Sarah Carson
Campus Sustainability Office
129 Humphreys Service Building
Ithaca, NY 14853

Dear Ms. Carson,

We are writing to you to provide you with our report, "Striving to Unify Our Climate Action." This report addresses the issues that Cornell's Campus Sustainability Office (CSO) is facing in regards to discrepancies with the climate and energy policies of Ithaca and NYS, which is making it hard for CSO to move forward with campus projects. This report provides recommendations as to how these three organizations can come to a consensus on how to resolve the aforementioned discrepancies.

Throughout working on this project, our understanding of the issue at hand has changed much. At first, we believed that CSO simply needed to find a workaround for the clashing policies that NYS and Ithaca have in place, but we later realized that the true problem at hand has to do with the lack of collaboration between these entities when it comes to policy creation, which has led to such great disparity in climate goals, plans, and actions. Lack of leadership and unity has given autonomy to all organizations to take their own initiatives in combating climate change, which has spurred encouragement and involvement but has also caused great disconnect.

After conducting research, our team recommends that CSO initiates collaborative workshops and meetings with the architects of IECS and NYSERDA to help solve this discrepancy. We believe that such a model of stakeholder involvement will allow every entity to create policies and with the consideration of fellow entities and their respective policies. With more alignment in goals and policies comes more alignment in action, and this will allow all three organizations to strive towards their climate goals efficiently and successfully.

Thank you for your consideration of our report and feedback throughout this process. You have been extremely helpful in crafting our recommendations. If you have any questions or concerns, please feel free to reach out to any of our team members, and we look forward to hearing from you soon.

Sincerely,

The Alliance for Sustainability

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Striving to Unify Our Climate Action
A Recommendation Report

Submitted to: Sarah Carson
For Campus Sustainability Office, Architects of the IECS, NYSERDA/NYS

Submitted by: The Alliance for Sustainability (Candela Lencina, Neeharika Kotimreddy, Samantha Cosgrove)

August 12, 2022

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Executive Summary

The purpose of this report is to highlight the disparity between NYS, Ithaca, and Cornell University's climate goals and policies and emphasize the need for goal alignment and collaborative policy making amongst these organizations. The report discusses the shared goals amongst these three, the specific policy disconnects that are proving to be roadblocks to achieving climate goals, and three recommendations for further action in resolving these policy disconnects.

Major policy disconnect is prevalent amongst all three organizations with respect to each other. With a lack of national guidance, states and local cities and towns have been forced to take greater climate action but have not done so with full stakeholder engagement, resulting in the emergence of different climate policies without consideration of interdependent communities. This has resulted in a lack of unity and coherence amongst different plans of action, which is ultimately detrimental to climate action progress for all three organizations.

At the end of the report, we provide three recommendations to help create unity in policymaking at all levels. We believe that these three recommendations can encourage interaction between all stakeholders so that they can contribute to creating a carbon neutral environment at their respective levels.

I. THE FIGHT FOR CLIMATE CHANGE THROUGH 24/7 CARBON-FREE ENERGY

Climate change has become an increasingly pressing issue for New York State, Ithaca, and Cornell University. Our global standard temperature has seen roughly a 2-degree Fahrenheit increase since our pre-Industrial era, and this increase in heat has caused detrimental weather conditions. This includes temperature extremes, heavy rainfall, melting ice caps, and rising sea levels to name a few, which have threatened not only the lives of various wildlife, but also the survival of the human race as we know it [1].

Global, state, and local organizations have recognized the impending doom of global warming and have taken initiative to enact climate legislation to combat the irreversible effects of global warming that the human race has caused. On a global level, the United Nations (UN) recognizes that our climate problem needs to be addressed immediately, and also estimates that it will take a $1 trillion investment per year among public and private sectors in order to reach acceptable standards for clean energy by 2030 [2]. As an effort to achieve clean energy, the UN crafted the 24/7 Carbon-Free Energy Compact (CFEC), which addresses the need to accelerate decarbonization by uniting different organizations in order to encourage countries to take initiative towards 24/7 carbon free energy [3].

As an example of 24/7 carbon free energy (CFE), Princeton University's ZERO Lab discusses the implications of an electricity procurement plan. The researchers in this study acknowledge that 24/7 CFE procurement raises electricity costs and adds challenges to the process, but they argue that the benefits of reduced emissions from electricity usage is far greater than the drawbacks associated with cost. Furthermore, 24/7 CFE procurement paves the way for advanced clean firm generation and long-duration energy technologies, both of which are key drivers in allowing communities to efficiently transition to a 100 percent carbon-free grid [4]. Perhaps the most important implication of this method of energy procurement is that even if costs are currently expensive to implement 24/7 CFE, implementation of such a procurement plan in the present can be pivotal in reducing costs of such a transition in the future [4]. This can allow for further cost reductions and widespread implementation of clean firm resources and energy in the upcoming decades, which supports the notion that Cornell, Ithaca, and NYS should strive to adopt long-term solutions *in collaboration* if they wish to effectively transition to carbon free energy [4].

II. SUPPORT FOR CARBON NEUTRALITY FROM NYS, ITHACA, AND CORNELL

NYS, Ithaca, and Cornell are three organizations who share the common goal of 24/7 carbon free energy. Each organization understands the importance of decarbonizing, and as a result, have made their own plans to achieve this goal for clean energy as set by the UN compact. In this section, we will detail the many ways each organization has individually supported carbon neutrality so that we have a base understanding of the great things each organization is implementing through their new policies.

A. New York State's Strong Start Towards Decarbonization

We will first discuss what New York State has been doing to work towards carbon neutrality. The New York State Energy Research and Development Authority (NYSERDA) is a corporation tasked with promoting energy efficiency and the use of renewable energy sources.

They also work towards reducing greenhouse gas emissions, accelerating economic growth, and reducing customer energy bills. An important responsibility of their job is to work with their stakeholders in order to help reduce greenhouse gas emissions. NYSERDA has made it a part of their promise to provide guidance to help members of New York make the most informed energy decisions [5].

On July 5, 2022, NYS passed legislation that ensured the state's commitment to clean energy development and efficiency whilst reducing greenhouse gas emissions. This legislation is in support of the Climate Leadership and Community Protection Act (CLCPA), which mandates a zero carbon emission electricity sector by 2040, and 70% renewable energy generation by 2040. The CLCPA gives NYS a path to reach 85% reduction in greenhouse gas emissions from 1990 levels by 2050 [6]. Even though it is still in its drafting stages, the CLCPA would create direction for greenhouse gas reduction.

The national Green New Deal inspired NYS to create their own Green New Deal (GND) bill. The very first draft of this GND was proposed in 2019, and has gone through revisions since then. This bill proposes the creation of a task force with 19 voting members that would develop a plan for NYS to become greenhouse gas emissions neutral by 2030. This would involve transitioning the NYS economy to one that is 100% clean renewable energy. The NYS GND is still in committee and has not reached the Senate floor yet. But once passed, it will not only prevent climate change, but also create jobs and promote economic growth in NYS [7].

B. Ithaca's Ambitious Carbon Neutrality Goals

As society has continued to emphasize the importance of being green, Ithaca's sustainability professionals and activists began pushing its government to show more leadership on the challenges of climate change, economic inequality, and racial injustice. This led to the adoption of the Ithaca Green New Deal on June 5, 2019 [8]. Its two major goals are to "achieve carbon-neutrality community-wide by 2030" and "ensure benefits are shared among all local communities to reduce historical social and economic inequities" [9]. The Ithaca GND considers the detrimental effects human-caused climate change has had on our society and infrastructure, and emphasizes the need for a more ambitious goal of "limit[ing] global warming to 1.5 degrees Celsius" as opposed to the widely accepted goal of 2 degrees Celsius. Most importantly, the GND elucidates the idea that the responsibility of reaching this goal has fallen on the shoulders of state and local governments due to insufficient action from the federal government, which has resulted in the creation of various versions of the GND [9]. This point implies that there is much disconnect between different levels of government when it comes to climate action and legislation and the absence of a strong overarching directional plan the country should collectively be following. Despite this inferred disconnect, NYS was supportive of this GND and granted the city of Ithaca $100,000 to come up with an action plan, which resulted in the creation of the Ithaca Energy Code Supplement (IECS) [9].

The city of Ithaca adopted the IECS on May 5, 2021 in order to reduce greenhouse gas emissions. Once in effect, it required newly constructed buildings to produce 40% fewer greenhouse gas emissions as opposed to those built according to state regulations. The IECS further requires buildings to have an 80% reduction in emissions by 2023, and net zero emissions by 2026 with no use of fossil fuels [10]. To enforce such guidelines for reduced emissions, the IECS lays out two options for compliance:

1. The “performance based whole building path,” which allows for more flexibility in building design and requires compliance with a high-performance building standard or the use of energy modeling [11].
2. The “prescriptive easy path,” which involves a point system that emphasizes affordability and electrification. This point system requires a building to achieve a minimum of 6 points in order to comply [11].

C. Cornell Continues to Work Towards a Sustainable Campus

Cornell wants a sustainable campus and has created action plans as a result. Their climate action plan was outlined in 2009 and updated in 2013 and includes a roadmap to campus carbon neutrality by 2035. In order to reach this goal, Cornell has established three main key steps in their approach: neutrality, innovation, and leadership. Recently, the university has been phasing out research into Earth Source Heat, a geothermal system which would use Earth’s heat to generate heat, as an option for campus-wide heating [12]. In addition, the campus has built out as many distributed energy resources (DERs) as possible, which has contributed to 20% of Ithaca campus’s net annual electricity running on renewable energy sources [9]. To help further achieve sustainability goals, Cornell created the Campus Sustainability Office (CSO), a team of staff that supports and coordinates projects regarding sustainability on campus [13].

III. MAJOR DISCONNECT LEADS TO POLICY PROBLEMS

A. Unifying Under UN 24/7 CFE Can Resolve Disconnects

After looking at the steps each organization has taken, it is evident that we (NYS, Ithaca, and Cornell) all share the common goal of reaching carbon neutrality through reduced greenhouse gas emissions [6][10][12]. It is also apparent that while each of our organizations is keen to achieve net zero emissions, there are discrepancies resulting from different timelines, baselines, and accounting methodologies. Cornell in particular is one of many large-scale energy consumers in Ithaca who need to operate both under city and state guidelines. However, these discrepancies make it difficult for not just Cornell, but any large-scale energy consumer, to comply. In the following section, we further explain these discrepancies in order to outline a shared understanding of various policies clashing for the purpose of uniting our organizations in reaching this common goal. To begin with, the disconnect in the methods that our organizations wish to achieve net zero is visualized in Figure 1 below.

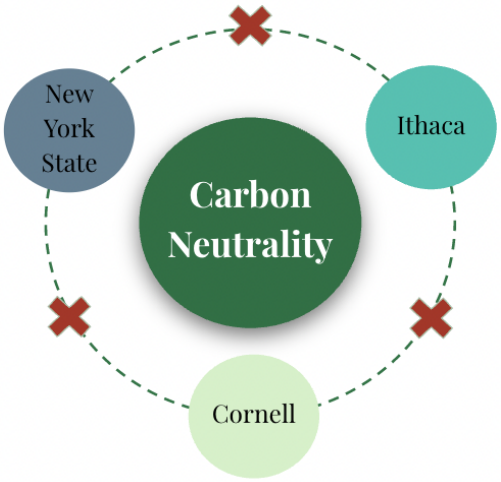

Fig. 1. NYS, Ithaca, and Cornell are creating roadblocks for one another

This visual makes it clear that New York State, Ithaca, and Cornell are revolving their strategies and next steps around carbon neutrality. However, these organizations are not independent of each other, so the policies and decisions one organization makes will impact another organization. Because we are not working with each other, NYS, Ithaca, and Cornell are roadblocks for one another in reaching the common goal of carbon neutrality. In order to effectively accomplish our goal, our organizations need to unite to resolve disconnects within our policies.

B. There is a Lack of Clear Leadership and a Cohesive Plan

Before jumping into what these specific roadblocks are, we will briefly discuss an overarching organization that NYS, Ithaca, and Cornell are all a part of: the United States (US). To support the 24/7 UN CFEC, the US government passed the Green New Deal (GND), which is a congressional resolution that tackles climate change through reducing greenhouse gas emissions. It recognizes the need to achieve net zero carbon emissions by 2050, and it begins with a 10 year plan to reduce carbon emissions in the US [14]. However, this plan is quite vague and does not clearly outline how states can take action in unified ways, and the nation has not supported their resolution with action. As a result, multiple versions of the GND have been created amongst different state and local governments, with different timelines, baselines, and action plans for how each entity wants to combat climate change. This points to a lack of clear leadership from the federal government and a lack of a cohesive plan for states and local cities and towns to collectively act upon.

C. The Problem from the Perspective of a Large-Scale Energy Consumer in Ithaca

Next, we will specifically discuss the disconnects our policies are having with one another. The particular problem Cornell is having is that we must comply with the IECS, however, there is a misalignment between NYS and the IECS for large-scale energy consumers that prevents us from being able to comply. We created a service blueprint to demonstrate the various people, props, and processes involved in this situation, and the interactions between them can be seen in Figure 2 below.

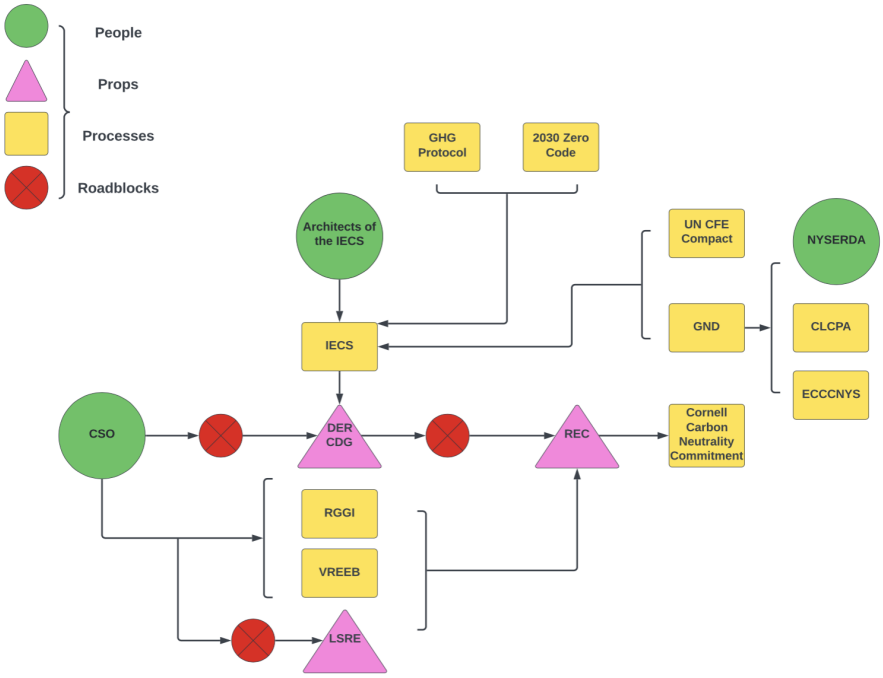

Fig. 2. Service Blueprint

Our service blueprint is broken up into three main components: people, props, and processes. It is modeled to represent a road map from Cornell's perspective through the CSO, where the destination is Cornell meeting its carbon neutrality commitment while obtaining the appropriate amount of RECs to comply with the IECS. A lack of DER and community distributed generation (CDG) is a roadblock in the way of the CSO achieving this goal of fulfilling Cornell's carbon neutrality commitment. Another roadblock CSO faces is their inability to participate in the LSRE market due to NYSERDA's index REC policy.

To meet the points outlined in the easy path of the IECS, Cornell would have to comply with the section dealing with renewable energy systems for commercial use (section C402.4.1). This section states that Cornell must procure renewable energy in the amount equal to or greater than the amount needed, and if the associated renewable energy or renewable energy credits (RECs) cannot be claimed, then alternative renewable energy in the amount equal to or greater than the amount needed needs to be procured [15]. RECs represent the energy that comes from a renewable energy source and are produced when mWhs of electricity are generated from a renewable energy source. RECs are a way to ensure that a specified amount of electricity from the grid is coming from a renewable energy source [16].

20 percent of Cornell's Ithaca campus net annual electricity is generated by renewable energy sources. However, because Cornell has reached their cap on the amount of renewable energy that can be procured from distributed energy resources (DERs), the university must turn to large-scale procurement of RECs due to its high energy use. However, there is no clear path to help Cornell procure any additional renewable energy due to ambiguous NYS policies [17]. The CLCPA in particular could help Cornell find a clear path, but because it is still not complete, Cornell is forced to meet the IECS before NYS policy due to the more progressive timeline in Ithaca.

As previously stated, Cornell has built out all their DERs, forcing the university to look at alternative options to procure RECs as demanded by the IECS. NYSERDA, however, has an index REC policy that has proven to be a roadblock for Cornell in participating in the LSRE market. In addition, NYS policy prioritizes central procurement as opposed to large-scale procurement which Cornell requires [17]. This leaves the CSO at a standstill with no clarity in how they can meet the IECS compliance requirements.

IV. POTENTIAL AVENUES FOR SOLUTIONS

A. San Diego's Macro Level Approach

San Diego has opted to take a long-term approach to decarbonization. Essentially, the state is not making quick fixes that are easily implemented at a micro-level but rather trying to make changes that can translate at a macro-level [18]. Cornell has attempted to make micro-level changes that are easily in their control. However, such changes will not be very beneficial in a long-term stance for campus neutrality. One of these micro-level changes is incorporating heat pumps, which would not be a good long-term solution for Cornell's decarbonization goals .

This is an interesting situation because it would be beneficial for California to reach net zero from an economic standpoint. As stated in the San Diego Regional Decarbonization Framework, "monetary savings from air quality improvements or avoided adaptation costs are expected to be larger than costs" [18]. California recognizes the same issues that the CSO are currently dealing with: "At the same time, the RDF recognizes that many policies necessary for reaching net-zero emissions are controlled at the state or federal level and not by local governments" [18].

San Diego has broken up different sources of emission into four categories and has discussed key decarbonization actions and areas of uncertainty for each respective area. Each action addresses a key emission source. Such emission sources that San Diego shares in common with Ithaca relate to building policies; they list residential water heating, space heating/cooling, and process energy. San Diego plans on dealing with these emission sources through what they call geographically targeted electrification, as well as expansion of the city's gas utility system. Another possible solution they have that will help reduce electricity costs and peaks is to make building shell improvements. One drawback of the geographically targeted electrification is that it is not certain to what long-term extent that it can be effective. That being said, for short term purposes, this is not relevant [18].

B. Pennsylvania's Carbon Capturing and Storage

Pennsylvania is another state to examine for ideas of potential solutions that will help achieve net zero. Pennsylvania's approaches may be useful to look at because like New York, the state is deregulated. Some examples of Pennsylvania's plans to tackle decarbonization include Carbon Capturing and Storage (CCS) and fuel switching by replacing a certain percentage of coal with biomass [19].

CCS is a method which Pennsylvania has employed in attempts to reduce CO2 emissions from industrial furnaces and kilns. An advantage of CCS that makes this method appealing is that it does not require changes in the industrial process. Another advantage is that CCS can be achieved with 90% efficiency. A recent study suggests that 98% efficiency can be achieved with a marginal cost increase at industrial facilities, proving the capability of CCS.

The storage of the captured carbon is an important part of reaching carbon neutrality. This storage needs to be done both safely and in a space that can withstand wear and tear. Some methods of carbon storage are injections in sedimentary formations and basalt formations [19]. If the carbon is transported in small quantities, it can be transported by truck. However, for large scale transportation with great quantities over long distances, a pipeline system is necessary [19].

Another method which Pennsylvania has employed to reduce carbon emissions is fuel switching. The state is looking to replace a certain percentage of coal with biomass. Similarly to CCS, fuel switching with certain types of biomass does not require infrastructure change, making this method appealing as a long-term solution to reduce carbon emissions. According to Pisciotta and fellow researchers from University of Pennsylvania, "Using biomass instead of fossil fuels in industrial kilns and furnaces does not necessarily reduce the emissions of CO2 at the facility level; however, the source of CO2 differs, which changes the lifecycle emissions of the feedstock and process" [19].

C. Hawaii's Trailblazing Way to a Clean Energy Economy

Hawaii has long been a leader in climate action, especially being the first state in the US to set a 100% clean energy goal. The state has found much success on their way to achieving a 100% clean energy economy and there are three reasons why: a willingness to try, clear guidance from leadership, and stakeholder engagement [20]. Focusing on stakeholder engagement, Hawaii has made a great effort to make sure all the stakeholders in this issue are collaborating together to take unified action under leadership guidance.

Specifically, the state has moved past more traditional practices of issuing informational requests and letting different parties fight for their own needs and has placed great importance on their Public Utilities Commission (PUC) staff developing guidance documents and framing to give organizations a baseline to follow along when developing their own plans and policies, which has aligned all the stakeholders towards a common climate purpose [20]. Much credit goes to PUC chair Mina Morita, who made it a point to foster the very cross-department collaboration among the PUC, governor's office, and legislature such as the Hawaii Senate and House of Representatives that has allowed for the creation of cohesive policies. However, it is also important to note that along with Morita, Commissioners Jeniffer Potter and Leo Asuncion have years of experience in the energy industry and have made a commitment to establish clear guidance for everyone in the state to work towards state-set energy goals [20].

Hawaii's phased plan further outlines the actions the state took to highlight collaboration amongst stakeholders. Phase 1 includes the identification of regulatory goals amongst involved organizations so that guidelines could be developed with everyone's needs and goals in mind. For every step in this phase, the PUC held workshops with stakeholders in charrette-style versus traditional hearings and followed up these workshops with staff concept papers that summarized discussion along with the opportunity for attendees to provide feedback and commentary [20]. Phase 2 further builds on this collaborative workshop structure where monthly group meetings were held to allow organizations to work on their PBR proposals together while considering interdependencies within policies and prominent issues with policy design [20].

D. New York State Can Utilize the Full Potential of DERs

Specifically addressed in NYS climate policies, DERs generate and store electricity for buildings to manage or serve their energy use on the electric grid. They are instrumental to

NYSERDA's carbon neutrality goals [21]. In particular, distributed solar PV and wind can help NYS reach its goal of 100% clean energy. Especially when combined, both have a combined technical potential of about 6 times the statewide electricity consumed in 2019; this exhibits a vast energy potential that NYS should further pursue. Furthermore, the location of a DER can potentially optimize or deplete its energy capabilities; location factors that can affect this include geography, weather, and terrain [22].

V. CONCLUSION

In conclusion, it is essential that these organizations see eye to eye if we all wish to reach our goal of net zero. Accomplishing this goal will be a complicated and integrated process, as it takes time to make major changes on the macro and micro level. When looking at solutions on a macro level, it is possible to compensate in some areas for others that may be lacking. This is why counting RECs in a more fluid manner may help solve this issue of a lack of DER. We hope that by working together, NYSERDA, Cornell, and the Architects of the IECS can help each other work through the bumps in the road on the way to solving this complex issue.

VI. RECOMMENDATIONS

Our team has three recommendations that we feel will help remedy the issue at hand.

1. Cornell should call a meeting with the architects of the IECS to discuss this problem and understand the importance of working together. This will allow Cornell and the architects to come to a consensus on a local level, and this may help foster collaboration in the future amongst local Ithaca organizations when climate policies are being made and remedied.
2. Encourage the state to work with the New York Higher Education Large Scale Renewable Energy consortium. This would help the state understand the difficulties NYS higher education organizations are facing when it comes to complying with climate policies and give both stakeholders a better understanding of each other's goals and planned climate actions.
3. All of the stakeholders–Cornell, architects of IECS, and NYSERDA–should hold a meeting together to discuss how to move forward with this policy discrepancy issue, come up with long-term solutions, and align on common goals. Taking a cue from Hawaii, a major emphasis on stakeholder engagement could help everyone set shared goals while still allowing for individual stakeholders to develop their own goals as well. The development of guidance documents from NYSERDA would be greatly helpful to ensure that all organizations under the jurisdiction of the state develop policies and plans that complement rather than conflict with state legislation. Furthermore, the implementation of non-traditional monthly workshops and meetings with collaborative policy development and discussion will allow for integration and accommodation for interdependencies among stakeholder plans, thus leading to the creation of strong, unified legislation that organizations can take impactful action upon.

These three key recommendations will help the three organizations reach their shared goals through a shared path, allowing all of us to effectively combat climate change as one.

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