Florida Tech Sustainability
2023 Northrop-Grumman Showcase
Student Research Posters

Ordinance Development, Grant Writing, and Outreach to Advance Sustainability in the Town of Melbourne, Beach, FL

Reese C. Johnson

NORTHROP GRUMMAN ENGINEERING & SCIENCE STUDENT DESIGN SHOWCASE FLORIDA TECH

Ordinance Development, Grant Writing, and Outreach to Advance Sustainability in the Town of Melbourne Beach, FL

Reese C. Johnson

Faculty Advisor: Dr. Ken Lindeman, Dept. of Ocean Engineering & Marine Sciences, Florida Tech

Introduction

The Town of Melbourne Beach, FL, borders the Indian River Lagoon (IRL) and the Atlantic Ocean, and faces challenges from a changing climate and development pressures. This project continues actions proposed in the town's Sustainability Action Plan[1]. The town's Environmental Advisory Board (EAB) is particularly focused on grants for landscaping and clean energy education, ordinance revisions, and community outreach.

Objectives

1. To apply for two grants which would develop a solar table project and an upland buffer project.
2. To work with the Sea Turtle Conservancy to develop a new lighting ordinance.
3. To engage the community by advertising and hosting sustainability events.

Methods

Grant Applications

- Apply for a One Lagoon grant to fund an upland buffer[2] to limit nutrient inflows into the IRL.
- Apply for a Dept. of Energy grant for 2 solar tables that charge all electronic devices. Both grants are for Ryckman Park.

Lighting Ordinance

- Through meetings and follow-ups, develop a revised town lighting ordinance with the Sea Turtle Conservancy (STC).
- Work with the EAB to ensure the town's specific objectives for this ordinance are achieved.
- With EAB approval, forward the ordinance to the town council for a vote by summer or fall 2023.

Community Outreach

- Develop marketing that invites the town residents to sustainability education events.
- Develop sustainability events for Founder's Day and other activities to educate the public.

Results

Grant Applications

The proposed upload buffer at Ryckman Park will consist of native shrubs and ground cover (Fig. 1).

Fig. 1: Aerial sitemap for the upland buffer

The second grant is requesting two solar charging tables from Enerfusion Incorporated (Fig. 2) in high traffic areas. The tables charge any device, day or night, and have sensors for night lighting.

Specifications

- 2 110 vac 60 Hz GFCI outlets
- 4 USB Type "A" power outlets
- Dual-Port High-Speed USB-C Charger Ports
- 4 Wireless Chargers on top surface

Fig. 2: Solar charging table with panels & console[2]

Lighting Ordinance

The proposed revisions to lighting ordinance the change the focus from regulating intensity to wavelength. The minimum wavelength permissible is 560 nanometers (Fig. 3).

Results (cont.)

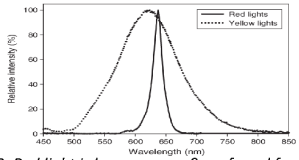


Fig. 3: Red light is less common & preferred for turtles[3]

Community Outreach

The outreach events attracted 124 total volunteers, ranging from 35 to 52 people per event (Fig. 4), many under age 18. Volunteers gained knowledge of applied town-scale landscaping and sustainability actions.

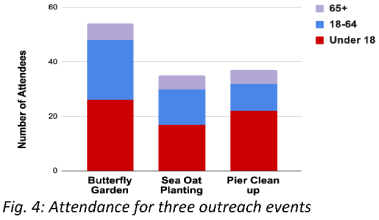


Fig. 4: Attendance for three outreach events

Discussion

The grant projects will advance sustainability actions at the town's premier public park in terms of solar education and runoff reduction. The new ordinance, if approved, will help reduce adult and hatchling sea turtle mortality. Three sustainability outreach events reached a wide-ranging audience. Another intern in 2023-24 can expand SUS actions.

References

[1] Sustainability Action Plan, Mel. Bch. 2019.
[2] Enerfusion website. Mar 2023.
[3] Robertson et al. 2016. *Wildlife Research.*

Acknowledgements

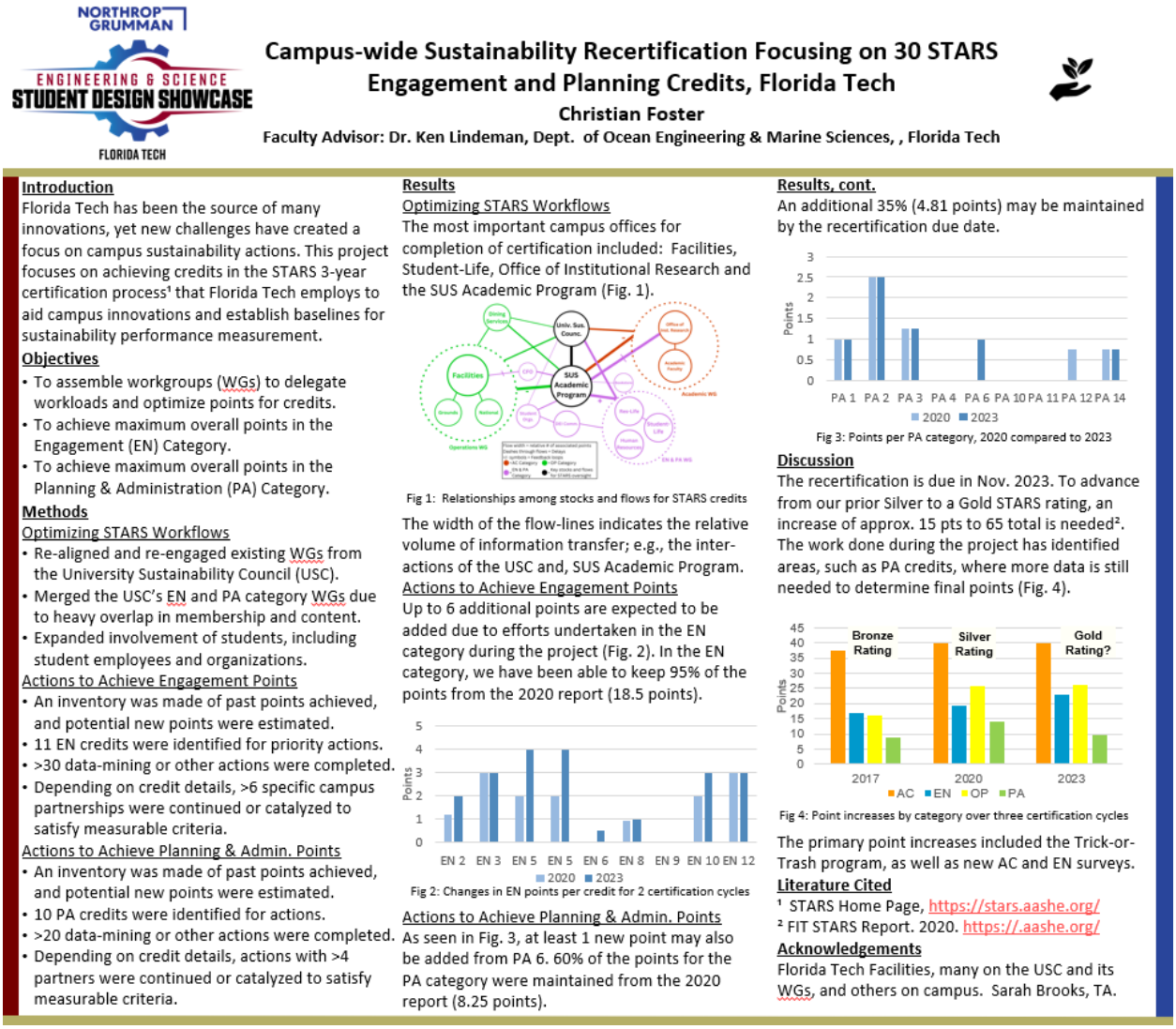
Thank you to the EAB, the STC , Elizabeth Mascaro and Sarah Brooks.

Project Summary

The Town of Melbourne Beach, FL, borders the Indian River Lagoon (IRL) and the Atlantic Ocean and faces challenges from a changing climate and development pressures. The town created a Sustainability Action Plan in 2019 to address these challenges. This project continues actions proposed in the plan. The town's Environmental Advisory Board (EAB) is particularly focused on grants for landscaping and clean energy education, ordinance revisions, and community outreach. The objectives of this project are to apply for two grants which would develop a solar charging table project and an upland buffer project, to work with the Sea Turtle Conservancy to develop a new lighting ordinance, and to engage the community by advertising and hosting sustainability events. The grant projects will be completed by applying for a One Lagoon grant to fund the upland buffer to limit nutrient inflows into the IRL and by applying for a Department of Energy grant for two solar tables. Both grant projects will be located in Ryckman Park. To develop a revised town lighting ordinance, a series of meetings and follow-ups were conducted with the Sea Turtle Conservancy (STC). After the STC developed the draft ordinance, the EAB began review of the draft to ensure the town's objectives for this ordinance were achieved. Following EAB approval, the ordinance will be forwarded to the Town Council for a vote by summer or fall 2023. To improve community outreach efforts, advertisements were created to invite town residents to educational events during the spring of 2023. These sustainability events were designed to educate the public about the IRL and the natural environment. The proposed upland buffer at Ryckman Park will consist of native shrubs and ground cover which will help limit runoff into the lagoon. For the solar grant project, the town is requesting two solar charging tables from Enerfusion Incorporated in Ryckman Park. To update the lighting ordinance, the proposed revisions have changed focus from regulating intensity to wavelength. The minimum wavelength permissible is 560 nanometers. As a result of community outreach efforts, the three town landscaping events had more than 30 volunteers, with many under age 18. The outreach events attracted 124 total volunteers ranging from 35 people to 52 people per event. The grant projects will advance sustainability actions at the town's premier public park in terms of solar education and runoff reduction. The new ordinance, if approved, will help reduce adult and hatchling sea turtle mortality by decreasing disorientation. Another intern in 2023-24 can expand sustainability goals and projects.

Campus-wide Sustainability Recertification Focusing on 30 STARS Engagement and Planning Credits, Florida Tech

Christian Foster



Campus-wide Sustainability Recertification Focusing on 30 STARS Engagement and Planning Credits, Florida Tech

Christian Foster

Faculty Advisor: Dr. Ken Lindeman, Dept. of Ocean Engineering & Marine Sciences, , Florida Tech

Introduction

Florida Tech has been the source of many innovations, yet new challenges have created a focus on campus sustainability actions. This project focuses on achieving credits in the STARS 3-year certification process[1] that Florida Tech employs to aid campus innovations and establish baselines for sustainability performance measurement.

Objectives

- To assemble workgroups (WGs) to delegate workloads and optimize points for credits.
- To achieve maximum overall points in the Engagement (EN) Category.
- To achieve maximum overall points in the Planning & Administration (PA) Category.

Methods

Optimizing STARS Workflows

- Re-aligned and re-engaged existing WGs from the University Sustainability Council (USC).
- Merged the USC's EN and PA category WGs due to heavy overlap in membership and content.
- Expanded involvement of students, including student employees and organizations.

Actions to Achieve Engagement Points

- An inventory was made of past points achieved, and potential new points were estimated.
- 11 EN credits were identified for priority actions.
- >30 data-mining or other actions were completed.
- Depending on credit details, >6 specific campus partnerships were continued or catalyzed to satisfy measurable criteria.

Actions to Achieve Planning & Admin. Points

- An inventory was made of past points achieved, and potential new points were estimated.
- 10 PA credits were identified for actions.
- >20 data-mining or other actions were completed.
- Depending on credit details, actions with >4 partners were continued or catalyzed to satisfy measurable criteria.

Results

Optimizing STARS Workflows

The most important campus offices for completion of certification included: Facilities, Student-Life, Office of Institutional Research and the SUS Academic Program (Fig. 1).

Fig 1: Relationships among stocks and flows for STARS credits

The width of the flow-lines indicates the relative volume of information transfer; e.g., the inter-actions of the USC and, SUS Academic Program.

Actions to Achieve Engagement Points

Up to 6 additional points are expected to be added due to efforts undertaken in the EN category during the project (Fig. 2). In the EN category, we have been able to keep 95% of the points from the 2020 report (18.5 points).

Fig 2: Changes in EN points per credit for 2 certification cycles

Actions to Achieve Planning & Admin. Points

As seen in Fig. 3, at least 1 new point may also be added from PA 6. 60% of the points for the PA category were maintained from the 2020 report (8.25 points).

Results, cont.

An additional 35% (4.81 points) may be maintained by the recertification due date.

Fig 3: Points per PA category, 2020 compared to 2023

Discussion

The recertification is due in Nov. 2023. To advance from our prior Silver to a Gold STARS rating, an increase of approx. 15 pts to 65 total is needed[2]. The work done during the project has identified areas, such as PA credits, where more data is still needed to determine final points (Fig. 4).

Fig 4: Point increases by category over three certification cycles

The primary point increases included the Trick-or-Trash program, as well as new AC and EN surveys.

Literature Cited

[1] STARS Home Page, https://stars.aashe.org/
[2] FIT STARS Report. 2020. https://.aashe.org/

Acknowledgements

Florida Tech Facilities, many on the USC and its WGs, and others on campus. Sarah Brooks, TA.

Project Summary

Florida Tech has been the source of many innovations, yet new challenges have created a focus on campus sustainability actions. This project focuses on achieving credits in the STARS 3-year certification process that Florida Tech employs to aid campus innovations and to set baselines for sustainability performance measurement. The project identified four STARS workgroups that

were already pre-existing in the University Sustainability Council, combining the Engagement (EN) and Planning & Administration (PA) workgroups (Fig 1). Additionally, a student workgroup was created involving student organizations and Federal Work Study Employees. For the EN category, 11 of the 15 credits were identified as requiring completion. 18.5 points (~95%) from the EN category acquired in the 2020 certification will be maintained in the resubmission of the report. Additionally, approximately 6 points are expected to be added for the 2023 certification in the Engagement category. Out of the 15 PA credits, 13 were identified as requiring completion. For the PA category, 8.25 points (~60%) are expected to be maintained, at a minimum, from the 2020 certification in the 2023 resubmission. Continuing efforts after the completion of the project could allow up to another 34% in point retention. At least one point is expected to be added to the PA category through new efforts. The largest increases during the project can be attributed to new projects that were started on campus, such as a Trick-or-Trash program, which alone added two new points for the EN category. In addition, the student workgroup worked with the Sustainability Academic Program to help develop a survey and a literacy assessment in tandem that when combined will add three new points to our Engagement and Academic Categories for two previously un-attempted credits for the institution. One major limitation is that many people involved in this project have very limited time and no prior experience in this type of certification exercise, forcing delays in data-collection of exact points for several credits. Although these constraints can slow the completion of the project, the groundwork laid out allows for high point retention and point total increases that could lead to an increase in Florida Tech's certification standing from silver to gold.

Categorization of Nuclear-Powered Safety Incidents for the Development of Standards for the Maritime Shipping Industry

An Edwards and Kara Perkins

Categorization of Nuclear-Powered Safety Incidents for the Development of Standards for the Maritime Shipping Industry

An Edwards and Kara Perkins

Faculty Advisor: Dr. Ken Lindeman, Dept. of Ocean Engineering & Marine Sciences, Florida Tech

Introduction

The American Bureau of Shipping (ABS) has been tasked with the International Maritime Organization's (IMO) goal of reducing carbon emissions from shipping 45% by 2030[1]. One fuel alternative is nuclear energy. The US Navy has been using nuclear energy within its submarines since the Cold War with no major safety incidents[2] .There have been several attempts to integrate nuclear energy into the commercial maritime industry[3] . However, due to public safety concerns, all attempts have failed. The goal of this project is to investigate nuclear safety incident cases and regulations in order to make informed suggestions for the implementation of nuclear energy in the commercial maritime shipping sector.

Objectives

- Conduct a literature review of safety incident cases on nuclear power and the maritime shipping industry
- Develop a report and presentation for ABS outlining safety incident cases, recommendations, and lessons learned based on existing safety standards

Methods

Literature Review

- A review of academic, corporate and military literature on nuclear safety incidents on marine shipping incidents was conducted.
- Error types were categorized as: human, design, and collision.
- Safety incidents involving nuclear power were reviewed (both land-based and sea-based).
- Based on categorization of the safety incident cases, specific lessons learned were compiled and relevancy was determined.

Existing Safety Standards

- We comparatively analyzed safety standards of the IMO & Russian Maritime Registrar of Shipping (RS).
- Recommendations for future standards were created based on consultations with ABS engineers.
- A report and presentation were prepared on the safety standards based on the literature review.

Results

Literature Review

The main contributors to nuclear safety incidents were human and design error (Fig. 1). An analysis was also conducted solely on submarine incidents finding that the main contributors are the same, with the addition of collisions. Suggestions for best practices were made based on case studies.

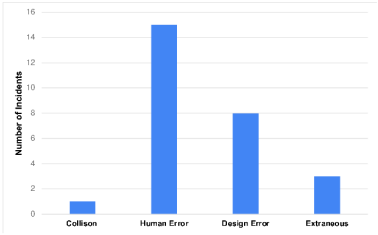


Fig. 1: Distribution of Nuclear Incident Causes

The number of peer reviewed articles related to nuclear energy has increased exponentially (Fig. 2). This research is relevant because interest in nuclear energy has increased over the past decade.

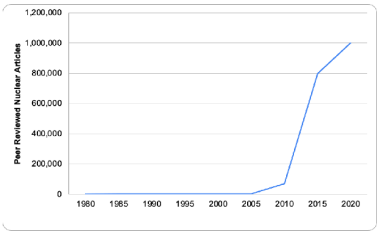


Fig. 2: Google Scholar Articles/yr. on "Nuclear Energy"

This rise in interest reflects an increasing research focus on nuclear energy and safety. This increase in available knowledge can help improve public opinion.

Existing Safety Standards

Type of Existing Standard	Which is preferred? (IMO or RS)
Fire Safety	RS
Training	IMO
NSSS automation systems	IMO
Testing and calculations	RS
Radiological protections design	IMO
Collision protection analysis	IMO
Construction of shielding barrier	RS
Damage stability calculations	RS
Alarm, indication, and protection systems	RS

Figure 3: Identification of Preferred Standards

When comparing the IMO to the RS standards, preferences were based on the level of detail and clarity provided. Fig. 3 demonstrates the preferred existing standards based on standard type. Five of the preferred standards were based on the RS and four on the IMO, reflecting differences on level of detail.

Discussion / Conclusions

Many lessons can be learned for the implementation of marine nuclear technology by evaluating past mistakes. Currently, the majority of safety incidents are caused by human error. The best way to combat this via detailed safety standards regarding training, materials testing, and overall systems testing. The next step include gathering more quantifiable research to determine which types of nuclear reactors would we best suited for implementation in commercial maritime shipping.

References

[1] *Index of Imo Resolutions*. International Maritime Organization. (n.d.).

[2] *The Nuclear Navy*. Naval History and Heritage Command. (n.d.)

[3] IAEA. (2022, November 15). *What is nuclear energy? The Science of Nuclear Power*. IAEA

Acknowledgements

ABS Team: Meg Dowling and Shania Suarez.
Sarah Brooks, Florida Tech.

Project Summary

With growing concerns regarding climate change, the United Nations has tasked the maritime commercial shipping industry with reaching net zero carbon emissions by 2050. The shipping industry is currently responsible for around 3% of greenhouse gas emissions worldwide. These emissions continue to rise despite many mitigation efforts. One alternative to traditional maritime energy sources is the use of nuclear energy in commercial shipping. Nuclear energy produces little to no carbon emissions and reduces the frequency of refueling, allowing ships to

stay out to sea for longer periods of time. Although nuclear energy has been proven to be highly efficient and safe, most of the public fears its use due to tragedies like Fukushima and Chernobyl. This report analyzed various nuclear safety incidents, determined their main causes, and suggested standards and procedures for the successful implementation of nuclear energy in the commercial maritime shipping industry. The research was conducted through an internship program with the American Bureau of Shipping (ABS). The research was split into two parts: the case studies on nuclear safety incidents and a comparative analysis of current nuclear energy safety standards. It was found that the main three contributors in nuclear safety incidents were human error, design error, and collisions. It was discovered that most of the safety incidents occurred due to human error. The second most common type of error was design error. After reviewing existing standards found in the International Maritime Industry (IMO) and the Russian Registar of Shipping (RS), we recommend detailed safety standards for training, materials testing, and overall systems testing. In the future, more quantifiable research should be gathered to determine which types of nuclear reactor would be best suited for implementation in maritime shipping.

Developing the First Sustainability Plan for the Town of Indialantic, FL

Emily Flint and Trinity DiNunzio

Developing the First Sustainability Plan for the Town of Indialantic, FL.

Emily Flint, Trinity DiNunzio

Faculty Advisor: Dr. Ken Lindeman, Dept. of Ocean Engineering & Marine Sciences, Florida Tech

Introduction

Coastal communities face challenges due to increasing population density and resource limitations. The Town of Indialantic has developed a Sustainable Communities and Resiliency Committee (SCRC) to work on mitigating these impacts[1]. For this project, our internships focused on creating the town's first Sustainability Plan to guide and implement actions in categories such as Stormwater and Knowledge and Access.

Objectives

1. Construct a framework for first town sustainability plan with town stakeholders
2. Develop a full sustainability plan for Committee and then Town Council approval

Methods

Plan Framing and Drafting

- Organize and expand information from previous interns and other relevant sources
- Collaborate with the SCRC on document structure and establish tiers of key categories
- Draft sections of the document for review
- Process SCRC feedback from monthly meetings
- Design graphics and gather other visual content to be included in the final product

Plan Completion

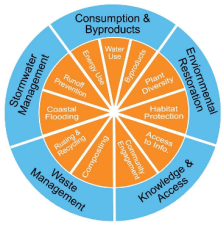
- Collaborate with SCRC members to finalize text and convert into a fully formatted document
- Prioritize committee members on areas of interest and need in the document
- Transition the document to a slide deck format that can be accessed by the public
- Present to the committee for internal review and approval prior to Town Council review

Results

Plan Framing and Drafting

Analysis of previous SCRC documents resulted in the establishment of five key project categories with nested subcategories (*Fig. 1*).

Fig. 1. Categories & subcategories of plan.



Within each category, there were a unique number of aspired actions and example projects to be carried out by the committee in the future (*Fig. 2*).

Fig. 2. Distribution of actions & examples per category.

Plan Completion

Transitioning the document to a complete state required many rounds of review feedback (*Fig. 3*).

Fig. 3. Select system structures & flows.

Results, Plan Completion, cont.

During the process, the committee decided to prioritize the Stormwater and Flood Management category. We analyzed the damage cost of hurricanes (*Fig. 4*). We iteratively reviewed plan text with the SCRC, beginning at the December 2022 meeting. The SCRC will vote to send the plan to the Town Council on April 26. The council vote will occur at a later date.

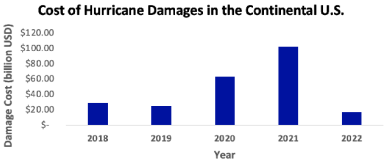


Fig. 4. Economic impact of hurricanes, continental U.S.[2]

Discussion

The creation of this plan gives the SCRC established goals and parameters that will guide their work in the future. This creates a valuable opportunity for the SCRC and the Town Council to codify sustainability priorities within the town. Future interns will oversee the implementation of priority actions in the plan. By working with the SCRC, town staff and the citizens, future interns can complete and expand upon outlined goals.

References

1. Boards & committees | the town of indialantic florida | official web site. (n.d.). Retrieved April 2, 2023, from https://www.indialantic.com/boards-committees/

2. Center, N. H. (n.d.). *National hurricane center*. Retrieved April 2, 2023, from https://www.nhc.noaa.gov/

Acknowledgments

V. Taranto, M. Casey, the town Sustainable Communities and Resiliency Comm.; S. Brooks; A. Paluzzi, N. Al Ghaithi

Project Summary

Coastal communities face challenges due to increasing population density and resource limitations. The Town of Indialantic has developed a Sustainable Communities and Resiliency Committee (SCRC) to work on mitigating these impacts. For this project, our internships focused on creating the town's first Sustainability Plan to guide and implement actions in categories such as Stormwater and Knowledge and Access. Our work was broken into two primary

objectives: constructing a framework for the first town sustainability plan and developing a full sustainability plan for Town Council approval. We collaborated with the SCRC at every stage of this project, resulting in the feedback loop structure outlined in Figure 2. For our first objective, plan framing and drafting, we organized and expanded upon information gathered from last year's interns, working with the SCRC to establish categories and subcategories displayed in Figure 1 and researching other town sustainability practices. We drafted the text of the plan and got feedback every month. We also continued developing the plan with individual committee members between meetings based on areas of need and personal interest. As we transitioned to completing the plan, we converted the framework to a cohesive text document with visual content and graphics. At the end of our project, we had a visually appealing product to present to the committee for internal review. We also had a text-only version to be used internally. The biggest challenge throughout this project was communicating with committee members to ensure we developed a final deliverable that accurately reflected their goals. Ultimately, the committee plans to present this to the Town Council. Our work will outline the goals and actions of the committee for years to come and help guide the work of future interns and sustainable-minded citizens in Indialantic.

Evaluation of Energy Engineering Upgrades to Reduce Expenses and Improve Resilience, City of Melbourne, FL

Mason Greene

NORTHROP GRUMMAN ENGINEERING & SCIENCE STUDENT DESIGN SHOWCASE FLORIDA TECH

Evaluation of Energy Engineering Upgrades to Reduce Expenses and Improve Resilience, City of Melbourne, FL

Mason Greene

Faculty Advisor: Dr. Ken Lindeman, Dept. of Ocean Engineering & Marine Sciences, Florida Tech

Introduction

Working alongside the City of Melbourne Beautification & Energy Efficiency Board (BEEB) and Trane Heating & Air Conditioning, this project aims to incentivize the installation of thermal ice storage systems to reduce energy costs, using the Inflation Reduction Act of 2022 (IRA)[1]. By targeting a prominent building in the area, the expectation is for others to follow the example of implementing energy efficient systems. Thermal energy storage works as a "battery" which can store energy for a later use. The system is charged when the energy is cheaper during off-peak hours and discharges the energy when needed.

Objectives

- To conduct a benchmarking study and develop a summary of current and projected energy efficiency in City Hall.
- To analyze the feasibility of installing a thermal ice storage system in City Hall.

Methods

Benchmarking Study

The current energy efficiency of Melbourne City Hall was determined utilizing recent utility and energy usage data. Evaluation of the building's efficiency was completed using the EPA's Energy Star Portfolio Manager. The engineering data collected throughout this study will be used to apply for a BEEB Clean Energy Award.

Feasibility of Thermal Ice Storage Installation

A walkthrough of Melbourne City Hall was conducted in November 2023, to determine metrics including square footage, building capacity, and AC load. Using Trane's FirstPass software, traditional AC and thermal ice storage system options for City Hall were assessed[2].

Results

Benchmarking Study

Fig. 1 shows monthly megawatt-hour usage in City Hall, 2017-2022. Along with seasonal trends, there is a general increase in MWh in recent years. This increase over time was caused by an increase in capacity post-pandemic (2020) and the lack of a capacity sensor to regulate the AC system.

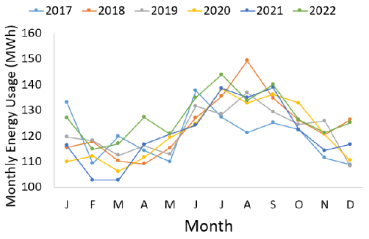


Figure 1: 2017-2022 city hall monthly energy usage

Table 1 lists the metrics determined using Energy Star between 2020-2022.

Energy Star Metrics Summary	2020	2021	2022	Total Change
Energy Star Score (1-100)	31	31	28	-3.0 (9.7%)
Source EUI (kBtu/ft²)	174	172.6	182.3	8.3 (4.8%)
Site EUI (kBtu/ft²)	62.2	61.6	65.1	2.9 (4.7%)
Energy Cost ($)	107,521	118,353	148,847	41,326 (38.4%)
Total GHG Emissions Intensity (kgCO2e/ft²)	6.9	6.9	7.3	.40 (5.8%)

Table 1: Energy Star metrics for Melbourne City Hall

Feasibility of Thermal Ice Storage Installation

Fig. 2 displays the expected daily energy usage of City Hall if thermal ice storage was installed. The green bars represent the energy usage while the system stores ice overnight. The blue and purple bars represent the chiller and ice bank energy usage while cooling the building. These data show how the system will save money, by dispersing energy consumption evenly throughout the day.

Results (cont).

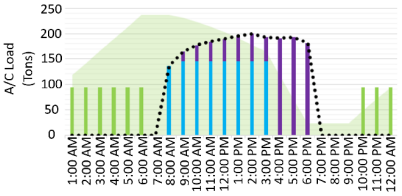


Figure 2: Expected city hall thermal ice storage loads, daily

Table 2 inventories the ice storage options for City Hall. This table shows the significance of the IRA tax credit and Florida Power and Lighting (FPL) utility rebate on cost of the system.

	Conventional	Full Storage
Chillers	(2) 100-ton AC	(2) 100-ton AC
Ice Tanks	N/A	(5) $173k
Utility Cost	$149k	$117k
First Cost	$300k	$420k
Tax Credit (IRA)	$0	$168k
Utility Rebate (FPL)	$0	$104k
Revised First Cost	$300k	$148k

Table 2: Comparison of ice storage and conventional options

Conclusions

Based on the results of the benchmarking (Table 1), City Hall requires a more efficient cooling system. The IRA with the FPL tax rebates greatly reduces the overall cost of the thermal ice storage system (Table 2). By implementing this system, a precedent could be established for other cities in the county.

References

[1] U.S. Senate. (2022). *The Inflation Reduction Act of 2022.*
[2] Trane Heating & Air Conditioning. (2023). *Thermal Energy Storage Systems.*

Acknowledgements

Trane Team Leader Bruce Lindsay, Sarah Brooks, Jennifer Wilster

Project Summary

The City of Melbourne is adjacent to the ocean and Indian River Lagoon which can amplify the effects of greenhouse gas (GHG) emissions, climate change, and sea level rise. This problem is not an exception, as 40% of the U.S. population calls coastal regions their home (only 10% of the total country's land mass NOAA, 2019). It is important for cities in the coastal zone to set a precedent and become a role model for other regions to create more sustainable systems and

mitigate these issues. This project was completed to reduce financial costs and improve the resilience of the City of Melbourne's City Hall air conditioning system. By applying the rebates offered through the Inflation Reduction Act of 2022 (IRA), the project aimed to incentivize the installation of thermal ice storage systems which will create energy savings. The first objective of this project included conducting a benchmarking study and developing a project summary on the current and projected energy efficiency of City Hall. Secondly, I analyzed the engineering and economic feasibility of installing a thermal ice storage system in Melbourne City Hall. With utility data from 2017-2022, the building energy benchmarking software, Energy Star Portfolio Manager, was employed and a score between 1-100 was determined. Comparing a series of energy metrics derived by the Energy Star software to similar local buildings, a building score of 28 was received for the most recent 2022 data. This low score revealed the need for a more energy efficient system in City Hall. Recognizing this need, the team moved forward with detailed scoping of a thermal ice storage system in the building. A building walkthrough confirmed the current air conditioning system was compatible with the proposed project. After determining that City Hall was compatible, energy savings were projected using Trane's FirstPass Software. Using the IRA tax credit, combined with the Florida Power and Lighting (FPL) utility rebate for thermal storage systems, the upfront cost of installation can be greatly reduced as shown in the table below. Upfront cost and utility savings will allow for GHG reduction in future projects. By creating annual savings, City Hall with have the option to install renewable energy systems such as solar panels to charge thermal energy, creating a hybrid system. The thermal ice storage system will also utilize software that will optimize energy usage by only creating as much ice as necessary. Selecting a prominent building in the local area, such as Melbourne City Hall, can catalyze other cities to implement more energy efficient systems.