Strategic Planning for Measurable Climate Impact and Powerful Partnerships:

An Analysis of Melbourne's Port Phillip EcoCentre

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Strategic Planning for Measurable Climate Impact and Powerful Partnerships:

An Analysis of Melbourne's Port Phillip EcoCentre

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Abstract

The Port Phillip EcoCentre in Melbourne, Australia recognizes their role in increasing awareness for climate change and the need for dramatic action to reduce carbon emissions within the next decade. To assist in the EcoCentre's strategic planning for the next three years, our team has completed an analysis of their strategic plan through archival analysis of their core documents, interviews of nine key partners, a staff wellbeing survey, and a review of program survey data. Additionally, to aid the EcoCentre in their efforts to prevent irreparable climate change damage, we developed a novel scorecard for evaluating carbon emissions reductions for organizational programs.

Executive Summary

Context

The world is currently faced with the increasingly dire threat of global warming. Rising atmospheric greenhouse gas levels have resulted in a 1°C increase in global temperature (Guilyardi, 2018 p.14-17). Current trends already indicate that without immediate and drastic action in the next ten years, global temperatures will not only reach, but exceed the 1.5°C threshold set by the Intergovernmental Panel on Climate Change (IPCC) (2019). It is imperative that action be taken on an individual, community, and governmental level to address the heightened concern.

Local organizations are a key force in promoting this change. The Port Phillip EcoCentre (EcoCentre) is a not-for-profit organization that works to combat climate change by promoting environmental sustainability actions through a number of programs, projects, and partnerships in the community of Melbourne, Australia. To address this climate crisis, the EcoCentre is focusing on a carbon emissions initiative in tandem with its strategic planning for the 2021-2024 period. In order to be effective in this strategic planning process and work to achieve its goals, the EcoCentre must be able to perform an external and internal analysis of its goals, partnerships, staff, and programs. This internal analysis refers to the evaluation of the EcoCentre staff and programs it currently runs, whereas the external analysis refers to the evaluation of the organization's partnerships. In an effort to actively reduce carbon emissions through its many programs and relationships, the EcoCentre must have a means to understand and indicate their impact. Our project assisted the EcoCentre with both evaluating partnerships and measuring program impact.

Methods

The EcoCentre needs to properly evaluate their programs, create metrics for current and future program impact analysis, and communicate with partners to promote effective practices to combat climate change in the community. The goal of this project was to provide the EcoCentre with data and resources to create an effective strategic plan and evaluate carbon reduction initiatives. In order to frame our project and research, five key objectives were developed:

1. To understand the EcoCentre and their strategic planning methods
2. To examine the views of the EcoCentre's partners on their relationship with the EcoCentre and the impact of these partnerships
3. To understand the EcoCentre's staff, their well-being, as well as their satisfaction within the organization
4. To assess and analyze the impact the EcoCentre has with its programs through an external perspective
5. To inform the EcoCentre on ways to measure the carbon impact their current and future programs can have

To begin our work in the internal and external analysis of the EcoCentre, the team read a number of the EcoCentre's strategic documents. These documents served to provide us with a foundation to guide the project and formulate it in line with the EcoCentre's goals in their next strategic plan. Additionally, this information served as a baseline during the team's observation of the EcoCentre's strategic planning workshops. These workshops served to supplement the team's understanding of the goals of the EcoCentre for their

next three year period.

To perform an external analysis of the EcoCentre, nine research interviews were conducted with leaders from partnering organizations including community organizations, research universities, state and local government, and businesses. These interviews provided insight and valuable perspectives on the relations held between partners on their relationship with the EcoCentre. In addition, an impact mapping matrix originally implemented by Li, et al was utilized to understand how to effectively prioritize partnerships based on the impact of change and the amount of time invested (2018). The accumulated knowledge from these two methods provided us with a clear image of how EcoCentre partnerships value the EcoCentre.

The internal analysis of the EcoCentre was subdivided between staff analysis and program analysis. The team's analysis of the staff was completed through the use of a survey assessing individual work well-being. Program analysis, on the other hand, was focused on the analysis of 371 unique program survey responses. In addition, past participant interviews were conducted to understand the effect and impact programs had on a longitudinal basis. The knowledge amassed from these topics provided insight on where to focus such that the EcoCentre can effectively achieve its long-term goals.

Finally, the team's efforts were focused on formulating a way for the EcoCentre to measure carbon emission reductions from their programs to assess their impact on climate change. To do this, we developed a novel design for a scorecard to be applied to a program an measure its carbon emission impact. The scorecard had four main design criteria: the scorecard is applicable to EcoCentre programs, the format is easy to use and understand, carbon emission values are accurate and relevant, and final evaluations are easy to compare and understand without prior knowledge. Through rigorous literature analysis, a number of values for calculating carbon emissions were gathered and compiled. The resulting information was then set as attributes used in scorecard calculations of its inputs. Once complete, a couple of case studies utilizing actual EcoCentre programs were completed to provide sample results and judge the scorecard efficacy. Utilizing this tool would provide the EcoCentre with a method to evaluate the impact of programs and projects on reducing emissions.

Results

Key findings on EcoCentre strategic planning goals

Within the archival analysis and meetings attended, we have summarized four main goals of the EcoCentre moving forward:

1. Climate change initiatives and programs targeted at a younger age group
2. Future online programs
3. Collaboration with climate change organizations
4. Facilitating access to renewable energy or electric vehicle charging stations for those in high density housing

These will work to increase the reach and success of the EcoCentre by connecting with more members of the community, providing greater accessibility to programs and renewable energy, and furthering climate change initiatives at the EcoCentre.

EcoCentre Partners are Extremely Satisfied with their Partnerships

Through our research, we concluded that the EcoCentre works with over 343 unique partnerships, with an astonishing 181 of these being new partners in the past three years. With this large number of organizations, it is unsurprising that interviewed partners had a huge amount of praise to be given for the EcoCentre. Despite some of these partners working heavily with the EcoCentre on multi-year long projects, and activities that involve huge amounts of interorganizational communication and cooperation, most partners maintained that the EcoCentre had no real areas in need of improvement. In addition to this praise, partners noted 14 different aspects that they value about their partnerships with the EcoCentre as well as 13 different aspects that they feel the EcoCentre does best. Both of these included comments on the passionate and

knowledgeable staff, as well as the wealth of knowledge that the EcoCentre puts forth, including their expertise, education efforts, and citizen science initiatives. Overall, these indicated the extreme satisfaction of the EcoCentre's partners. In indicating areas to focus on, partners overwhelmingly agreed that they believed the EcoCentre should pursue more projects with outside partners, including more research projects as well as event activation ,which would be beneficial for the growth of the EcoCentre.

Those Relationships Create a Wide Range of Impacts

The creation of an updated impact matrix indicates that the EcoCentre has done well at managing time and resources to those partnerships that provide the most impact. By comparing the effort to the scope of change, we came to the same conclusions as Li et al. in regards to the significance of each partnership based on where they fall in the matrix. The overwhelming majority of partnerships fell into the significant impact and change categories, with the least amount of effort hours to maintain. Additionally, no partnerships were found to require over 40 hours for an individual scope of change. This result is extremely important as it indicates that the EcoCentre has maintained useful partnerships and has allocated its resources appropriately to avoid spending them on lower significant partners.

EcoCentre Staff are Extremely Enthusiastic but are Overworked at Times

The results of the staff well-being survey showed more than anything that the EcoCentre staff are extremely passionate about their work with the organization. Many noted that the most rewarding part of their job was working with the community or program participants to spread awareness of the environment and seeing the change right in front of their eyes. All of the staff surveyed reported that their work contributed or contributed very much to the organization's mission. However, with this passion and enthusiasm, came a serious concern for burnout and overworked staff. The survey revealed that 8 out of 14 respondents work more hours than they are employed, with three of these being consistently ten or more hours. With over half of the staff working overtime at one point or another, the risk of a staff member burning out creates a domino effect that could cause the rest of the staff to become burnt out as well. In tandem with this result and concern is the concern of comfortability among the staff of the EcoCentre. We found that there was a notable difference between staff's comfortability with talking to a manager regarding work stress and their comfortability with talking to a manager about their health, including mental health (Figure E.1). With the current COVID-19 pandemic, mental health of staff is an extreme concern with most organizations around the world, which has the potential to lead to additional burnout. The EcoCentre staff, through this survey, suggested solutions such as acquiring an organizational psychologist, creating more open space in the workplace, possibly with the creation of new facilities, and more remote working flexibility.

Figure E.1: *Staff Survey Comfortability Questions, n = 13 and n=14 respectively*

Participants are highly satisfied with their program experiences

Program survey data, collected after participants completed a program, asked participants to rate their program experience from one to ten. Analysis of this data indicated that 88% of survey respondents rated their overall program experience as an eight or higher (Figure E.2).

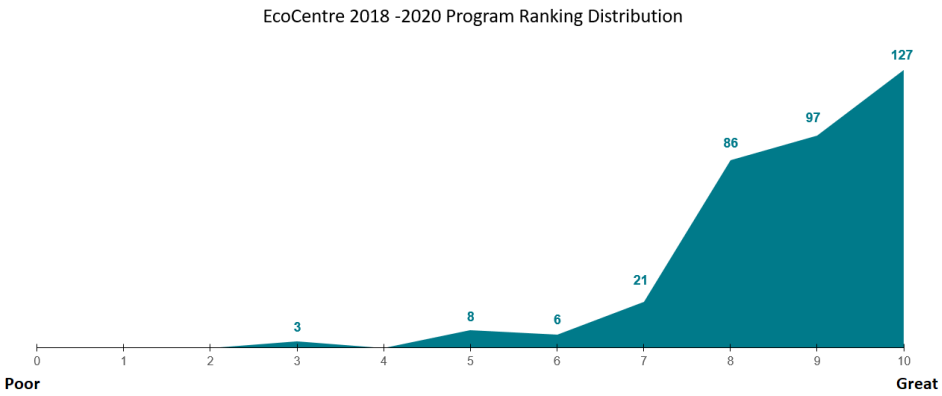

Figure E.2: *Overall program participant rated experience from 2018-2020*

In addition, another program survey question prompted survey respondents how the activity could be changed. Analysis of these responses revealed that the majority of survey respondents saw fit that no change was necessary. The second and third most numerous codes focused on more activity resources and more engagement. Participants are, therefore, very pleased with the programs and how they are run.

Programs Have Variable Success to Inspire Participants to Take New Sustainability Action Between Individual and Group Based Programs

There is a clear discrepancy between the resulting drive of participants to take new sustainability action following participation in an individual based and group based program. Within the individual based program surveys, 75% of survey respondents indicated that they would take some new sustainability action. Most of this action was noted to be in regard to care for the environment. Group based programs, however, indicated that only 65% of survey respondents indicated taking some sustainability action. The significance of this discrepancy can be especially seen when comparing this question to the others prompting learning, spending, and connecting to the environment.

Design of Scorecard allows the measurement of CO2 emissions for direct action programs

The EcoCentre CO2 Program Scorecard

The final scorecard design uses a three phase process beginning with the selection of an applicable program and ending with a final evaluation on a scale of 1-5. The process phases are titled Brainstorm, Estimate, and Calculate and follow the steps of brainstorming ways the program can impact carbon emissions, estimating numerical values to calculate the total emissions, and finally use the scorecard formulas to calculate the final carbon emission evaluation. To develop this process we carried out a series of case studies and design trials using the EcoCentre programs Zero Waste Birthday Parties and St. Kilda Repair Café as references. Through these trials we discovered that attempting to calculate exact CO2e emission values for programs was extremely time consuming and the uncertainties in those calculations were hard to estimate. This is because CO2e emission reports and datasets focus on processes that produce

Description	Sector	Action	Action Occurred	Action Prevented	Inputs			Program Score
					#	Rank	Total	
	Energy	Standard Grid Electricity Use (1 kWh)	x		40	D	D+	
	Transportation	EcoCentre Cars (1 km)		x	70	D	C-	
	Waste	Electronic bought new (1 kg)		x	30	C-	B	2 Petals
	Water	Potable Water (1 L)	x		65	F	D-	
	Carbon Capture	Plant seagrass (1 m^2)		x	15	D-	D-	

Figure E.3: The user interface of the final version of the scorecard with example inputs from each sector of the scorecard

tons of CO2e, while the EcoCentre's program reduces emissions of the kilogram scale. To make the evaluation process easier and allow each program evaluation to be comparable, we created a system using predefined actions stored in the Excel file that could be applied to multiple sustainability efforts (Figure E.3). Every predefined action had an associated CO2e value calculated from trusted sources and applied as an estimation of possible CO2e emission for that action. The predefined actions emission can then be scaled up using the scorecard, depending on the extent to which the action is performed in the program. This was the main feature of the scorecard that make is a valuable program assessment tool for the EcoCentre since it makes the scorecard endlessly applicable to a large variety of programs while also creating evaluations in a time efficient manner.

Recommendations

Continue to Reach out for Further Projects with Partners

Out of all areas mentioned by EcoCentre partners, working on more collaboration and projects far surpassed all others. With this, we recommend that the EcoCentre continue to reach out to their current partners to facilitate conversations regarding potential new projects. With the huge increase in new partnering organizations, the EcoCentre is in an opportune place to increase their already large impact in the local community. We therefore recommend that the EcoCentre continue their efforts to connect and undertake projects that work in tandem with multiple organizations or universities to further increase their impact across the larger community of Victoria.

Brainstorm and Implement Actions that will help Mitigate the Staff Burnout

From the responses given through the well-being survey, we recommend that the EcoCentre focus more heavily on ensuring the well-being of their staff. We first recommend that the EcoCentre invest time into further analyzing the individual responses to the survey in order to create a more robust analysis with the lens of the EcoCentre internal structure. Secondly, we recommend that the EcoCentre conduct a staff workshop or brainstorming session, especially in the wake of the pandemic, in order to gain staff input as to how the organization could improve its operations to stem this burnout and allow the staff to be heard in their opinions and feelings. Finally, we recommend that the EcoCentre undertakes this survey on an annual or bi-annual basis in order to give them an opportunity to voice their concerns anonymously

Continue to Focus on the Means of Outreach in the Community

Our findings indicated that partner and program analysis concluded that the EcoCentre should continue to focus on further engagement. Analysis of program data indicates that participation in EcoCentre programs was strongly tied to having an established knowledgebase of the organization. Summarizing our findings together indicated that most people find the EcoCentre through others. The EcoCentre has relied on this method of communication that, as evident by their success, has worked well for them. Despite its usefulness, this means of communication alone limits the extent to which the EcoCentre can reach the community. It is our team's recommendation that the EcoCentre focuses on outreach along the lines of an increased social media presence. In tandem, doing so could work to improve participant engagement, lead to greater impact within the community, and open the opportunity to develop current partnerships and foster new ones.

Continue Implementing More Interactivity in Programs

As indicated in the findings, there is a statistically significant discrepancy between the participants of individual based programs and group based programs. When it comes to the individual based program, the EcoCentre is participants to take new sustainability actions. The only recommendation that can be made is for the EcoCentre to continue doing what it has been for these programs. The group based programs are seeing much less success. It is this team's recommendation that the EcoCentre focus on establishing programs with more

engagement in these group based programs. Continuing implementing more engagement and interactivity within group based programs would certainly inspire more action and desire to commit to action in EcoCentre participants. The scope of the group based surveys makes a more thorough analysis and understanding difficult. Thus, implementing a longitudinal review option, similarly to the individual based surveys, may prove useful in understanding the impact of said programs following participation.

Evaluate the Entirety of Eligible Programs for their Carbon Impact and Adjust Categorization Values to Better Reflect EcoCentre Abilities and Goals

To fulfill the initial goal of the scorecard as a tool to assess how well the EcoCentre helps to reduce carbon emissions, the EcoCentre should put a concentrated effort towards evaluating all programs that have the potential to reduce carbon emissions. Completing scorecard evaluations for all potential programs will demonstrate to the EcoCentre whether improvements must be made to the kinds of programs offered.

A comprehensive evaluation of programs should also be followed by a reevaluation of the ranking cutoff for the 1-5 petal ranking system. This scale rates programs' carbon reduction from 1kg CO_2e to 1000kg CO_2e based on the values calculated in the two program case studies. After completing evaluation for more programs, the raw total carbon emissions prevented by the program can be accessed in the scorecard. Looking at these values the EcoCentre can assess whether their programs tend to reduce carbon emission in the 10s of kg range of 1000s of kg range and rewrite the ranking cutoffs to better reflect the range of programs they offer.

Figure E.4: The IQP project team remotely in Melbourne, (From left to right: Kaitlyn Morrison, Brigitte Lefebvre, Adrian Orszulak, Zachary Sotland)

Authorship

Section	Primary Author	Secondary Author
Abstract		
Executive Summary	A. Orszulak	All
Introduction	All	N/A
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Strategic Planning is a Multi-step Process that Cultivates Trust Between a Community and a Not-For-Profit Organization	A. Orszulak	N/A
Evaluating Partnerships, Staff, and Programs is Vital for Creating an Effective Strategic Plan	K. Morrison	A.Orszulak
International Organizations have created Carbon Counting Methods for Countries and Cities	B. Lefebvre	N/A
Carbon Emission Assessments for Specialized Groups	B. Lefebvre	N/A
Methods		
Objective 1: Understanding the EcoCentre, it's mission, and their strategic planning methods	Z. Sotland	N/A
Objective 2: Understanding the Opinions of EcoCentre's Partnership as well as the Impact that the Partnerships Create	K. Morrison	N/A
Objective 3: Evaluating EcoCentre Staff Well-Being	K. Morrison	N/A
Objective 4: Assessing EcoCentre Program Impact In the Wider Community	A. Orszulak	N/A
Objective 5: Carbon Emission Evaluation Development Plan	B. Lefebvre	N/A
Results		
The EcoCentre's Strategic Planning Goals have Evolved over Time	Z. Sotland	N/A
EcoCentre Partners are Satisfied with their Partnerships and are Enthusiastic about Future Involvements	K. Morrison	N/A
EcoCentre Staff are Enthusiastic about Their Work but are Over Worked at Times	K. Morrison	N/A
EcoCentre Programs Have High Participant Satisfaction but Variable Sustainability Impact	A. Orszulak	Z. Sotland
Carbon Emissions Scorecard for the EcoCentre	B. Lefebvre	N/A
Recommendations	All	All
Appendices	All	N/A

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Introduction

The world is currently faced with the increasingly dire threat of global warming. The rapid burning of fossil fuels beginning during the industrial revolution has led to an increase of 1°C in global temperature (Guilyardi, 2018 p.14-17). The UN's Intergovernmental Panel on Climate Change (IPCC) says that all countries must work together to keep the global temperature increase below a total of 1.5°C before 2050 to prevent an extreme climate disaster. Accomplishing this requires major changes in human behavior, and to ensure these changes are made, the IPCC has set guidelines for carbon emissions and reductions in every member country (2019). However, these goals can't be accomplished through government action alone. In the next 10 years, decisive action must be taken at the industrial, community, and individual levels to prevent global temperatures from reaching a 2° C increase.

Local environmental organizations are vital to changing the ways both people and governments think about and interact with the environment as they center their work around environmental sustainability, proposing ways that humanity can change their individual lifestyles and government policies. The Port Phillip EcoCentre located in St. Kilda, a suburb of Melbourne, Australia, is one such organization. It is a not-for-profit, community-based organization that promotes environmental sustainability actions in the local community through education, sustainability based projects, policy change advocacy, and public awareness. Their mission is to "[Create] An empowered community, actively cultivating long-term environmental well-being" (Port Phillip EcoCentre, 2018b). Through their operations, the organization connects the community with the environment, working with over 160 partnering organizations and over 200 schools in the Melbourne area. (Port Phillip EcoCentre, 2021d).

The EcoCentre uses an evidence-based strategic-planning approach to consistently assess its activities and ensure its efforts. This has been done in the past by analyzing program survey data and evaluating partnerships. (Port Phillip EcoCentre, 2018c; Port Phillip EcoCentre, 2015; Port Phillip EcoCentre, 2012). In 2018, the EcoCentre worked with a research team of WPI students in this process for their 2018-2021 operations. This team completed interviews with the EcoCentre's partnering organizations and analyzed program survey data aid the EcoCentre in their strategic planning (Li et al., 2018). Along with the conclusions and suggestions made from this analysis, a data visualization outlining the strength and involvement of specific partnerships and their involvement with the EcoCentre was submitted for the same purpose (Li et al., 2018).

The EcoCentre has reached the end of their current three-year strategic plan and is developing a new plan for the next three years. To assist the EcoCentre with their planning, we conducted an analysis of their internal affairs through a staff well-being survey, external relationships through partner interviews, and recent activities through analysis of past participant surveys. Additionally, in this new strategic plan, the EcoCentre is working to take steps to consciously monitor their climate change impact and take steps to reduce emissions in the Melbourne area. Through our research, we found that there are no carbon emission evaluation methods for small organizational processes and programs that the EcoCentre could use to guide their initiatives in this coming strategic plan. We have developed a novel tool in the form of a scorecard to estimate the carbon emissions reduction potential of EcoCentre programs, potentially the first of its kind. This project provided the Port Phillip EcoCentre with data and resources to create an effective strategic plan and evaluate carbon reduction initiatives.

Background

Strategic Planning is a Multi-step Process that Cultivates Trust Between a Community and a Not-For-Profit Organization

Strategic planning is vital for any not-for-profit organization. Strategic planning refers to the long-term creation of plans for achieving any long-term goals that is discussed in great detail by Williamson (2013) and Tschirhart & Bielefeld (2012). The process of crafting a strategic plan can be summarized in five key steps: the development of a mission and vision, external/internal analysis, creating objectives, formulating a strategy for operational processes, and establishing a method to evaluate the plan (Figure 1). When setting up this framework, the strategic plan needs to address the particular not-for-profit's internal capabilities and the organization must be aware of where to invest and divest from external opportunities with its limited resources to ensure success in achieving its mission (Coltoff, 2010). One of the crucial steps in this process is the external and internal analysis. Identifying what to invest and divest in and how much to do so internally and externally is a hallmark of strategic planning (Thomas & Strom-Gottfried, 2018). Over emphasizing in any one area, such as the salience of partnerships, can result in risky or ruinous behavior, impeding the organization's objectives. Therefore, a not-for-profit organization must be conscious of how much time it invests in all its activities and partnerships to be successful. Given these limitations, as Jiao (2019), Williamson (2018), and Thomas and Strom-Gottfried (2012) point out, the strategic plan sets the very framework to coordinate staff, maintain partnerships, and establish operation processes under a goal set to advance an organization's mission. Achieving this delicate balance explains the need and importance for creating a strategic planning document. It is, thereby, imperative that evaluating partnerships, staff, and programs be completed. Doing so provides a channel with which a not-for-profit can focus its efforts towards and achieve this delicate balance.

By evaluating and tracking progress, the knowledge becomes accessible by partners and the general public so as to see the organization's work in action. With an effective strategic plan and evaluation metrics, a not-for-profit organization is also able to create a positive image and reputation. As Tschirhart & Bielefeld (2012) describes, building a positive reputation alongside a positive image sets the organization closer to working to achieve its outlined mission. In a similar vein, in developing a strategic plan, a not-for-profit organization can work to achieve positive branding alongside its image which can work to ensure resource availability, external opportunities, and minimal external inopportuneness (Coltoff, 2010).

Evaluating Partnerships, Staff, and Programs is Vital for Creating an Effective Strategic Plan

Evaluation of Stakeholder Partnerships

Stakeholders of a not-for-profit organization are critical to the organization's success and operations. A stakeholder is defined by strategic planning experts Bryson and Alston as "any person, group, or organization that can place a claim [utilizes] on the organization's resources, attention, or output or is affected by its output" (Bryson and Alston, 2011)(Figure 2). By this definition, not only are the funders of not-for-profits considered stakeholders, but also other partner

Figure 1: A summarized strategic planning process (adapted from Williamson, et al., 2013; Tschirhart, & Bielefeld, 2012).

organizations that work with them on collaborations. In addition to funding, stakeholders provide exposure, knowledge, and resources to a not-for-profit which are essential for its survival. They work to support the not-for-profit in two main ways: helping form a social bond where a not-for-profit organization operates, and providing exposures and funding for an organization's operations (Valeau et al., 2018). It is extremely important that not-for-profits maintain good working relationships with key stakeholders as well as ensure that their resources are going to the most effective partnerships.

To assess these relationships, it is critical for not-for-profit organizations to understand stakeholders' thoughts relating to the strength of the relationship and the future direction of the organization. In their workbook on creating successful strategic planning documents for not-for-profits, Bryson and Alston also stated, mission development should be thought of in terms of how the stakeholders feel about the not-for-profit's mission and how it should be changed or modified (2011). Not-for-profit organizations, therefore, should look to their key stakeholders to gain insight as to how they should move forward in their goals, mission, and future planning. Part of strategic planning is understanding and developing the organization's mission and focus as well as how that will be put into practice over that time period (Williamson et al., 2013; Valeau et al., 2018). Given the importance of stakeholder influence for not-for-profit organizations, it is important to consider their input when creating a strategic plan. Secondly, not-for-profits have limited resources so it is important for them to evaluate if their resource allocation is providing effective moves for the organization.

The EcoCentre works with over 200 partnering organizations, ranging from small local community groups to governmental agencies to schools to large businesses (Port Phillip EcoCentre, 2021b). For this project, we looked at EcoCentre partnerships, defined as organizations that benefit from their work with the EcoCentre. These partnerships can be as small as working with another organization or business for a single event a year, or as large as working together on multi-year projects that result in published research reports. With the multitude of partnerships that the EcoCentre engages with in some capacity, it is crucial that they identify the most important and influential partnerships and how those partners feel about the EcoCentre's next steps during this upcoming strategic planning period. To evaluate influential partnerships during their 2018 strategic planning phase, the

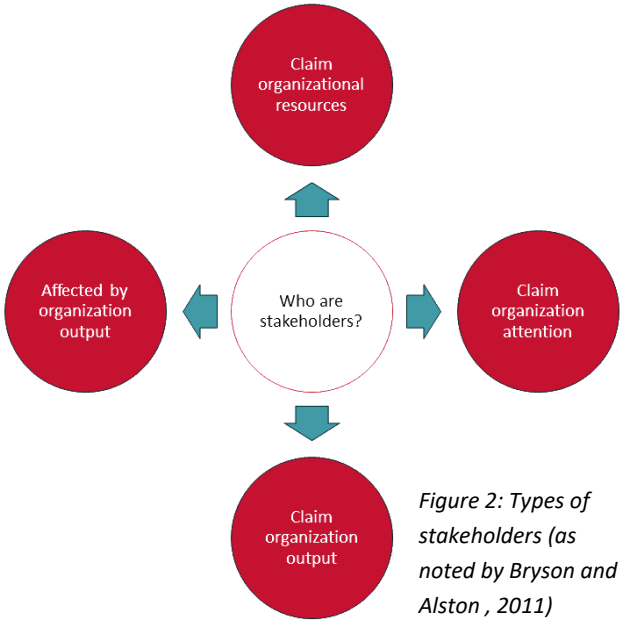

Figure 2: Types of stakeholders (as noted by Bryson and Alston , 2011)

EcoCentre turned to a group of students from Worcester Polytechnic Institute (WPI) to understand the knowledge flow between the EcoCentre and their partners as well as the impact that those partnerships had (Li et al., 2018). This was done by assessing the effort the EcoCentre put towards a partnership and the resulting change that came from that effort, which was adopted in our own methodology.

Evaluation of Staff Well-Being

Stakeholders, defined as a group that uses an organization's resources or is impacted by an organization's output, also include staff and volunteers of the EcoCentre who also have an important role in strategic planning (Bryson and Alston, 2011). Staff and key volunteers play an important role in furthering the not-for-profit's mission as they are the ones executing the efforts to further that mission or goal. The EcoCentre employs around 20 staff members, and works with numerous key volunteers to run and maintain their programs (Port Phillip EcoCentre, 2018b). Ensuring good performance and staff motivation is key for the advancement of any not-for-profit's mission as indicated by Tschirhart & Bielefeld (2012) and Marr (2009). Staff motivation can then be linked to work engagement, which is heavily influenced by the well-being of the staff (Utriainen et al., 2015). It is, therefore, important to evaluate how the staff feel about the organization as a whole, their well-being within the workplace, and their opinions on the strategic plan. Work well-being is broadly defined so as a concept it is difficult to characterize. As pointed out by Utriainen et al. in their research, "[work well-being] is proved to be dependent on the object of the work..." (2015). In the case of this

Figure 3: The influences of staff performance (adapted from Tschirhart & Bielefeld, 2012)

project, we took the approach of work well-being centralized about three main aspects: staff relationships, work culture, and personal feelings. Though each is important in its own right, together these aspects impact a staff's motivation and engagement (Dalkrani & Dimitriadis, 2018; Marr, 2009). Such a work environment can deepen the passion that the staff has for the work, acting as a strong and effective force to further drive the staff to work towards the EcoCentre's mission in their particular role (Birch & Wachter, 2008; Tschirhart & Bielefeld, 2012; Marr, 2009) (Figure 3). Assessing the wellbeing of the staff, using the measures just discussed was vital in the EcoCentre's self-assessment and strategic planning. Additionally, in order for the proposed programs to be successful, the staff and key volunteers must be motivated in running them. In the wake of the COVID-19 pandemic, it is ever more important to maintain communication with the organization's management and staff to ensure there is no tension or miscommunication on goals or mission values and to ensure their well-being.

Evaluating Program Effectiveness

Programs and other operational processes can be evaluated in line with the evaluation metrics established in strategic planning (Williamson, et al., 2013; Tschirhart & Bielefeld, 2012). As Auerbach & Zeitlin (2015), Grinnell (2012), and Spaulding (2013) describe, an organization identifies current program outcomes and determines if program objectives are met through program evaluation. Programs can be evaluated using four different perspectives: Needs, Process, Efficiency, and Outcome, which were extensively described by Auerbach & Zeitlin (2015) and Grinnell (2012) (Figure 4). Performing one or multiple of these assessments builds on the EcoCentre's understanding of how well programs are working towards achieving the goals and mission of the organization.

In the coming years, the EcoCentre plans to offer new programs, so they must establish a method for evaluating programs in their next strategic plan. In conjunction with their mission to reduce carbon emissions, the EcoCentre plans to evaluate the potential carbon reduction impact of programs that the organization may undertake. There is no conventional way to evaluate carbon emission reductions for not-for-profit programs. Therefore, it is imperative that a new method of program evaluation be developed through a needs based approach. This process will be completed by examining how carbon emissions have been evaluated by other organizations.

Needs	Process	Efficiency	Outcome
• Evaluate how well a program's goal reaches the audience	• Evaluate a program's effectiveness to its cost	• Evaluate, primarily, the monetary impact of a program	• Evaluate the degree to which a program goal is achieved

Figure 4: Program assessment perspectives (Auerbach & Zeitlin, 2015; Grinnell, et al., 2012; Spaulding, 2013).

International Organizations have Created Carbon Counting Methods for Countries and Cities

One of the EcoCentre's goals for this year's strategic planning process is to develop an approach for assessing programs for their carbon reduction potential. To lower greenhouse gas emissions and reduce climate change impacts, the EcoCentre's programs must help their attendees and partners avoid producing emissions. This can be achieved through both immediate actions taken during the EcoCentre program and the long term effect their actions create. Assessing a program through this lens requires a way to evaluate the amount of carbon emissions created and prevented by a program. These carbon emissions can be measured by the amount of carbon dioxide equivalents (CO_2e) each action can create or prevent. Carbon dioxide is a gas that traps heat in the atmosphere, leading to what is known as global warming and climate change (Guilyardi, 2018). However, this warming is not only caused by carbon dioxide. Other gases such as methane, nitrous oxide, and hexafluorocarbons among others also contribute to the gaseous blanket encasing the Earth. These gases are accounted for in carbon emission calculations with the use a gas's global warming potential (GWP) (World Resources Institute, 2014, p.51). GWPs are a numerical value related to how well an atmospheric gas traps heat relative to CO_2. Using these values, all gases that enter the atmosphere through human intervention can be converted into carbon dioxide equivalents and easily added and compared. Standardizing the measurement of greenhouse gases allows organizations to quantify emissions and draw conclusions about their current output. Because of this, carbon emission values are reported as the weight of CO_2e produced. Measuring carbon emissions is of special importance to countries and cities because of the Paris Agreement and Kyoto Protocol, which set a precedent for governing bodies of populated areas to track the CO_2e emissions their citizens and industries produce. Because of this, standardized methodologies on counting carbon for these bodies are thoroughly developed and well documented.

Counting Carbon at the Country Level

Amongst the organizations that work to assess carbon emissions is the United Nations Intergovernmental Panel on Climate Change (IPCC). The panel works to monitor carbon emissions in the world, working as an overseeing board of the United Nations member countries. The IPCC's 2019 Guidelines were written as the standard for countries to calculate and report their own carbon emissions so they can evaluate their progress in achieving future carbon emission reduction goals. The process for calculating emissions is split into five main categories: energy, industrial processes and product use, forestry and other land use, agriculture, and waste (2019a, p. 1.6). These sectors were identified as the areas of a country's operations that would produce or capture the most carbon emissions, and most smaller operations can be categorized into one of these sectors. As per the IPCC's recommendations, nations create national inventory institutions for overseeing the collection and aggregation of data for each of the sectors (2019a, p.1.12). The methodology for the collection of carbon emission data is to first use existing data; this can come from national and international carbon emission statistics, industrial and academic data, and modified existing data sets. After collecting this information, countries can begin collecting their own data through measurements and surveys (2019b, p. 2.7). All collected data must be quality checked according to IPCC standards. This includes evaluating the methods of data collection, having data checked by an outside source, and calculating uncertainties in the measurements. Once data is collected and compiled for each sector, a country's leadership not only knows how much carbon emissions they create, but what sectors of their economic output creates the most carbon emissions.

Cities Assess Carbon Using Specific Scopes

The Greenhouse Gas (GHG) Protocol is a city level carbon assessment strategy written by the World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI - Local Governments for Sustainability and based on the IPCC guidelines (2014). This protocol shares many traits with the IPCC guidelines when it comes to data collection and quality. However, an important tool that was developed for cities to judge what carbon emissions they were producing was the idea of scope. The GHG protocol uses scope labels to

> "[distinguish] between emissions that physically occur within the city (scope 1), from those that occur outside the city but are driven by activities taking place within the city's boundaries (scope 3), from those that occur from the use of electricity, steam, and/or heating/cooling supplied by grids which may or may not cross city boundaries (scope 2)" (World Resources Institute, 2014, p. 31) (Figure 5).

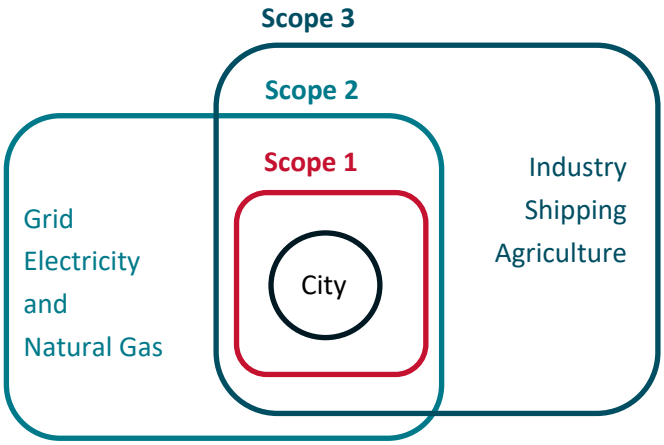

Figure 5: A basic visualization of the scope system used in the GHG Protocol

This scope system is helpful to cities, since their boundaries are not as well defined as countries and their resource chains are much more interconnected to surrounding communities. For example, a city could send its waste to a landfill outside of city limits, but the related carbon emissions for that waste is still the responsibility of the city. If this were not the case, a city looking to reduce its carbon emissions might not reduce single use plastics or cut electricity use, because the impact of those actions aren't reported. This scope method is essential for effective carbon reduction. Understanding the amount and source of carbon emission is paramount for solid carbon reduction efforts.

Carbon Emission Assessments for Specialized Groups

While the EcoCentre can use similar methods as the IPCC and GHG protocol suggest, both methods are designed for evaluating bodies that are responsible for generating and then reporting several trillion tons of CO_2e. The EcoCentre's programs will largely be reducing carbon emissions on the kilogram scale. To create a more accurate program evaluation tool, drawing inspiration from endeavors to measure environmental impact at smaller scales or in the local area of the EcoCentre will aid in its development.

Beyond Zero Emissions

Beyond Zero Emissions is an Australian based organization with the mission to generate ideas, research, and initiatives that push the country to become more sustainable. A facet of this goal is the organization's CO_2 Emissions Snapshot tool, which gives local government areas information about the amount of carbon emissions they create and the types of activities that produce these emissions. Port Phillip is among the Australian council areas that the organization creates profiles for. The carbon emission snapshot profiles break down the city's emission by waste, transport, gas, and electricity and shows the percent of total emissions that come from each sector (Beyond Zero Emissions, 2019). To create these emission profiles, the organization largely makes use of regression equations to scale national and state data to smaller scales based on local demographic data (Beyond Zero Emissions, 2020). This method is highly effective for quickly creating many profiles that can be compared amongst each other and give councils a basic idea of how much emission they are creating. However, the use of regression tools and large data sets means that some of the effects of local initiatives are not taken into account. While these carbon emission values can be helpful for the EcoCentre's evaluations, because many EcoCentre programs are restricted to specific geographic areas the effect of localized initiatives and policies that can effect carbon emissions should also be taken into account.

Energy Star

The United States Environmental Protection Agency (EPA) developed the Energy Star program to set standards for energy efficient household items, buildings, and servers in the United States. The Energy Star guidelines define limits on energy use for the operation of these buildings or products to qualify them for an energy star certification. The Energy Star organization creates sets of guidelines for all the appliances, servers, and buildings that are eligible for an Energy Star rating, which are then tested by a non-biased outside party (Energy Star, n.d.). Focusing on the well known appliance rating system, every type of appliance has its own set of standards for the products' energy and water savings, as well as its lifespan and performance. If the appliance doesn't offer significant energy savings or operates below the expected standard appliance on the market, it won't receive the certification. Appliances are simply split between those appliances that do not meet certification standards and those that do. However, Energy Star certifications for buildings have both 1-100 scale ratings as well as star ratings to rate buildings. The rating scales are applied to buildings because there are many different ways a building can be designed to save energy and the scale allows buildings that focus on certain energy saving features to be compared to buildings that focus on other methods. While the evaluation system Energy Star uses has pages of specified standards for every appliance, their outward facing ranking system is a good tool for easily conveying evaluation information.

Ecological Footprint Report

This report was conducted by the Melbourne Sustainable Society Institute on behalf of the City of Port Phillip to understand the effect the urban lifestyle of the city has on the environment. The report follows the Greenhouse Gas Protocol, and is rigorous in tracking not only the impact within the city, but the resources needed to support the food, imports, etc. of an urban lifestyle (Candy et al, 2018). Since the report was conducted specifically for the city of Port Phillip, it contains a lot of local data on lifestyle, resource use, and carbon emissions. The carbon emissions reported are on the scale of millions of tons of CO_2e, while the EcoCentre deal with emissions on the kilogram scale. The data is also applied to the whole population, and is based on averages about consumption habits, electricity usage, eating habits, housing situation, etc. so the data is helpful in understanding the average Port Phillip resident. It has a lot of information about where Port Phillip would like to improve, and could help guide ideas for where the EcoCentre would like to focus new programs

Methods

In order to achieve our project goal of providing the Port Phillip EcoCentre with data and resources to create an effective strategic plan and developing a tool to evaluate carbon reduction initiatives, we completed our five main objectives (Figure 6). These objectives were outlined during our preparatory term, January 28th - March 18th 2021 and finalized in our final project proposal. We completed our objectives during our project term, March 24th - May 13th 2021, which was carried out remotely due to the COVID-19 pandemic between our project team based in Worcester, MA and our sponsoring organization The Port Phillip EcoCentre which is based in St. Kilda, Australia.

Objective	Methodologies
1) To understand the EcoCentre, Its mission and their strategic planning methods	• Complete archival analysis of past strategic plans and EcoCentre documents • Conduct interviews with the CEO and committee members
2) To examine the views of the EcoCentre's partners on their relationships and the impact of them	• Conduct interviews with select partners • Identify new partners and the impact that those relationships create
3) To understand the EcoCentre's staff, their well-being, and their satisfaction within the organization	• Conduct staff well-being survey with staff and key volunteers
4) Assess and analyze the impact the EcoCentre has with its programs through an external perspective	• Analyze past program participant data using a variety of methods to understand program impact • Conduct participant interviews
5) To inform the EcoCentre on ways to measure the carbon impact their current and future programs can	• Conduct a staff survey to understand priorities • Develop a scorecard for EcoCentre programs • Use existing EcoCentre programs to test the scorecard through case studies

Figure 6: Overview of the objectives and methodologies within this project.

Objective 1: Understanding the EcoCentre, it's mission, and their strategic planning methods

To understand the EcoCentre and their goals for the next strategic planning process, we primarily used archival analysis centered around the EcoCentre website and supporting documents. We were then able to determine how the EcoCentre currently measures impact, and how their strategies and goals work towards successful impact, as well as learning about the EcoCentre's current strategic planning methods. Throughout the project we continued to reference the EcoCentre's online documents, such as past annual reports and strategic plans, as our knowledge of the EcoCentre grew. Their annual reports gave us insight on how program impact is quantified or measured by the organization to report it out to the public, while their strategic plans provided insight on the route they took to that measurement. Also, learning about their programs, and specifically those centered around climate change, provided insight on the EcoCentre's current climate impact.

Secondly, we watched and observed the EcoCentre's virtual strategic planning meetings. This gave us insight into the goals of the EcoCentre, their views and opinions of the current strategic planning methods, and potential plans for the future. We also gained a more refined view on what the EcoCentre hopes to accomplish, and how they want to achieve that goal. Knowing this, we were able to focus our project around helping the EcoCentre in the best way possible, to give focused insight and analysis on programs and relationships.

Objective 2: Understanding the Opinions of EcoCentre's Partnership as well as the Impact that the Partnerships Create

To understand the views of EcoCentre partners as well as the impact that those relationships create, we completed both research interviews with partners and impact mapping in order to gain a complete image of EcoCentre partner relationships. These methods are separately discussed in detail below.

EcoCentre Partner Interviews

In order to assess the opinions of the EcoCentre's partners about the EcoCentre, we conducted research interviews with leaders of nine partnering organizations chosen by the EcoCentre. The purpose of these interviews was to gain insight into how partners perceive the EcoCentre and their overall view of the relationship. Partners were selected to represent all types of EcoCentre partnerships, including government, community or not-for-profit organizations, universities and research institutions, and businesses. Purposeful sampling was used to create the final list and was based on the availability of stakeholder representatives as determined by our sponsor, the amount of time that has passed since the EcoCentre has reached out to the partner, and the EcoCentre's interest in learning what a particular partner's current feelings are. We were then put in contact with these leaders and their organizations, detailed in Table 1, through the EcoCentre staff.

Table 1: Organizations interviewed as part of the partnership analysis

Stakeholder name	Type of Organization
Brighton Sea Scouts	Community Organization
City of Port Phillip	Local Government
CoastCare Victoria	State Government
Melbourne Water	Local Government
Royal Melbourne Institute of Technology (RMIT)	Research University
Corporate Volunteering Participant X	Business
St. Kilda Repair Café (Jewish Ecological Coalition)	Community Organization
Worcester Polytechnic (WPI)	Research University

A set of research interview questions were adopted from Li, et al. and developed using input from

1. How would you personally describe your organization's mission and/or purpose?
2. What are your groups key objectives for the next three years? How can the EcoCentre play a unique role to help deliver those objectives?
3. Why does your organization choose to partner with the EcoCentre?
4. How would you describe the EcoCentre to a colleague?
5. Can you give me an example of a collaboration that you have done with the EcoCentre?
6. What have been the outcomes of your work with the EcoCentre? Has it been sustained?
7. What do you personally value about your partnership with the EcoCentre?
8. What could the EcoCentre learn from best practices of your other partnerships?
9. Do you have any feedback that you would like to share regarding how the EcoCentre could improve the relationship it has with your organization and/or how it could improve in general?
10. Do you have anything else you would like to add?

Figure 7: Partnership Interview Questions. See Appendix B for Consent Form

the EcoCentre's Executive Officer (EO) and the EcoCentre's professional strategy consultant (Figure 7) (2018). These questions worked to understand how partners view the EcoCentre, what types of interactions they have with the organization, and their thoughts on how it could improve. The only exception to this list was our first interview, held with a representative from CoastCare Victoria, who was interviewed before an adjustment of our research instruments to cut the length of the interviews (Appendix A). A consent statement used for all interviews was also created (Appendix B). After completing these interviews, the audio recordings were transcribed digitally by Otter.ai and then manually checked by a team member. From there, each team member read and/or listened to the interviews and came up with code categories or themes that appeared in the interviews. Continuing to follow the methodology first put forth by Li et al. (2018), we then utilized these interviews as the tool to answer four specific research questions, detailed in Table 2, which paired up with specific interview questions. A matrix was then made in order to count the amount of occurrences of each idea. These occurrences were used as indicators as to the overall feeling of the interviewed partners and gave insight into how the partners view their relationship with the EcoCentre and how the EcoCentre

Table 2: Research questions surrounding the stakeholder interviews

Research Question	Relating Interview Questions
1) What do stakeholders value their partnership with the EcoCentre?	7) What do you personally value about your partnership with the EcoCentre?
	5) Can you give me an example of a collaboration that you have done with the
2) What does the EcoCentre do best?	3) Why does your organization choose to partner with the EcoCentre?
	4) How would you describe the EcoCentre to a colleague?
	6) What have been the outcomes of your work with the EcoCentre? Has it been
3) Where can the EcoCentre improve?	8) What could the EcoCentre learn from best practices of your other partnerships?
	9) Do you have any feedback that you would like to share regarding how the EcoCentre could improve the relationship it has with your organization and/or how it could
4) What should the EcoCentre focus on in the next few years?	2) What are your group's key objectives for the next three years? How can the EcoCentre play a unique role to help deliver those

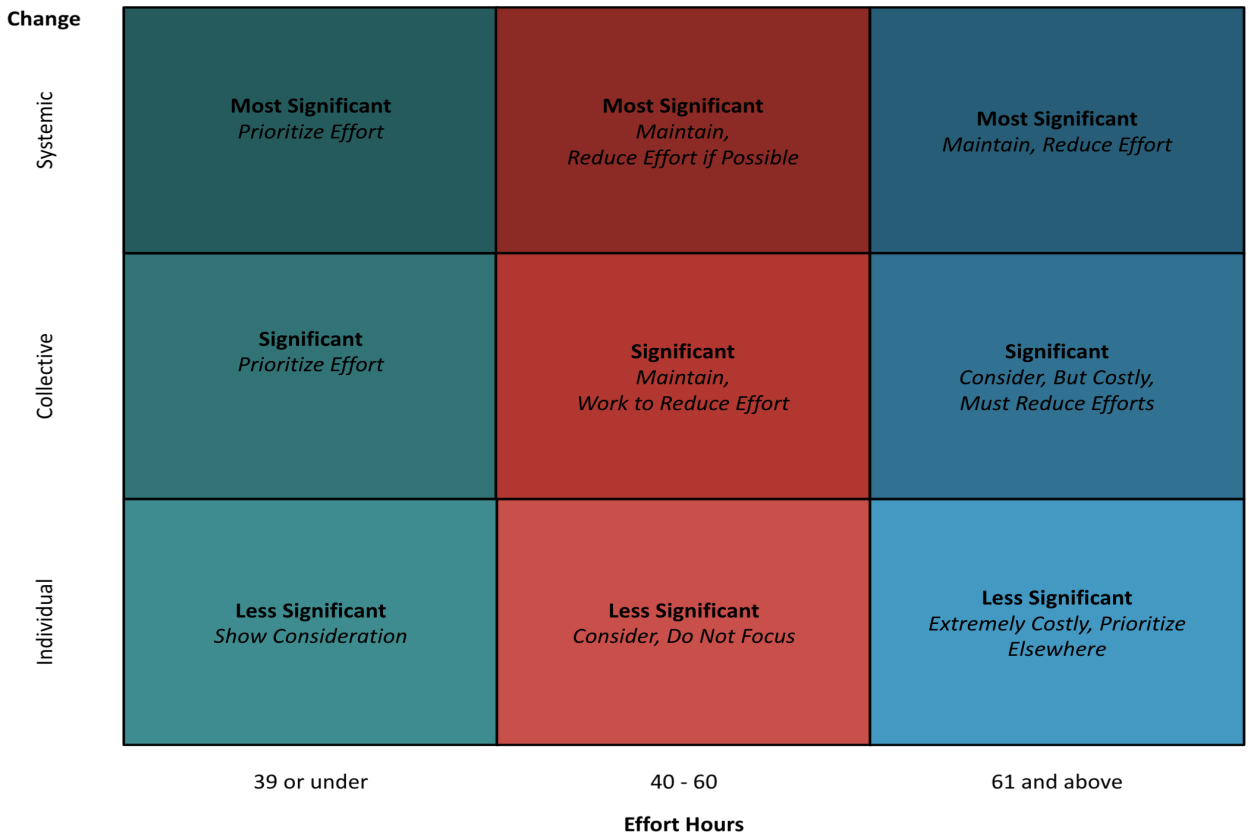

Figure 8: The adapted matrix used to classify the EcoCentre's Partners into impact categories (Li, et al., 2018)

could improve their organization over the next three years.

Impact Mapping

When last completing their strategic plan in 2018, the EcoCentre worked with a group of students from WPI to establish a knowledge flow map to describe the resources and knowledge flowing between the EcoCentre and their partners, as well as an impact map (Li, et al., 2018). Each stakeholder was categorized by a variety of factors to generate a full knowledge flow map with each classification denoted by a specific marker (Li et al. 2018)(Appendix C). By doing this, the EcoCentre was able to visually see where gaps in knowledge were and where there were imbalances in the amount of information being exchanged between the two organizations. Additionally, Li, et al. created an impact matrix that categorized each identified partner of the EcoCentre by the scope of change the partner was looking to accomplish versus the amount of hours per year, outside paid hours, that the EcoCentre invested towards maintaining the relationship (2018). They then compiled this data and entered it into a matrix which plotted these two characteristics against each other (Figure 8, See Appendix D for the detailed matrix) and from that, provided the EcoCentre with recommendations as to which partnerships were worth investing more effort into and which external stakeholders to divest in. From this analysis, the EcoCentre could then ensure that their most impactful partnerships were being consulted in their strategic planning to produce an overall better strategic plan.

After the last three years, the EcoCentre efforts and impact have changed with some partners since they were last categorized on this matrix, as well as partnered with new organizations not present on this matrix. Therefore, we identified all organizations that were not previously identified on this matrix through the EcoCentre's past three annual reports (Port Phillip EcoCentre, 2018d; Port Phillip EcoCentre, 2019; Port Phillip EcoCentre 2020). We then talked with the EcoCentre's EO to obtain information on the new and existing partnerships regarding the scope of change that they created and the amount of hours that the EcoCentre

put into the partnership averaged over the last three years. Using this information we finally placed each partner into the impact map previously created during the last strategic plan (Figure 8) (Li et al., 2018). By assessing each of these new partnerships' impacts, we were able to provide the EcoCentre with suggestions as to how to move forward with these new partnerships.

Objective 3: Evaluating EcoCentre Staff Well-Being

In order to evaluate the current state of well-being among the staff and key volunteers of the EcoCentre, we conducted an anonymous digital survey of staff members. The purpose of this method was to understand the current feelings of the EcoCentre staff in both how the EcoCentre is running and how they themselves are feeling within the organization. It sought to determine: how well do the EcoCentre's staff work with each other, how do the EcoCentre staff feel about working for the organization, and how do the staff feel about their own contributions towards the EcoCentre mission. With input from the EcoCentre's EO, their committee's professional strategy consultant, as well as through research of our own, we developed a 24 question long survey that incorporated both scaling questions as well as prose questions (Appendix E). The scaling questions, on a 1-5 scale of strongly disagree to strongly agree, were incorporated to provide a basis for evaluating trends over multiple cycles of the survey and to provide some break in the prose questions. These questions looked to understand the overall feeling of the staff towards the working environment. The prose questions, consisting of 19 out of the 24 questions, provided individual opinions to the work environment and work culture of the EcoCentre. An additional consideration when creating this survey was relative anonymity of the responses due to the small size of the EcoCentre staff. To this end, a consent statement was provided to the staff taking the survey which noted the potential break in anonymity and ensured them that all responses would be treated as anonymous even if there were identifying responses that could point to one staff member (Appendix F). This survey was distributed digitally to all 15 staff members of the EcoCentre through the EcoCentre's EO.

Once all the responses were collected, we employed content analysis on the qualitative data and performed standard percentage analysis for the quantitative, scaling data. From there, we identified the trends and came to a reasonable conclusion regarding the staff well-being of the EcoCentre as well as suggestions for how the EcoCentre can move forward.

Objective 4: Assessing EcoCentre Program Impact In the Wider Community

The EcoCentre is able to connect with and inspire change in the Melbourne community through the numerous programs it runs. In order to obtain a sense of how well the EcoCentre is achieving their goals through programs, understanding program impact is essential. Program assessment provides valuable information that the EcoCentre utilizes to evaluate success indicators for the objectives set in their current strategic plan (Port Phillip EcoCentre, 2018c). The methods used include analyzing collected program survey data, interviewing past program participants, and analyzing the geographic distribution of participants in EcoCentre programs to amass more of an understanding in EcoCentre program impact. Through these methods, an understanding of participant satisfaction, participant behavioral changes, and program impact will be gathered and analyzed. Within this particular section, each method will be detailed and explained individually..

Program Survey Data

The program survey data was collected from participants in an optional survey following the

completion of each program associated with the EcoCentre from 2018-2020. A total of 370 unique responses were collected, and provided for analysis. This survey data informs the EcoCentre more specifically of individual behavioral changes that are made, overall participant program satisfaction, how well the programs themselves are run, and any areas in which programs can be improved. There were two main variations of these program surveys: individual and group based. In the individual based surveys, participants entered and submitted information individually. In the group based surveys, staff members entered information based on responses prompted to all participants before the end of a particular program. Each survey had different questions depending on the type completed (Appendix G). Regardless of the type of survey, there are a number of key criteria that the EcoCentre is looking for based on the responses to specific questions. These criteria include participant satisfaction, how a program influenced behavioral changes, and changes in perspective. In organizing this data, the inconsistencies between program activity descriptions promoted our organization of the data overall and by year. While the program data is not a random sample of data, the insights and trends of the data can still be used to draw conclusions.

In addressing participant satisfaction, the EcoCentre poses a number of questions aimed at identifying how enjoyable a program is (Figure 9). In the second question, the EcoCentre looked to understand how satisfied participants are on a scale that can be quantified. Likewise, we were also able to gauge participant satisfaction in the third question. These trends were used by the EcoCentre to examine if their programs are improving or losing people's interest. To address the contents of those prose responses, we again employed the strategy of content analysis (Appendix H). Correlation analysis of this data was also done to determine whether certain codes are linked by a relationship of some kind. In addition to this content analysis, a computer algorithm was created to record the instances of all words in the survey data for each question (Appendix I) (Appendix J). This algorithmic approach allowed the team to validate their content analysis work by analyzing word instances related to

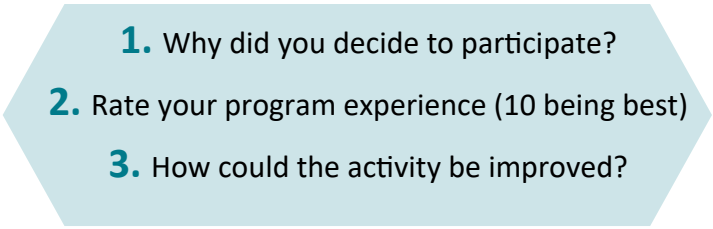

Figure 9: Participant Survey Questions Addressing Participant Satisfaction

categories, provide useful terminology to the EcoCentre, note instances of behavior change, and identify program impact through the terminology used and instances of that terminology . Statistical analysis using the sign test was also performed with this data. Performing this test was used to discern if the median participant satisfaction between each program and for all programs is greater than a particular median (Petruccelli, et al., 1999). The program data, though not a random sample, will be assumed to be continuous when performing the statistical tests. The results of this test showed whether the EcoCentre has significant satisfaction within their programs.

The remaining survey questions sought to understand how a program leads to changes in participant's behavior and perspective (Figure 10). Within the individual based survey, question four consists of prose data that was analyzed utilizing content analysis and the dictionary algorithm as discussed previously. Questions one, two, and three represent binary, yes/no response data. To evaluate this data, we enumerated the number of yes responses and no responses in order to calculate a percentage of respondents that answered yes and no for programs overall and individually. These percentages yielded information regarding how perspectives, knowledgebase, and behaviors of the participants have changed after being a part of a program. Between individual programs we were able to identify perspective and behavioral changes of participants. In addition, a statistical analysis using Cochran's Q Test was performed on the individual binary questions. This test used the number of yes responses, defined as success, to determine if there is a statistical difference between the successes between groups (Patil, 1975). This particular test examines if there are any differences between the responses between all years an

Individual based survey

1.Did you (or your group) learn something new about the local environment? (Y/N)

2.Do you (or your group) now feel more connection with the local environment? (Y/N)

3.Do you (or your group) expect to spend more time connecting to the local environment as a result of this activity? (Y/N)

4.Do you (or your group) plan to take any new sustainability action?

Group based survey

1.How many people in your group answered YES for: they learned something new about the local environment?

2.How many people in your group answered YES for: they now feel more connection with the local environment?

3.How many people in your group answered YES for: they expect to spend more time connecting to the local environment as a result of this activity?

4.If an action program -- How many people in your group answered YES for: plan to take any new sustainability action?

Figure 10: Participant Survey Questions Addressing Behavioral Changes and Perspectives

individual program is run. The group based survey questions ask about the same information to their counterparts in the individual based survey. Our team calculated the percentage of participants who answered yes and no similarly to what will be completed for the individual based survey questions using binary, yes/no data. A Z-score test for one proportion was completed to evaluate whether these percentages were significantly greater than a cut-off. Doing so would indicate that a program was more effective than a set value.

Participant Interviews

Within the individual based surveys, participants were asked to enter a form of contact information if they were interested in answering questions about their program experience in a year's time (Appendix G). Through the EcoCentre, we contacted all 150 individuals who provided contact information in the survey for an interview for programs from 2018-2020. In total, we were able to interview five individuals. In line with this longitudinal study method the EcoCentre performs, interviewing previous participants was beneficial to understanding the impact programs have had on individuals. Oftentimes, it takes time for changes to be created and maintained in an individual's daily life. Therefore, this longitudinal analysis was useful in assessing how participation in a particular program really changed one's behaviors through first-hand accounts. We were able to hear more about the sustainability actions individuals have taken since responding to the initial program survey, as well as changes they have seen in others. Overall, the interviews provided insight, from first-hand accounts, on participant satisfaction, program impact, and how individual behavior changed.

Within the questions we asked the past participants, assessing behavioral changes was examined mainly by questions 3, 4, and 5, while program satisfaction was examined mainly by questions 1, 2, and 6, and program impact was examined mainly by questions 1, 3, 4, 5, and 6 (Appendix K). Future improvements by the EcoCentre were also assessed using question 7 (Appendix K). The final question served to note any additional information that an interviewee would have liked to provide us. The blue text indicates aspects that were filled in specific to the interviewee. We also utilized content analysis by simply coding the data in a similar way to the method previously described to gain more insight on the impact programs have had on them. In accordance with ethical practices, a consent statement had been drafted that was provided to interviewees upon agreement to an interview or a survey respectively (Appendix L). For interviews, this consent statement was read to interviewees before beginning the interview, and oral consent was obtained. These were one-time interviews specific to the strategic planning initiative.

Postal Code Mapping

The final method that addressed program impact involved the use of postal codes and social mapping. By examining the postal code data, we were able to assess where the EcoCentre programs participants come from. Next, archival analysis of various documents that discuss

environmental projects and advances within the city of Melbourne in each of these postal code areas was completed. Utilizing this information, a postal code data visualization was constructed to identify key projects and program responses for the EcoCentre. Finally, we cross-referenced demographic data with postal code areas to understand how widespread the EcoCentre's impact is using a demographic lens. Through this, we analyzed the reach of the EcoCentre in regard to demography and income, as well as proximity to Port Phillip.

Objective 5: Developing a Tool to Evaluate Carbon Emission Reduction of EcoCentre Programs

To aid the EcoCentre in its plans to enact measurable climate change prevention, we developed a scorecard that estimates the total carbon emissions prevented by a single EcoCentre program. The scorecard then categorizes the program into one of five levels of carbon emission reduction. The scorecard was designed to be extremely flexible and adaptable to suit not only the currently broad range of programs the EcoCentre offers, but also any future programs the EcoCentre choses to pursue. To develop this scorecard, we used the following methods during the design process.

Initial Survey to Understand EcoCentre Priorities

To understand the intention the EcoCentre has for their Carbon Emission programs, we surveyed six EcoCentre executive board members. This survey was designed to collect information on the EcoCentre's carbon reduction plans, as well as the kinds of resources regarding carbon emission reduction that they have access to (Appendix M & N). We were particularly interested in carbon emissions data tailored to Port Phillip, such as those from the local power grid and transportation services. Our intention was to gain a quick understanding of where the board members stood on their priorities in carbon reduction efforts, and possible pathways to carbon reduction they were already examining. Their answers were used to guide the design of the first prototype scorecard.

Scorecard Inspiration

Through our research on carbon emission tracking and reporting, we were unable to find evaluations with similar scales or purposes. Most carbon emission counting methods were designed for use on large corporations and entire countries. Smaller scale evaluations tended to either be for extremely specific types of products or take a holistic approach that evaluated many sustainability actions and goals. However, while developing the scorecard we took inspiration from these assessments to come up with preliminary ideas from the methods used. With these previous methods in mind, we surveyed and talked with EcoCentre staff about our ideas and incorporated their knowledge on both how the EcoCentre runs and accurate carbon emission reporting to tailor the scorecard more closely to the EcoCentre's needs. These conversations helped answer questions about the extent that carbon emissions should be measured and calculated, the types of programs the scorecard evaluates, and the expectations on how the final evaluation would be presented.

Design Criteria for a Meaningful Evaluation Scorecard

During the development process for the carbon emission scorecard, several pieces of design criteria were considered. We chose to focus on these aspects of the scorecard design so that the scorecard process was simple enough to be easily understood and used while the final evaluation calculated by the scorecard was as accurate and easy to calculate as possible.

The criteria we focused on are as follows:

1) Scorecard is applicable to EcoCentre programs
2) Format is easy to use and understand
3) Carbon emission values are accurate and relevant
4) Final evaluations are easy to compare and understand without prior knowledge

To develop the criteria we had several ideas on how each one would be fulfilled before beginning our first scorecard prototype.

1 Scorecard is Applicable to EcoCentre Programs

The scorecard first and foremost had to be able to evaluate EcoCentre programs. The current methods designed for assessing carbon emission impact discussed previously are designed for groups measuring industrial processes and emissions on the scale of tons of CO_2 emissions. However many of these methods are well designed and result in accurate and easy to understand emission, so we chose three different concepts from existing carbon counting methods to incorporate into the scorecard that would help in defining how the scorecard applied to the EcoCentre. These concepts were Scope, Sector, and Action.

Scope: The scope of a change is used in the GHG Protocol and refers to how far in time and impact a scorecard calculates. Time refers to how long it must take to see carbon emission reductions. For example, switching to LED lightbulbs changes the carbon emissions a home produces by reducing energy consumption which can be measured over an hour, month, year, or even lifetime of the bulb. Impact refers to the extent that carbon emissions should be attributed to a program. With LED light bulbs, carbon emission impact could refer to carbon saved from not using energy, but could also refer to the carbon need to produce an LED light bulb versus an incandescent bulb.

Sector: The sector refers to what sources of carbon emissions the program tackles, such as energy consumption or overabundance of waste. These categories were inspired by the IPCC carbon emission sectors: energy, industrial processes and product use, forestry and other land use, agriculture, and waste. However we expected to edit, remove, or add sectors to better reflect the types of programs the EcoCentre may run once we began designing the scorecard. For example, an LED light bulb campaign might be categorized as energy and is a good fit for defining EcoCentre programs. However the EcoCentre does not participate in agriculture, so we removed this category.

Action: This refers to actions taken during or because of the program. In a light bulb campaign, this would be the action of replacing an incandescent lightbulb with an LED light bulb. This concept was used to anticipate what the EcoCentre would focus on in their programs.

2 Format is Easy to Use and Understand

We knew that the scorecard would be used by multiple members of the EcoCentre Board and staff, so when we developed the scorecard we worked to ensure that each step was understandable and our process was well documented. The first decision we made in order to make the scorecard usable was that the scorecard would run using Excel. This is because the program is fairly common and many people know the basics of navigating Excel. The second decision we made was to create a thought process document while we designed and tested the scorecard that acted as a supplemental material to understand how the scorecard works. Our third and final decision was to put instructions directly on the scorecard to guide users through the scorecard process.

3 Carbon Emission Values are Accurate and Relevant

To make sure that the values used in scorecard calculations accurately reflected the programs at the

EcoCentre, we aimed to find data that was local to the City of Port Phillip and Life Cycle Assessment (LCA) data for individual items that the EcoCentre might use in order to calculate carbon emissions. We wanted to find these types of data because the EcoCentre works on a small scale in a geographically specific region, and applying datasets from, for example, Russia's national carbon emission reports would be inaccurate. To make sure the data is accurate, we first found sources of carbon emission data reported from Port Phillip, the Victoria government, or the Australian government. If data from these three sources could not be found, we used data from laboratory tests or read the methodology sections of the reported data to see if the circumstances for the data collection were similar to those found in Australia.

4 Final Evaluations are Easy to Compare and Understand without Prior Knowledge

The scorecard is an evaluation tool for internal EcoCentre decisions, but we were also tasked with developing a public facing rating system. To fulfill this need, we created distinct bins for each program to be categorized under based on the amount of CO_2 emission the program reduces. We then created icons to indicate the rank of the program that can be added to the EcoCentre website and documents.

Scorecard Prototyping

The prototyping phase was a continuous effort to create and tweak the format and calculations for the physical scorecard as we collected more CO_2e emissions values, adjusted the information needed to put in the scorecard, and the form of the final program score. This process was guided by the defining the following scorecard metrics used in the scorecard.

Benefits: This is any action in a program that reduces carbon emissions.

Detriments: This is any action that must occur for a program to run, and increases carbon emissions. This might be the use of personal cars to travel to a program destination or single-use materials that are necessary for the activity.

Inputs: This is the word used to define numeric values that can be used to calculate the carbon emissions created or prevented by program actions

In addition to the metrics that had to be defined to standardize how every aspect of a program was accounted for, the scorecard to be tested to check that the process and format worked for evaluating EcoCentre programs.

Design Trials and Case Studies

Through out the development of the scorecard, EcoCentre programs were used as a touchstone to check that the different aspects of the design worked on EcoCentre programs. After the previous metrics were defined an EcoCentre program, Zero Waste Birthday Parties, was selected to evaluate the first prototype. The Zero Waste Birthday Parties program was chosen because it has easily measurable actions, reducing single use plastics, that could be equated to a CO_2e value. Using this program, the first scorecard design was to determine what changes needed to be made. The problems that arose in this case study, including flaws in how CO_2e equivalents were being measured and an impractical level of detail being demanded for evaluations, were addressed. Following the first case study, each aspect of the scorecard was checked through various design trials where a program was used as a guide to find any further problems in the prototype design. Trouble spots were noted and those problems were corrected in the next iteration of the scorecard. The testing process using programs as guides was continued until our final model was created. Once the design was finalized, two full case studies using Zero Waste Birthday Parties and the St. Kilda Repair Café were completed to understand the range of CO_2e emission reductions that could be achieved by the EcoCentre.

Results

It was our goal to provide the EcoCentre with data and resources to create an effective strategic plan and evaluate carbon reduction initiatives. Analysis of strategic documents, stakeholder partnerships, staff well-being, program data, and participant interviews was completed for the internal and external analysis required for strategic planning (Figure 11). Our team had a number of key findings following this extensive analysis.

In addition, the EcoCentre plans to begin evaluating their programs for carbon reduction impact to make internal decisions on program offerings as well as advertise these benefits to both partners and participants. Therefore, a method of analyzing program carbon emission impact was created in the form of a scorecard (Figure 11). This scorecard calculates carbon emission produced or reduced for a program based on a set of informed values from literature review, and attributes a score to those values in a binning system.

1. The EcoCentre's strategic planning goals revolve around the ideas of increasing community engagement and climate change impact
2. Partners are satisfied with their relationship with the EcoCentre and the work that they are doing.
3. The staff are enthusiastic about their work and the impact of the work, yet they feel overworked.
4. EcoCentre programs have high participant satisfaction, but variably inspire participants to seek sustainability action
5. A scorecard was created to calculate the carbon emission impact of EcoCentre programs

Figure 11: A summarized list of key findings

The EcoCentre's Strategic Planning Goals have Evolved over Time

By reading through the EcoCentre's recent annual reports and strategic plans, we obtained a better understanding of what the EcoCentre is seeking out of the strategic planning process and the specific analyses that would be most helpful in this process. We also determined the type of formats the EcoCentre prefers to use, so the general public has full understanding and is engaged with the material. Learning from the annual reports, we have provided our data in percentages, graphs and tables for ease of use and visibility as well as providing stand out responses from the participant survey for later use by the EcoCentre if desired. Also, the EcoCentre's past success

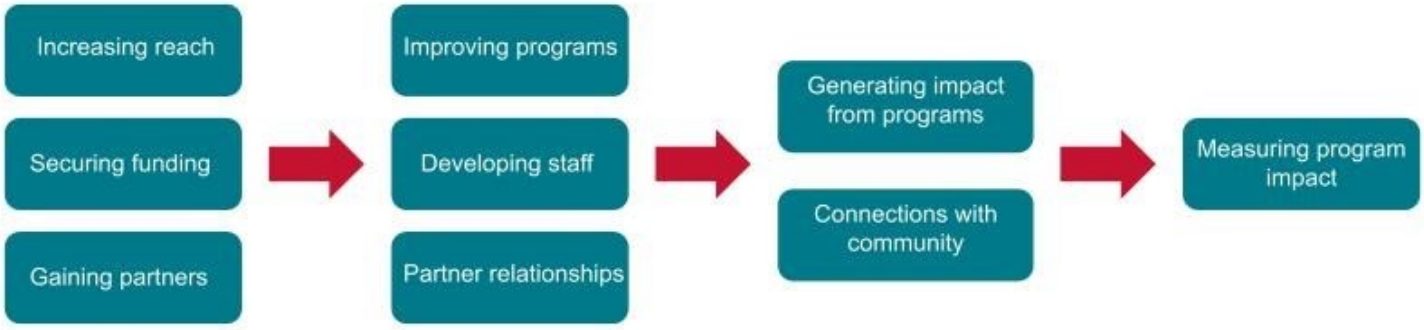

Figure 12: The EcoCentre's strategic planning focuses over the last three strategic planning phases, leading to how our project will assist in the next phase

indicators have helped to develop our understanding on what they seek to accomplish, and how our project can accomplish similar goals.

As the EcoCentre has grown and changed, their strategic planning goals have shifted as well. They began with a focus on gaining partners, increasing their reach, and securing funding, then shifted towards improving programs and partner relationships, as well as staff development. Moving into their most recent strategic plan, they have a focus on generating an impact from their programs and community connections. Advancing into the next strategic planning phase, our project will aid in the measurement of impact from EcoCentre programs through the implementation of a program calculation scorecard and past program survey analysis (Figure 12). Additionally, many new partners were found through the annual reports, to be assessed and added to the continued partnership analysis.

The meeting with both the Committee of Management and staff provided us insight on the direction the EcoCentre is striving to move into in the next three years. It reinforced the need to implement more climate change initiatives, with the City of Port Phillip recently declaring a climate emergency and soon developing its own climate action plan. In the future, the City of Port Phillip will be more likely to make climate change and the environment a larger focus with increased community engagement, which will be generated by the EcoCentre aiming to develop new programs focused around climate change and engaging a wider audience. Developing climate change related programs in the future will be essential, and with the great partnerships the EcoCentre has with other local environmental organizations, connecting with those who specialize in climate change will play a key role in developing great programs. Additionally, if the EcoCentre is a facilitator in creating and providing access to renewables in high density housing in Melbourne, the community will be even more involved in decreasing their carbon emissions and increasing support. With the accomplishments of the most recent microplastics initiative both locally and nationally, the EcoCentre is in a great position to transition to working on climate change with much recent success. Also, developing some programs around an online platform will lead to greater reach and accessibility, resulting in greater impact. Within the archival analysis and meetings attended, we have summarized four main goals:

1. Climate change initiatives and programs targeted at a younger age group
2. Future online programs
3. Collaboration with climate change organizations
4. Facilitating access to renewable energy or electric vehicle charging stations for those in high density housing

EcoCentre Partners are Extremely Satisfied with their Partnerships and these Partnerships Contribute to a Wide Range of Impacts

We completed nine partner interviews to understand the EcoCentre partners' perspectives of the organization as well as their thoughts on how the organization should move forward in the next three years. Using content analysis, we sought to answer four main research questions: What do partners value about their partnership with the EcoCentre, what does the EcoCentre do best, what does the EcoCentre need to improve on, and what should the EcoCentre focus on in the next three years. From analyzing the interviews based around these questions, we concluded that EcoCentre partners are extremely satisfied with their relationships with the EcoCentre, have little to say that could be improved upon, and are excited for future collaborations.

Additionally, we updated the impact map first established by Li et al. to evaluate the relative impact of partnerships where the EcoCentre's resources and time were being distributed (2018). With the review of the existing partners from the previous matrix as well as the addition of all new partnerships culminated over the past three year, we were able to create a full impact matrix.

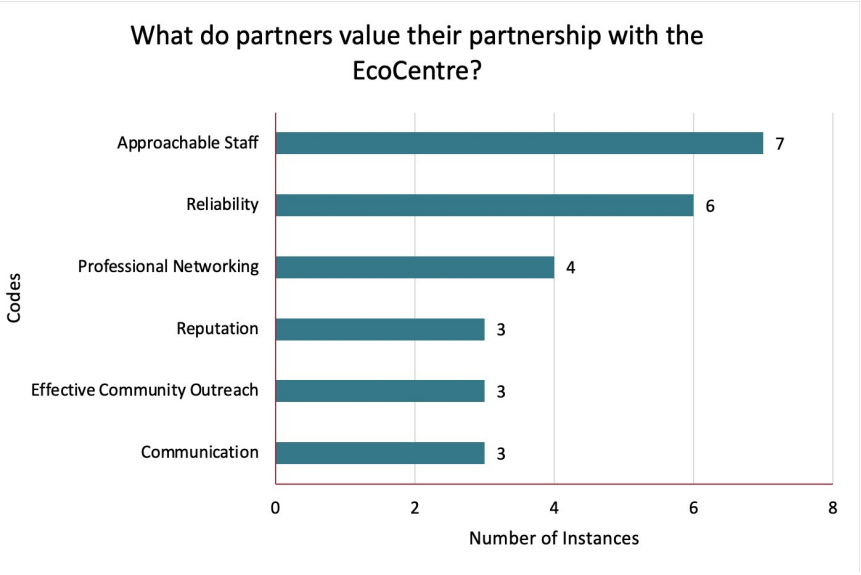

Figure 13: Understanding what different partners value in their relationship with the EcoCentre, n = 9 The full set of data can be found in Appendix O

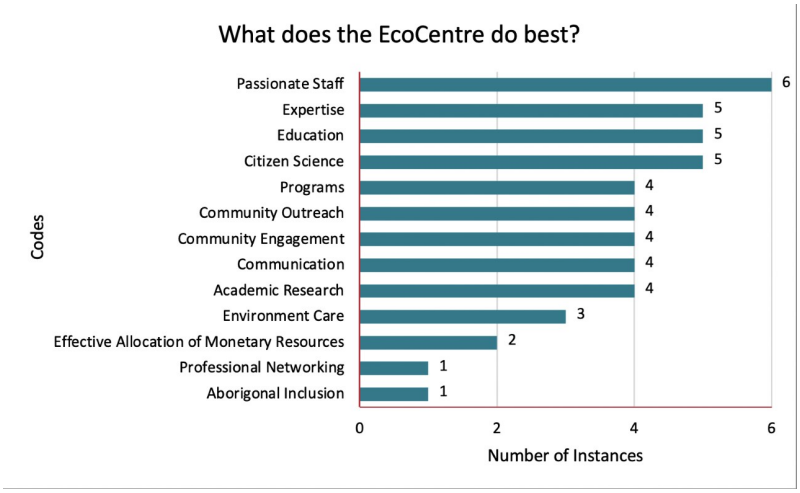

Figure 14: Understanding what the EcoCentre does best in the views of their partners, n = 9 The full set of data can be found in Appendix P

We concluded that the EcoCentre has continued to effectively allocate time and resources to the most significant partnerships.

EcoCentre Partners are Extremely Satisfied

The analysis of the interviews showed that partners interviewed were all very pleased with the EcoCentre and gave almost nothing but praise for the organization. A representative from CoastCare Victoria, when asked what they value about the partnership, described the partnership as "flawless, and I can't say that about too many stakeholders". Similar themes appeared in many of the interviews. **Out of nine total interviews, when asked what the EcoCentre could improve on, seven interviewees indicated that no change was necessary**. Despite some of these partners working heavily with the EcoCentre on multi-year long projects, activities that involve huge amounts of interorganizational communication and cooperation, most partners maintained that the EcoCentre had no real areas in need of improvement. Both of these support the notion that EcoCentre partners are extremely satisfied with their partnerships with the organization.

There were several aspects of the EcoCentre that partners indicated that they valued about the EcoCentre. Our analysis found 14 different values mentioned by partners; the top six of which are shown in Figure 13. Seven of the nine interviewees referred to the staff of the EcoCentre and their approachability, kindness, and enthusiasm to the partnerships and the events/projects done in conjunction with them. Additionally, six describe **the EcoCentre's reliability as extremely valuable to them**. These two qualities, wonderful staff and reliability, are of great importance to an organization when working with any outside group. This notion points to the fact that **the EcoCentre has an amazing foundation that its partners value tremendously, translating to their overall high satisfaction of the organization**. Other values that multiple partners mentioned were the EcoCentre's great professional networking abilities that the partners are able to take part in, their communication, effective community outreach, and their reputation. It is clear that partners are satisfied with all areas of their partnerships with the EcoCentre.

The EcoCentre a Multitude of Strengths and Assets as an Organization

In addition to what the partners valued about their relationships, our team identified areas in which the partners felt that the EcoCentre does extremely well. We concluded that the **EcoCentre has a wide range of strengths and assets**, with 13 different strengths being identified in these interviews. All 13 of these areas, along

with their explanations, are graphed by the number of instances in Appendix P (Figure 14). The most commonly mentioned strength was passionate staff, with six partnerships talking directly about the availability, approachability, and enthusiasm of the staff they worked with. One representative from the Brighton Sea Scouts said to "clone everyone working there" as a way to "improve" the organization. This speaks volumes to the impression that staff members have left on the EcoCentre's partners and proves that **one of the EcoCentre's best attributes is having passionate and enthusiastic staff**. The next three areas, expertise, education, and citizen science, were all mentioned five times and speak to the **wealth of knowledge** that is present at the EcoCentre. Each of these areas pull from the specific knowledge that each staff member and key volunteer brings to the EcoCentre and how that allows for an extreme concentration of highly specialized knowledge that not many other organizations have. As an example, in addressing their collaborations, a representative from RMIT mentioned that the EcoCentre's "expertise and experience were vital" in establishing the citizen science portion of the project that the representative had started through the university. This pool-of-knowledge proves to be a huge asset to the EcoCentre and is thought of by many partners to be some of the best attributes of the EcoCentre. Additional areas mentioned included their programs, community outreach, community engagement, communication, and academic research among others which proves the wide range of things that the EcoCentre does well at and again proves how well received the EcoCentre is with its partners.

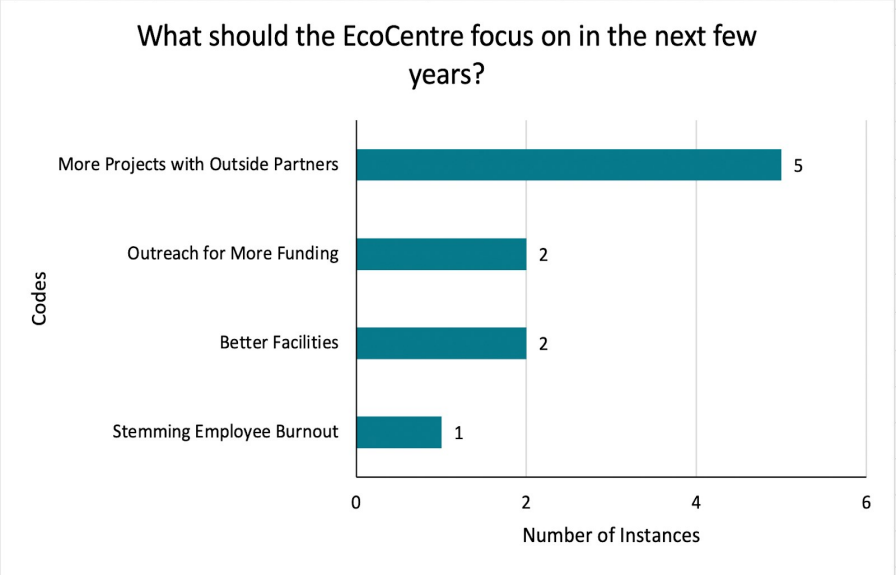

Figure 15: Summary graph of areas noted by partner interview of areas for the EcoCentre to focus on over the next three years, n = 9 The full data can be found in Appendix R

There is a Concern Regarding Staff Burnout

When asked about aspects where the EcoCentre could improve, almost every stakeholder began by responding with, no, not really and after thinking about it fully, as stated above, a resounding seven interviewees maintained that there was no change necessary. However, three organizations did mention something for the EcoCentre to improve on, although two maintained that these were "nitty gritty things" as a representative from Worcester Polytechnic Institute described it. The representative from CoastCare Victoria mentioned the fear of burnout and that while the EcoCentre does amazing work, they were concerned how "**they [EcoCentre Staff] can deliver what they do with their capacity and not burn out"** (Appendix Q). To that point, this project also created a staff well-being survey that can be the basis for a annual staff survey that measures and keeps track of potential burnout; however, as the EcoCentre has not, up until this point, conducted one of these, this point is of valid concern and should be treated as an important area to improve on. Additional areas mentioned that could be improved included securing better facilities, proactive outreach for new partnerships, demonstrating concrete benefits of the work, and more marketing on social media. Each of these were mentioned once and were followed up with a note that the EcoCentre does do these things but could do them more. However, with the huge range between the instances of areas of improvements and the thought that no change was needed, it is clear again that the assertion that partners are overall very satisfied with their partnerships still remains.

Partners are Enthusiastic about Future Work with The EcoCentre

The partners interviewed also gave insight into what they thought the EcoCentre should focus on in the next three years as the organization develops its newest strategic plan. A total of eight areas were mentioned with a summary of the top 4 shown in Figure 15. More than anything, the interviewees noted that the **EcoCentre could work to do more projects with outside partners, including more research projects as well as event activation**. The representative from Melbourne Water put it plainly that they "just [want to] run some events with [the EcoCentre]" while the representative from RMIT thought that the EcoCentre could expand to work on projects that involve multiple organizations and/or universities to increase their scope. With multiple partners having the desire to see the EcoCentre branch out for more projects, this avenue would be beneficial to pursue for the growth of the EcoCentre. Other areas that were mentioned twice included better facilities and outreach for more funding, both of which were already noted in the small amount of improvements. Both of these points speak to the growth of the organization over time and are areas that the EcoCentre is already taking action towards. In speaking of funding, ideas mentioned by a representative from RMIT included leveraging the status of universities or other organizations to apply for grants in those areas. This willingness to explore these options is one that could lead to more funding for the EcoCentre and their initiatives. When the concept of requiring better facilities was mentioned, interviewees were aware that a plan is in place and that it was unable to come to fruition at that particular time. Despite this understanding, more work should be put towards this goal.

Throughout our research on the partners of the EcoCentre, the main points that can be taken away can be summed up into one simple sentence. While there are always small areas of improvement, overall the **EcoCentre is a fantastic organization with amazing expertise, staff, and enthusiasm for its mission and purpose**.

The EcoCentre has Maintained Impactful and Significant Partnerships over the Past Three Years

Through the creation of an updated impact matrix, the final matrix, indicates that the EcoCentre has done well at managing time and resources to those partnerships that provide the most impact (Figure 16). Through researching the partnerships of the EcoCentre over the past three years through their Annual Reports, we concluded that the **EcoCentre worked with an additional 181 partners over the past three years** (Port Phillip EcoCentre, 2018d; Port Phillip EcoCentre, 2019; Port Phillip EcoCentre 2020). Combined with the existing partners that were noted in the 2018 report by Li et al., the **EcoCentre has worked with 343 total partners**. These partners range from organizations that donated prizes to singular events to partners that work with the EcoCentre on a daily to yearly basis. To narrow down the amount of partners present on this matrix, organizations that contributed singular prizes, funders, and organizations that worked at a singular event were taken off. Similarly, 12 groupings were made to denote partners that work in a similar capacity. For example, all affiliate organizations were grouped into one Affiliate organizations group and then placed on the matrix. These groupings are shown on the matrix in bold and have an asterisk next to them to denote a grouping. An expanded list of all partners in each grouping can be found in Appendix S. With these culling, a total of 95 partnerships were mapped onto the matrix (Figure 16).

By comparing the effort time to the scope of change, we came to the same conclusions as Li et al. in regards to the significance of each partnership based on where they fall in the matrix (2018). Partnerships that fall into less than 39 effort hours and lobby for systemic change, are considered as the most significant partnerships, as they require little non funded hours on the part of the EcoCentre but create a high level of change. **27 partners, including 11 new partners (28% of all mapped partnerships) fell into this most significant category**, the second highest percentage of all the categories. These partners include the Boon Wurrung Foundation, EPA Victoria, and Sustainability Victoria. The largest number of partnerships fell into a significant

Figure 16: Updated impact matrix

category, with **33 partners, including 5 partner groups and 10 new partnerships, (35% of all mapped partnerships) requiring less than 39 effort hours and lobbying for collective change**. These partnerships are considered significant as they require little non funded effort on the EcoCentre's part, but still create a higher level of change. Additionally, with the partner groups representing multiple partners, this results in significantly more partners overall that exist in this category that are not counted in the total number of partners mapped. With low effort hours and individual scope of change, a total of 25 partners, 26% of all mapped partnerships, were present in this category, with 11 partners being new in the last three years. However, while this represents the third largest category on this matrix, this section includes six partner groups, meaning that overall total is the highest of all the categories. Beyond this 39 hours category, two partners, RMIT and the Jewish Ecological Coalition, fell into the 40-60 effort hours column, with the organizations creating systemic and collective change respectfully. Both these organizations create higher than individual change, both are still considered significant, with RMIT being considered most significant. To improve these relationships further, the EcoCentre could look to reduce the amount of effort hours slightly. Six partners, including one partner group, fell into the over 61 effort hours column and create systemic change. Therefore, because of their high level of change, they are the last group considered most significant in this matrix, with the note to work to reduce effort hours, again, if possible. However, with many of these partners, for example, the City of Port Phillip, the effort is considerable but proportional to the amount of support and change the City gives to the EcoCentre.

Thus, having partners in this category is necessary. Lastly, two partners, Scouts Victoria and WPI, fell into the significant category, creating collective change and requiring over 61 effort hours. This placement is largely due to the projects that the EcoCentre has participated in with these organizations over the last three years, and still makes these partnerships valuable and impactful. **No partnerships were found to require over 40 hours for an individual scope of change**. This result is extremely important as it indicates that the EcoCentre has maintained useful partnership and has allocated its resources appropriately to avoid spending them on lower significant partners.

Overall, **89.4% of EcoCentre partnerships were found to require 39 hours or less of effort to maintain**. This high percentage of partners indicates that the EcoCentre has maintained impactful partnerships while also keeping the effort hours low, creating more impactful change overall. By maintaining these low effort partnerships, the **EcoCentre creates more widespread and impactful change**.

EcoCentre Staff are Enthusiastic about Their Work but are Over Worked at Times

In conducting our digital survey, we received 14 responses out of 15 potential survey takers, representing 93% of the EcoCentre staff. Most respondents choose to answer every question, with only 6 out of 24 questions not receiving the full total of 14 responses. Standard data graphing was used to analyze the 5 scaling questions while content analysis was used for the other 19 questions. Overall, the survey indicates that the EcoCentre staff are excited about the work that they do and are comfortable at the EcoCentre but are many times overworked.

Staff are enthusiastic about the EcoCentre and their work towards its mission

When asked on a scale from strongly disagree to strongly agree, "to what extent do you feel your work contributes to the EcoCentre's missions, 8 out of 14 respondents indicated that they strongly agree that their work contributes to the overall mission (Figure 17). Moreover, all other respondents indicated that they agree with this statement, meaning that **100% of respondents agree or strongly agree that their work contributes to the EcoCentre's mission**. In an organization whose sole focus is centered around a mission of change, it is important that all staff members feel that they are working towards that mission with their work. The EcoCentre has a sense of mission in the staff that is imperative for the success of the organization's goals. This sense of mission creates excited and enthusiastic staff. Many, when asked about the most rewarding part of their job, indicated that it was teaching others about the environment and making a meaningful change. One staff member wrote "Feeling like you're making an impact in protecting the planet". This response was one of many similar ones that proves that **EcoCentre staff are excited about their work and its contribution to the EcoCentre mission**.

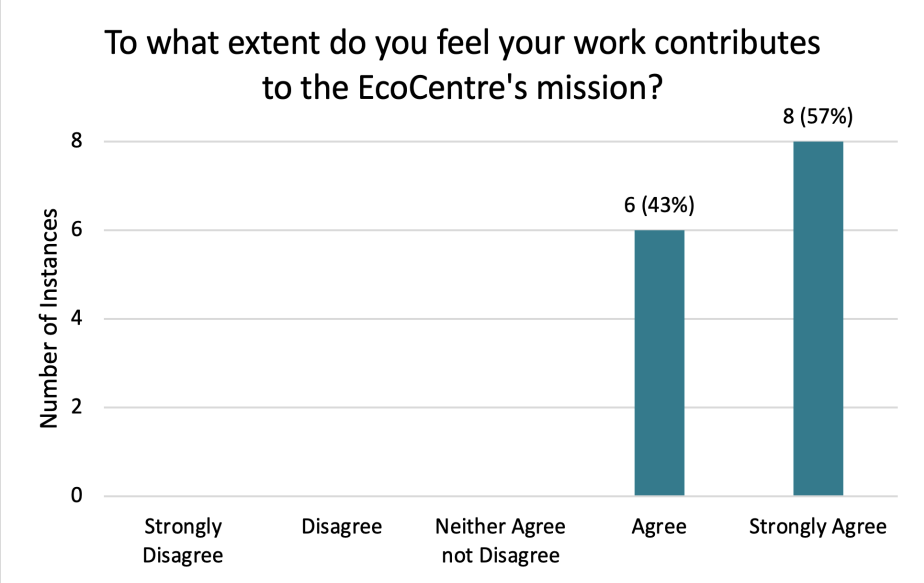

Figure 17: The extent to which staff feel their work contributes to the EcoCentre mission, n= 14

EcoCentre Staff Are Currently Overworked

From the responses gathered, it is clear that the EcoCentre staff are overworked, and are at risk of burnout. As stated by a partner in the partner interviews, the staff working long hours is a large concern. Of all respondents surveyed, **8 out of 14 responded that they work more hours than they are employed** (Table 3).

Of these eight, three respondents noted that they work ten or more hours over their employed time regularly, with the other five reporting that the time that they work over depends on the circumstances surrounding that week. With **over half of the staff working overtime** at one point or another, the risk of a staff member burning out creates a domino effect that could cause the rest of the staff to become burnt out as well. In addition, many respondents noted that they feel that the hours that they work are extremely varied, and many indicated that they often work over hours to complete their tasks. One respondent wrote that "the biggest issue I have with this work is the irregular workload" while another wrote that the biggest stress that they have is "there is never enough time to do all the things". The variability of the workload required of the EcoCentre staff, while partially inherent due to the nature of the work, creates a source of stress within the work environment which could lead to burn out. As one respondent pointed out, the structure of the organization prohibited the ability for constant and steady work-flow. While not much can be done to change the rate at which work must be done, exploring options for how to delegate these work surges or adding staff assistants during these times could help alleviate the stress of frequent periods of overworking. The EcoCentre must be aware of the high risk of burnout that its staff can experience at times and look for strategies to lessen the effect of the extra hours worked by staff.

Being overworked brings the potential for high work stress and interpersonal issues as well as the potential for poorer mental health. With this sort of work environment, to combat burnout, it is imperative that the leadership are approachable to allow for staff to voice their personal concerns and well-being. When asked to rate, again on a scale from strongly disagree to strongly agree, how they feel about the statement "you feel comfortable reaching out to your direct manager in case of work issues/stress, 11 out of 13 respondents reported to agree or strongly agree, with two respondents reporting in the middle (Figure 18).

However, when asked to rate "you feel comfortable and supported to discuss your health, including mental health, with your colleagues and/or manager", only 8 out of 14 respondents reported to agree or strongly agree with the statement (Figure 19). Out of the rest of the respondents, 4 out of 14 reported neither agreeing or disagreeing and two out of 14 reported to disagree that they feel comfortable and supported in discussing their health.

While this is a smaller percentage, there is a **notable difference in staff comfortability with discussing stress and discussing health, including mental health, to colleagues and managers**. Many respondents noted that they felt supported, especially during the recent COVID-19 pandemic, however these two respondents and the

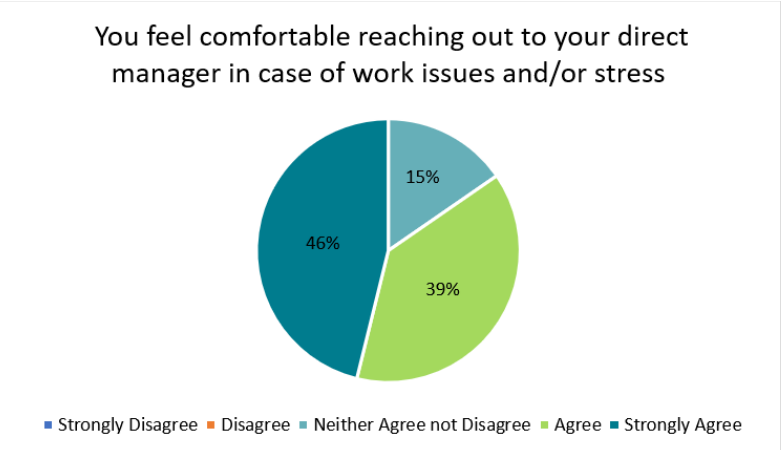

Figure 18: Staff feelings towards reaching out to a direct manager for work issues/stress, n = 13

Table 3: Comparison between the hours that staff are employed versus the actual amount of hours that they work.

Hours Employed>Hours Worked	1	7%
Hours Employed=Hours Worked	5	36%
Hours Employed<Hours Worked	8	57%

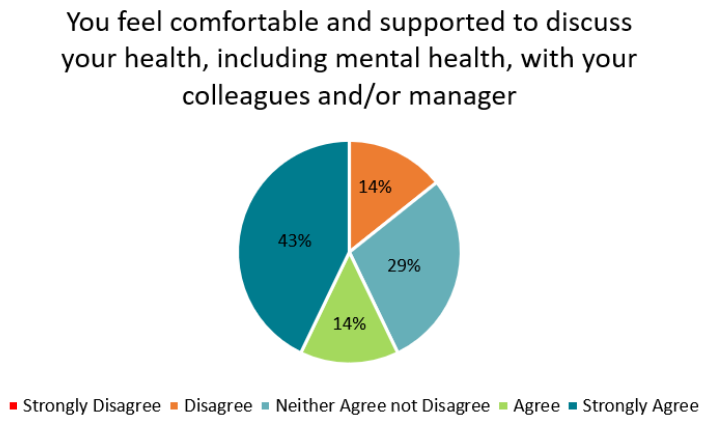

Figure 19: Staff feelings towards feeling comfortable to discuss physical or mental health at work, n = 13

marked difference is cause for concern. With the wake of the COVID-19 pandemic, poor mental health is higher in the general public, making it extremely important for the EcoCentre and all employers to create an environment where everyone feels comfortable to talk about their health if need be. Therefore, to ensure that their employees are at an adequate state of work well-being, the EcoCentre must focus a bit more on ensuring every staff member is comfortable.

As part of this survey, respondents were also asked to describe ways that the EcoCentre could provide extra support or techniques that could be implemented to As part of this survey, respondents were also asked to describe ways that the EcoCentre could provide extra support or techniques that could be implemented to help with workplace stress. Some respondents took the opportunity to suggest ideas such as bringing in an organizational psychologist, providing more remote work flexibility, and more working space within and around the EcoCentre facility.

EcoCentre Programs Have High Participant Satisfaction but Variable Sustainability Impact

Utilizing a set of 371 unique survey data responses from 2018-2020, qualitative and quantitative data analysis was completed. Each survey response was grouped and analyzed depending on whether it was individual-based or group-based. This data analysis served to address three main research topics: participant satisfaction, noted behavioral changes, and the overall impact programs have on participants. In addition, we examined program impact overall through a method of social mapping utilizing the postal code information provided in the survey data.

To preface the presentation of the data, as previously noted, we organized the data by programs in order to understand differences of the rankings per program. However, the variety of entries for the name of the program activity marked organizing the data more difficult. It was decided to organize the data by year and highlight particular programs. In addition, the prose data was evaluated using content analysis (Appendix H). Codes were determined from an initial review of a sample set of 80 responses, with each member of the project team reviewing 20 responses each. Inter-rater reliability for each of the four response questions yielded inter-rater reliability scores of 37.12%, 53.17%, 66.67%, and 43.18% for each question. These results indicated high divergence between team members which led us to perform content analysis as a team opposed to just simple calibration.

Program Participants Are Highly Satisfied

The analysis of the program survey data indicated that participants are highly satisfied with their experiences participating in EcoCentre programs. When examining participant ranking of program experiences, survey respondents rated their experiences highly (Figure 20). Of all survey respondents, 40% rated their program experience as a ten. Survey respondents that rated their program experience as an eight or higher comprise 88% of all survey respondents. The mean of the overall program experience over the 2018-2020 period rests around 8.8 out of 10. From 2018 to 2020, the overall program experience dropped by 0.2 points. This drop, however, is not statistically significant. It is clear that participants strongly feel satisfied with the program experiences. In further support of this, we can examine

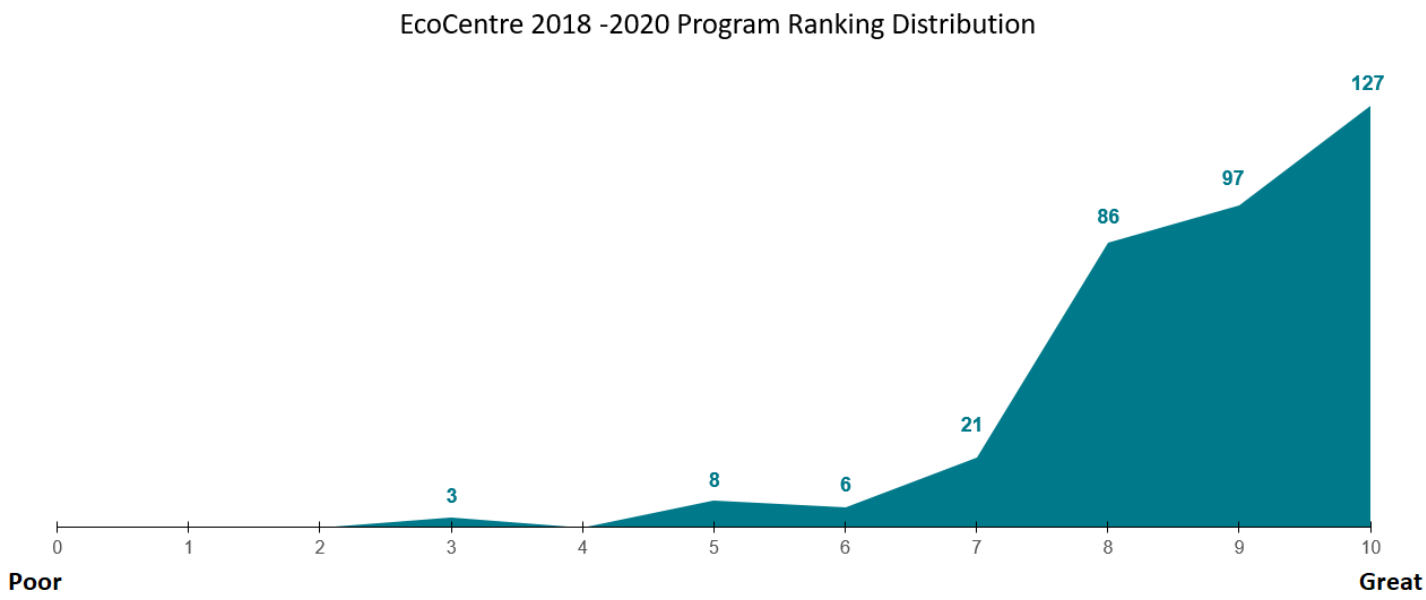

Figure 20: Overall program participant rated experience from 2018-2020

the question when individual participants were asked to note any improvements that could be made moving forward. The 14 codes generated included Length of Program, Add Informative Resources, Add Activity Resources, More Information, Less Information, Different Information, Safety, Circumstantial Issues, More Engaging/Interactive, More Staff Involvement, Path to further engagement, Change in Location, Accessibility, and No Change (Appendix T). For the 345 different individual surveys, the number of instances per code and a visualization of those with greater than ten instances was created (Figure 21).

By far, the code indicative of no change to programs appeared most frequently in participant responses. Survey respondents have, overall, indicated that programs do not require any changes nor can they be improved upon. According to the survey results, programs are run extremely well, and participants are extremely satisfied with the EcoCentre programs. The next three most accounted for codes were mentioned nearly the same amount of times: More engaging/interactive, add activity resources, and length of program. While many of the suggested changes were program specific, programs should strive to engage participants by adding resources to involve the participant more. In addition, while program length should be catered to the audience, the majority of responses indicated that programs should increase the length of time they run for. Examples of programs with many responses mentioning increasing program duration included the sharks webinar, green teams programs, LAGI, bay cleaning, and most gardening related programs. Professional development courses and programs had an even split between increasing and decreasing the overall length. Regardless of the code, all still indicate a high amount of participant satisfaction as participants want to see more and add more to

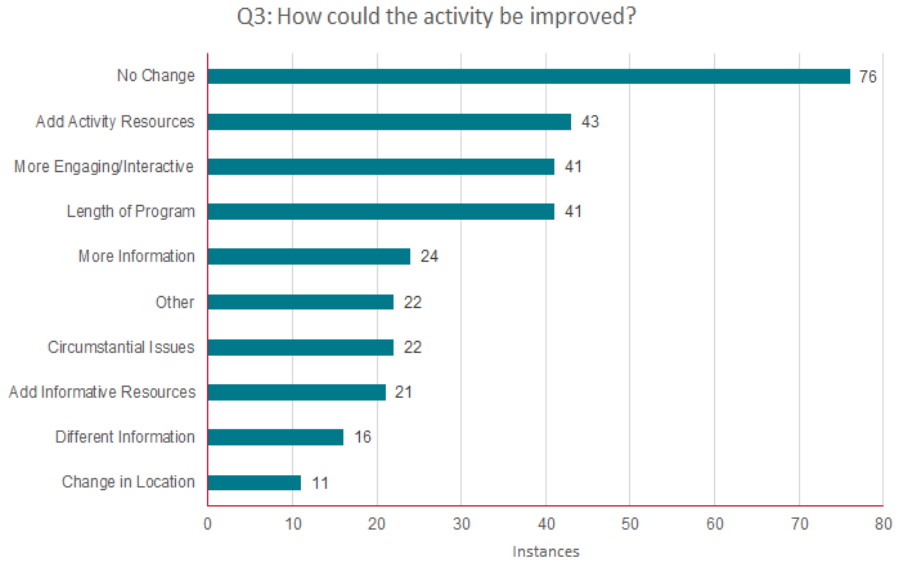

Figure 21: Responses from question three of survey data, n = 273

programs.

Interestingly, there were a large number of blank responses for this question. If it were not removed, blank responses would be the second most frequent code. It is surprising to see that many did not answer this question. Not answering the prompt, however, could be indicative that a participant felt no change was needed to the program. Past participant interviews further validated this notion. All interviewees were extremely satisfied with the specific program they participated in as well as those that they continue to participate in. A key factor in their experience were the high levels of engagement and contagious passion from the staff and program leaders. In praise to the EcoCentre, these past participants noted how well the EcoCentre acts as a beacon for environmental education - especially for children and students. One past participant noted how programs at the EcoCentre have inspired students to think of environmental sustainability projects and efforts on their own. Our analysis and longitudinal evaluation of these programs clearly show how highly satisfied program participants are.

The EcoCentre has Considerable Reach across Melbourne

In the individual-survey based data, participants were asked to include the postal code where they live. To analyze the reach of the EcoCentre from these postal codes, we first cross-referenced demographic data to understand how widespread EcoCentre's impact is using a demographic lens. We referenced the Commonwealth of Australian's census data from 2016 to give us information on the demographics in each postal code area marked down by EcoCentre participants. This led to finding almost **40% of the postal codes recorded from the survey in Melbourne having a significant minority population**. Of those postal codes outside of Melbourne, only 10% had such due to the great diversity of Melbourne. Here, significant is defined as being in the top three of all demographic backgrounds in the region. The figures below show the demographic distribution of the postal codes from the survey inside and outside of the Melbourne region. Our analysis indicates that English, Australian, and Irish make up the majority of the regions of EcoCentre volunteers (Figure 22)(Figure 23). The EcoCentre also reaches some communities with large Chinese, Indian, Scottish, and Vietnamese populations, although these make up a significantly less percentage than the previous.

We also see about an even distribution in income throughout the areas inside and outside of Melbourne (Figure 24)(Figure 25). Although this is such a small sample set, we still see postal codes from New South Wales, Queensland, South Australia, and Tasmania. Through this analysis we see that the EcoCentre has significant reach within the specific regions of Melbourne as well as through the rest of Australia.

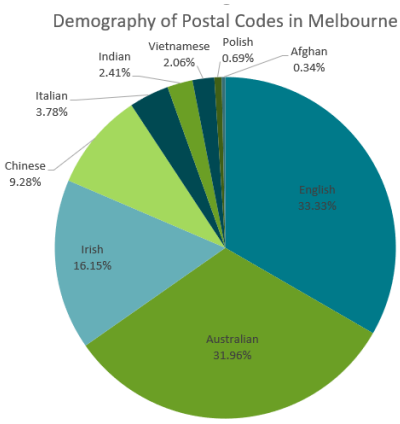

Figure 22: Demography of the postal codes from the EcoCentre survey only in the Melbourne region, n = 297

EcoCentre Programs have Great Community Engagement

When first examining program impact, it is clear that programs have a strong impact in connecting members of the community together. With the first

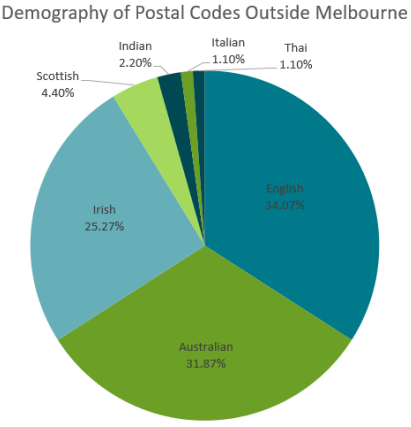

Figure 23 Demography of the postal codes from the EcoCentre survey outside of the Melbourne region, n =45

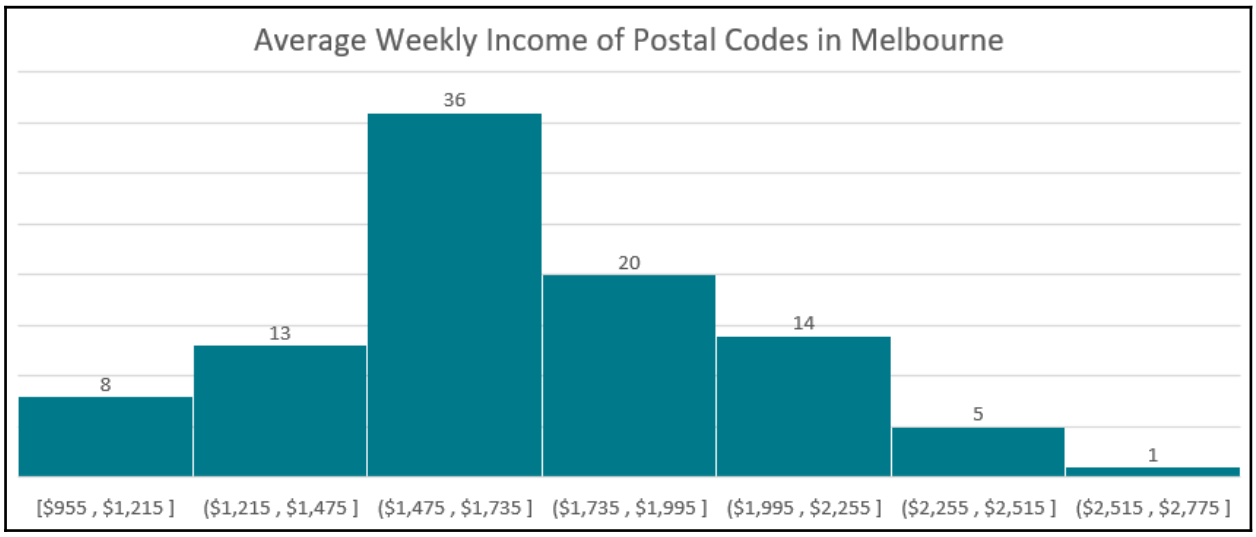

Figure 24: Average weekly income (AUD) of the postal codes from the EcoCentre survey inside the Melbourne region, n = 297

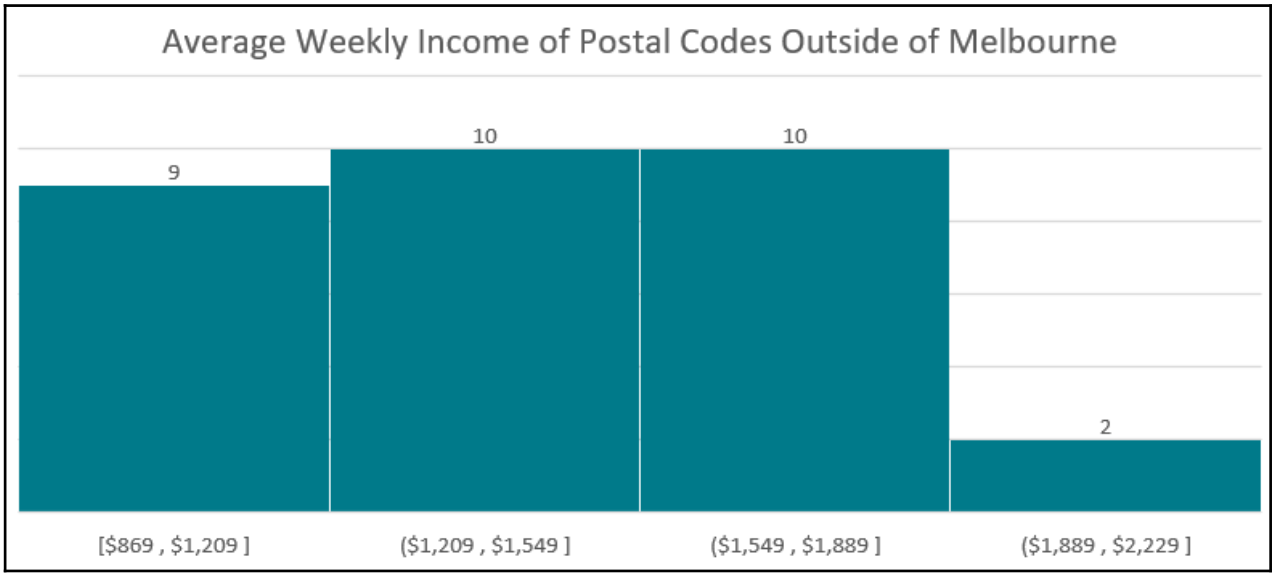

Figure 25: Average weekly income (AUD) of the postal codes from the EcoCentre survey outside of the Melbourne region, n = 45

question of the individual-based surveys, participants were asked to answer why they decided to participate in the program. From this and the dictionary algorithm output, ten definitive codes were created: gain personal knowledge, gain institutional knowledge, professional work involvement, education/academic involvement, familial obligation, recommended/social aspect, interest in work of the EcoCentre, previously engaged with the EcoCentre, interest in the activity, and appreciation for nature/environment. A miscellaneous code marked "other", and a code for no entry were also added (Appendix U). From this content analysis, we see that out of the 345 individual entries, the number of instances of the particular codes for those with greater than ten instances (Figure 26).

Overall, interest in activity, coded for 33% of surveys, is tied most strongly to participation despite education being a large sector from which programs are run. Gaining personal knowledge is seen as the second most coded item in the surveys. This indicates that participation is also strongly impacted for a desire to gain personal knowledge. Participants are likely assumed to have some knowledge base on environmental issues or objectives prior to program participation. Finally, the third most strongly correlated code, professional work involvement, indicated that participation in EcoCentre programs can be attributed to an individual's occupation whether it be as an educator or a corporate volunteer. While the reasoning behind overall participant interest is great, more important is the most prominent code: interest in activity. This indicates that general knowledge of the work of the EcoCentre or the EcoCentre's

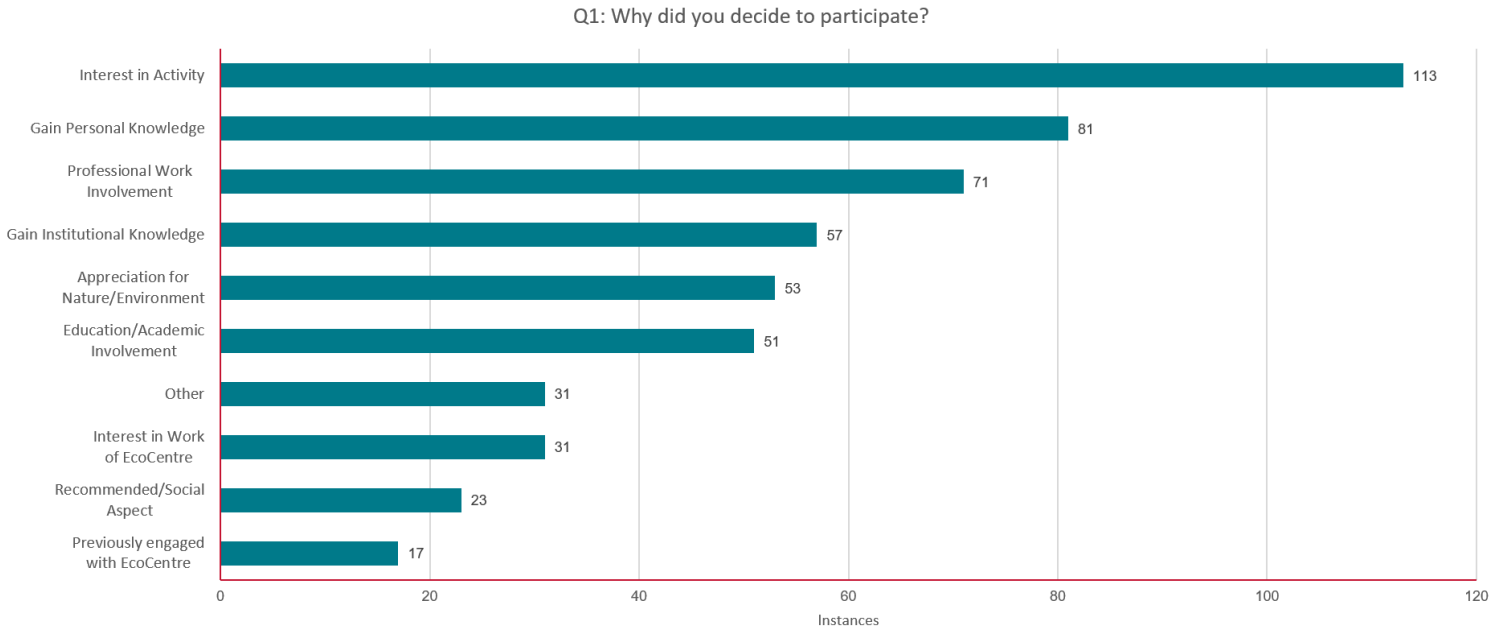

Figure 26: Responses from question one of the survey data, n = 336

initiatives is already considered common knowledge for many survey respondents. This notion is supplemented by the 9% of surveys coded for interest in the EcoCentre's work. Therefore, programs are receiving a great amount of engagement and word-of-mouth transmission of information from past participants. Past participant interviews have also mentioned the premise of community engagement following EcoCentre program participation. Participants recommend and talk about their experience with friends, spreading information about EcoCentre programs and their mission.

Past participants noted that participating in EcoCentre programs led them to find a new community of people to interact and share experiences with. Many interviewees noted their joy in meeting and working alongside new people. As one past participant put it during a volunteer experience cleaning the bay, “you make many friends when you are working on the bay [clean-up] and sitting cozy drinking coffee together”. Especially during the COVID-19 pandemic and the lockdowns, exploring nature and sharing photos or accounts safely with community participants was critical for their mental health. Many noted that having this community was extremely useful to help them stay connected. This is not surprising as postal code data indicates that 87% of all program participants from 2018-2020 lived within the greater Melbourne area. Despite the usefulness of word-of-mouth transmission of information, past participants had mixed accounts about whether this form of communication about the EcoCentre and their programs led to future involvement. Ensuring more methods of communication would seek to improve the EcoCentre's outreach beyond, as one past participant noted, “preaching to the choir”. With a very engaged and passionate staff, generating the capacity to expand outreach to others not familiar with the work or the importance of the EcoCentre’s work will serve to address the EcoCentre’s mission. In conclusion, participants believed the EcoCentre’s work is important, and hope that the organization can continue to and expand both their initiatives and their outreach moving forward to accomplish future initiatives and their mission.

EcoCentre Programs Inspire Environmental Behavioral Changes in their Participants

Programs at the EcoCentre inspire behavioral change in regard to connecting and interacting with local environments. Of all survey respondents, 93% indicated feeling more connected to nature, and 87% of survey respondents noted that they would spend more time connecting to nature (Figure 27). When examining for significance, both of the overall percentages were greater than a cut-off margin of 80%. In addition, the question regarding feeling more connected to the

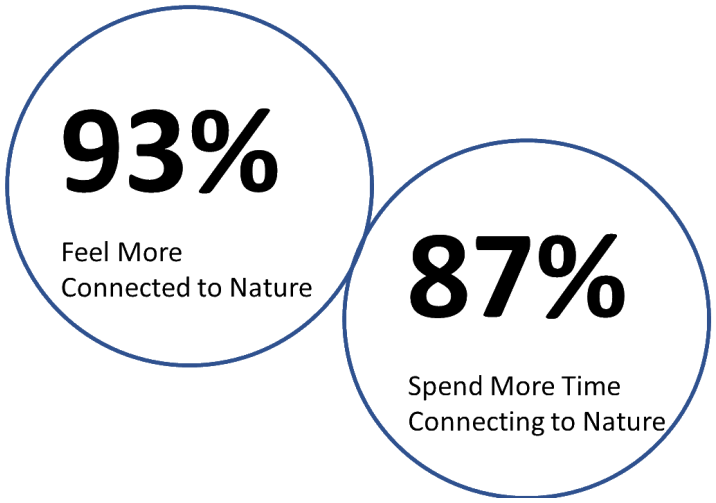

Figure 27: Individual based survey respondents detailing feeling connected to nature and spending more time connecting to nature, n = 341

environment was significantly greater than a cut-off margin of 90%. Individually, the percentages indicate a great amount of program impact. However, the percentages compared together indicate that programs are having less of a continuous effort from individual-based programs. There is not a significant discrepancy between the two percentages regarding learning about the local environment and feeling more connected to nature. This indicates that a significant percentage of participants are looking to change their habits and appreciate the local environment more. Accounts from the past participant interviews further validate this notion. Many noted how more connected they feel to the local environment and the EcoCentre's efforts to clean and preserve it following program participation.

A similar conclusion can be reached when examining the group-based survey data as well. Of all survey respondents, 85% of survey respondents believed they learned something new about the local environment from the program they participated in. Additionally, 84% of survey respondents felt more connected to the local environment after participating in an EcoCentre program, and of all program participants, 87% said that they would spend more time connecting to nature (Figure 28). Statistically examining the percentages individually, the questions pertaining to learning something about the local environment, feeling more connected to the local environment, and spending more time connecting to nature all were significantly greater than an 80% cut-off. While the percentages and margin may be lower, this can be attributed to the fewer number of group-based surveys. Nevertheless, overall data indicates a large percentage of individuals have taken to changing their behaviors to appreciate the environment to a greater extent.

Individual Based Programs Inspire Participants to take New Sustainability Action

Participants from individual-based programs have a strong indication to take some future sustainability action. The fourth and final question of the individual-based survey, asking participants if they planned to take on any new sustainability action after completing the program, is a good indicator of this notion. Our methodology led to the creation of 13 codes: Yes, No, Unsure, Feels like they do enough, Personal Change, Collective Change, Future Volunteering, Advocacy, Consumption, Natural Environment Care, and Waste. Similarly to the previous questions, an Other and Blanks code were added (Appendix V). Many of these codes can be grouped by the similarity in their themes, and are likewise evaluated as such. The first four codes address whether any new action or continued action can be noted (Figure 29).

From this data, we see that a majority of survey

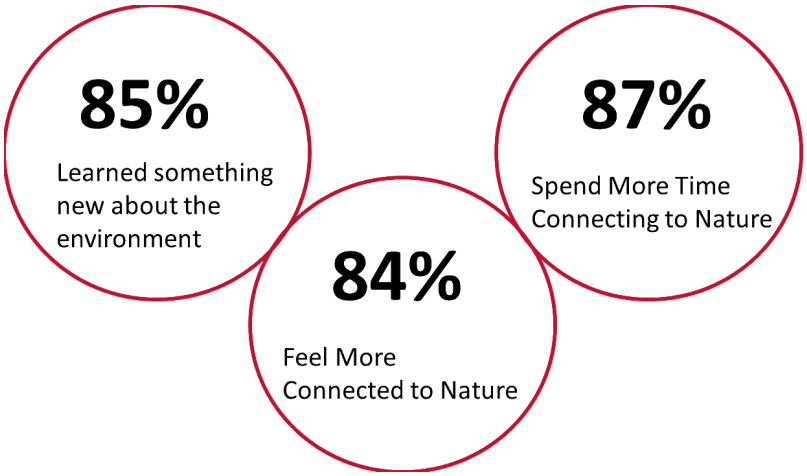

Figure 28: Group based survey percentages for behavioral change in participants, n= 578

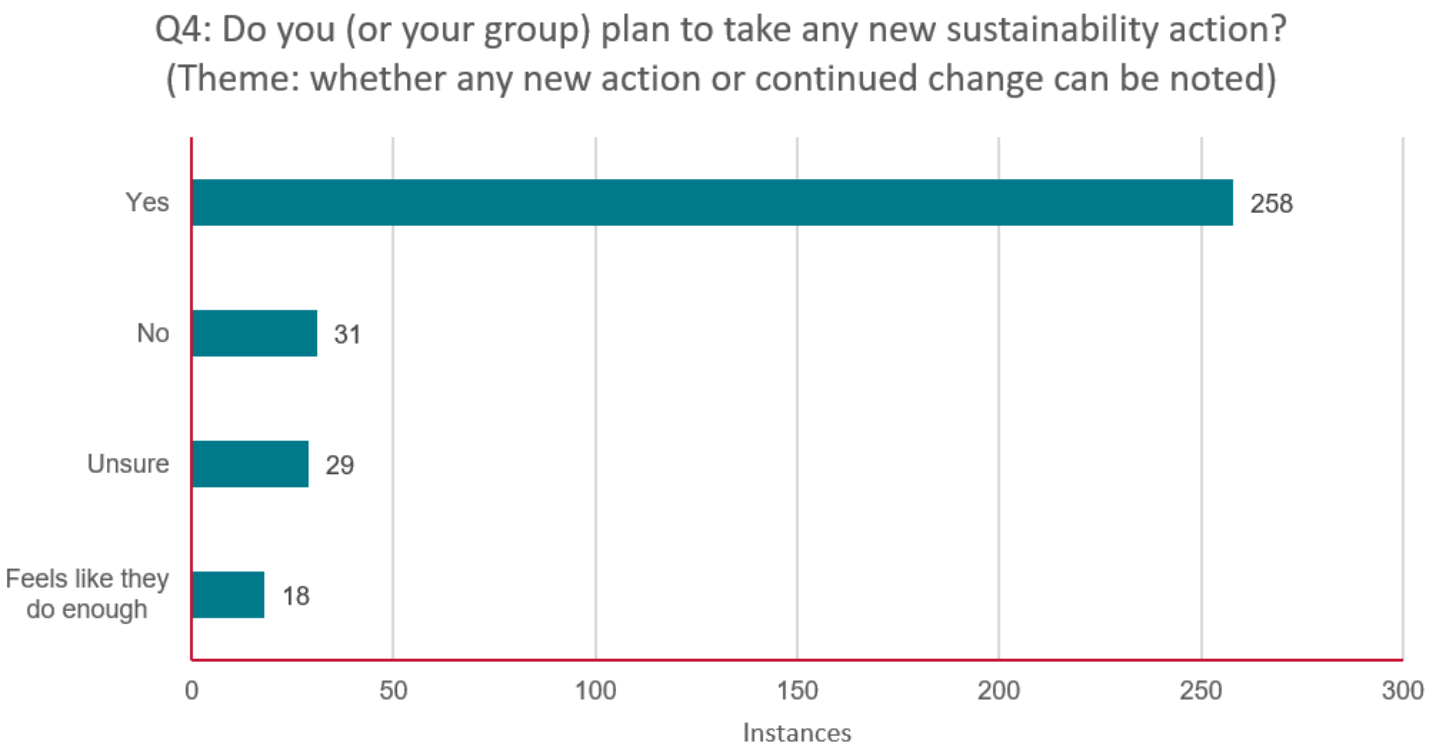

Figure 29: Responses coded from question four of the survey data in those who detailed sustainability action, n = 344

respondents, 75% of all respondents, answered that they will be undertaking some form of new sustainability action. EcoCentre programs clearly impact the individuals behavior and lifestyles, inspiring participants to take some action to promote sustainability in their lives. The next two codes, personal change and collective change, address whether this new sustainability action will be pertaining to the individual or to a collective group respectively. A larger number of personal changes than collective changes was noted from the surveys. In other words, more individuals rather than groups are looking to take new sustainability actions (Figure 30).

Neither personal nor collective change had any follow-up associated with the indication of survey response. This is especially true for collective change, where group lifestyle or sustainability changes across a classroom or students or corporate employees is difficult to map beyond the survey. Not all respondents who were categorized in the "Yes" code are not represented in this theme of change. Some responses did not detail beyond a binary entry of "Yes". Finally, the remaining six codes denote what kind of sustainability action, if disclosed, a survey respondent is willing to take, and if a passion is ignited within the survey respondents (Figure 31).

The data indicates that a large number of survey respondents who detailed their future sustainability indicated their work would be focused on caring for the environment in some way. Participants are seeking to take more sustainability action to care for the environment. Past participant interviews support this claim. Many interviewees noted the excitement for projects related to reclaiming areas for the natural environment, such as the plans to restore a golf course in such a way. Additionally, many past participants participate in programs related to natural care for the environment. The next highest codes show that survey respondents would seek to reduce waste and advocate for

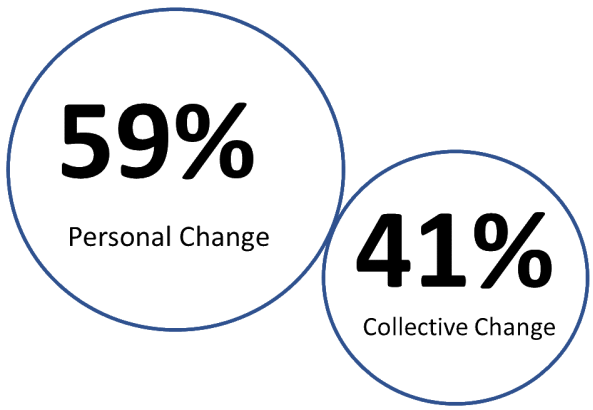

Figure 30: Summary percentages of personal change and collective change of survey respondents, n = 181

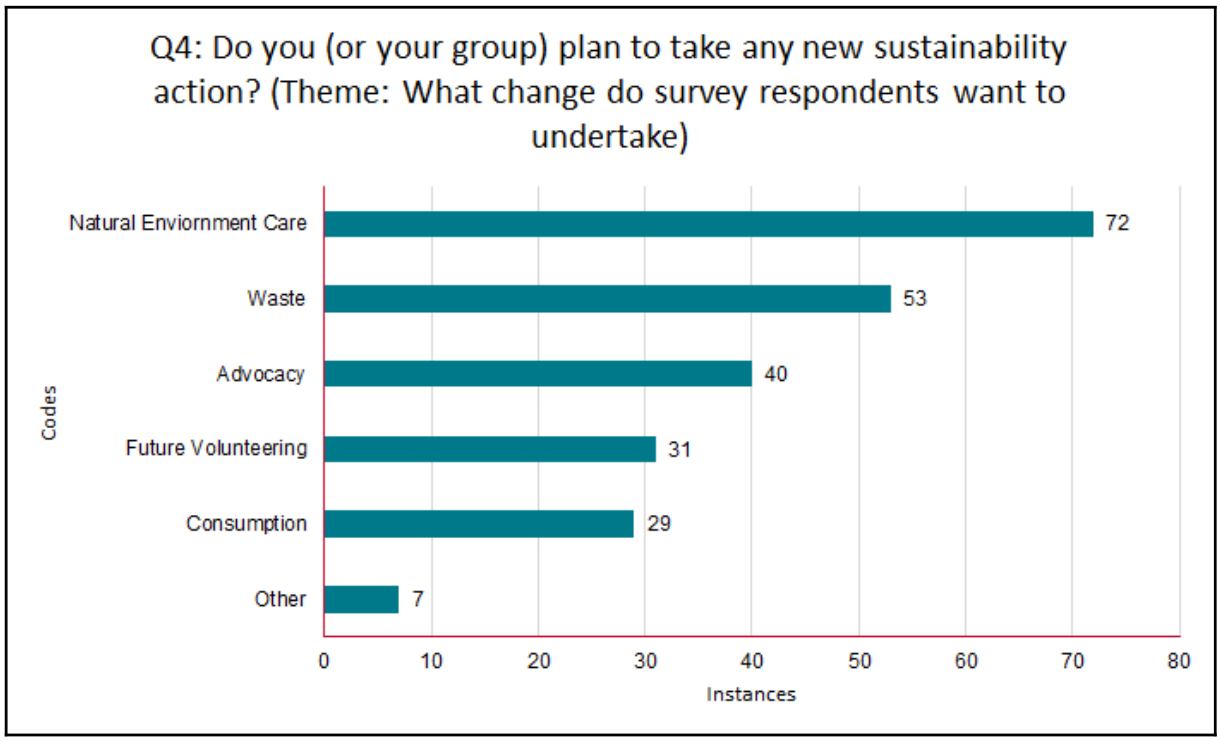

Figure 31: Responses coded from question four of the survey data in those who detailed sustainability action, n = 232

environmental sustainability and change in their communities respectively. The program survey data reveals that, overall, the programs seem to inspire a passion and change in the majority of survey respondents. Overall, the three themes from question four indicate that programs are having an impact on participants to take new sustainability action, especially when taken in tandem with the noted environment related behavioral changes previously mentioned.

Alongside this, the second question of the individual-based surveys continues to note how impactful EcoCentre programs can be. This second question asked participants to highlight what was done well by the staff or what was done well in the activity overall. From our coding and dictionary algorithm output, thirteen defined codes were created: Coordination and organization, Engagement, Staff Attitude and Passion, Staff Knowledge, Presentation Methods, Program Information, Child involvement, Physical Activity, Participant applied knowledge, Understand the bigger picture, Location, Criticism, and Everything. An additional code to denote blank entries was also created (Appendix W). For 345 different surveys, we see the number of instances for these codes with greater than ten instances (Figure 32).

From the data, the code with the largest number of instances is program information that was reported by 34% of program respondents. Survey respondents, therefore, found that the information within the program itself to be the best. As some program survey respondents noted, the programs "provided a lot of interesting information", and that "[programs] gave an insight to the positive holistic approach that underlies activities". Program information is most relevant in promoting change, as one survey respondent noted in the Global Melbourne Program, that "[the program] taught me how to minimize my [ecological] footprint". Another instance from a pamper the penguins program by a survey respondent noted that "Clear explanations not only of what our tasks were but how the penguins would benefit" were noted. With program participation inspired by interest in the activity and gaining personal knowledge, the data is not surprising. Furthermore, the individual-based survey data indicates that overall, 94% of survey respondents reported learning something about the local environment after taking the program. This question was significantly greater than a cut-off margin of 90%. Engagement has the second largest instances for a code which indicates that feeling involved within the program was appealing to the survey respondents. The third most numerous instances are

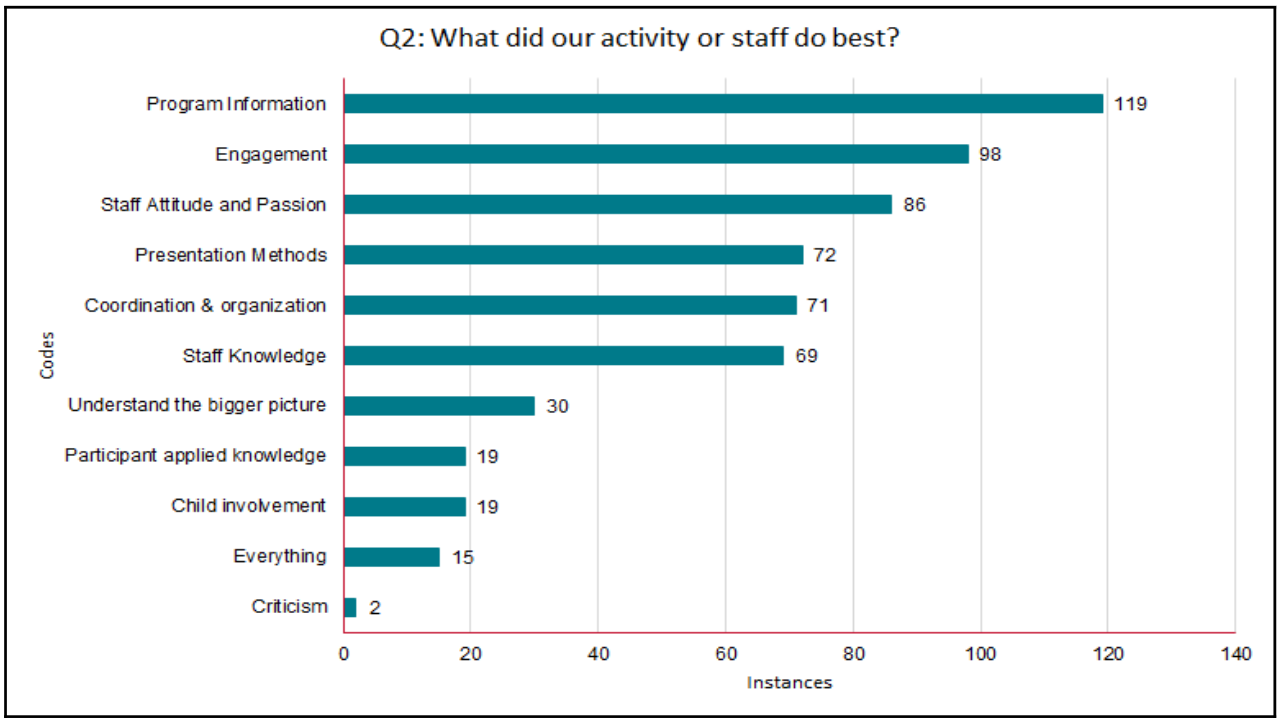

Figure 32: Responses from question two of the survey data, n = 331

attributed to staff attitude which indicates that the disposition and passion of the staff is also an important factor in what EcoCentre programs do well. Since program information, engagement, and staff attitude and passion represent the most instances, EcoCentre programs are impacting participants. Additionally, two responses were attributed to some form of criticism that have been compiled for the EcoCentre (Appendix X). The majority of survey respondents were satisfied with the programs, noting different aspects that were done well (Appendix Y).

There is an interesting discrepancy that arises, however, when comparing the overall percentages of survey respondents feeling more connected to the environment, learning something new about the environment, and spending more time connecting to the local environment. In comparison to all survey respondents, there is a significant difference between learning and feeling connected to the environment and taking future action to spend time connected to the environment. Despite the high percentages of individuals that indicated working to commit behavioral change and sustainability action, there is a statistically significant discrepancy between these two ideas. This discrepancy, despite its significance, is low. In tandem with the high percentage of those indicating taking some sustainability action shows that participants of individual-based programs are impacted to take new sustainability action.

Group Based Programs Variably Inspire Participants to Take New Sustainability Action

The group-based survey respondents see a greater discrepancy than the individual based programs in inspiring sustainability action. The question relating to seeking new sustainability action is only significantly greater than a 60% cut-off. This difference is seen when comparing the percentages of participants learning something new about the local environment, feeling more connected to the local environment, and spending more time connecting to nature. There is a significant difference between all the questions and the question pertaining to seeking new sustainability action. Group-based surveys do not have a significant effect on behavioral changes of participants following program participants. As mentioned before, it should be noted that this survey data is not a random sample. Working to instill more of a continuous and lasting impact on group-based program participants should also be looked into. Overall, there appears to be a greater impact in the individual based programs as opposed to the group based ones.

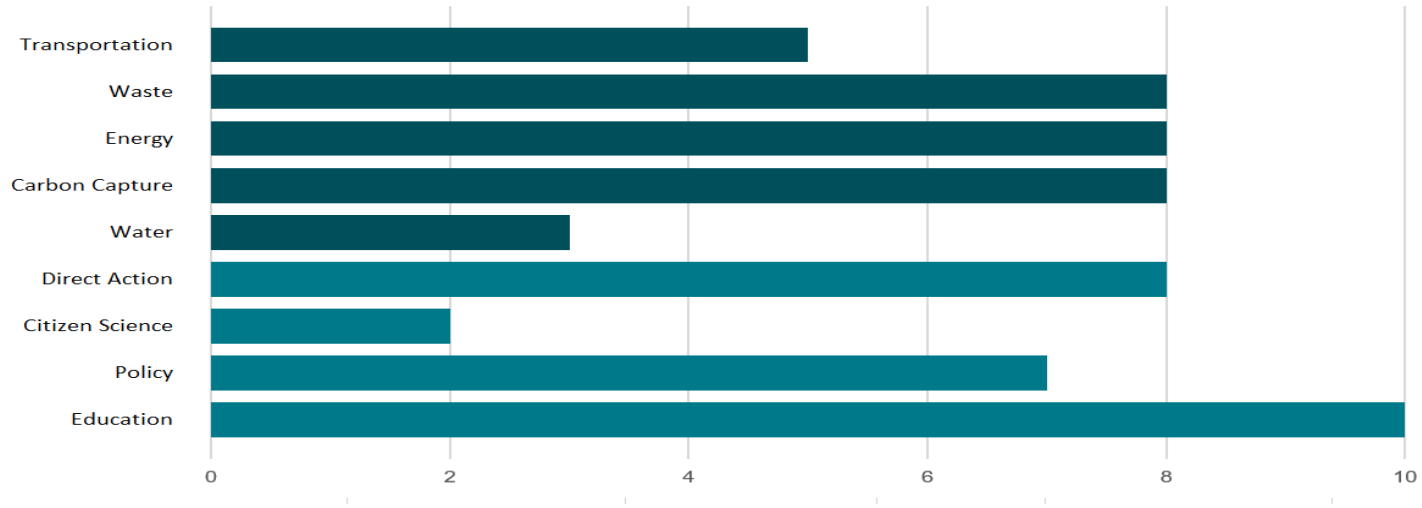

Figure 33: EcoCentre staff priorities for future carbon emission focused programs based on the total number of responses gathered from EcoCentre staff.

Staff Priorities for Carbon Emission Programs

The initial staff survey for the scorecard received five individual responses from committee and executive board members and offered a look at the expectations the EcoCentre has for their carbon reduction plans. The answers to survey questions 1,2,3 and 5 (Appendix Z) were compiled and content analysis was used to find common themes. There were 13 out of 20 responses containing important content to analyze. Each response was analyzed and the following categories were mentioned most frequently: Transportation, Waste, Energy, Water, Carbon Capture, Direct Action, Citizen Science, Education, and Policy (Figure 33). The first five coding categories were used to describe the ways their carbon reduction programs would most likely run to reduce carbon emissions. The last four categories relate to the method of outreach the programs might utilize to reduce emissions. The most commonly mentioned type of program was education, which indicated that finding a way to measure the possible CO_2e emission reduction of an educational program would be worthwhile. Direct Action programs were the next most common type of program mentioned and were the types of programs we focused our scorecard on. This is because estimating

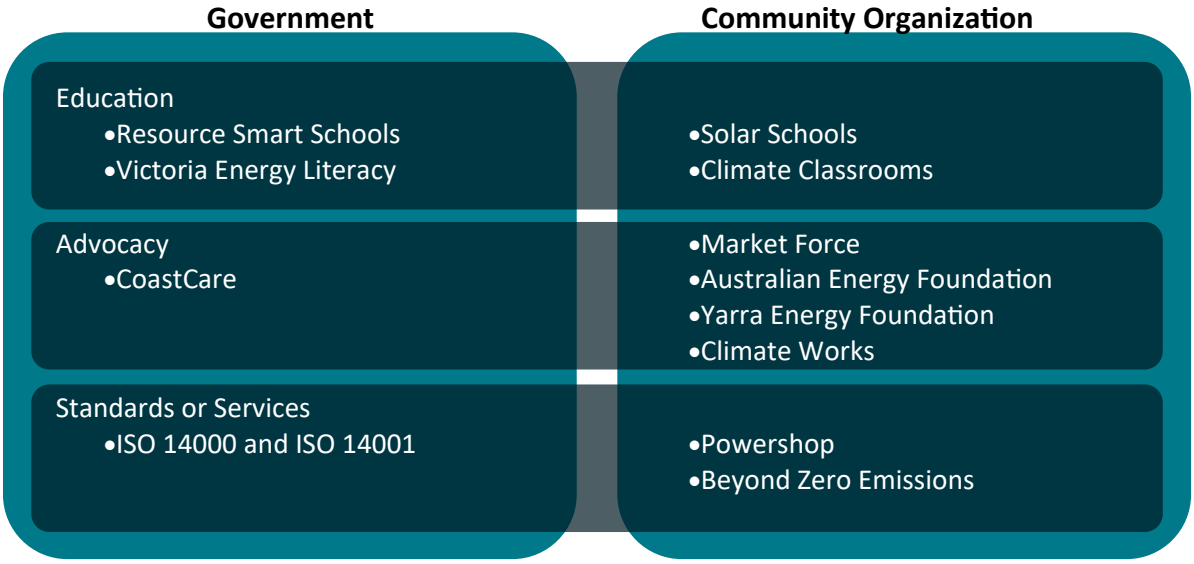

Figure 34: The organizations that the EcoCentre staff believe could be partners for carbon emission programs, sorted by the type of organization and their mission.

carbon reduction from direct actions with a measurable cause and effect is easier than educational programs that don't have a measurable numeric outcome. If educational programs were able to track the numbers of participants who's behavior changed after the program then carbon emission reduction could be measured in some capacity. As for the ways carbon reduction could occur in programs Waste, Energy, and Carbon Capture were mentioned eight times each, making them the most commonly noted. This informed us that gathering data for these kinds of activities would be the most beneficial for the function of the scorecard. Question four of the survey (Appendix N) asked for what kinds of outside organizations might be helpful for the EcoCentre's future programs to understand some concrete actions the EcoCentre might take in the future. The responses were compiled into a list and the types of projects were split into categories (Appendix AA). The organizations were split into government and community organizations, and further split into organizations that were focused on education, advocacy, or sustainability services (Figure 34). These programs were used to understand the types of activities the EcoCentre may engage in for the future.

The Scorecard Design Elements

Foundational Decisions for the Scorecard

As we worked on the scorecard, we used an iterative design process while focusing on each of our design criteria:

1. Scorecard is Applicable to EcoCentre Programs
2. Format is Easy to Use and Understand
3. Carbon Emission Values are Accurate and Relevant
4. Evaluations make sense without Prior Knowledge

The Scope and Sectors of the Scorecard are based on the needs of the EcoCentre

When we began designing the scorecard, we first defined the scope and sectors for the scorecard. These metrics were defined using both the results from the initial survey and through discussions with EcoCentre staff members. The scope refers to the period of time and type of impact that the possible carbon emissions and reductions should be measured over (Figure 35). We determined that a scope of one year was ideal because the EcoCentre expects any program that is run will continue to provide benefits for at least a year, but can't be sure of continuing benefits after this time period. Especially in the case of programs such as Resource Smart Schools in which they have little control over how long the sustainability practices are maintained at the school. After discussing with EcoCentre staff we also determined that only direct impacts of the programs would be measured given that indirect effects such as educational outcomes and future participant actions are difficult to measure and thus unreliable to use for assessing program emissions. The sectors of the scorecard were determined through the results of the initial survey (Figure 33). The most useful data was the mentioned priorities of the EcoCentre staff, which indicated programs focusing on Transportation, Waste, Energy, Carbon Capture, and Water were likely.

When we began collecting data for these sectors, we found that the year long time frame for the scope was most applicable for the Carbon Capture sector. While the other sectors actions have immediate carbon

Scorecard Scope

Scope of Time	Scope of Impact
Attribute no more than 1 year of continuing carbon emissions impacts to the program	Actions that have immediate and measurable carbon emission impact

Figure 35: The two aspects of scope defined for the scorecard

Table 4: Programs the are currently offered through the EcoCentre and a description of the main action that could be used to evaluate the carbon impact of the program.

Program	Measurable Action during Program that reduces CO_2e
Zero Waste Birthday	Stops the use of single use papers and plastics for a birthday party
Community Composting	Diverts compostable waste from the landfill and creates sustainable fertilizer
Penguin Friendly Events	Stops the use of single use papers and plastics for a school fest
St. Kilda Repair Cafe	Prevents repairable items from being sent to landfill and purchasing replacements
Resource Smart Schools	Replaces use of potable water of grid electricity with wastewater or renewables
Powershop	Switches fossil fuel burning grid electricity to carbon neutral providers

emission impacts, plants absorb carbon emissions over the course of a lifetime. Limiting the carbon emission reduction attributed to the EcoCentre to one year of the plants lifespan helps account for the fact that the EcoCentre doesn't directly care for many of the plants from programs after they are planted.

The year long scope is not accounted for in any of the other hard coded data values in the scorecard, but is considered when analyzing the program before the scorecard is used. These kinds of considerations are seen more as we worked through the EcoCentre case studies.

Establishing Carbon Emission Values for Program Activities

The numerical values for the scorecard were a particularly difficult aspect of the scorecard design process. Values first and foremost had to be from reliable sources of information, so only trusted sources were used for these values. This includes government entities, academic research, and climate and sustainability organizations that included methodologies on how their data was collected or calculated. We also focused our search for data collected in Australia. While this was not possible for every value, when reliable information from an Australian source was available it was used. When it was unavailable the methodology of other sources was analyzed to determine if the data was applicable to Australia. Data that was collected in laboratory conditions, from countries with similar standards, or was not collected in Australia but applied to the country by trusted sources was all considered applicable to the scorecard.

Our initial intention for the numerical values of the scorecard was based around using LCA databases and carbon emission databases that aggregated on websites to calculate the amount of carbon emissions that were created by EcoCentre programs. This would have allowed us to utilize large amounts of data on many carbon creating processes. Unfortunately, current databases that are available as free excel files are designed for industrial and government agencies and contain carbon emission values for material processing, machine parts, and shipping processes. LCA data for consumer goods is not consolidated in databases and industrial parts and processes don't apply to EcoCentre programs.

For the final scorecard design, we focused on assessing which types of information would be most helpful for the EcoCentre by looking at the responses to the staff survey. Using the sectors we defined from those responses, we looked at both current EcoCentre programs and organizations the EcoCentre might partner with (Figure 34)(Table 4). Looking at these programs, we developed guidelines for the types of actions the EcoCentre might take to help research relevant CO_2e data. The actions we researched and added into the scorecard were generalized enough to apply to many individual actions, such as throwing away plastic or driving an average Australian car.

After gathering data for different actions we identified, we had to create a method of categorizing the emissions created. Even thought the values were calculated using trusted sources, there are unknown uncertainties in these values. For example, one action in the scorecard is preventing plastic from going to landfill.

20470	Major
8386	Major
2640	High
2392	High
2138	High
1404	High
733	Medium
550	Medium
485	Medium
243.8	Medium
209.1	Medium
153	Medium
151	Medium
139	Medium
83	Low
77	Low
28.6	Low
22	Low
22	Low
20.2	Low
17.7	Low
0.597	Micro
0.004	Micro
2E-07	Micro
0	Micro

Figure 36: CO_2 Emission values in grams (left) and the categorization for the value (right) for each action we calculated for.

Table 5: The value range for each carbon emission category

Major	5,000+
High	5,000 > x >= 1,000
Medium	1,000 > x >= 100
Low	100 > x >= 10
Micro	10> x >= 0

Table 6: The letter grade (left) and kg CO2 values (right) for the scorecard categorization that appears in the final scorecard

F	0.0001
D-	0.001
D	0.1
D+	1
C-	5
C	25
C+	50
B-	100
B	150
B+	200
A-	400
A	600
A+	800
A++	1000

The initial value that was used to calculate these emission values was intended for landfills to use in their own carbon emission calculations (Appendix AB). The value was initially reported to three significant figures in the units MT CO_2e per short ton of material. Converting this number to the unit g CO_2e per kg of material introduces uncertainty due to lack of significant figures in the initial value. The source of the data also calculated the value using average manufacturing, transportation, and end of life emissions for a mixed variety of plastics. This was chosen to simplify the evaluation process, however this also means CO_2e values are not actual CO_2e emissions, but estimates. As discussed earlier, more accurate and comprehensive values are not available so these uncertainties were worked into the scorecard.

We accounted for the uncertainties by developing a system of categorizing the raw data values into ranked categories. We did this in order to divorce the scorecard user from the numerical calculations. Using exact values and reporting a final carbon emission reduction value would be misleading and could cause users to assume changes in a few kg of plastic to landfill could significantly change the CO_2e emissions of a program, when in reality there may be a baseline of CO_2e emissions created whether 10kg or 20kg of plastic is thrown away. Instead, we split the initial carbon reduction actions into five different categories Major, High, Medium, Low, and Micro by using the heat mapping function built into excel to visualize the different levels of emissions created by each action (Figure 36). Each category was then assigned a range, increasing logarithmically until the high category (Table 5). This was based off of the distribution of values to create a category for every substantial group of emission values.

After establishing these categories we created a final graded scale of the actions that was measured in kg and spanned a large range of values to be able to account for when an action is performed multiple times (Table 6). The Major, High, Medium, Low, and Micro categories became the C- through F categories.

Ranking of Scorecard Values keeps Evaluations Action Focused over Numbers Focused

As part of both the functionality of the scorecard, and an aspect of the binning process used for carbon emission reduction actions, we developed a five tiered system to give the programs their final rating. The system is based off of the letter grade ranking of the actions, but the number from the total of all the programs is used. The one petal rank is the F-D+ range, two petals is the C range, three petals is the B range, four petals is the A range, and five petals is A++ and beyond. These ranges were based of the results of the final program case studies, where Zero Waste Birthday Parties was rated in the tens of kilograms, while the St. Kilda Repair café rated in the thousands of kilograms. The petal system is an outward facing categorization for the scorecard, and is intended to be used on the EcoCentre website to indicate to program participants what programs can reduce

Figure 37: The fully filled in flower icon for a five petal program

carbon emissions. Petals were chosen as the symbol of the five star system, as opposed to stars or other similar symbols, because the design of the icon resembles a flower. As the rank increases, the petals are filled in until the entire flower is displayed (Figure 37).

Format of the Scorecard

The scorecard is an Excel worksheet because the program is fairly common and easy to use. Additionally, an Excel file can have copies saved, so multiple versions of the scorecard with inputs filled out for each program can be saved separately and referred to again when changes are made or the EcoCentre is reevaluating their programs. We developed a user interface on the first page of the Excel workbook for the scorecard, prioritizing minimizing inputs needed from the user, intuitive design, and easy readability.

Developments of the Scorecard

To develop our scorecard we used EcoCentre programs to test the current method we had designed to see if our process and scorecard would effectively and accurately assess EcoCentre programs.

Case 1—Problems with Exact CO_2e Emission Values

The first iteration of the scorecard attempted to calculate the exact amount of CO_2e created by the program of interest. When testing the early scorecard in a case study, we realized the difficulties that exact scorecard values would cause. The initial process we designed used a six step guide where each action in the program was equated to an exact amount of CO_2e (Appendix AC).

The steps were as follows:

Step 1: Identify ways CO_2 is saved
Step 2: Identify ways CO_2 is created by the program
Step 3: Determine program numbers to calculate CO_2
Step 4: Find CO2 Emission Data Corresponding to Step 3
Step 5: Calculating total Carbon Reduced and Created
Step 6: Adding Benefits and Detriments

To test our method, we conducted a case study using the EcoCentre's current program: Zero Waste Birthdays (Appendix AD). This case study was successful in steps 1-3 during which we identified ways the program could both reduce and create carbon emissions and estimated the number of times an activity would be completed during a single run of the program. However once we reached step 4 we were unable to continue the scorecard method.

While trying to complete step 4 of the process, was when we discovered that finding exact carbon emission information with a small uncertainty and on the same scale as the EcoCentre is near impossible. Most carbon emission data is collected at a state government level or higher and many data collection efforts focus on industrial processes, not residential actions. Additionally, LCAs that we were planning on using to calculate the CO_2e reduction for the Zero Waste Birthday program were unusable because of three main reasons. The first being that many LCA databases are behind paywalls. The second is that many LCAs available for public use focus on industrial parts and processes. The third is that LCAs vary widely in the scope they cover, so even if LCAs were found for every consumer product the EcoCentre deals with, every group calculating LCAs takes different amounts of the raw material extraction, manufacturing, and transportation of a product into consideration for their final CO_2e value. Because of these issues, we stopped our case study before any carbon emissions were calculated and focused on reworking the scorecard so that exact carbon emission data was not required

Sector	Activity		Benefit	Inputs			Detriment	Inputs			Program Score
				#	type	CO2e		#	type	CO2e	
Waste	1										0
	2										
	3										

Waste
Repair Existing Item
Change Item
Prevent Item Use
Dispose of Item

Figure 38: Prototype of the carbon emission scorecard incorporating the first use of predefined actions

Case 2 - Structuring the Physical Scorecard

In the second approach, we still wanted to calculate carbon emissions. However, instead of gathering new data for every action, we created a list of possible actions that could be taken in any EcoCentre program and assigned each action a unit of measurement and a CO_2e value. In this phase, we decided to keep the first three steps of the process we had created because they set a good foundation for the assessment and encouraged critical thinking about the ways a program could reduce carbon emissions. However, since we removed the exact carbon emission calculations from the scorecard process and replaced them with predefined actions, we changed the wording of step 3 to indicate that the step should be used to identify actions already available in the scorecard that correspond to the actions that were identified in steps 1 and 2.

Step 1: Identify ways CO_2 is saved

Step 2: Identify ways CO_2 is created by the program

Step 3: Determine actions in each sector that exist in the scorecard or must be researched

We then began compiling values for some waste related actions inspired by the actions we defined in our first case study of Zero Waste Birthday Parties and the EcoCentre's affiliate organization, the St Kilda Repair Café. Both these programs focus largely on waste reduction, so we focused on actions that would occur in these programs such as an item not being thrown away (Figure 38).

We also created our first outline of the scorecard interface in Excel while we began our research. The scorecard used the sector, activity, benefit, detriment, input categories we defined in the methods section (Figure 38). The intention of this design was that a program such as Repair Café or Zero Waste birthday parties could be assigned to a sector such as waste, and activities from that sector could be assessed and used to calculate emissions and a scorecard value.

Case 3 - Restructuring for ease of use and incorporating researched carbon emission values

When the case 2 scorecard was used to evaluate the Zero Waste Birthday Parties, we identified a few key aspects of the evaluation process that did not work with the previous scorecard. While Zero Waste Birthday Parties is largely about reducing waste, there were other identified actions that fell under sectors such as water to use for washing dishes that also must be accounted for so we moved the sector category after the activity description and allowed each action to be attributed to its own sector (Figure 39). Many actions also did not have a directly correlated beneficial and detrimental action, so we created columns that could be checked off to indicate if a single action was beneficial or detrimental. At this phase of development, we also began binning the carbon emission values we researched into ranks and grading each action taken.

Action	Sector	Benefit	Detriment	Inputs			Program Score
				type	#	CO2e	

Figure 39: Prototype of the carbon emission scorecard after restructuring the evaluation categories

Description	Sector	Action	Action Occurred	Action Prevented	Inputs			Program Score
					#	Rank	Total	
	Energy	Standard Grid Electricity Use (1 kWh)	x		40	D	D+	2 Petals
	Transportation	EcoCentre Cars (1 km)		x	70	D	C-	
	Waste	Electronic bought new (1 kg)		x	30	C-	B	
	Water	Potable Water (1 L)	x		65	F	D-	
	Carbon Capture	Plant seagrass (1 m^2)		x	15	D-	D-	

Figure 40: The user interface of the final version of the scorecard with example inputs from each sector of the scorecard

The culmination of all the design criteria considerations and design iterations is the final carbon emission scorecard, which includes both the actual scorecard and a step by step process to complete before using the scorecard (Figure 40). The scorecard uses four inputs from the user to calculate the final program score:

1. Sector
2. Action
3. Action Occurred/Prevented
4. Number

These inputs need to be determined before the scorecard can be used and can be determined by analyzing the program of interest. Once the program is analyzed, the description column is designed to contain notes on the action that is being calculated in each row of the scorecard and the four input rows should be known and filled in. The process to get the final program evaluation score has three phases

Brainstorm

During the brainstorming process, the first step is to determine if a program has the potential to reduce any amount of carbon emissions. The easiest way is to do this is to first determine if the program fits into at least one of the scorecard sectors, Energy, Transportation, Waste, Water, and Carbon Capture. If a program focuses on changing the way the participants use resources in any of the sectors then it is a good candidate for being a carbon reducing program. For example, the Repair Café is a program in the waste sector that reduces carbon emissions by preventing items from going to landfills and new items from being bought. However, if the program focuses on teaching program participants how to act more sustainably instead of guiding them through the carbon reducing action during the program duration, the program should not be used in the scorecard. This is because that while the scorecard is designed to account for the uncertainties associated with measuring carbon emissions, it is not designed to account for uncertainties of the extent education changes behavior in participants. While the brainstorming process might be helpful for assessing if an educational program is capable of reducing carbon emissions, it should not be put into the scorecard to evaluate the carbon emission reductions.

After determining if a program has the potential to reduce carbon in any of the five major sectors and ensuring that the program is not solely educational, actions that either produce or reduce carbon emissions should be identified. To identify carbon reducing actions, inspiration can be taken from the existing actions already in the scorecard. There are currently 25 carbon creating actions in the “Exact Values” tab of the scorecard excel workbook. These were determined to be common actions the EcoCentre would likely work to prevent, or encourage actions that produce less CO_2e. These are all actions that create CO_2e, so the program would either prevent these actions from occurring, or swap a high CO_2e producing action for a less polluting one. For example, in each of the sectors there are some general trends in actions that a carbon reducing program would follow.

Energy

Reducing the total amount of electricity used or shifting the energy that is used towards a more renewable option.

Transportation

Reducing the total amount of kilometers that must be travelled or changing the type of transportation to one that produces less CO_2e

Water

Reducing the total amount of water used or collecting rainwater and reusing wastewater.

Waste

This can be any action that decreases consumption of products, extends the lifespan of a project, or responsibly disposes of unwanted items.

Carbon Capture

This is the only section of the scorecard that is reported in negative values, because the action that is taken reduces CO_2e in the atmosphere. This can be achieved through reclaiming sparsely covered or urban areas with densely packed plants.

Once program actions that fit in these sectors are identified, actions taken during the program that could create carbon emissions should also be identified. These are often actions such as necessary transportation to program locations, use of water and electricity, and accounting for actions that are a more eco-friendly alternative but still produce some level of carbon emissions. The extent to which these actions are accounted for is flexible, but should be consistent across all EcoCentre program evaluations. For example, the possible kilometers driven by unaffiliated EcoCentre participants would be difficult to account for, but it would be useful to include the kilometers traveled by the EcoCentre staff and partners outside of their regular commute.

Estimate

After the brainstorming process, the program of interest should have a list of carbon reducing and producing actions that occur for the duration of the program. The first step of estimating is finding an action in the "Exact Values" tab of the scorecard excel workbook that corresponds to each action identified during the brainstorming process. If an action can't be found in the "Exact Values" tab, time must be spent to find a CO_2e value for the action from a trusted source. The sources and calculations for the 25 current actions can be found in the Scorecard Value Tracker (Appendix AB). Guidance on how trustworthy sources were identified can be found on page 37 in the Carbon Emission Values section of this report.

Once every action has a CO2e value, the amount of times the action is performed must be estimated. Every carbon emission value has a corresponding unit, for example CO2e/km driven. To calculate the total carbon emissions from driving, the number of kilometers driven needs to be estimated. Any exact values that are available are preferable but for programs where thorough records haven't been kept or future programs that haven't been run, an estimate will work well. Once every action that was identified has a corresponding CO2e/unit value and numerical value of said unit used in the program, the final program score can be calculated.

Calculate

The calculations to determine the final program score are all run by the scorecard using excel formulas and range definitions. Once the values are entered into the scorecard, all calculations are automatically run by the scorecard to determine the final program score.

Recommendations

Streamline Program Name Description in the Program Surveys

When analyzing program survey data, the team noted the variety of entries that were inputted for a single program. Many participants did not enter in the exact program name, and put in an abbreviation or only one word from the program name. This made analysis between programs difficult given the outside, independent perspective the team was looking at the EcoCentre through. For future program surveys, adding a drop-down menu for a list of program names or automatically filling in the activity would be useful. Future analysis of program surveys will then be able to be completed between programs. In future strategic planning, analyzing the effects and impacts of programs between one another may prove insightful.

Work on Implementing More Interactivity in Programs

As indicated in the findings, there is a statistically significant discrepancy between the participants of individual based programs and group based programs. Individual based program participants have a high amount of both sustainability interest and action that is not seen in the group based surveys. In those group based programs, there is a significant difference between sustainability interest and sustainability impact. It is our team's recommendation that the EcoCentre work to implement more interactivity based learning in their programs. Working to achieve this recommendation could potentially include adding more means of hands-on work during the program. Informing participants of more ways to get involved with sustainability in a large project and in their daily lives could also address the discrepancy.

Continue to Focus on the Means of Outreach in the Community

As previously noted, the EcoCentre has had great community engagement and understanding of its efforts. Our findings indicated that partner and program analysis concluded that the EcoCentre should continue to focus further on engagement. Program data analysis indicates that participation in EcoCentre programs was strongly tied to having an established knowledgebase of the organization. Furthermore, past participants noted their concern of relying on word-of-mouth communication alone. Summarizing our findings together indicates that most people find the EcoCentre through others. The EcoCentre has relied on this method of communication that, as evident by their success, has worked well for the EcoCentre. Despite its usefulness, this means of communication alone limits the extent to which the EcoCentre can reach the community. The EcoCentre is not unaware of this, however. Our analysis of the strategic planning documents and strategic planning workshop revealed that many key goals the EcoCentre wishes to achieve in this next strategic planning period focuses on outreach and perception. It is our team's recommendation that the EcoCentre focuses on outreach alongside these goals particularly. In addition, the EcoCentre should make partners and participants aware of the EcoCentre's social media presence. In tandem, doing so could work to improve participant engagement, lead to greater impact within the community, and open the opportunity to develop current partnerships and foster new ones. Expanding their social media presence is one way that the EcoCentre can do this.

Continue Efforts to Secure Upgraded Facilities

Both the staff and partners of the EcoCentre indicated that the EcoCentre is in need of a facilities upgrade. While able to hold the current activities and programs in place, the Ecohouse is becoming exceedingly crowded, as noted by staff, and is causing more stress on those working there. Additionally, some partners of the EcoCentre recognized the limitations that the current facilities impose and pointed out the room for growth and expansion if this new building was created. We understand that these new facility plans have been in the works for some time and with COVID-19 and other circumstances, the plan has not yet been able to come to fruition. In order to expand their reach and impact in the greater community and systemically, we recommend that the EcoCentre continue its strong efforts for an upgrade facility. In addition, with the results of the well-being survey, we recommend that more outdoor and indoor break time space be included in order to facilitate a more healthy work well being for the staff.

Brainstorm and Implement Actions that will help Mitigate Staff Burnout

From the responses collected in the well-being survey, we recommend that the EcoCentre focus more heavily on ensuring the well-being of their staff. In order to accomplish this, we advise the EcoCentre, first and foremost, to invest more time into further analyzing the current responses to the survey in order to get a more robust sense of individual staff member's thoughts on the work culture present at the EcoCentre. More specific conclusions can be determined regarding the current feelings of the staff. Doing so would allow a more comprehensive game plan to be thought out moving forward. Additionally, we recommend that the EcoCentre focuses on their staff's well-being in this next strategic plan by working with the staff to understand areas that could be improved upon. We suggest that a staff workshop be held in order to brainstorm with the collective staff, the ways that change can be made to allow for growth within the organization and better systems put into place. By incorporating staff in this process, the EcoCentre can allow them to feel heard and appreciated for the work and efforts, as well as create necessary change for the health of the staff and organization. Lastly, in order to continue this open dialogue, we recommend that the EcoCentre conduct this staff survey on an annual or bi-annual basis in order to understand their staff's personal well-being and to give them an opportunity to voice their concerns anonymously.

Expand on the Action Values in the Scorecard so that any Future Program can be Assessed

As a part of the scorecard process, the actions taken in each program correspond to a researched action and CO_2e value that is stored in the "Exact Values" sheet of the scorecard. This format is intended to make the scorecard evaluation process easier and more streamlined by using generalized CO_2e values that can be applied to multiple action in programs. This reduces that time that would be needed to find values for every possible action or item the EcoCentre can use to reduce carbon emissions. The 25 values currently in the scorecard were chosen for both their potential to be useful for future carbon reduction programs as well as our ability to find values for these actions within the project term. Some sectors, such as transportation and energy, have actions that can apply to most of the anticipated ways CO_2e emissions can be reduced for the sector. However, the Waste and Carbon Capture sectors have a greater range of actions that can be more specific than simply using less electricity. Because of this, as more programs are evaluated, CO_2e values for actions that haven't already been added to the scorecard should be researched. To find values to add, a similar approach to what it shown in the Scorecard technical document should be used. The value tracker shows the sources that the information was taken from as well as the calculations and unit conversions used to produce the final g CO_2e /unit value in the scorecard. Once this value is known, the action title, CO_2e value, unit, and link to source only need to be added into the appropriate sector of the "Exact Values" tab. Then the scorecard will

automatically assign the action a rank add it to the drop down menu options.

Conduct a Comprehensive Assessment of All EcoCentre Programs for their Carbon Reduction Impact

The scorecard has been used to evaluate both the St. Kilda Repair Cafe and Zero Waste Birthday Parties, and now can be applied to any current and future EcoCentre programs that have the potential to reduce carbon emissions. Conducting an evaluation of programs for the upcoming three years will help assess whether the EcoCentre is strongly contributing to carbon emission draw down in Port Phillip or if this goal needs to be addressed when planning new programs. To begin this process, start by identifying all programs that include concrete carbon reduction actions that can be measured during the duration of the project. Once the list of programs is narrowed down to those that are promising, each can undergo the Brainstorm, Evaluate, Calculate process.

During this process, we also recommend reevaluating both the letter grade and petal ranges for kg CO_2e reduced. The ranges used to define the ranking of that are While the F through C ranks were based off of the grams of CO_2e from the researched actions, the A++ value of 1000 kg was based off of a generous estimation of the CO_2e reduced by the St. Kilda repair cafe, assuming that 200kg of their year waste reduced was E-waste. The ranks in between were chosen by what was assumed to be reasonable. After evaluating a few more programs, having a cap at 1000 kg of CO_2 might be too restrictive and many programs easily reach the five petal score. On the other end of the spectrum, EcoCentre programs might mostly prevent 10 - 100 kg of CO_2e, and it would be more useful to have the petal ranges differ by a few hundred with the few outliers in the 1000s also being categorized as 5 petals.

Consider the Impact of Educational Programs on Carbon Emissions

The carbon emission scorecard was developed with only direct action carbon reducing programs in mind, and its not recommend that the scorecard be used to evaluate educational programs. Most of these programs lack exact numerical values that can be correlated to carbon emissions and those that do will probably not be carried out at the same scale as programs focusing only on carbon reducing action and therefore reduce lass measurable carbon emissions. However, it can be successfully argued that educating the general population on sustainable practices and inspiring a passion for the environment will be more effective in stopping climate change in the long run than any single program. Therefore, it is important to keep in mind that educational programs do have carbon reduction potential, it is just not easily measurable.

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Appendix A

DELWP Partner Interview Questions

Due to scheduling conflicts, the partner interview with CoastCare Victoria was done two weeks in advance of the other partner interviews. After completing this interview, it was noted by the EcoCentre EO that the overall interview was too long and should be shortened as to not ask too much time of the different partnering organizations. Therefore, all other interviewees were asked the ten questions that appear in Figure 7.

1. How would you personally describe your organization's mission and/or purpose?
2. Does your organization focus on or work directly in reducing carbon emissions and stopping climate change? If so, in what ways does it accomplish this? *Skip if number 2 if it is obvious*
3. What is your main goal when partnering with another organization?
4. Why does your organization choose to partner with the EcoCentre?
5. How would you describe the EcoCentre to a colleague?
6. What position do you feel the EcoCentre takes in reducing carbon emissions and stopping climate change?
7. Can you give me an example of a collaboration that you have done with the EcoCentre?
8. What have been the outcomes of your work with the EcoCentre? Has it been sustained?
9. What do you personally value about your partnership with the EcoCentre?
10. What are your groups key objectives for the next three years? How can the EcoCentre play a unique role to help deliver those objectives?
11. Are there any aspects of your other partnerships you appreciate that you would like to see the EcoCentre do?
12. Do you have any feedback that you would like to share regarding how the EcoCentre could improve the relationship it has with your organization?
13. Do you have any feedback that you would like to share regarding how the EcoCentre could improve?
14. Do you have anything else you would like to add?

Appendix B

Partner Consent Statement

Below is the consent statement spoken at the beginning of each partner interview in compliance with sound research ethics. Each interviewee was asked to verbally consent when prompted.

Thank you again for responding and accepting our request for an interview with you. Before this interview starts we will have you listen and verbally agree to a consent statement

You, the participant, are being invited to participate in an interview with our team from Worcester Polytechnic Institute (WPI) working on behalf of the Port Phillip EcoCentre. This interview is part of our research project to assist the Port Phillip EcoCentre in their strategic planning for 2021 - 2024. In this interview, we are looking to hear about your experience in working with the EcoCentre as a partner. We are seeking to learn about what you and your organization value about your partnership with the EcoCentre as well as how the partnership works. The interview is scheduled for around 30mins. With your consent, we will be voice recording the interview, (do we have your consent?). We will not publish your name, the names of others mentioned during the interview, your email, or other personal information that may arise in conversation. With your consent, individual responses to interview questions along with topics mentioned may be published (do we have your consent?).

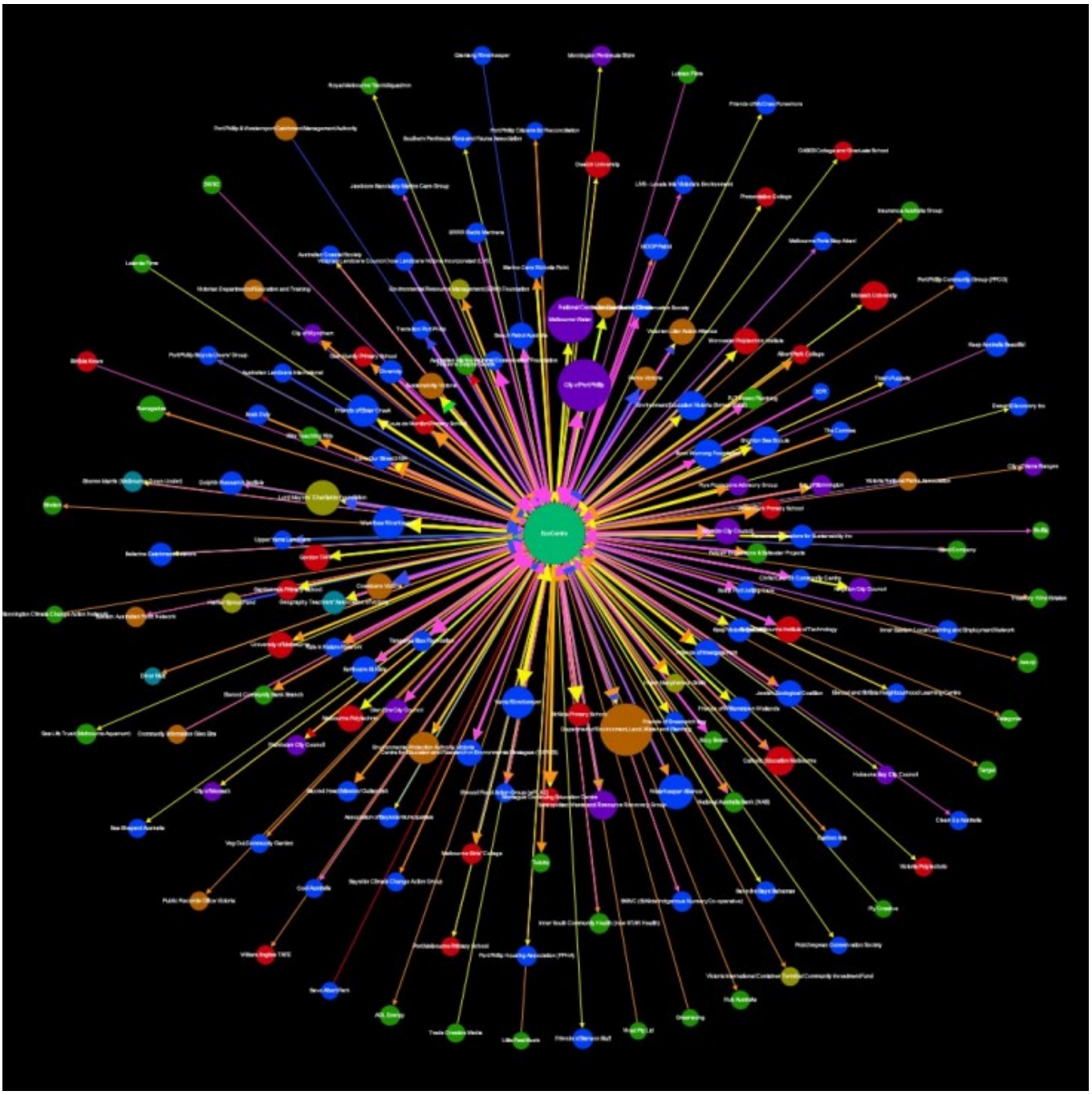
This process is a voluntary one. If you do not want to answer any particular question, you are not obligated to do so. We will simply move on should you make this known. Additionally, if you no longer feel open to an interview or wish to stop the interview, you have the right to withdraw from the interview at any point.

Do you have any questions before we begin?

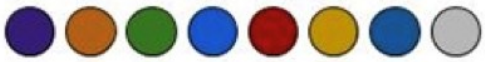
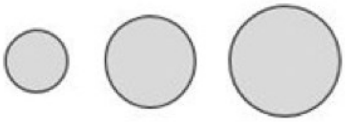
Appendix C

EcoCentre Knowledge Flow Map

Below is an image of the final EcoCentre knowledge flow map created by Li et al. (2018). Each circle represents one of 160 organizations mapped while other variable, such as color, represent the types and direction of knowledge flow. A key is also provide as apart of this appendix on the following page.



Appendix A: EcoCentre Knowledge Flow Map

Map Variable	Data Source	Map Representation
Number and Type of Stakeholder:	Annual Reports	
Type of Knowledge Shared/Created:	Annual Reports, Staff Interviews	
Direction of Knowledge Flow	Annual Reports, Staff Interviews, Stakeholder Interviews, Staff Workshop	
Connections Between Stakeholders	Staff Workshop	
Strength of Connection	Annual Reports, Staff Interviews, Stakeholder Interviews	
Level of Effort	Staff Interviews	

Appendix D

Original 2018 Completed Impact Matrix

Below is the completed impact matrix of all EcoCentre partners created in 2018 by Li et al. During this process a total of 162 partners were categorized, allowing the team to give recommendations as to what partnerships were most worthwhile.

Change	Effort (hours/year) 39 or Under	40 - 60	61+
Systemic	Most Significant -Prioritize Effort- (A) Association of Bayside Municipalities, Australian Coastal Society, Bayside City Council, CERES, City of Monash, City of Stonnington, eFLAG, Frankston City Council, Gordon TAFE, Hobsons Bay City Council, Kids in Nature Network, Love Our Street 3184, National Centre for Coasts and Climate, Polperro Dolphin Swims, RMIT, Save Albert Park, St Kilda Primary School, Sustain: Australian Food Network, SV, Tangaroa Blue Foundation, University of Melbourne, VLAA	Most Significant -Maintain, Reduce Effort if Possible- (D) Boon Wurrung Foundation, Catholic Education Melbourne, Environment Education Victoria, Environmental Protection Authority Victoria, Metropolitan Waste and Resource Recovery Group, Lord Mayors' Charitable Foundation, Waterkeeper Alliance, Werribee Riverkeeper, Yarra Riverkeeper	Most Significant -Maintain, Reduce Cost- (G) City of Port Phillip, Department of Environment, Land, Water and Planning, Melbourne Water
Collective	Significant -Prioritize Effort- (B) Albert Park Primary School, Animal Liberation Victoria, Bayside Climate Change Action Group, Beach Patrol Australia, City of Wyndham, Clean Up Australia, DRI, Earthcare St Kilda, ESNLC, HMS Trust, Jewish Ecological Coalition, Kingston City Council, LIVE, Parks Victoria, Pelican Expeditions & Saltwater Projects, Presentation College, Scab Duty, Sea Life Trust (Melbourne Aquarium), SKINC, St Louis de Montfort Primary School, Target, Transition Port Phillip, Tomorrow's Leaders for Sustainability Inc, WPI	Significant -Maintain, Work To Reduce Effort- (E) Brighton Sea Scouts, Friends of Elster Creek	Significant -Consider, But Costly, Must Reduce Effort- (H)
Individual	Less Significant -Show Consideration- (C) Aesop, AGL Energy, Albert Park College, AMMCF, Carbon Arts, City of Yarra Ranges, Coastcare Vic., Community Information Glen Eira, Deakin Uni., Diver Matt, ERM Foundation, Friends of Greenwich Bay, Friends of Westgate Park, Gardenvale Primary School, GTAV, Glen Eira City Council, Glen Huntly Primary School, GoodCompany, Greensong, Hub Australia, STAR Health, Insurance Australia Group, Kids Teaching Kids, Little Feet Music, Marine Care Ricketts Point, Melbourne Girls' College, Melbourne Polytechnic, Montague Continuing Education Centre, MOOP Patrol, Mornington Peninsula Shire, NAB, OASES College and Grad. School, Patagonia, PJT Green Plumbing, Port Melbourne Primary School, Port Phillip BUG, PPCfR, PPCG, PPHA, Public Records Office Vic., RMYS, Rye Foreshore Advisory Group, Sacred Heart Mission/ Outlandish, Melbourne Down Under, South Port Uniting Care, SCAN, Stratton, Telstra, The Connies, Trash Puppets, Treasury Wine Estates, Upper Yarra Landcare, Veg Out Community Garden, VICT Community Investment Fund, Vivad Pty Ltd, William Angliss TAFE	Less Significant -Consider, Do Not Focus- (F)	Less Significant -Extremely Costly, Prioritize Elsewhere- (I)

Appendix E

Staff Well-Being Survey Questions

Below is a list of the survey questions created for the staff well-being survey. This survey was distributed to all 15 EcoCentre staff through the use of a google form.

1. What attracted you to work at the EcoCentre?
2. How many years have you worked for the EcoCentre?
3. What are your primary job responsibilities at the EcoCentre?
4. Have your responsibilities changed over the course of your time at the EcoCentre? If yes, can you explain in what ways?
5. How many hours per week are you employed at the EcoCentre?
6. Roughly, how many hours per week do you put towards your work here at the EcoCentre? If this is different than the number of hours employed, what creates this difference?
7. How would you describe the EcoCentre's mission in your own words?
8. To what extent do you feel your work contributes to the EcoCentre's mission?
9. With the ongoing COVID-19 pandemic, how has your work well-being changed? Has the EcoCentre adapted to reflect this?
10. What do you feel is the most personally challenging part of your job?
11. What do you feel is the most personally rewarding about your job?
12. Can you describe a time when you felt a sense of satisfaction or accomplishment by a part of your work with the EcoCentre?
13. What part of your job, if any, causes you the most stress?
14. Can you describe an experience where you felt overwhelmed or stressed by something revolving around your work at the EcoCentre? What was the outcome?
15. On a scale from strongly disagree to strongly agree, you feel comfortable reaching out to your direct manager in case of work issues and/or stress
16. What workplace tools or techniques, if any, does the EcoCentre apply or support you to apply to address work-related stressors?
17. What workplace tools or techniques would you appreciate support for, to address work-related stressors?
18. On a scale from strongly disagree to strongly agree, you feel comfortable and supported to discuss your health, including mental health, with your colleagues and/or manager
19. On a scale of strongly disagree to strongly agree, you feel personally well outside of the workplace

Appendix E: Staff Well-Being Survey Questions

20. On a scale of strongly disagree to strongly agree, you feel personally well when inside the workplace
21. What words would best describe the team culture at the EcoCentre?
22. The EcoCentre values diversity, equity, and inclusiveness. Do you feel your identity is supported by organizational culture and practices? Why?
23. What would you suggest, if anything, that the EcoCentre could improve upon regarding staff relationships and/or work culture?
24. Is there anything else you would like to add?

Appendix F

Staff Consent Statement

Below is the consent statement written in conjunction with the staff well-being survey. This statement worked to acknowledge the difficulty of ensuring anonymity in this type of survey and giving the staff a safe space to voice all opinions without fear of repercussions.

Thank you for participating in our digital survey. In order to proceed with the interview, we ask that you kindly read the following consent statement and check the box to affirm that you have read it.

You, the participant, are being invited to participate in a digital survey with the team for Worcester Polytechnic Institute (WPI) working on behalf of the Port Phillip EcoCentre. This survey is part of the team's research project to assist the Port Phillip EcoCentre in their strategic planning for 2021 - 2024. With this survey we are looking to hear about your experience in working at the EcoCentre and your well-being within your position. We are seeking to learn about your thoughts on the EcoCentre as a workplace and your feelings working there, especially with the recent virtualization due to the COVID-19 Pandemic. The survey should take 20 to 40 minutes to complete with a total of 24 questions.

This survey is meant to be anonymous, but we understand that some of these questions may give indicators of the participant's identity. To this end, all answers to this survey will be treated anonymously with our focus being the topics/themes of staff responses. We will not publish your name or other personal information that may arise in the answers. Individual responses may be quoted in our report to the EcoCentre for internal use. Any specific names used in your responses will only be used in combined and/or de-identified feedback to improve EcoCentre well-being practices..

This process is a voluntary one. If you do not want to answer any particular question, you are not obligated to do so, simply leave it blank. Additionally, if you no longer feel open to filling out the survey or wish to stop, you have the right to not submit the survey at any point.

Appendix G

Identifying the Quantitative and Qualitative Data within the Program Surveys

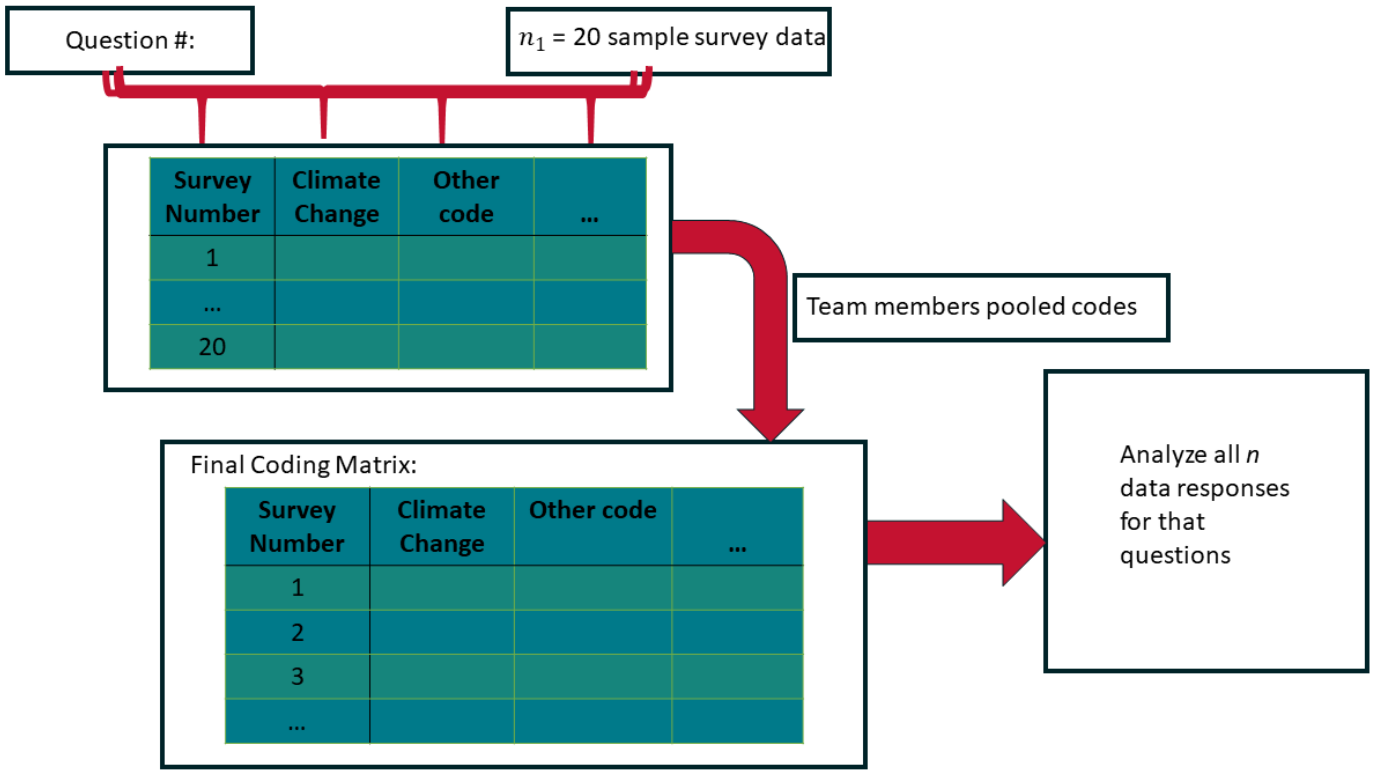
Note: A dark teal background indicates quantitative data. A red background indicates qualitative data. No color on a background indicates auxiliary data not pertaining to analysis of the survey data specifically

Individual Based Survey Questions	I am (asking the status of the individual)
	Name of activity
	Activity Date
	Why did you decide to participate?
	What did our activity or staff do best?
	How could the activity be improved?
	Did you (or your group) learn something new about the local environment? (Y/N)
	Did you (or your group) now feel more connection with the local environment? (Y/N)
	Do you (or your group) expect to spend more time connecting to the local environment as a result of this activity? (Y/N)
	Do you (or your group) plan to take any new sustainability action?
	Rate your program experience (10 being best)
	Your stories inspire us! We would like to contact some of our participants next year and check in with a 5-minute survey. Please write your name and email here if it is okay for us to contact you.
	Your postcode
Group Based Survey Questions	Name of individual filling out the survey
	Name of activity or client group
	Activity date
	Number of participants
	How many people in your group answered YES for: they learned something new about the local environment?
	How many people in your group answered YES for: they now feel more connection with the local environment?
	How many people in your group answered YES for: they expect to spend more time connecting to the local environment as a result of this activity?
	If an action program – How many people in your group answered YES for: plan to take any sustainability action?
	Note any comments, anecdotes or feedback you heard on the day

Appendix H

Content Analysis Methodology

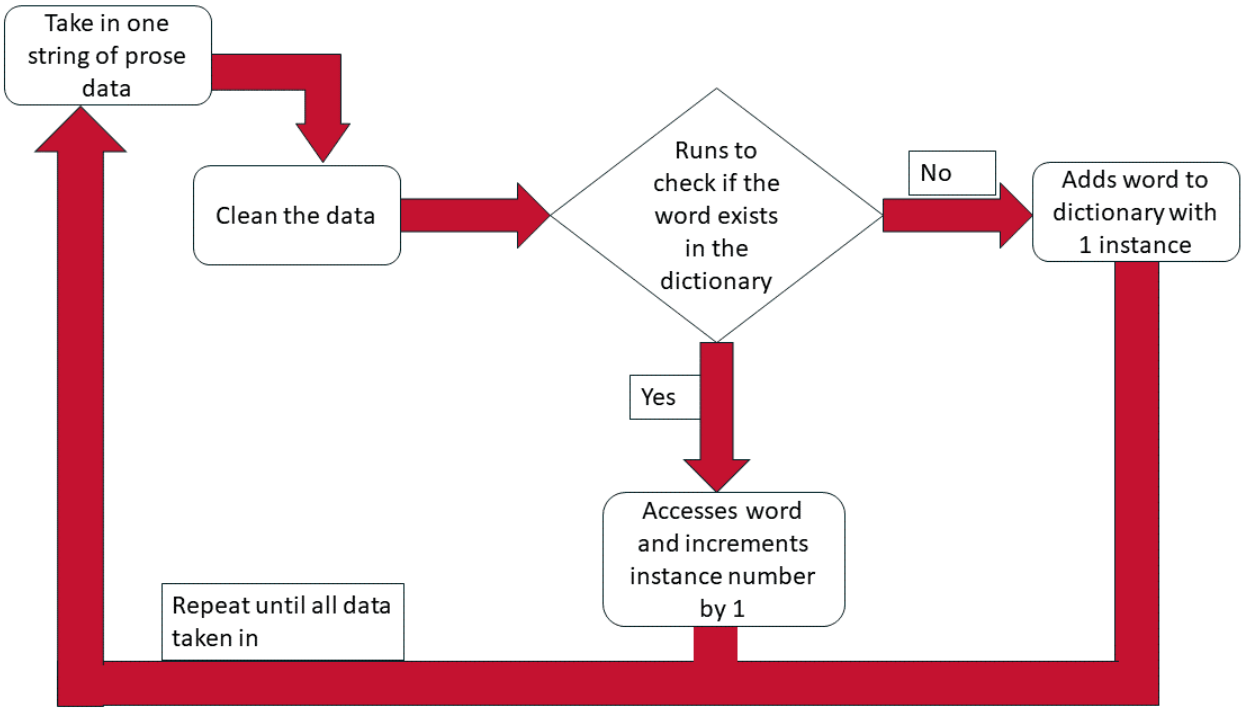
A sample set of twenty randomly selected survey responses will be used to generate a set of coding categories or themes that appear in the data. Individual team members used these categories to code a subset of the data, and compared their coding for inter-rater reliability. This helped us clarify our coding categories and develop a final, master content analysis matrix coding matrix to code the remaining data. Once complete, all surveys were analyzed using this matrix to mark off particular aspects of the data. Treatments were added to the master matrix if needed. Comparison between team member results occurred in order to finalize results and treatments, calculating a final inter-rater reliability score. This process was completed for each question



Appendix I

Dictionary Algortihm Functionality

The algorithm itself was programmed to create a dictionary from string data, which held and reported every word utilized in the responses and the number of instances every word appeared. This was repeated for each response



Appendix J

Dictionary Algorithm Code

Included here is the code for each section of the dictionary algorithm. Underlined words are the file names. This code was written using Python.

Main:

```
################################################
#       Adrian Orszulak       #
#   IQP D'21 Dictionary Algorithm    #
#   Sponser: Port Phillip EcoCentre   #
#                #
#                #
# This objective of this code is to create a #
# dictionary from a text file containing  #
# responses from program survey data    #
# questions and enumerating the number of  #
# instances for each word. This can be used  #
# in understanding the spread and      #
# connotations for different codes in content #
# analysis. In addition, this can be used for #
# marketing purposes of the Port Phillip  #
# EcoCentre.             #
################################################

#Import the other modules
        from inputFileNames import inputFileNames
        from processWordCount import processWordCount
        from outputDictionary import outputDictionary

#Main function to create the output text file
        def main():
          fileNames, outputFileName = inputFileNames()
          wordDictionary = processWordCount(fileNames)
          outputDictionary(wordDictionary, outputFileName)

if __name__ == "__main__":
          main()
```

fileReader:

```
        #Reads a file line by line, then makes the necessary adjustments to the line
        #so that it is split, stripped, and all in the same case. Then it returns
        #the output of a string list. Appropriately opens and closes a file also.
```

Appendix J: Dictionary Algorithm Code

```
def fileReader(name):
        wordList = []

 #Open the file for reading, and record all the file lines
        file = open(name,"r")
        fileLines = file.readlines()

 #Clean each line for all lines in the file
        for line in fileLines:
          splitWords = line.split()

          for word in splitWords:
            word = word.strip("'")
            word = word.strip(',~.{}[]()/?!-;:@#%^&*_`"â¢$')
            word = word.strip("'")
            word = word.lower()

    if(len(word) > 0):
              wordList.append(word)
            else:
              continue

 file.close()
        return wordList

inputFileNames:
        #Takes in the filenames from the user. Called by the wrapper to return
        #the list of filenames that will be examined. Tests to see if the string is
        #ever equal to the chosen word "STOP" so that it knows when to stop
        #iterating

def inputFileNames():
        fileNames = []
        string = "temp"

 #Input the names of the files you want to input.
        #Enter one txt file, then get a dictionary for the questions
        print("Please enter the names of the files you want to count the words and their occurrences in. Please enter
an empty string when you are done.")
        print("Be sure to add the extension of file (.txt). Enter the names right here and hit enter:", end = "")

        while(string != ""):
          string = input()

   if(string != ""):
            fileNames.append(string)

 #Name the output file
```

Appendix J: Dictionary Algorithm Code

```
print("Enter the name of the output file: (with the extension .txt as well)", end = "")
        outputFileName = input()

        return fileNames, outputFileName

processWordCount:
        #Imported modules
        import fileReader

#Module that processes the string by taking in a string list that is separated
        #and puts it into a dictionary that associates words with their number of
        #occurrences within the inputted files. Gets the string list that is separated
        #from the a file reader module (imported).

def processWordCount(fileNames):
        wordDictionary = {}

 #For every file (usually one file name will be entered), all the words
        #are recorded and enumerated for each instance.
        for name in fileNames:
          #Calls the fileReader to return a list of words
          wordList = fileReader.fileReader(name)

   for word in wordList:
            if(wordDictionary.get(word, 0) == 0):
              wordDictionary[word] = 1
            else:
              tempValue = wordDictionary[word]
              tempValue = tempValue + 1
              wordDictionary[word] = tempValue

 sorted_wordDictionary = {k: v for k, v in sorted(wordDictionary.items(), key=lambda item: item[0])}
        return sorted_wordDictionary


        outputDictionary:
        #This module formats and outputs the dictionary that stores the words and
        #the number of their occurences. This module also counts the number of words
        #in the dictionary, and counts the number of words in the dictionary overall

def outputDictionary(wordDictionary, outputFileName):
        #Total number of distinct words
        numberDifferentWords = len(wordDictionary.keys())

 #Format out the output on a file
        sampleFormat = "{0:>5d} {1:20}"
        totalWordNumber = 0
```

Appendix J: Dictionary Algorithm Code

file

```
= open(outputFileName, 'w')
            for word in wordDictionary:
              totalWordNumber = totalWordNumber + (wordDictionary.get(word, 0))

              if((len(word) > 3) or (word == "yes") or (word == "no")):
                tempString = sampleFormat.format(wordDictionary.get(word, 0), word)
                file.write(tempString)
                file.write("\n")

 file.write("----------\n")
            file.close()
```

Appendix K

Past Participant Interview Questions

Included here are the interview questions that were asked of past program participants. The blue text would be information filled in during the presentation that is specific to each participant.

1. How would you describe the _specific program_ to a friend?
2. Do you have any strong memories from the _specific program_ program?
    - Do you feel more knowledgeable about _item addressed in response to question 2 or specific item addressed in the interview that are important in EcoCentre's mission_? *If addressed*
3. Has your experience with _specific program_ changed your lifestyle in any way?
    - Could you describe this through an example?
4. How do you feel more connected to the local environment after your program with the EcoCentre?
5. Do you know someone else who has taken _specific program_ or another program through the EcoCentre?
    - If Yes, then - Have you noticed any behavioral changes or impacts as a result?
6. Whom would you recommend any EcoCentre programs to?
7. In the next 3 years, is there anything that you would like to see with/from the EcoCentre?
8. Is there anything else you would like to add?

Appendix L

Past Participant Consent Statement

Thank you again for responding and accepting our request for an interview with you. In order to proceed with the interview, we ask that you kindly fill out and return this consent form.

You, the participant, are being invited to participate in an interview with the team for Worcester Polytechnic Institute (WPI) working on behalf of the Port Phillip EcoCentre. This interview is part of the team's research project to assist the Port Phillip EcoCentre in their strategic planning for 2021 - 2024. In this interview, we are looking to hear about your experience with a specific program that you had previously engaged and participated in with the Port Phillip EcoCentre. We are seeking to learn about your satisfaction with the program, the impact the program has had on you or others you know, and changes that you made after taking said program. The interview will be short, lasting at most 15 minutes. While we will not record the interview, we will be taking notes on your responses. We will not publish your name, the names of others mentioned during the interview, your email, or other personal information that may arise in conversation. Individual responses to interview questions will not be published. The topics of responses shall be the aspects that are disclosed, and any quotes will be attributed to "past participant". The EcoCentre may follow-up with you if they are interested in a particular story or quote you may have.

This process is a voluntary one. If you do not want to answer any particular question, you are not obligated to do so. We will simply move on should you make this known. Additionally, if you no longer feel open to an interview or wish to stop the interview, you have the right to withdraw from the interview at any point.
Do you have any questions before we begin?

Appendix M

Carbon Emission Staff Survey Consent Form

Thank you again for participating in our digital survey. In order to proceed with the interview, we ask that you kindly read the following consent statement and check the box to affirm that you have read it.

You, the participant, are being invited to participate in a digital survey with the team for Worcester Polytechnic Institute (WPI) working on behalf of the Port Phillip EcoCentre. This survey is part of the team's research project to assist the Port Phillip EcoCentre in their strategic planning for 2021 - 2024. With this survey we are looking to to answer our questions about your carbon emission programming. We are currently looking to get an idea of what would be the most useful form of program evaluation for the EcoCentre and to gather any types of data the Eco-Centre already has access to that would make program evaluations easier or more accurate. The survey should take no more than 20 minutes. We will not publish your name, the names of others mentioned in your questions, your email, or other personal information that may arise in the answers. Individual responses to interview questions may be published with your permission. The topics of responses shall be the aspects that are disclosed.

This process is a voluntary one. If you do not want to answer any particular question, you are not obligated to do so, simply leave it blank. Additionally, if you no longer feel open to filling out the survey or wish to stop, you have the right to not submit the survey at any point.

Appendix N

Carbon Emission Staff Survey Questions

Initial Survey Questions

1.What might the EcoCentre's approach to carbon emission reduction be like during the next three years?
2.What types of carbon reducing programs will most likely be implemented by the EcoCentre?

- Unsure
- Electricity use reduction
- Renewable energy
- Waste Reduction
- Encouraging better consumer choices
- Green transportation
- Planting carbon sinks
- Other

3.If you choose other, could you list some of the program themes
4.Are there existing programs or initiatives from local organizations or governments that the EcoCentre might use in future carbon reduction programs? If yes, what are they?
5.Are there current EcoCentre programs you believe reduce carbon emissions or have potential to become carbon reducing programs? If yes, what are they?
6.What carbon emission, electricity, or program turnout data does the EcoCentre collect or have access to? (Data collected specifically for Melbourne, Port Phillip, or the EcoCentre is most useful)
7.Do you have any additional comments about the scorecard?
8.Would you be willing to take about half an hour to meet with our team to discuss the EcoCentre's carbon emission plans and our program evaluation work sometime in the next few weeks?

1.Yes
2.No

9.What email would be best for us to contact you through for this interview?
10.Do you have any general comments or questions about any of the work the WPI team is doing that you would like to share with us?

Appendix O

Tabulated Raw Data of Content Analysis for Research Question One - What Do Partners Value about Their Relationship with the EcoCentre?

Code	Code Instance Number	Explanation
Approachable Staff	7	Partners commented on the amazing efforts put on by the staff and how enthusiastic, wonderful, and helpful they are
Reliability	6	Partners commented on the dependability of the EcoCentre and its staff in being responsive and being readily available to work
Professional Networking	4	Partners commented on valuing the network of other organizations that the EcoCentre is connected to and given the partners the opportunity to work with those others
Reputation	3	Partners commented on valuing the reputation that the EcoCentre carries and how well regarded they are among the community and other organizations
Effective Community Outreach	3	Partners commented on valuing the amount of community outreach that the EcoCentre is able to do, as well as how well they work with all different age groups, backgrounds, and types of people
Communication	3	Partners commented on valuing the great communication that the EcoCentre engages in with their organization in both projects and day-to-day activities
Value-for-Money	2	Partners commented on valuing how the EcoCentre can stretch funds and use them in a way that increases the impact multifold

Appendix O: Tabulated Raw Data of Content Analysis for Research Question One - What Do Partners Value about Their Relationship with the EcoCentre?

Code	Code Instance Number	Explanation
Program Opportunities	2	Partners commented on valuing the types of programs that the EcoCentre runs as a way to get others involved in the organization and having a learning experience
Pool of Knowledge	2	Partners commented on valuing the wealth of knowledge that the EcoCentre holds in its staff and the diverseness of that knowledge
Community Trust	2	Partners commented on valuing the trust that the community as a whole has with the EcoCentre
Community Engagement	2	Partners commented on valuing the amount of community engagement the EcoCentre is able to create through its staff and programs
Resource Access	1	Partners commented on valuing the access of resources (ie. tools, space, etc.) that being associated with the EcoCentre brings them
Funding Access	1	Partners commented on valuing the EcoCentre for its ability to help them with funding access and grant writing for their own organization
Expertise	1	Partners commented on valuing the EcoCentre for its specific expertise in community engagement and citizen science efforts

Appendix P

Tabulated Raw Data of Content Analysis for Research Question Two - What Does the EcoCentre Do Best?

Code	Code Instance Number	Explanation
Passionate Staff	6	Partners commented that the staff of the EcoCentre are enthusiastic, hard-working, passionate workers who do amazing things as part of their work and are overall wonderful to work with
Expertise	5	Partners commented that the EcoCentre has an amazing array of expertise through program activation, community engagement, scientific knowledge, and many other areas of expertise
Education	5	Partners commented that the EcoCentre does a great job at delivering education to all ages and types of people through different learning styles and approaches that gives everyone the information
Citizen Science	5	Partners commented that the EcoCentre does an amazing job and has a wealth of expertise with citizen science initiatives
Programs	4	Partners commented that the EcoCentre does best at its array of programs and its program activation
Community Outreach	4	Partners commented that the EcoCentre does best at reaching out to the community and getting them to participate in multiple programs
Community Engagement	4	Partners commented that the EcoCentre does best at engaging the community and participants in their programs and environmental issues

Appendix P: Tabulated Raw Data of Content Analysis for Research Question Two - What Does the EcoCentre Do Best?

Code	Code Instance Number	Explanation
Communication	4	Partners commented that the EcoCentre does best at communicating with their partners and about the projects they are working on
Academic Research	4	Partners commented that the EcoCentre does best at producing academic research and incorporating that research into impactful reports that lead to further
Environment Care	3	Partners commented the EcoCentre does best at taking care of the environment through its programs and
Effective Allocation of Monetary Resources	2	Partners commented that the EcoCentre does best at taking the monetary resources that they are given and stretches it to its fullest potential for creating impacts
Professional Networking	1	Partners commented that the EcoCentre does best at networking with other organizations and government entities and keeping those relationships
Aboriginal Inclusion	1	Partners commented that the EcoCentre does best at including aboriginal themes and participants in their programs

Appendix Q

Tabulated Raw Data of Content Analysis for Research Question Three - Where Could the EcoCentre Improve?

Code	Code Instance Number	Explanation
No Suggestion for Change	7	Partners commented that there were no areas that should be improved
Risk of Burnout	1	Partners commented that they were concerned that with the capacity that the EcoCentre staff works at, the risk for burnout could be a real concern and is something that should be looked out for to preserve the longevity of the organization
Proactive Outreach for New Partnerships	1	Partners commented that the EcoCentre should actively look for new partnerships and projects to work on to expand their outreach and impact on other communities
Marketing of Brand	1	Partners commented that, specifically with the introduction of the new council board, that the EcoCentre should look to market their organization in a way that appeals to people of different viewpoints
Demonstrating Concrete Benefits	1	Partners commented that while the EcoCentre does demonstrate concrete outcomes, they should work to emphasize the benefits of their efforts more
Better Facilities	1	Partners commented on the need for better facilities to reach higher goals and facilitate more people and programs, as well as provide a better outward image

Appendix R

Tabulated Raw Data of Content Analysis for Research Question Four - What Should the EcoCentre Focus on in the Next Few Years?

Code	Code Instance Number	Explanation
More Projects with Outside Partners	5	Partners mentioned that the EcoCentre should look to work with organizations on other long term projects and utilize other organizations status to engage in higher impact projects
Outreach for More Funding	2	Partners mentioned that the EcoCentre should look to leverage other organizations status for more funding and proactively search for outside funding through again leveraging of other partnering organizations statuses (like universities)
Better Facilities	2	Partners mentioned that with the increase in programs, staff, and partnerships, the EcoCentre should continue to push for lobbying for new, better facilities which would allow for more opportunities and space
Stemming Employee Burnout	1	Partners mentioned creating a way to check in on employees and stem potential burnout
Proactive Outreach for New Partnerships	1	Partners mentioned that the EcoCentre should continue to reach out for other partnerships
Presenting Themselves to All Viewpoints	1	Partners mentioned that the EcoCentre should look to make sure that they present themselves as best they can to all different political views
More Social Media Presence	1	Partners mentioned that the EcoCentre could look to have more social media presence (It should be noted that it was noted that the EcoCentre already does this)
Continue Outreach and Vision	1	Partners mentioned that the EcoCentre should continue to do what they do best in outreach and working towards their vision

Appendix S

Partner Groupings

Below are partners categorized under the 12 partner groupings created for the updated impact map. These partners include those found in researching the partnerships of the EcoCentre but do not necessarily contain all EcoCentre partnerships defined under that category. Italicized names indicate partners new to the EcoCentre in the last three years

Partner Grouping	Individual Partners
Affiliate Organizations	Animal Liberation Victoria
	Australian Youth Climate Coalition Macnamara (AYCC)
	Brighton Playgroup Inc.
	Christ Church Community Centre
	Climate for Change (C4C)
	Desert Discovery Inc
	Elwood Flood Action Group (eFLAG)
	Glen Eira Environment Group
	Get up! Melbourne Ports Action Group
	Jane Goodall's Roots & Shoots
	Landcare Victoria Inc
	LIVE - Locals Into Victoria's Environment
	Marine Care Ricketts Point
	Mary and Basil Community Garden
	Melbourne Bicycle Touring Club
	Permaculture Women Australasia
	Port Phillip Alliance for Sustainability
	Port Phillip Bicycle Users' Group
	Port Phillip Climate Action Network (PECAN)
	Port Phillip Community Group (PPCG)
	RAW Australia
	South East Suburbs Permaculture

Appendix S: Partner Groupings

Partner Grouping	Individual Partners
Affiliate Organizations	South Port Uniting Care
	St Kilda Community Garden Club
	Stop Adani Macnamara
	Sustainable Gardening Australia (SGA)
	Veg Out Community Garden
	Victorian Landcare Council (now Landcare Victoria Incorporated (LVI))
	WEAll Youth Melbourne
	Westgate Biodiversity: Bili Nursery and Landcare
Arts and Media Partners	*3AW*
	Alive Events Agency
	Breathe a Blue Ocean
	City of Voices
	Climactic
	Climate Choir Melbourne
	Filmtime
	Glee Plus
	Gold and Grit Photography
	Hootville Communications
	Huzzara Video
	Land Art Generator Initiative (LAGI)
	Latenite Films
	Linden Gallery
	Lutman Films
	M-Video
	PluginHUMAN
	Remember the Wild
	Serene Lau, artist
	Sheree Marris (Melbourne Down Under)

Appendix S: Partner Groupings

Partner Grouping	Individual Partners
Arts and Media Partners	*South Port Singers*
	St Columba's Primary School Climate Change Choir
	St Kilda News
	Streamline Media
	Tarius McArthur
	The Connies
	This Week in St Kilda
Corporate Volunteering Participants	Aesop
	AGL Energy
	ANZ
	CSL
	Corporate Volunteering Participant X
	Edelman
	General Mills
	Hub Australia
	Insurance Australia Group
	Mimecast
	Mkt Communications
	Pexa
	Recoveries Corporation and SEEK
	Stratton
	Telstra
	Treasury Wine Estates
	Vivad Pty Ltd
	Vocus
Excursion Schools	Includes all School that participate in EcoCentre Excursions
Experts in Residence Schools	Includes all School that participate in the EcoCentre's expert in residence programs

Appendix S: Partner Groupings

Partner Grouping	Individual Partners
"Friends of" Groups	*Balcombe Estuary Reserve Group (BERG) Mt Martha,*
	Bayside Friends of Native Wildlife
	Birdlife Bayside
	First Friends of Dandenong Creek
	Frankston Beach Association
	Friends of Cobbledicks Ford
	Friends of Barwon Bluff
	Friends of Elster Creek
	Friends of Native Wildlife
	Friends of McCrae Foreshore
	Friends of St Kilda Botanic Gardens
	Friends of the Earth Melbourne
	Friends of the Marine Discovery Centre
	Friends of Werribee River Park
	Friends of Williamstown Wetlands - Hobsons Bay Wetland Centre
	Jackson's Creek Eco Network
	Jawbone Sanctuary Marine Care Group
	Point Cook Open Spaces
	Port Phillip Conservation Council
	Rye Foreshore Advisory Group
	Scab Duty
	Southern Peninsula Flora and Fauna Association
Health and Inclusion Partners	*First Step*
	Launch Housing
	Star Health
Living Water Workerbees Schools	Includes all School that participate in the EcoCentre's Living Water Workerbees programs

Appendix S: Partner Groupings

Partner Grouping	Individual Partners
ResourceSmart Schools	Includes all School that participate in the EcoCentre's ResourceSmart programs
TAFE Schools	Includes all School that participate in the EcoCentre's TAFE programs
Tomorrow's Leaders for Sustainability	Includes all School that participate in the EcoCentre's TLFS programs
Waterkeeper Partners	*Kenya Lake Victoria Waterkeeper*
	Kenya Marine Fisheries Research Institute
	Qiantang Riverkeeper
	Save the Bays Bahamas
	Waterkeeper Alliance

Appendix T

Tabulated Raw Data of Content Analysis for Question Three – How Could the Activity be Improved?

Code	Code Instance Number	Explanation
Length of Program	41	The program length could be increased or decreased depending on the activity (most of them mentioned an increase though)
Add Informative Resources	21	Programs should have more information resources during the course of the program. Some examples noted a summary list for collection based programs whereas others noted some casual talks/lectures during nature walks.
Add Activity Resources	43	Programs should have more materials or small activities to them. For example, it would include more resources to increase the amount of work being done or a small additional activity.
More Information	24	More program information should be added
Less Information	3	Less program information should be added
Different Information	16	The should include more information relating to understanding the larger picture, where the work in the program fits into the work towards sustainability, or additional information in EcoCentre strategy days
Safety	1	There was a safety concern with the program. Only 1 total here though.
Circumstantial Issues	22	These are related to issues dependent upon uncontrollable factors such as weather or willingness to do more in the program
More engaging/interactive	41	The program should be engaging and interactive

Appendix T: Tabulated Raw Data of Content Analysis for Question Three – How Could the Activity be Improved?

Code	Code Instance Number	Explanation
More Staff Involvement	7	The staff should do more in the program, weather that be through guidance, information, or engagement
Path to Further Engagement	7	Individuals wanted to know more or get involved with opportunities to volunteer or do more with the EcoCentre and the environment in general
Change in Location	11	Participants noted a change in location because of a noisy street or not being able to be outside more in the course of the program. The requests are usually program specific and few and far between - nothing really repeat-
Accessibility	4	There were issues with attending the program where individuals could not hear the information well. These mainly address Strategy Days and Zoom webinars
Other	7	Responses that did not fit in the listed codes, nor had a large sum to devote to another code
Blank	1	Responses that were left blank

Appendix U

Tabulated Raw Data of Content Analysis for Question One – Why Did you Decide to Participate?

Code	Code Instance Number	Explanation
Gain Personal Knowledge	81	Individuals sought out information for themselves by taking this program
Gain Institutional Knowledge	57	Individuals sought out information in order to gain collective knowledge for others, such as an educator for teaching children, or collective knowledge tied to an institution, such as a group of students taking the program
Professional Work Involvement	71	Individuals were involved with the program because of their occupation or profession. This is mainly tied to being a teacher, EcoCentre staff, or corporate volunteer
Education/Academic Involvement	51	These individuals participated as a result of involvement with their academic career - most typically students
Familial Obligation	8	Family members were the main driver in having individuals participate in an EcoCentre program
Recommended/Social Aspect	23	Individuals participated as a result of a recommendation from someone they know or invitation
Interest in Work of the EcoCentre	31	The individuals participated because individuals had an interest in the work of the EcoCentre
Previously Engaged with the EcoCentre	17	The individuals participated because of they previously participated in an EcoCentre program and wanted to participate again
Interest in Activity	113	Individuals wanted to participate because they had an interest in the activity specifically

Appendix U: Tabulated Raw Data of Content Analysis for Question One – Why Did you Decide to Participate?

Code	Code Instance Number	Explanation
Appreciation for nature/environment	53	Individuals participated because of an appreciation for various aspects of the nature and the environment
Other	31	Responses that did not fit in the listed codes, nor had a large sum to devote to another code
Blank	9	Responses that were left blank

Appendix V

Tabulated Raw Data of Content Analysis for Question Four – Do You (or Your Group) Plan to Take Any New Sustainability Action?

Code	Code Instance Number	Explanation
Yes	258	Yes
No	31	No
Unsure	29	Unsure
Feels like they do enough	18	Feels like they do enough
Personal Change	106	Participant will be taking some individual change
Collective Change	75	A participant makes known that a group change will be undertaken
Future Volunteering	31	The activity involved some great hands-on work
Advocacy	40	The activity involved some great hands-on work
Consumption	29	The participants were able to use their knowledge in the program and that was great
Natural Environment Care	72	Participants were able to see what the overall goal of the program, specific sustainability effort, or relation to climate change
Waste	53	The location of the program was great, even if it was just outside
Other	7	Responses that did not fit in the listed codes, nor had a large sum to devote to another code
Blank	1	Responses that were left blank

Appendix W

Tabulated Raw Data of Content Analysis for Question Two – What Did Our Activity or the Staff Do Best?

Code	Code Instance Number	Explanation
Coordination and Organization	71	The program was well organized or coordinated
Engagement	98	The program was highly engaging
Staff Attitude and Passion	86	The staff had a great attitude and passion
Staff Knowledge	69	The staff was knowledgeable
Presentation Methods	72	The methods used for presenting the information of the program were great
Program Information	119	The information of the program itself was great
Child Involvement	19	The activity involved some great hands-on work
Physical Activity	9	The activity involved some great hands-on work
Participant Applied Knowledge	19	The participants were able to use their knowledge in the program and that was great
Understand the Bigger Picture	30	Participants were able to see what the overall goal of the program, specific sustainability effort, or relation to climate change
Location	3	The location of the program was great, even if it was just outside
Criticism	2	Notes that were criticisms of the program
Everything	15	The whole program was great
Blank	14	Responses that were left blank

Appendix X

Criticism from Question Two - What Did Our Activity or Staff Do Best?

Activity	Response
LAGI	meh
Wildlife and Sensory Gardening	well illustrated & good pace of presentation, need pauses to absorb

Appendix Y

Sample Responses from Question Two (What Did Our Activity or Staff Do Best?) with Staff Member Mentions from Program Survey Data

Activity	Response
LAGI	Help with preparing for the presentation (especially sharron)
Eco House, Measuring Energy, Sustainable Building & War on Waste	The students most enjoyed the worm activity and measuring the energy activity as they were more hands on. We would use the Eco Centre for another sustainability excursion; however next time we might only do 3 activities and these use the last time to explore the botanical gardens and greenhouse as we ran out of time to do that. The staff were very friendly and had a lovely manner with our students. We really appreciated how well organized the excursion was and the information pack that came before the excursion answered a lot of questions we had. Thanks so much
Pamper the Penguins	Story-telling. Fam is an ace story teller.
Pamper (Pamper the Penguins?)	Reiko was amazing. I don't often remember people's names as I meet an average of 1200 clients per week, however she was absolutely outstanding. So welcoming, friendly and flexible for us to decide what we could do that met our capability both as a group and individually.
Sunscreen winter sampling	Fam provided a concise and clear understanding of the project and its intentions
Edible and Indigenous Garden	Allowed children to use their senses to feel, touch, taste and see the plants. Deb was so nice to one of our children when he accidentally broke the cup.

Appendix Y: Sample Responses from Question Two (What Did Our Activity or Staff Do Best?) with Staff Member Mentions from Program Survey Data

Activity	Response
Visit to Port Phillip Eco Centre	Belinda was a fantastic host, she was kind and patient with the girls and explained everything very well. She created excitement and the girls thoroughly enjoyed the excursion.
Port Phillip Bay Teacher PD	Sharron and Cecile were fantastic - knowledgeable, engaging and encouraging
Sam Sea Dragon	Our year 3's loved Sam the puppet and it prompted lots of discussion about plastics. Matt answered their questions well and there was a nice mix of information, video and question time.
Sam the Seadragon	Matt was extremely knowledgeable and attentive to children's curiosity. His presentation was well structured and delivered with passion and creativity. Our children loved the puppet and enjoyed asking questions at the end.

Appendix Z

Carbon Emission Staff Survey Content Analysis

Q1	Energy	Transpor-	Waste	Water	Carbon	Direct	Citizen	Educa-	Policy
Totals	2	3	2	1	2	2	2	4	4
What might the EcoCentre's approach to carbon emission reduction be like during the next three years?									
		1				1		1	1
					1		1	1	1
	1	1	1	1			1	1	1
	1	1	1		1	1		1	1

Q2							Citizen		Policy
Total	3	1	4	1	4	4	0	4	0
What types of carbon reducing programs will most likely be implemented by the EcoCentre?									
			1	1	1	1		1	
	1		1		1	1		1	
	1	1	1		1	1		1	
	1		1		1	1		1	

Appendix Z: Carbon Emission Staff Survey Content Analysis

Q3	Energy	Transpor-	Waste	Water	Carbon	Direct	Citizen	Educa-	Policy
Total	2	1	1	0	0	1	0	1	2
If you choose other, could you list some of the program themes									
	1		1					1	1
	1	1				1			1

Q4	Energy	Transpor-tation	Waste	Water	Carbon Capture	Direct Action	Citizen Science	Educa-tion	Policy
Total	1	0	1	1	2	1	0	1	1
Are there current EcoCen-tre pro-grams you be-lieve re-duce car-bon emissions or have potential to be-come carbon reducing pro-grams? If yes, what are they?									
								1	
	1		1	1	1	1			1
					1				

Appendix AA

List of Potential partner Organizations for EcoCentre Carbon Reduction Programs

Are there existing programs or initiatives from local organizations or governments that the EcoCentre might use in future carbon reduction programs? If yes, what are they?
ISO 14000 and 14001
Powershop
Resource Smart Schools (Sustainability Victoria) - need more grants
Victoria Energy Literacy
Coastcare (DELWP)
Market Force
Solar Schools
Climate Classrooms (https://www.monash.edu/mcccrh/projects/climate-classrooms)
Australian Energy Foundation
Beyond Zero Emissions
Climate Works
Yarra Energy Foundation

Appendix AB

Example Scorecard CO2e calculations

More CO_2e calculations for the scorecard can be found in the Scorecard Technical Document that was submitted alongside this report

Source Reduction and Landfilling Emissions in MT CO_2e/Short Ton from WARM (Pg 1-4)

Material	Net Source Reduction Emissions for 100% Virgin Inputs	Net Landfilling Emissions
Mixed Paper	(7.61)	0.07
Mixed Plastics	(1.94)	0.02
Mixed Electronics*	(18.57)	0.02
Food Waste (Fruit and Veggies)	(0.44)	0.50
Glass	(0.60)	0.02

*Values were taken from the average of all electronics listed in the sheet
Parentheses indicate that emissions are saved, non-parentheses indicate emissions are released

1 MT = 1,000,000 g
1 Short Ton = 907.185 kg
1 MT/ 1 Short Ton = 1,000,000/907.185 = 1102.31 g CO2/kg <- Conversion Factor

Source Reduction and Landfilling Emissions in g CO_2e/kg adapted from WARM (Pg 1-4)

Material	Net Source Reduction Emissions for 100% Virgin Inputs	Net Landfilling Emissions
Mixed Paper	(8386)	77
Mixed Plastics	(2138)	22
Mixed Electronics*	(20470)	22
Food Waste (Fruit and Veggies)	(485)	550
Glass	(661)	22

*Values were taken from the average of all electronics listed in the sheet
Parentheses indicate that emissions are saved, non-parentheses indicate emissions are released

Appendix AC

Thought Process Step-by-Step for the First iteration of the Scorecard, using an exact CO2 approach

Basic Considerations

There are no perfect ways to measure Carbon Emissions, so attributing carbon emissions to small programs depends largely on scaling down information calculated for huge industrial processes and trusting calculations that come from a variety of sources. Careful thought must be put towards both what aspects of programs can reduce carbon emissions and the level of accuracy provided by the data being used. To evaluate a program, following these steps and the layed out thought process will help ensure a program is appropriately evaluated.

Step 1: Identify ways CO2 is saved

This step is an important moment for determining if a program will help reduce CO2 emissions in a concrete way. An important piece of information that should be identified at this stage is what method the program uses to reduce carbon emissions. The two ways this is accomplished is preventing the emission from being created and capturing carbon that exists in the atmosphere

1. Carbon Capture - harder to measure
2. Planting trees
3. Restoring habitats
4. Converting urban landscapes to natural landscapes
5. Other actions that restore natural environment
6. Carbon Prevention
7. Using less coal produced electricity
8. Buying less manufactured goods
9. Creating less waste
10. Using less petroleum based products
11. Encouraging use of bikes and public transportation
12. Other actions that prevent the creation of new things

Step 2: Identify ways CO2 might be created by the program

These are the inverse of actions that were identified in Step 1. It is important to acknowledge that programs will often need materials, transportation, etc. that create CO2 emissions. Ignoring this reality would misrepresent the real benefit of a program.

3. Carbon Capture - unlikely for EcoCentre to participate in this kind of activity
1. Destroying natural plant life
2. Carbon Prevention
3. Increasing use of electricity (Counting every light you turn on is overkill, but the electricity intensive devices such as power tool, induction stovetops etc should be kept in mind)
4. Producing physical educational or promotional materials
5. Transportation to program sites, especially if the are a considerable distance from residential areas

Thought Process Step-by-Step for the First iteration of the Scorecard, using an exact CO2 approach

Step 3: Determine program numbers to calculate CO2
After determining the actions that a program involves, numerical values should be determined to describe how much of the action is done this can include...

- Number of participants completing the actions
- Kg of waste saved/added to landfill
- L of water used/saved
- kWh of electricity used/saved
- Number of items used/saved

Step 4: Find CO2 Emission Data Corresponding to Step 3
This step is particularly difficult because most carbon emission data is collected for countries, cities, or industrial data bases. Some of the places this data is kept are in example evaluations, and those resources are good jumping off points for finding numbers for CO2 emissions.
Step 5: Calculating total Carbon Reduced and Created
After the deep thinking in Steps 1-4, this is the easier part. All the numerical values that were found need to be multiplied together to create an estimate of the carbon emissions from each action. For example these calculations might look like

- Number of participants x 1 item unused x kg of CO2 per item
- kWh of electricity saved x CO2 created by 1 kWh of electricity

Step 6: Adding Benefits and Detriments
After calculating the CO2 created and saved by each action in a program, actions that remove carbon emissions must be added while actions that created carbon emissions must be subtracted from the total of the beneficial actions.

Appendix AD

Zero Waste Birthday Parties Case Study for the First Iteration of the Scorecard, using an exact CO2 approach

Zero Waste Birthday Parties
Step 1: Identify ways CO2 is saved
Carbon Prevention

- No CO2 used to produce paper plates, cups, goodie bags, and plastic containers
- No CO2e (methane etc) caused by the single use items decomposing in a landfill
- No CO2e created for party activities

Step 2: Identify ways CO2 might be created by the program

- CO2 produced from compostable plates, cups, and flatware
- How are these items composted? Are they added to the EcoCentre compost bins? How much CO2 emissions does this create.
- CO2 created from driving to the EcoCentre
- This would be opposed to parents driving to a nearby house or somewhere closer to where the families live. Extra km driven by the parents is not easy to estimate, and might not be applicable because if the birthday party was hosted at a different kids party facility then the driving might be the same
- CO2 used to purify and transport water for dishes
- Since the EcoCentre has rain and waste water barrels, if all the sinks are connected to these then no extra CO2 would be emitted
- Any virgin plastics and material that are necessary for making the puppets

Step 3: Determine numbers to calculate CO2

- Number of participants is a solid starting point
- **5-15** sounds like a reasonable range of kids at a birthday party but can be adjusted to the numbers you've seen in the past
- For each participant...
- 2 plates (meal and cake)
- 2 plastic forks
- 1 plastic cup
- 2 paper napkins
- 1 plastic goodie bag
- 5 wrapped candies
- 1 plastic toy
- For each party…
- 1 plastic cake container
- 1 roll of masking tape

Step 4: Find CO2 Emission Data Corresponding to Step 3
Unsure how to continue