

Sustainability Sub-Council Fall 2022

November 17, 2022

iSEE

Institute for Sustainability, Energy, and Environment



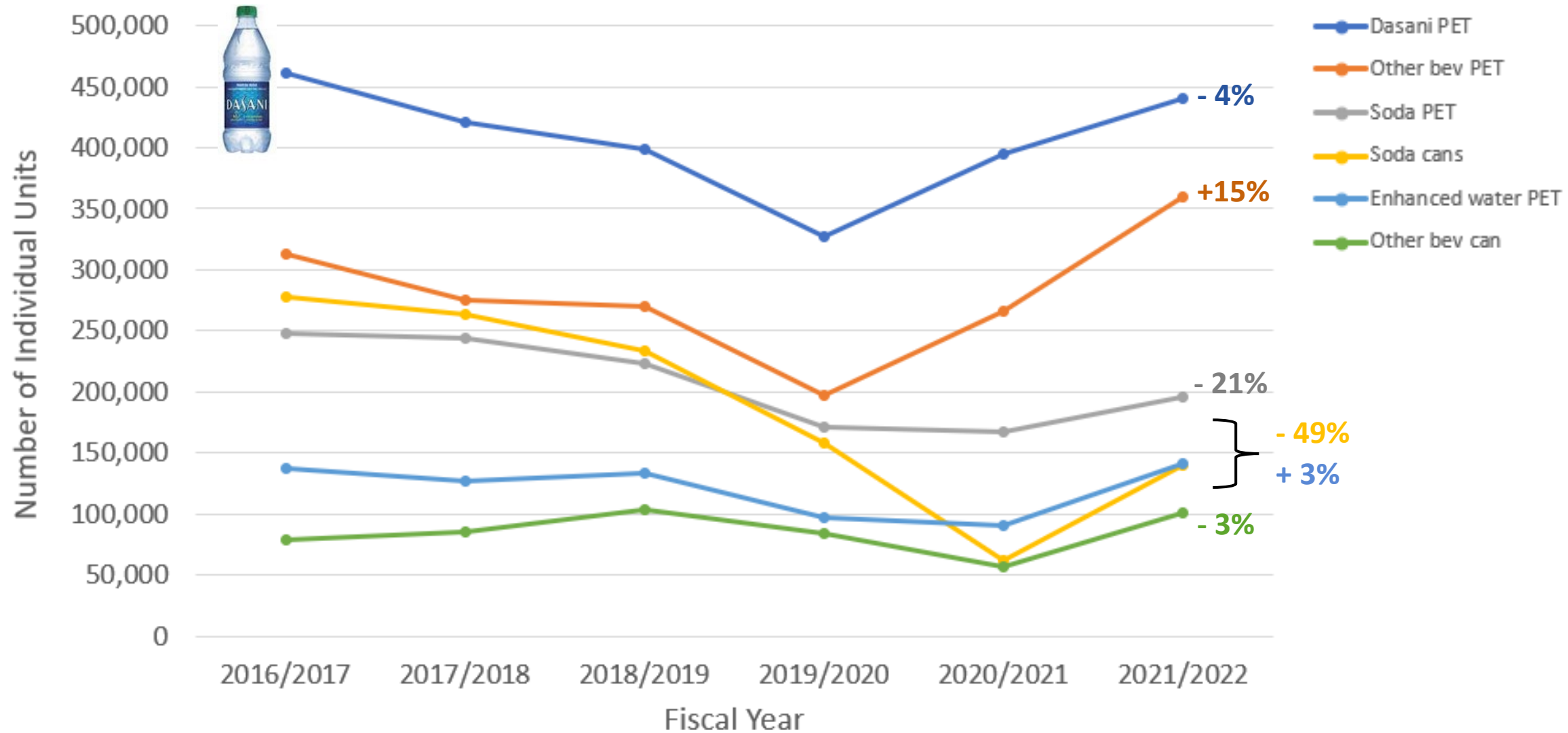
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Agenda

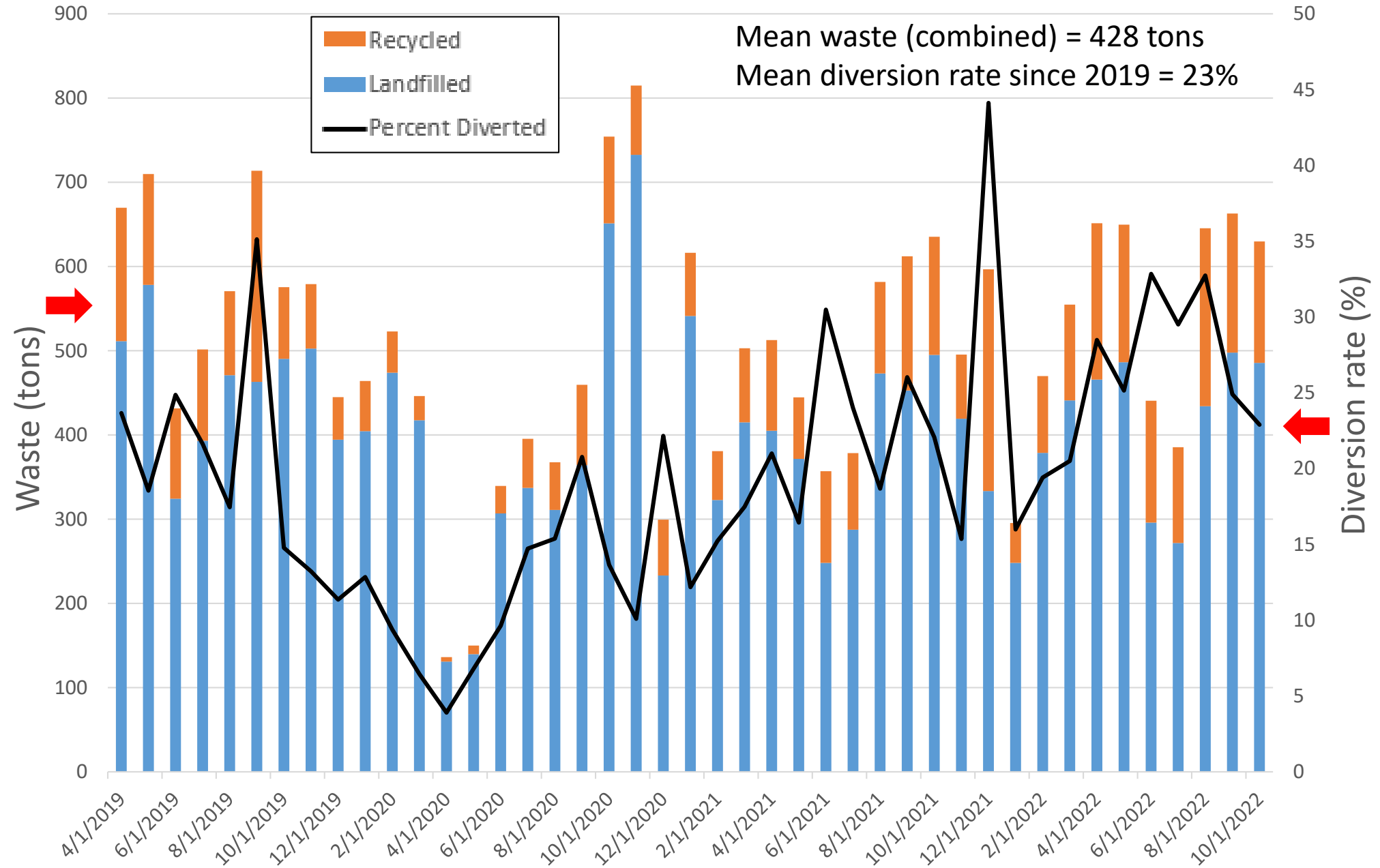
- Zero Waste
- Energy Planning
- Strategic Plan
- Old business
 - Sustainability General Education Requirement
 - Sustainable Land Management Committee Report



Plastic water bottles are a primary contributor to plastic waste



Only 20-30% of solid waste is recycled



Understanding the Single Use Plastic Waste Reduction Challenge for Campus

- Survey of students to understand drivers of demand for bottled water
- Mapping bottle filler stations to evaluate access to tap water
- Discussions with Coke
- Engagement with Athletics

Drivers of Demand

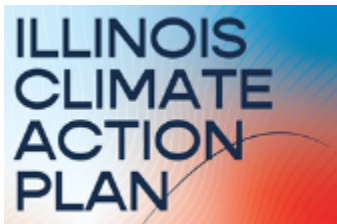
- **Drinking Water Survey (ZW005)**

- ~350 responses: convenience and flavor were primary factors for choosing bottled water
- Several participants noted that water bottle filler stations should be added outside of campus convenience stores



- **Water taste test**

- 75 participants in blind taste test at Green Quad Day: bottled vs. tap water
- Half of participants could not distinguish the difference between the two choices



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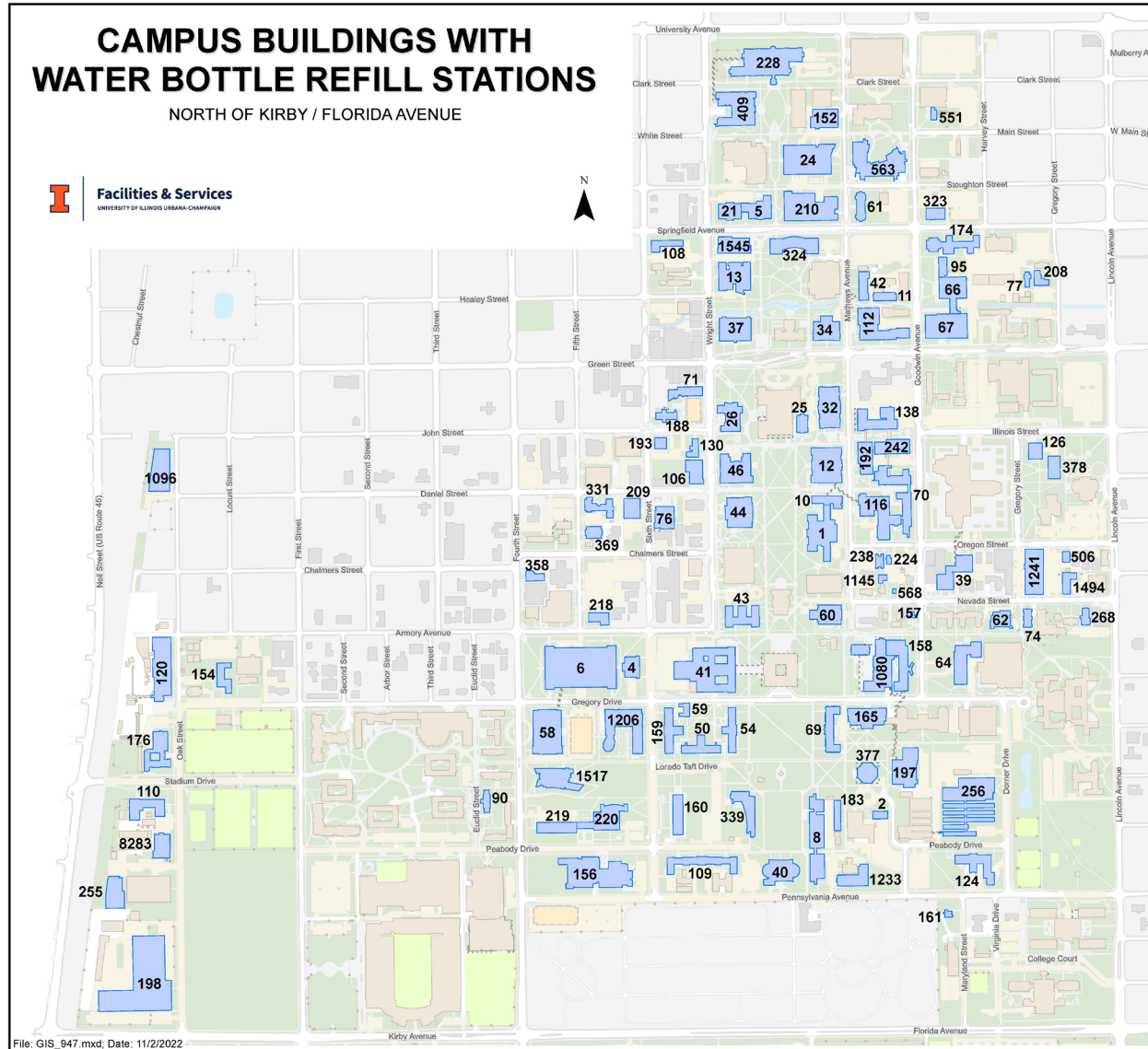
Access to tap water

- Inventory of water bottle filler stations
 - Incomplete
 - Additional filling stations needed

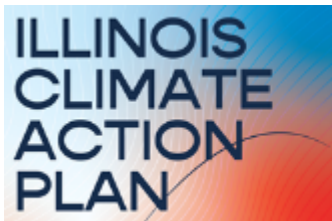
CAMPUS BUILDINGS WITH WATER BOTTLE REFILL STATIONS NORTH OF KIRBY / FLORIDA AVENUE



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Building Code	Building Name	Simple Bottle Filler	Fancy Bottle Filler
1	Davenport Hall	0	6
2	College of Fine and Applied Arts Performing Arts Annex	1	0
4	Marshall Best Building	2	0
5	Gym Annex	1	0
8	Library	10	2
9	Agricultural Engineering Sciences Building	0	2
10	Chemistry Annex	0	4
11	Corvallis Hall	0	2
12	Noyes Laboratory of Chemistry	0	2
13	Habbel Laboratory	0	0
14	M. E. Renshaw Gymnasium	4	0
24	Nathan M. Renshaw Civil Engineering Laboratory	1	1
25	Oliver Albert Hawker Hall	0	3
26	Alumni Hall	3	1
32	Natural History Building	0	11
34	Materials Science and Engineering Building	2	1
37	William L. Evered Laboratory	0	2
39	Music Building	2	5
40	Stack Pavilion	1	0
41	Main Library	5	2
42	Transportation Building	1	0
43	Gregory Hall	8	0
44	Knights Building	1	0
46	David Dodds Henry Administration Building	3	5
50	Architectural Building	0	1
54	David Greig Hall	0	1
58	George Mott Hall	4	1
59	Richard D. and Anna Marie Krain Doctoral Study Hall	0	2
60	Smith Memorial Hall	1	4
61	University High School	5	1
62	Chile Development Laboratory	1	4
64	Louise Fries Hall	0	1
66	Frederick Selys Materials Research Laboratory	5	2
67	Loomis Laboratory of Physics	0	2
69	Munford Hall	5	4
70	Chemical & Life Sciences Laboratory	2	2
71	Student Services Academic Building	0	0
74	Institute of Government and Public Affairs Building	0	1
76	Physiology Laboratory	0	1
77	Plan Services Building - Northwest	1	0
80	Noble Hall	0	2
85	Suspension Technology Center	0	1
106	Herb Lester Bookstore	0	0
108	Computing Applications Building	4	0
109	Natural Resources Building	2	13
110	Nuclear Physics Laboratory	0	0
112	Silvery L. Mechanical Engineering Building	0	5
116	Roger Adams Laboratory	2	1
120	William Lambert Abbott Power Plant	1	0
124	National Soybean Research Center	4	0
126	Margaret M. and William E. Lewis Faculty Center	0	1
130	Cobbie Hall	2	1
138	Burrill Hall	0	1
152	Coal and Environmental Engineering Building	0	4
154	Personnel Services Building	2	0
156	Law Building	3	1
157	African American Studies	1	0
158	Bender Hall	1	9
159	Wichers Hall	5	0
160	Education Building	6	1
161	1401 S. Maryland Dr.	2	0
165	Animal Sciences Laboratory	4	0
174	Engineering Sciences Building	2	0
176	Rehabilitation Education Center	3	0
188	Food Engineering Laboratory	1	0
189	Fred H. Turner Student Services Building	0	1
192	Medical Sciences Building	0	3
193	Starkland Administration Building	0	4
197	Jonathan Baldwin Turner Hall	0	14
208	Physical Plant Service Building	5	1
209	Speech and Hearing Sciences	0	1
210	Digital Computer Laboratory	7	0
218	School of Labor and Employment Relations	1	1
219	Art and Design Building	2	1
220	Wentworth Art Museum	0	1
224	1205 W. Oregon St.	0	1
228	Aurelio D. and Mabel M. Beckman Institute*	0	15
238	1207 W. Oregon St.	0	1
242	Morell Hall	8	0
255	University Press Building	1	0
256	Plant Sciences Laboratory	1	0
268	Science Studio	1	0
323	Public Safety Building	2	0
324	College Engineering Library Information Center	2	0
331	Graduate School of Library and Information Sciences Building	5	0
339	Trempe Youngs Reed Hall	0	1
358	Police Training Institute - 1200 S. Fourth St.	2	0
369	International Studies Building	2	0
377	ACES Library, Information, and Alumni Center	5	0
378	Office of Administration and Finance Building	0	4
409	Electrical and Computer Engineering Building	9	0
506	905 W. Oregon St.	2	0
551	McNamara Studio	0	0
583	Thomas M. Siebel Center for Computer Science	4	0
588	1205 W. Nevada St.	0	5
1080	Carl R. Woese Institute for Genomic Biology	0	4
1080	Carl R. Woese Institute for Genomic Biology	0	4
1095	Oak Street Library Facility	1	0
1145	African American Cultural Center	1	0
1205	Business Institutional Facility	0	1
1233	Integrated Bioprocessing Research Laboratory	2	0
1241	Gregory Hall II	1	0
1404	Chor Viraen Center	0	2
1517	Seibel Center for Design	0	0
1545	Campus Instructional Facility	0	10
8283	Oak Street Chiller Plant and Distribution System	0	1



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Discussions with Coca-Cola

- Discussed replacing plastic bottles with aluminum cans
 - Not a viable option
- Changed focus to increasing recycling rate
 - Infrastructure and engagement via “Don’t Waste” campaign
 - Messaging via digital platforms, large events, e.g., Welcome Celebration for ~6,000 incoming students
 - New portable bins



Partnering with Athletics

- Reach large audiences and divert plastic waste
 - [Zero Waste Basketball Game](#), Nov. 14
 - Total waste collected = 2,620 lbs
 - Landfilled = 2,340 lbs, Recycled = 280 lbs
 - Diversion rate = 10.6%
 - Develop program for recycling in tailgating areas



Discussion: Next Steps

- Educational campaign about environmental problems caused by single-use plastics
- Infrastructure: Recycling bins and bottle filler stations
- Continued engagement with Athletics

Agenda

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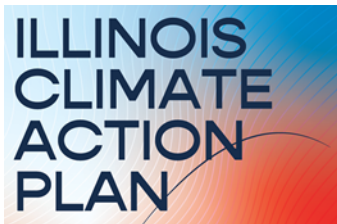


Comprehensive Energy Planning Document

- iCAP Working Group: We support hiring a professional service company to develop a specific, measurable, achievable, realistic, and time-bound carbon neutrality energy master plan.
- Sustainability Council: F&S and iSEE should work together to develop the scope for the study.

Progress

- ABE 469 senior capstone interviews for scope development
- Solar Farm 3.0 options analysis – in progress
- Energy Performance Contract for ACES Lab Facilities, preliminary technical audit starting
- Facility Condition Assessment; RFP closes 11/29/2022



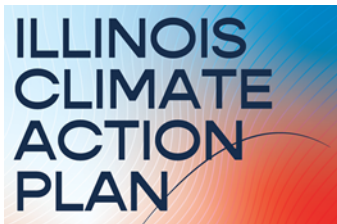
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Interviews included students, faculty, and staff

- 2/25/22: Bill Rose - *iCAP Energy Team Co-Chair*
- 2/25/22: Andrew Stumpf - *iCAP Energy Team Co-Chair*
- 3/8/22: Ximing Cai - *CEE Professor, Former Associate Director of iSEE*
- 3/11/22: Maria Maring - *SSLC iWG Representative*
- 3/11/22: Gabriel Kosmacher - *SSLC Member*
- 3/22/22: Rob Roman - *F&S Director of Utilities & Energy Services*
- 3/24/22: Scott Willenbrock - *Former Physics Professor, UIUC Solar Farm Involvement*
- 3/28/22: Cynthia Klein-Banai - *Director of Sustainability at UIC*
- 3/31/22: Caleb Brooks - *NPRE Professor, UIUC Micro-Nuclear Involvement*
- 4/5/22: Clark Bullard - *Former MechE Professor, Experience in Thermal Systems*
- 4/5/22: Xinlei Wang - *ABE Professor, Experience in Renewable Energy Systems*
- 4/5/22: John Zhao - *ABE Doctorate Student, Research in Geothermal Systems*
- 4/7/22: Mike Larson - *F&S Director of Utilities Production*
- 4/8/22: Paul Foote - *Energy Efficiency and Conservation Specialist*
- 4/8/22: Karl Helmink - *F&S Associate Director of Utilities and Energy Services*



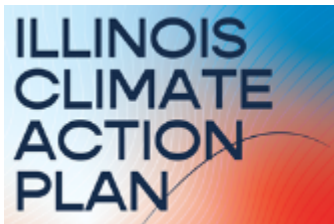
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Energy Plan Scope Topics from ABE

- Energy Efficiency: prevent additional energy loads, new buildings need to follow strict sustainability/energy efficiency standards, reduce/limit space demands
- Energy Conservation: expand existing conservation programs at F&S, and prioritize large mechanical renovations and building envelopes in deferred maintenance program, policies to encourage conservation
- Clean energy technologies: nuclear, solar, geothermal, air source heat pumps, solar thermal, renewable natural gas
- Conversion from steam to hot water heating system: electrification with a shift to using more clean power; need storage solutions



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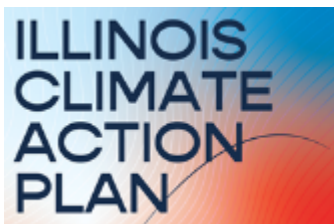
Discussions underway about Solar Farm 3.0



Solar Farm 1.0	+ ~5,000 MWh/yr
Solar Farm 2.0	+ ~20,000 MWh/yr
Wind PPA (Lincoln, IL)	+ ~25,000 MWh/yr
<u>Solar Farm 3.0 (proposed)</u>	+ 90,000 MWh/yr
iCAP goal	= 140,000 MWh/yr

Energy Performance Contract next project is starting soon

- Estimated Project Cost: \$40M
- Number of Buildings Proposed: 7
- Projected Annual Savings: \$1.5M in first year, 20 year payback
- Approximately 25% Cost Reduction
- These numbers are rough, preliminary estimates that would be finalized during the audit process when an ESCO is selected.
- Target Schedule: Energy Audit Agreement beginning in FY23



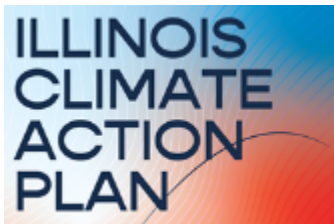
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Facility Condition Assessment

- Includes all three campuses, with 12.5M GSF included from UIUC in phase one
- Includes some auxiliary facilities from UIUC
- Schedule: RFP closes 11/29/2022, BOT contract approval in April 2023, UIUC phase one assessments to occur from summer 2023 to December 2024
- Key Deliverables:
 - Facility Condition Reports for each of the identified campus facilities
 - Editable database software that each university can access, maintain, update annually, customize and update prioritization, and use to produce building-specific, campus-specific reports, and system-level reports.



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Discussion: Options for Energy Reduction

- Increase funding for F&S energy conservation programs (retrocommissioning, occupancy sensors, energy performance contracts, etc.)
- Increase funding in campus Revolving Loan Fund, for internal campus loans to fund energy and water reduction projects
- Incentives/rewards for individual actions, like with Illini Lights Out, the Freezer Challenge, and the Energy Conservation Incentive Program (ECIP)
- Cost-share/match funding with Student Sustainability Committee projects that reduce campus energy use

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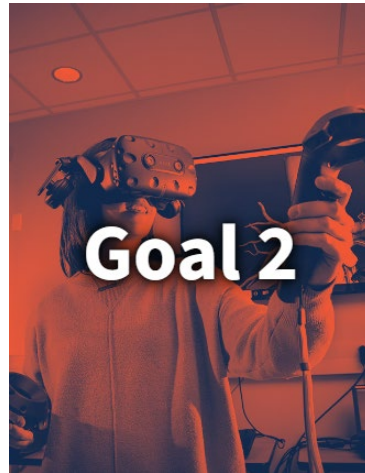


Strategic Plan

How can we incorporate sustainability and the iCAP 2020 into the Illinois Strategic Plan?



**Foster Scholarship,
Discovery, and
Innovation**



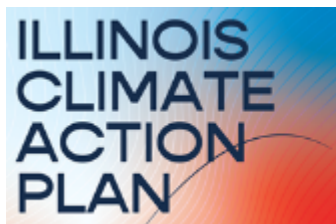
**Provide
Transformative
Learning Experiences**



**Make a Significant
and Visible Societal
Impact**



**Steward Current Resources
and Generate Additional
Resources for Strategic
Initiatives**



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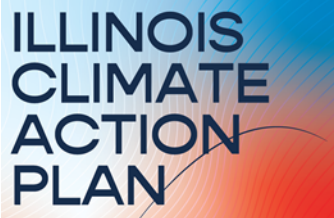
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Proposed Sustainability General Education Option

Luis Rodriguez



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Review

Proposal: Create a 3 credit-hour gen-ed category within Natural Sciences and Technology for a course in sustainability and environmental topics

- Will be an option for all undergraduate students to fulfill their Natural Science and Technology credit hours
- Initially passed as an Illinois Student Government resolution
- iSEE has been supporting student efforts to get this approved

Update

A proposal was submitted for review to the college Associate Deans for Academic Programs. The below feedback was given and will be incorporated into an updated proposal:

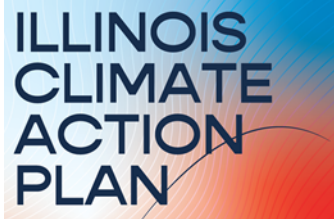
- This option should not be limited to the Natural Sciences and Technology category and should be expanded to have an option within Social and Behavioral Sciences category.
- There is a small number of courses that would be added to the Gen. Ed. list. This may not be an issue since this is only an option and not a separate requirement.
- Contact departments where courses were identified and determine if there is support from the unit's head to include those courses as fulfilling the general education requirement.
- Identify if there are expected shifts between which classes are taken and how that may impact colleges.

Next Steps

- Revise proposal to incorporate Deans' feedback
- Reach out to department heads
- Resubmit proposal to college Deans
- Pass proposal through UC Senate committees
 - Educational Policy
 - Campus Operations
 - Senate Executive Committee
- Invite supporters and contributors to speak on behalf of proposal during discussion
- Introduce final proposal to Senate floor
- Gen-Ed Board will approve courses to fulfill the requirement

Sustainable Land Management Committee report

Adam Davis



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Charge to SLM Committee

- A. Sustainable land management practices: develop plan for evaluating and inventorying sustainable land management practices on the South Farms on non-research land, and for increasing the sustainability of South Farms land management practices.
- B. Agronomy Handbook: develop plan for updating the UIUC Agronomy Handbook with best management practices for sustainable land management.
- C. Outreach with university tenants: Work with interested tenants on University-owned land to showcase selected sustainable land management practices in the updated Agronomy Handbook.

Progress to date

A. Inventory of sustainable practices on South Farms

1. Cover crops, perennials and woody plants
2. Dr. Emily Heaton's lab group: aggregating and analyzing management and soil data for past decade to get baseline data

B. Updates to land management practices on South Farms

1. Increased crop diversity on 'fill' acres (small grains and cover crops)
2. Increased use of cover crops in experimental plots

C. Agronomy Handbook chapter on sustainable farming practices

1. Dr. Giovani Preza-Fontes, Asst. Professor of Field Crop Extension Agronomy, potentially interested in having his group work on this. Will need postdoc support.

Thank you



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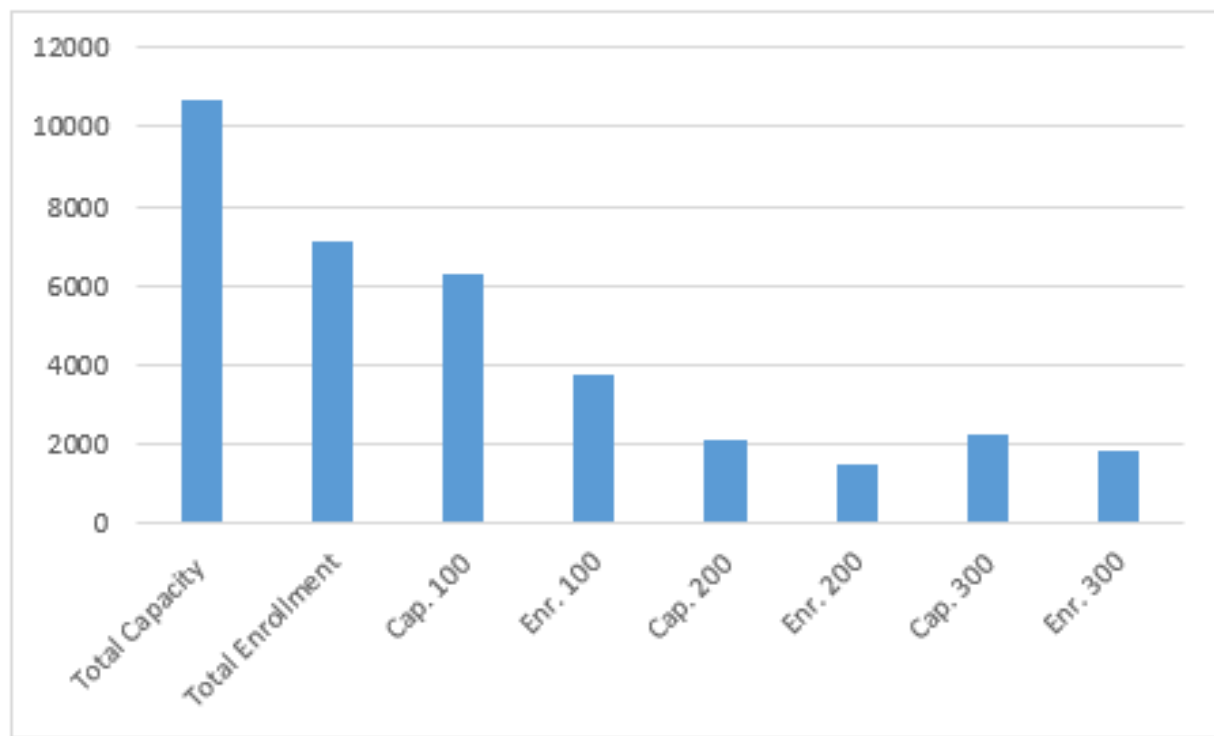


Figure 1: NST Candidate Course Capacity

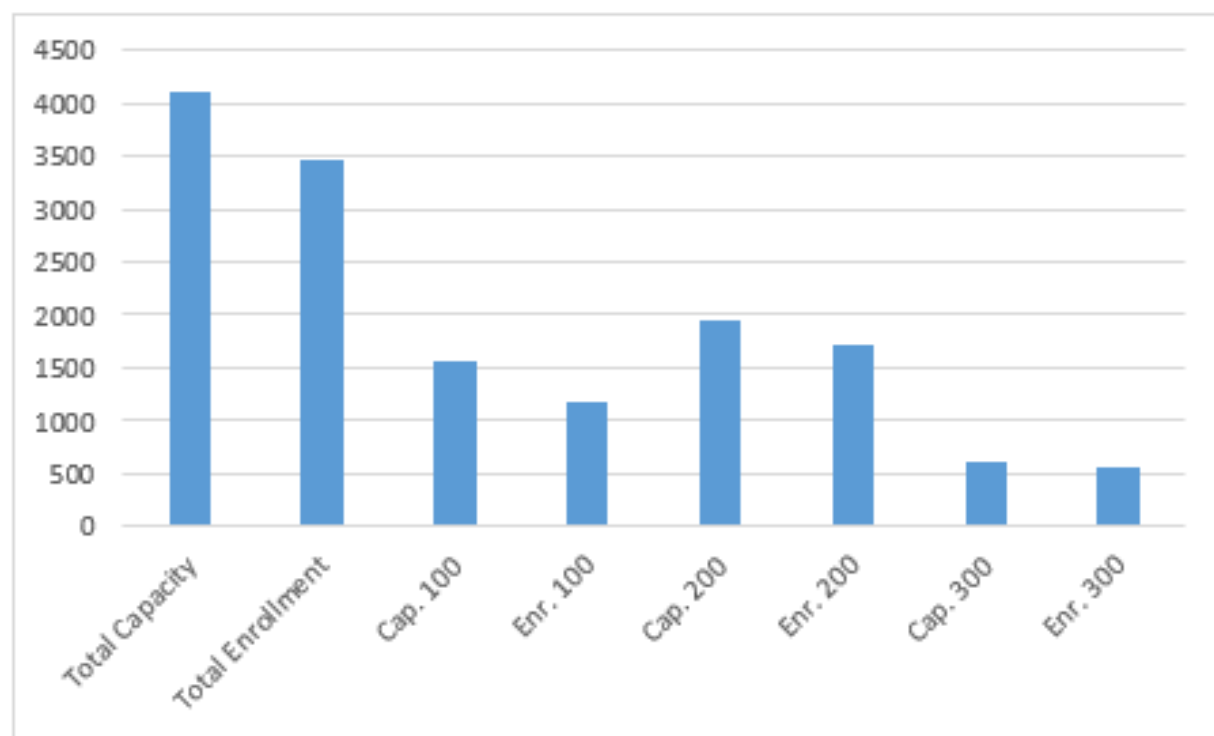


Figure 2: SBS Candidate Course Capacity

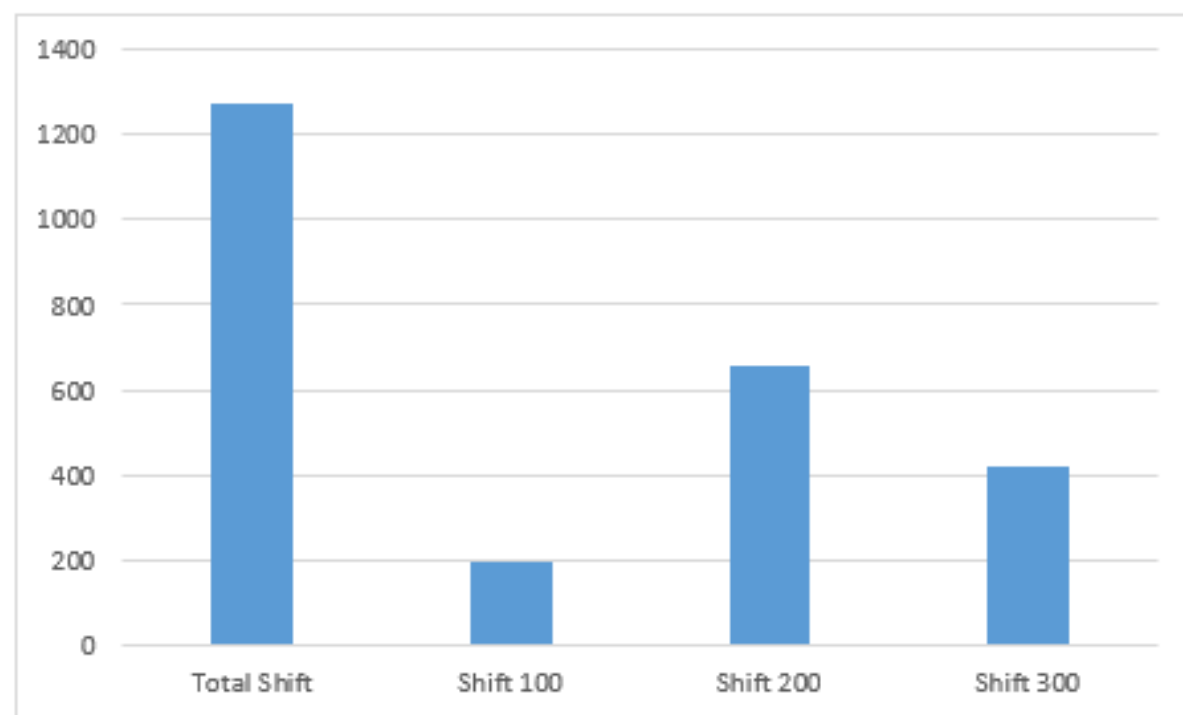


Figure 3: NST Shift in Demand

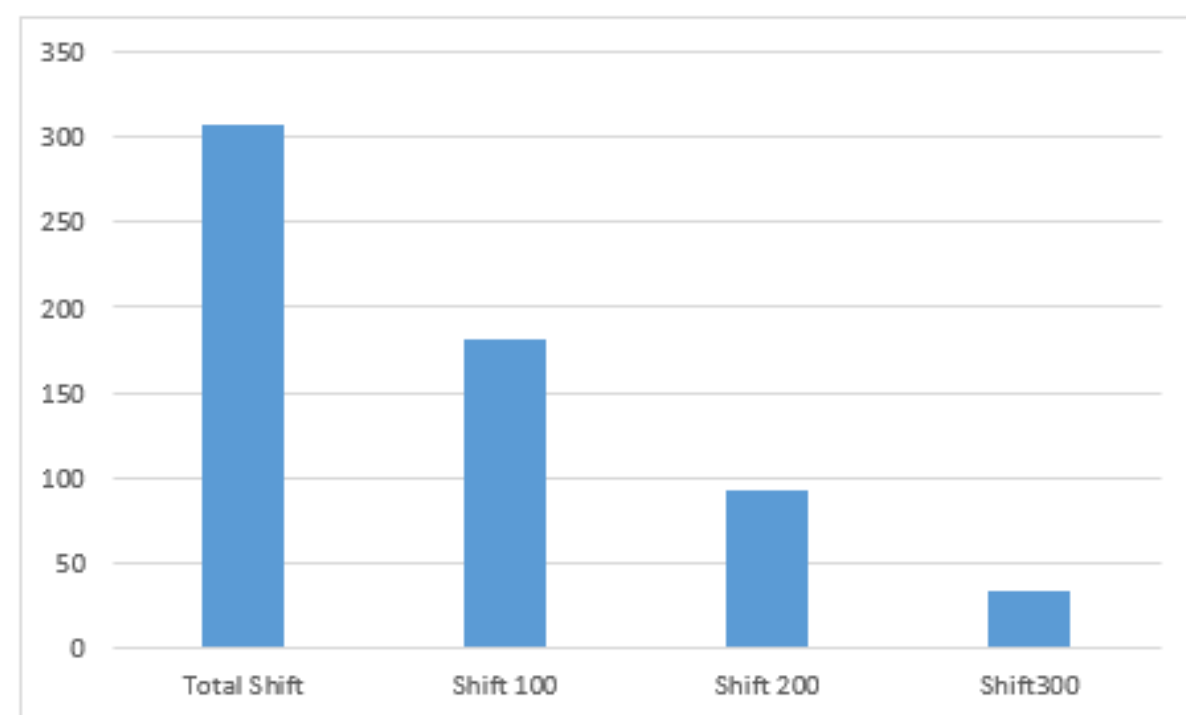


Figure 4: SBS Shift in Demand