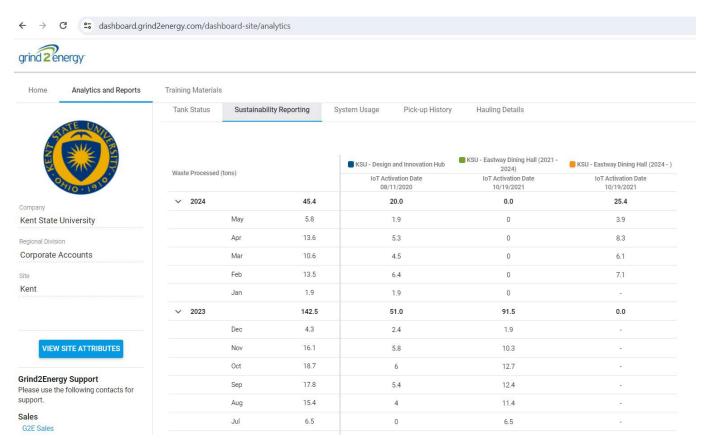
G2E CR2ZW WEEK 1

DI Hub: 3,200 lbs (1.6 tons)

Eastway: 0



Screenshot by Leah Graham



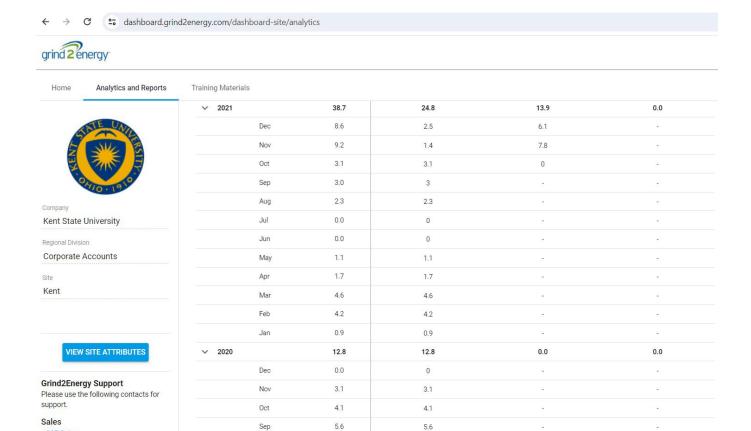
Grind2Energy Dashboard total waste processed by month and year for DI Hub and Eastway. Screenshot by Leah Graham.





Home Analytics and Reports	Training Materials				
THE CONTRACTOR OF THE CONTRACT	May	5.6	1.6	4	-
	Apr	14.6	6.4	8.2	
	Mar	16.5	7.8	8.7	(5)
	Feb	7.4	5.9	1.5	120
410.19	Jan	6.9	2.1	4.8	130
Company	√ 2022	120.9	44.9	76.0	0.0
Kent State University	Dec	9.2	3.1	6.1	
egional Division	Nov	15.2	5.6	9.6	(5)
Corporate Accounts	Oct	11.6	4.1	7.5	
ite Kent	Sep	13.2	5.3	7.9	(*)
	Aug	10.5	2.2	8.3	-
	Jul	3.9	0.3	3.6	(a)
	Jun	8.3	4	4.3	
VIEW SITE ATTRIBUTES	May	7.4	2.2	5.2	(4)
rind2Energy Support	Apr	12.3	6.2	6.1	120
lease use the following contacts for upport.	Mar	11.5	4.3	7.2	2
ales	Feb	12.1	4.3	7.8	-
G2E Sales	Jan	5.7	3.3	2.4	-

Grind2Energy Dashboard total waste processed by month and year for DI Hub and Eastway. Screenshot by Leah Graham.



Grind2Energy Dashboard total waste processed by month and year for DI Hub and Eastway. Screenshot by Leah Graham.

G2E Sales