Final Literature Review Summary

To conduct our literature review, we first identified a set of key questions that we wanted to ask while reading through relevant literature. To learn what scholars have previously found while studying and researching climate action plans at institutions, particularly United States universities, we searched for relevant peer-reviewed articles and added those to a library using Mendeley, a reference management software. We divided those articles between the four of us and then read, took notes, and summarized our findings on annotation worksheets based on the key questions that we had prepared earlier on in the process. After creating a draft summary, we compiled our answers into a final literature review to provide background and comparative-level information on the climate action planning process. This summary is organized around the questions the study group felt were most relevant to MSU's future climate planning efforts.

A. HOW DO SUCCESSFUL PLANS DEVELOP A BASELINE?

To set realistic goals and develop a baseline, universities must have a comprehensive understanding of their carbon footprint, which consists of direct and indirect emissions. Successful plans incorporate and conduct GHG inventories, which address the three scopes of the carbon footprint: direct, indirect internal, and indirect GHG emissions external to the institution. Plans develop these emissions by using sources such as individual questionnaires, focus groups, and creating carbon footprints (Bauer, et al. 2020; Macharis et al. 2019; Robinson, et al. 2017; Spirovski, et al. 2012). Other methods to set a baseline include volunteer efforts, offering course studies and research credits, and hiring summer, part-time, or full-time assessment coordinating positions (Helferty & Clarke, 2009).

One study indicated that universities with successful plans establish target and strategic vectors as the first step in developing a baseline. These vectors include the establishing establishment of specific mitigation goals, including the assessment of exactly which sources and from where GHG emissions will be cut, and broader strategic goals including ideas regarding community and stakeholder engagement (Ramisio, et. al. 2018).

B. BY WHAT METRIC IS SUCCESS MEASURED? STARS?

There are varied metrics to measure success, as there is no single standardized evaluating process. However, some are more widely adopted, such as The the Association for the Advancement of Sustainability in Higher Education (AASHE) and Sustainability Tracking Assessment and Rating System (STARS), comprehensive systems that assess the performance of campus sustainability plans. Both approaches have extensive criteria, with categories on for Education, Operations, Planning, Administration and Engagement, which aid in standardizing evaluations and common core views (White, 2014). Another example metric researchers discuss is *The College Sustainability Report Card,* an interactive website and independent sustainability evaluator that provides detailed sustainability profiles for hundreds of universities in the United States and Canada (Finlay, et al. 2012).

In addition to studying standardized metrics such as AASHE and STARS, one study focuses on assessing the role that non-academic staff and stakeholders play in successfully implementing a supply (limiting paper towels, limiting toilet paper and reorganizing its campus food plan) demand (reducing available parking for students and faculty) side approach (Katiliute, et. al.,

2018). Along with GHG mitigation, success was also measured based on the level of participation/student engagement (Helferty & Clarke, 2009) as well as the continuity of resilience efforts, relationships built, and ongoing mitigation strategies (Washington-Ottombre et al., 2018).

C. ARE THERE COMMON THEMES/GOALS PRESENT IN THE MOST SUCCESSFUL PLANS?

There are some striking thematic similarities represented in the literature that are noteworthy. Old inefficient buildings are relics of the past continuing to age on campuses nationwide. With many universities taking steps to minimize their carbon footprint, old buildings pose a significant problem considering they are inefficient energy consumers (Finlay, et al., 2012). Researchers concluded that retrofitting campus infrastructure can improve the building's performance while eventually saving campuses money. Recycled carpet, waterless urinals, energy star appliances, programmable thermostats, etc., are moderate cost options that can be implemented on campuses relatively easily (Helferty, et al., 2009). Universities are continuing to grapple with aging infrastructure, but with increasing care of social and environmental components. Retrofits are becoming a universal staple to campus infrastructure in the fight to lessen the impacts of university energy consumption.

Another common element incorporated into CAPs is incorporating sustainability outreach into the university curriculum. Creating internships and study programs exploring climate change and sustainability is an effective way to engage students and promote further support of CAPs (Spirovski, et al., 2012; Robinson, et al., 2017; Bauer, et al., 2020). Education is crucial to the long-lasting implementation of a climate mitigation plan that encourages students and the community to invest in sustainable transitions (Semeraro & Boyd, 2017). A joint and successful initiative was coordinating residence challenges or competitions that engaged students in reducing energy consumption and becoming more interested in climate change (Helferty & Clarke, 2009). Lastly, integrating sustainability into the campus curriculum promotes bottom-up management in the planning process, which invokes critical perspectives. A curricular focus encourages adaptive co-management, with an emphasis on collaborations, networks, and defining resiliency. (Washington-Ottombre, et al., 2018).

D. IS A BOTTOM-UP OR TOP-DOWN APPROACH USED IN THE PLANNING PROCESS?

There are many examples of CAPs using either top-down or bottom-up approaches in the planning process; evidence shows that a combination may be the most effective. Both methods are useful in implementing change. Student-led initiatives pressure university stakeholders to take immediate action, while one paper found that a bottom-up approach resulted in fewer delays and faster implementation (Spirovski et al. 2012; Bauer, et al., 2020). Faculty and staff are crucial to the CAP's structure and organization. Therefore, a shared power relationship between faculty and students effectively promotes collective and individual participation in campus-wide efforts to address climate change (Macharis, et al., 2019). Integrating both management approaches allows for centralized messaging and organization from university executives and leaders while encouraging behavioral change born from establishing a sense of responsibility on behalf of students and non-academic staff (Ramisio, Katiliute, et. al., 2017, 2018). Notably, however, it appears to be the case that regardless of the quality of top-down management,

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Commented [LP17R16]: What it a quantitative or qualitative-based metric?

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Commented [JHH20]: A bit broad for a lit review. Is this one study, several studies? Do all campus retrofits save money? Under which circumstances?

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without high quality bottom-up management, CAPs often fail in their objectives (Katiliute, et. al., 2018).

E. HOW ARE ~~THESE~~ CAMPUS CLIMATE ACTION PLANS ~~BUDGETED~~FUNDED?

In researching the funding for CAPs, very few plans discussed the details surrounding the financing of the program itself (White, 2014). While there is mention of the creation of specific funds for campus sustainability (Helferty & Clarke, 2009), other schools instituted fees to help support specific climate action activities. Many universities did not specifically budget for work related to executing climate action plans. Rather, there was reliance on use of university resources within the science, research, and data analysis process. In rare instances, some universities established grants that individual faculty could apply for to aid in funding for interns and expenses (Bauer, et al. 2020; Spirovski, et al. 2012).

F. HOW DO THESE PLANS ENGAGE~~/~~ AND INFORM STAKEHOLDERS?

One of the most important predictors of a successful CAP is the widespread engagement of stakeholders internal and external to the campus. It is evidently critical that the community is involved and encouraged to play a role in the transition to sustainable development in higher education institutions. One paper suggested that interactive workshops effectively include stakeholders in the planning process while gaining important feedback. The interview method allows stakeholders to share their opinions, ask each other questions, work in groups, and present ideas. A previous program used this methodology in its planning process that proved to be successful (Macharis et al. 2019). Researchers have also concluded that programs educating students and the community on sustainable living give a deeper understanding of the social, environmental, and economic impact of climate change. These programs give communities hands-on learning experiences that encourage students and stakeholders alike to participate in sustainability planning (Finlay et al. 2012).

~~There~~ The literature points to ~~are, however,~~ a variety of different ways ~~in which~~ to successfully engage stakeholders. Some studies, for example~~s~~, have ~~emphasised~~ emphasized the engagement of external stakeholders through hosting or participating in local sporting and cultural events their respective universities are involved in (Ramisio, et. al., 2018). Others examined universities that had students working with members of multi-stakeholder committees (Helferty & Clarke, 2009). The way in which stakeholders are sought to be included in climate action initiatives appears to matter less than does the simple fact that the most successful plans focused on engaging stakeholders through enhanced communication and collaboration among diverse groups and established common goals and metrics to have a shared trajectory (Washington-Ottombre et al., 2018). Furthermore, the literature overwhelmingly pointed to the fact that the most successful plans did not discriminate in the stakeholders they reached out to as the stakeholders involved in climate action programs vary from local governments officials to university students and general public representatives (Bauer, et al. 2020). Put simply, the role that stakeholder engagement plays in the success of campus climate action plans is pivotal and largely because thoughtful engagement works to reinforce the interconnected systems that form one institution and guide short and long-term goals (Semeraro & Boyd, 2017).

G. WHAT OBSTACLES PREVENT THE ~~CAPS~~ EFFECTIVENESS OF CAPS?

The ability to foster effective climate action plans is inherently dependent on the environmental landscape. Environments where there is a lower economic and educational population creates

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Commented [JHH31]: Okay, so this is how the planning process is funded. Important. And what about funding for implementing the plans???

Commented [LP32]: How is community defined? By geography? What about communities of interest?

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roadblocks to understanding. Colleges themselves face their own ~~personal~~ unique challenges, however, in making progress in climate action plans. Coordinating with local state and county officials is often misaligned with separate seasonal calendars and communication styles (Robinson, et al. 2017). This can be detrimental to colleges as coordinating efforts to identify opportunities to align, communicate, and share data is imperative. Colleges also face the reality of inconsistencies in data collection and analysis, finding ~~the ability to track~~ some areas such as goods and services nearly impossible to track (Bauer, et al. 2020).

The most common obstacles that impact the ~~CAP's~~ effectiveness of CAPs include lack of a coordinated approach to assess campus initiatives and implement them effectively. Challenging projects are much more difficult for campuses to implement, while traditional sustainability measures are much more successful on campuses, including recycling and water conservation. However, large projects such as renewable energy consumption are much more challenging to implement successfully. Several factors that prevent campuses from fully transitioning into green spaces include financial burdens, inaction, and conservative attitudes of faculty and staff (Finlay et al. 2012). Additional barriers that are frequently noted include a lack of available funding and the elevated cost of eco-friendly services and goods like cleaning, heating, refrigeration, and food products (Katiliute, et. al., 2017). Furthermore, the long lifespan of university infrastructure, much of which operates with considerable inefficiencies, was frequently noted as an obstacle encountered in the face of achieving the goals outlined in CAPs (Katiliute, et. al., 2018)

Lastly, a factor frequently referenced as an obstacle was the challenge of dealing with a diverse set of stakeholders, all with distinct values, which the universities had to address to move the planning process along. This made it particularly difficult to define common benchmarks and metrics (Washington-Ottombre et al., 2018).

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Commented [LP40]: Values made it difficult to define these? How?

Commented [JHH41]: Is it possible to add a summary paragraph that provides key takeaways for interviews and also for the MSU planning process?
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