Energy Transitions & Climate Resilience: Technology, Policy & Social Change

Team Project Proposal/Outline

Project Title: "A New Kind of Garden Party" with Mothers Out Front

Team Members: Cassidy Chang, Israel Collazo-Luciano, Suyog Vilas Zagadu

Date: 10/23/22

Project Summary:

The main goal of this project is to build a toolkit that can help people to create small/native pollinators gardens to replace lawns. Mothers Out Front anticipates that the toolkit we create will be used in the future to educate and as an outreach tool for other organizations. This toolkit encourages the creation of healthier gardens and does not use any harmful energy to reach this goal of making it 100% renewable.

Background:

A potent instrument in the fight against climate change is restoring the health of the soil beneath our feet. Our yards, gardens, trees, parks, farms, and wetlands will absorb carbon from the Earth's atmosphere and store it underground by depending on tried-and-true methods, many of which Indigenous and Black farmers have used for millennia. To prevent a risky rise in the global temperature, we must take this action.

Mothers out Front highlights that synthetic fertilizers and pesticides are jeopardizing human health and kill what keeps soil healthy. When the soil's below-ground microbial life thrives, healthy soil absorbs carbon and restores water cycles while supporting Earth's biodiversity. When we do not use fertilizers or pesticides on our lawns, we protect rivers and oceans from this harmful chemical runoff.

Meadows require much less maintenance than a lawn because they do not need irrigation, fertilizers, routine mowing, or other maintenance. They certainly do not require herbicides and pesticides. On the other hand, lawns pose a significant environmental risk. It takes a lot of effort and resources to maintain the "ideal" lawn, including water, herbicides, chemicals, time, and irrigation.

Lawns turn into biological deserts that are devoid of other life as a routinely mowed monocrop. On the other hand, meadows sustain a variety of microbiological and macro-invertebrate species, including birds and small mammals like mice, as well as pollinators like butterflies and bees and abundant soil life.

Mothers out Front wants to push for a healthier garden that is different from the standard lawn. In the creation of this toolkit, we are trying to move away from the monoculture of lawns and inform people on how to create healthier gardens that can be created in any community space. This will make it more accessible and attainable for people of all backgrounds.

Current Relevance to Energy System Change:

Lawns have been a part of American society for a long time. As far back as the 1870's they have been crucial to the idea of American homes. Lawns can no longer be seen as the staple to American homes. There is currently water crisis in many parts of the United States and lawns use up a lot of resources. According to the Washington Post lawns are the biggest irrigated crop by area in the us. They take up about 40 million acres of land and over 9 billion gallons of water are used on landscaping every day. Creating a new form of garden could save a huge amount of water and create sustainable, cleaner, and healthier options for homes and green spaces (Washington Post)

As studied in article (Jiahn Son, (2020) *Lawn maintenance and climate change*), lawn movers were accountable for the emission of 26.7 million tons of pollutants in 2011, according to a Quiet Communities assessment. Another study that year also showed that consumer-grade leaf blowers emit more hydrocarbons than pick-up trucks or sedans do. According to EPA data, gas-powered lawn mowers contribute 5% of all air pollution in the United States, and this percentage rises to significantly higher levels in metropolitan areas. The toolkit that we plan to create can help to push for these new garden models and promote energy system change.

Project Goals:

(1) To nurture healthy soil, (2) To act in support of environmental justice, (3) Create information that is accessible to the public and easy to use

Specific Project Outcomes:

Develop a toolkit which will serve as an educational, communicational and outreach tool. It will help people to create meadows that will replace lawns, which will cultivate habitat for birds, butterflies, bees, and other pollinators. Share the toolkit with as many people as possible to help spread the information. The toolkit will have condensed information and quick links to allow for quick and efficient presentation of valuable information regarding these new forms of gardens. By the end of the semester, we hope to have a complete toolkit that Mothers Out Front and other organizations in Boston can use and share without the need for us to be there.

Work Plan:

Mondays, 12-1pm: Weekly check-ins with Mothers Out Front Team

Fridays EOD: Student team sends weekly update

November 3: Midterm presentations for class due; have draft of overall document with most major research and sections started.

November 7-22: Each team member gets independent review on the project by either meeting with student orgs on campus, solicitating classmates' opinions, or other Mothers Out Front chapters.

December 16: Final Projects due, present project in class

December or January: Student team presents research at a Mothers Out Front meeting

Team-Member Roles:

Cassidy- The point person with Mothers Out Front and their organization. Background in environmental studies, knowledgeable about environmental issues. Research positive effects this toolkit could have on community and help with framing the data

Suyog- Energy systems and analytics background. Will work with data for toolkit and find the data to inform people.

Israel- Background in Policy, can help to research the legislative aspect of the project, community outreach, and possible shareholders.

Resources and References

Connections:

MOF-Healthy Soil Livable Future: Frances Bagdad-Peyton, Lisa Brukilacchio, Claryce Evans

Professor Elizabeth Allen

Toolkits from Mothers Out Front: Pumpkin Smash, Compost: ,

New Garden Party

Somerville Pollinator Action Plan

Tufts Pollinator Initiative

Brandeis University rewilding

GreenRoots

CANU

References:

Roach, Margaret. "Your Lawn Questions, Answered." *The New York Times*, The New York Times, 29 June 2022, https://www.nytimes.com/2022/06/29/realestate/lawn-care.html.

Zak, Dan. "There's a Water Crisis. Why Do We Still Have Lawns?" *The Washington Post*, WP Company, 27 Aug. 2022, https://www.washingtonpost.com/lifestyle/2022/08/24/lawns-and-replacement/.

"The Natural Lawn Pledge." *Mothers out Front*, 29 July 2021, https://www.mothersoutfront.org/take-action/natural-lawn-pledge-2021/.

Submitted by jwalton on July 20. "Turn Your Lawn into a Meadow." *Green America*, https://www.greenamerica.org/blog/turn-your-lawn-meadow.

"Lawn Maintenance and Climate Change - Psci." *Princeton University*, The Trustees of Princeton University, https://psci.princeton.edu/tips/2020/5/11/law-maintenance-and-climate-change.

Energy Transitions & Climate Resilience: Technology, Policy & Social Change
Team Project Proposal/Outline

Project Title: Case Study: Energy Infrastructure Vulnerabilities and Interdependencies in Coastal Communities of Oregon

Team Members: Lucie Amidon, Saul Blain, Catherine Clement, Madeleine Gugliemi

Date: October 24, 2022

Project Summary

The Cascadia Coastal Coalition is an nonprofit organization whose mission is to promote disaster readiness, response, recovery and resilience in support of Pacific Northwest coastal communities. Our project will evaluate the connection between energy resilience and disaster preparedness in Florence, Oregon, for the purpose of creating infrastructure recommendations to improve the community's readiness for natural disasters.

Background

The Cascadia region, also known as the Pacific Northwest, is a geographical area that extends from Northern California into British Columbia in Canada, mainly comprising Washington, Oregon and Southern Alaska. This region lies parallel to a 600-mile-long fault line that lies approximately 70-100 miles off the coast's shoreline. (Cascadia Subduction Zone) In the last 10,000 years there have been 41 earthquakes along this fault line, occurring as few as every 190 years or as much as 1200 years apart. (Cascadia Subduction Zone) The last earthquake to specifically hit Oregon was in the year 1700, and the plates at the fault line have been building up pressure ever since. Scientists are estimating that there is a 37% chance an earthquake with magnitude 7.1+ will hit this region in the next 50 years. (Cascadia Subduction Zone) Naturally, those who live in this region are worried about the potential of this catastrophic event and are beginning to prepare for the worst.

In the last few years, a group of emergency responders and activists have come together to create an organization called the Cascadia Coastal Coalition (CCC). This group is exceptionally aware of the threat of an earthquake and are taking initiative to begin creating disaster plans for the coastal communities in the Cascadia region who this event will most strongly affect. For all intensive purposes, CCC is starting this process from scratch and is focused on aiding disaster readiness, response, recovery and resilience for the coastal communities of the Pacific Northwest. The initial (internal) focus of CCC is to create emergency plans regarding communications and medicine. In an extreme natural event where standard phone communication is unavailable, the CCC is asking questions such as, how will these smaller isolated communities communicate with the larger, inland, metropolitan areas? How will they communicate with each other? Additionally, how will the community residents who require electricity for medical machines and medicine replenishment survive if the power lines are down and the roads to the community unpassable?

The Kitsap County Department of Emergency Management breaks down threats and hazards into 4 different phases: Mitigation, Preparedness, Response and Recovery. (Emergency Phases - KCDEM, 2021) Using these principles allows communities to survive and bounce back from disaster. The CCC is mainly focused on Preparedness: the ability to handle an emergency. At the moment, the Coalition is internally focusing on emergency communication and medicine planning. However, they have enlisted the help of our Energy Democracy and Climate Resilience course at Northeastern University in Boston, MA and paired with us on the service-learning aspect of our course. Our group is focusing on the energy and water system vulnerabilities, as well as the interdependencies between the energy system and other systems that could be impacted in a natural disaster in these coastal communities. We will be analyzing the current systems in place, identifying susceptibilities and offering recommendations to improve infrastructure, with an emphasis on social justice, disaster scenarios and climate resilience. Ultimately, we will create a case-study report that outlines all the information above and present it to the Coastal Community Coalition with actionable suggestions to improve their infrastructure.

Relevance to Current Events Related to Energy System Change

In recent years, the impact of climate related weather events on coastal communities has been a major piece in many news cycles. The flooding and extreme winds characteristic of strong hurricanes have the capability to destroy critical infrastructure such as housing, electric transmission lines, water distribution systems, and communication systems. Puerto Rico, an island still recovering from the devastating impacts of Hurricane Maria in 2017, was hit with another storm in September of 2022. Despite making landfall as only a Category 1 hurricane, the storm still caused widespread electricity blackouts and damage to critical infrastructure. In the aftermath of Hurricane Fiona the entirety of the electric grid in Puerto Rico went down and homes were disconnected from the power grid for days, leaving millions of people not only in the dark, but also with limited communication and access to critical medical care. Additionally, waist high flood waters caused further damage to infrastructure and over 1,000 people had to be rescued by emergency workers (Pérez, 2022). In the wake of these storms, it has become increasingly evident that rebuilding efforts must be centered around creating resilience and disaster preparedness, and the efforts to merely rebuild the 20th century infrastructure that suffered the damage will not lead to long term resilience (O'Neill-Carrillo, 2022).

Across the United States, similar devastation occurred in September when Category 4 Hurricane Ian struck. Across the state, coastal communities were left devastated by flood waters, power outages, and structural damage to houses and roads. Despite the widespread damage, one community was able to withstand the worst of the storm and come out with minimal damage. The town, called Babcock Ranch, was specifically designed with adaptation to extreme weather due to climate change in mind, and prioritized energy system resilience and flood water management to ensure that critical communication and access to drinking water would not be impacted by extreme storms. With 700,000 solar panels, underground power lines, and retention

ponds to hold flood waters, the community never lost power during the storm and buildings escaped with minimal damage (Neuman, 2022). Meanwhile, the rest of the state suffered from destroyed roads, buildings, and electric infrastructure.

In response to the increasing impacts of climate change, recent policy changes have been made to both mitigate carbon emissions and increase resilience to storms and other weather related impacts. In August of 2022, the United States signed the Inflation Reduction Act into law which contains multiple clean energy incentives. In addition to renewing the power production tax credits for wind farms and investment tax credits for solar installations, the bill created the first ever investment tax credit for energy storage projects. Under the new bill, up to $0.06 /kWh of electricity produced for wind farms and up to 30% of a solar or energy storage facility can be refunded as a tax credit. Additionally, provisions are in place to increase tax incentives for projects located in energy justice and low income communities (Jones, n.d.). In light of the recent weather events devastating coastal communities and the policy response in the United States, it is time to prioritize changes to energy systems and to improve disaster preparedness in coastal communities.

Project Goals

The comprehensive goals our group wants to achieve with our project is to identify vulnerabilities within the energy systems of coastal towns in the Pacific Northwest; we plan to attain this by looking at existing research and infrastructure studies. Our group also plans to identify the interdependencies with other critical infrastructure; such as water, communications, and healthcare. Lastly, we plan to provide recommendations to address energy system vulnerabilities within coastal towns. We will execute this by gathering data through existing research and infrastructure studies that already have developed emergency plans.

Specific Project Outcomes

We will produce a report on our findings, which will include a discussion of possible points of vulnerability to energy systems, as well as interdependent systems (water, communications, and healthcare), in coastal towns in the pacific northwest. The report will also provide recommendations for infrastructure changes/improvements to aid these communities in building resilience against climate related disasters.

Work Plan

Our group has already begun the process of working with our community-service partner Cascadia Coastal Community (CCC). We had an initial meeting with our point of contact Ralph Garono to learn about the work that the CCC is doing and what outcomes they hope for from our project. We identified a general case-study approach towards coastal communities and their energy systems would be beneficial to the Coalition’s efforts. Going forward from the project proposal, we will follow the table below to meet the final deliverable (i.e., case study report) by

the end of the semester. The plan below may change based on the feedback from Dr. Allen and Ralph Garono from Cascadia Coastal Coalition.

	Week								
Task	10/23	10/30	11/6	11/13	11/20	11/27	12/4	12/11	12/15
Write Project Proposal									
Research Energy Infrastructure									
In-class Midterm Report									
Create Final Report Outline									
Identify System Vulnerabilities									
Identify System Interdependencies									
Develop Infrastructure Recommendations									
Ensure recommendations apply justice and resilience principles									
Write Final Report									
Review Final Report									
Submit Final Report									
In-class Final Presentation									

Team-Member Roles

Our group plans to contribute equally to our research and writing for the reports. If we see it is needed, we will split our project goals, giving each individual a project goal.

Resources and References

"Cascadia Subduction Zone." *Oregon Department of Emergency Management : Cascadia Subduction Zone : Hazards and Preparedness : State of Oregon*, https://www.oregon.gov/oem/hazardsprep/pages/cascadia-subduction-zone.aspx#:~:text=Currently%2C%20scientists%20are%20predicting%20that,felt%20throughout%20the%20Pacific%20Northwest.

"Emergency Phases - Kitsap County Department of Emergency Management. (KCDEM)" *Kitsap County DEM - Serving the Residents of Kitsap County, WA*, 1 Nov. 2021, https://www.kitsapdem.com/phases/.

Jones, D. (n.d.). *Legal alert: A guide to the renewable energy provisions of the Inflation Reduction Act of 2022*. Legal Alert | A Guide to the Renewable Energy Provisions of the Inflation Reduction Act of 2022 | Husch Blackwell. Retrieved October 23, 2022, from https://www.huschblackwell.com/newsandinsights/a-guide-to-the-renewable-energy-provisions-of-the-inflation-reduction-act-of-2022

Neuman, S. (2022, October 6). *One Florida community built to weather hurricanes endured Ian with barely a scratch*. NPR. Retrieved October 23, 2022, from https://www.npr.org/2022/10/05/1126900340/florida-community-designed-weather-hurricane-ian-babcock-ranch-solar

O'Neill-Carrillo, E. (2022, October 21). *To survive more frequent hurricanes, Puerto Rico needs to rethink preparedness*. Scientific American. Retrieved October 23, 2022, from https://www.scientificamerican.com/article/to-survive-more-frequent-hurricanes-puerto-rico-needs-to-rethink-preparedness/

Pérez, L. N. (2022, September 19). *On anniversary of Hurricane Maria, storm leaves Puerto Rico in the dark*. The New York Times. Retrieved October 23, 2022, from https://www.nytimes.com/2022/09/19/us/puerto-rico-power-hurricane-fiona.html

Energy Transitions & Climate Resilience: Technology, Policy & Social Change

Team Project Proposal/Outline

Project Title: Sustainable Urban Development from a Social Justice Lens
Team Members: Nicole Duffe, Qirui Yu, Faris Muhtadi, and Madison Prifti
Date: 10/22/23

Project Summary:
Our team will be consulting for Sustainable Consumption Action and Research Initiative (SCORAI) to provide a collective forum of case studies of various cities taking approaches to low-carbon lifestyles and advancing social justice goals. We will examine topics such as housing programs and incentives, transportation interventions, designing public spaces, and green infrastructure. Additionally, trends in municipal and regional governance, funding, and surrounding policy will be examined for each initiative to better understand the aspects of a successful sustainability transformation that enhances collective well-being.

Background:
Decades of studies have demonstrated that communities of color and lower-income households bear a greater share of the energy burden such as the negative health impacts and environmental pollution. Rural and less educated communities face the negative externalities disproportionately, whereas urban inhabitants receive a bigger proportion of the advantages of the current energy system and clean energy transition. Colored, low-income, rural communities are also influenced by financial aspects. Higher-income urban dwellers pay 2.3% of their income on energy utilities, while African American families pay 7.2% and low-income rural residents pay 9%.

There are four established approaches to combating climate change: business as usual, incrementalism, adaptation, and transformation. Under the "business as usual" strategy, which aims to maintain the status quo, decision-makers and regular people would carry on with behaviors such as subsidizing fossil fuel companies, and tax-free carbon generation that in the long run harms or destroys their homes and society. “Incrementalism” aims to lessen the harm caused by upcoming crises and shocks without necessitating significant institutional adjustments. Exemplary actions are building seawalls, and dams to keep advancing water away from developed regions. In contrast, “adaptation” would entail a large-scale withdrawal from regions that are most susceptible to the consequences of climate change. The most difficult and least likely response to climate change is “transformation”, which would include paradigm adjustments in social conduct. Infrastructure-based solutions have traditionally been used to address severe storms, flooding, and other weather-related emergencies. In order to mitigate the effects of climate change, and to address current and prevent future injustices, various transformation strategies are required. However, concentrating only on physical infrastructure carries the danger of omitting social and economic infrastructure, which are other essential parts of building resilience.

The climate crisis is also a crisis of leadership. For far too long, far too many leaders have put corporate profits ahead of the common good, worsening climate vulnerabilities and perpetuating racial and economic injustice. Leaders who link social justice to climate and energy are necessary for the transformation to a just, sustainable, renewable-based society. Energy democracy, a growing social movement that envisions a future free of fossil fuels in which people, households, and communities rely on a diverse mix of renewable energy with local ownership, local control, and local benefits, offers a compelling contrast to the narrow lens of climate isolationism. Energy democracy links the transition to renewable energy with the redistribution of income, power, and ownership to build a more just and equitable society. Energy democratic leaders realize that investing in renewable energy is considerably more than just replacing existing energy systems. Instead, the shift to renewable energy offers a chance to undo the economic inequality brought on by reliance on fossil fuels and a small number of wealthy individuals.

With the increasing need to transition from fossil fuel-based energy to clean renewable energy solutions, cities have to reassess their energy habits, in an equitable manner. These assessments will result in changes in social, technological, and environmental actions. There is a need to examine successful transformations in urban areas to understand how to adequately move towards energy democracy and a sustainable climate through housing programs and incentives, transportation interventions, designing public spaces, and green infrastructure. This project will act as a resource for cities around the world to examine successful climate democracy initiatives and sustainable transformations that have the objective of solving current social and environmental injustices as well as promoting climate change mitigation strategies.

Current Relevance to Energy System Change:
In January, as heavy rain caused massive floods in Malaysia's Kelantan, Terengganu, Pahang, Johor, Malacca, Negeri Sembilan and Sabah, more than 125,000 people had to evacuate and 8,727 people were taking shelter at 128 relief centers.

In March, the temperature in eastern Antarctica was measured at 0 degrees (minus-17.7 Celsius) which is 70 degrees hotter than normal. The coldest region is unprecedentedly turning hot.

In August, a record-high heat wave engulfed China. The heat has dried up rivers, wilted crops and sparked forest fires. It has grounded ships, caused hydropower shortages and forced major cities to dim lights.

In August, extreme 100-year flood killed nearly 1500 people and affected 33 million in Pakistani. The damage was estimated to be 40 billion dollars.

Countries and people all around the world are subjected to the impact of extreme weather as the direct result of climate change. Our generation is the first experiencing the severe

consequences of greenhouse gas emissions. Changes in social infrastructure, political policies are both needed to building resilience toward climate change.

Project Goals:

1. Focusing on urban locations, examining and presenting successful sustainability transformations (social, environmental, technological) that could be used as a resource of information for other urban areas looking to implement similar initiatives.
2. Offer amendments and solutions to achieve an equitable path to net zero carbon emissions.
3. Provide information to the public to raise awareness on climate action, and policies associated.

Specific Project Outcomes:

Develop a research paper/presentation to convey current urban low-carbon initiatives and transformations, and offer solutions to further progress to an equitable net zero future.

Work Plan:

Now through November 3rd: Research urban locations and their environmental, social, and policy habits. Compile any project questions/challenges to discuss with the class.
November 4th through December 1st: Dive deeper into examining specific urban initiatives that are addressing low-carbon lifestyles and social injustices. Create suggested amendments to the current system to transition to a more just, environmentally conscious society.
December 1st through December 15th: Developing, editing, and finalizing our research paper/presentation. Present clear action items in an engaging manner to educate and share information and awareness about the clean energy transition with the public.

Note: Additionally, our team will be holding weekly check-ins on our progress and bi-weekly zoom meeting (if necessary) to discuss any challenges and research updates.

Team-Member Roles:

All team members will be conducting research on various case studies of urban initiatives for the first two weeks. We will then re-assign specific roles regarding research areas for the project.

Potential Contacts:

Liz Allen, PhD

References:

Aldrich, D., 2018. The Right Way to Build Resilience to Climate Change. Current History, 117(795), pp.16-21.

Bushard, B. (2022, October 19). Record Flooding: $40 Billion Of Damage In Pakistan As Monsoons Devastate South Asia. *Forbes*. Retrieved from https://www.msn.com/en-us/news/world/record-flooding-40-billion-of-damage-in-pakistan-as-monsoons-devastate-south-asia/ar-AA13bdWt

Baker, S. (2021). Revolutionary Power: An Activist's Guide to the Energy Transition. Washington D. C.: Island Press.

Carley, S. and Konisky, D., 2020. The justice and equity implications of the clean energy transition. Nature Energy, 5(8), pp.569-577.

Reuters. (2022, January 2). Malaysia floods hit seven states forcing thousands to evacuate. *CNN*. Retrieved from https://www.cnn.com/2022/01/02/asia/malaysia-floods-evacuation-intl-hnk/index.html

Stephens, J. (2020). Diversifying power: why we need antiracist, feminist leadership on climate and energy. Washington, D.C.: Island Press.

Samenow, J., & Patel, K. (2022, March 18). It’s 70 degrees warmer than normal in eastern Antarctica. Scientists are flabbergasted. *The Washington Post*. Retrieved from https://www.washingtonpost.com/weather/2022/03/18/antarctica-heat-wave-climate-change/

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Ritz, Aixa A, and Isabel Rimanoczy. (2021). Sustainability Mindset and Transformative Leadership: A Multidisciplinary Perspective. Springer International Publishing Retrieved from https://link-springer-com.ezproxy.neu.edu/book/10.1007/978-3-030-76069-4

Energy Transitions & Climate Resilience: Technology, Policy and Social Change
Team Project Proposal

Project Title: Green Series Community Educational Resource Development, Lincoln MA
Team Members: Elizabeth Zhorov, Alex Cherney, Liana Greenberg-Nielson, Sabrina McClain
Date: October 23rd, 2022

Project Summary:

This project will focus on the education of the residents of Lincoln, Massachusetts on home energy efficiency through the use of well crafted, easy to understand powerpoint slides in order to increase home energy efficiency and save residents money. Our team will be working with the Lincoln Green Energy Committee to make sure that the community knows why this is important and how they can get started using state funding. This project connects to the goal of 100% renewable energy because using less energy in homes massively cuts emissions from our grid and puts less strain on our energy system, making the goal of 100% renewable energy easier to obtain.

Background:

Pre-existing buildings pose an environmental threat due to the amount of energy they use and carbon emissions they produce. Energy-efficiency retrofitting can include a number of different measures. Whether it's construction, appliances, or lighting, ensuring local community involvement in mitigating climate change is a significant step towards the 100% renewable goal. Remodeling older homes to limit carbon emissions is a more recent concept. Energy Star, a program run by the Environmental Protection Agency, that promotes energy efficiency was founded in 1992. When it comes to retrofitting homes a challenge to consider is combining old and new technology, initial costs and financing, as well as securing citizen involvement. In a paper titled “Challenges in Implementing Green Retrofitting in Pre-Existing Residential Buildings: A Review,” Padma Parija highlights the need for public participation saying, “GRF of existing buildings can only be effectively promoted if occupants have subjective will and participate in the upgrade” (Parija 2022). Community organization on the small municipal scale is important when considering potential energy transformation. By working with local experts we will be able to tailor our presentations to specifically tackle important goals set by the organization.

This project is extremely important as it is focused on community development. The article "The Right Way to Build Resilience to Climate Change" by Daniel P. Aldrich emphasizes that community development programs are just as important as federal and state ones (Aldrich 2018). Similarly, Atiya Martin in an interview about Equity, Resilience, and Climate Change discusses how we need to view communities as partners rather than people to educate. More specifically, she says, "We need to respect their context expertise" (Martin 2019). This is a crucial aspect of the energy transition. This project will spread awareness and educate residents

of the Lincoln, MA community, which can strengthen climate resilience in the jurisdiction. Community members will make more informed decisions regarding retrofitting their homes as well as electing officials who make these projects more affordable and accessible. Sustainable housing alternatives will safeguard homeowners from extreme weather events and reduce the potential of climate change effects.

Relevance to Current Events Related to Energy System Change:

There have been several events in recent times that might impact our project and the people in the Lincoln Community. The first event was the passing of the federal infrastructure bill, which has a part that focuses on home retrofitting and allocates $3.16 billion to the Federal Weatherization Assistance Program (WAP). This means that Massechuessets might be able to secure more funds for the people in Lincoln to retrofit their homes. Another current event that might impact our project and the people in the community is the high inflation rate and the federal reserve increasing interest rates once again by 75 basis points in September. Increasing interest rates indicates that we are heading towards a recession, which means that the residents in Lincoln might be less willing to make an investment on their home efficiency, even if they are provided with the information.

Project Goals:

The goal of the project is to inform residents of Lincoln how they can retrofit their houses to be more energy efficient and use more renewable energy sources. They can become more energy efficient through making their houses better insulated, using smart thermostats, and LEDs. They can use more renewable energy through community solar, electric cars, and heat pumps.

Specific Project Outcomes:

We will be helping make several powerpoint presentations to inform the people of Lincoln, MA how they can retrofit their houses to use less fossil fuels. There will be a presentation on envelope and windows, on community solar, on smart thermostat, LEDs, and electric cars, and one on heat pumps.

Work Plan:

Weekly monday meetings with CFREE Coordinator
Monday, Oct 24:Division of Roles verified, Questions with Lincoln Coordinator
Thursday Nov 3: Outline of powerpoints and midterm presentation
Monday, Nov 7: Rough draft of presentations showed to Lincoln Coordinator
Monday Nov 21:1st revision of powerpoints due
Monday, Dec 5: Final Powerpoints showed to Lincoln Coordinator
Friday, Dec 16: Prepared to give final presentation

Team Member Roles:
Elizabeth: Communication lead; in charge of "Miscellaneous" presentation; collaborator on introductory presentation
Alex: In charge of "Envelope" and "Windows" presentations; collaborator on introductory presentation
Liana: In charge of "Heat Pumps" presentation; collaborator on introductory presentation
Sabrina: In charge of "Community Solar" presentation; collaborator on introductory presentation

Resources and References:

- Mass Save: 866-527-SAVE (7283)
    - https://www.masssave.com/en/saving/residential-rebates
- EnergyWise RI (RISE Engineering): 888-633-7947
    - https://www.nationalgridus.com/RI-Home/Energy-Saving-Programs/
- Mass Municipal Wholesale Electric Company
    - https://www.mmwec.org/who-we-serve/
- Energy New England
    - ENE Sustainability | Energy New England - ENE

Tips for consumers interested in heat pumps:

- Mass Clean Energy Center
    - https://goclean.masscec.com/wp-content/uploads/2021/01/MassCEC_ASHP_GUIDE.pdf
- Mass Save installer lists:
    - https://www.masssave.com/en/learn/find-a-contractor-ac-check
- Rewiring America online book (https://www.rewiringamerica.org/)
- NEEP's (Northeast Energy Efficiency Partnerships') primer on heat pumps (https://neep.org/)
- MassCEC guides (https://goclean.masscec.com/clean-energy-solutions/)
- Mass Save guides (https://www.masssave.com/)
- GECA (Green Energy Consumers Alliance)- (https://www.greenenergyconsumers.org/)

Lincoln, MA:

- https://www.lincolntown.org/137/Green-Energy-Committee
- https://www.lincolngreenenergy.org/

Link to old Solar ppt.

- https://docs.google.com/presentation/d/1FLTJZXc85i-5kYhX2WH0k-mHSLkGytBz2AN9k-QHU2Y/edit?usp=sharing

Other Resources:

- https://www.census.gov/quickfacts/lincolntownmiddlesexcountymassachusetts
- Parija, Padma. (2022). Challenges in Implementing Green Retrofitting in Pre- Existing Residential Buildings: A Review. https://www.researchgate.net/publication/358233548_Challenges_in_Implementing_Green_Retrofitting_in_Pre-_Existing_Residential_Buildings_A_Review
- https://www.energystar.gov/
- Aldrich, D. P. (2018). "The Right Way to Build Resilience to Climate Change."

- Martin, Atyia. (2019) Bouncing Forward: An Interview with Dr. Atyia Martin about Equity, Resilience and Climate Change. Interview with Emily Peiffer. Next50. January 23, 2019

Energy Transitions & Climate Resilience: Technology, Policy & Social Change

Team Project Proposal/Outline

Project Title: Universities as Key Nodes in a Renewable Energy Transformation
Team Members: Trinity White, Katherine Cutler, Radhika Shivaprasad, Michael Pasqua
Date: 10/23/2022

Project Summary:
The "Key Nodes" project will provide research and recommendations to the Northeastern Climate Justice and Sustainability Hub's *Climate Justice Action Plan (CJAP)*, which will focus on energy consumption and sourcing, climate justice, transportation, and climate resilience. In partnership with the Northeastern community and neighborhood stakeholders, this project aims to prepare the university in becoming an example of a carbon-free and resilient institution.

Background
Universities can be leaders in achieving global sustainability goals, and Northeastern is taking steps to achieve such goals. The CJAP was inspired by Northeastern University's 2007 American College and University Parents' Climate Commitment (ACUPCC), which is a long-term commitment to achieving carbon neutrality. This shaped the 2010 Sustainable Action Plan (NUSAP) which is now being developed into a climate justice action plan that addresses the disproportionate impact that climate change has on marginalized populations.

The CJAP committee was developed to integrate climate justice action into the University's Strategic Plan, and reduce greenhouse gas emissions that eventually lead to carbon neutrality. Northeastern has a troubled history with surrounding neighborhoods. University expansion and development has led to increasing gentrification of surrounding neighborhoods by pricing out long-term residents. When it comes to being a renewable energy leader, it is important that any more developments at Northeastern involve residents of surrounding communities.

"Average annual emissions from all institutional classifications are 52,434 metric tons carbon dioxide equivalent (MTCO2 E), with emissions from purchased electricity, stationary combustion, and commuting accounting for approximately 88% of total emissions." (Sinha et al., 2012)

Relevance to Current Events Related to Energy System Change
Northeastern University has committed themselves to being leaders in sustainability for years. Many actions to achieve this goal have been seen across campus with "the reduction of greenhouse gas emissions per square foot by 39% since 2005, the implementation of 7 LEED-certified buildings on campus and a total of 41% of operational waste diverted in 2019" (Cussen, 2021). Taking strides in achieving sustainability across campus has been widely accepted, but more needs to be done. In September of this year Northeastern students played a big role "on a $10.6 million project to design and build 18 units of net-zero housing on two Highland Park neighborhood properties near the Boston campus" proving the university has the capability of implementing wide-scale carbon-free and resilient infrastructure (Conti, 2022). With "Northeastern University on track to meet their commitment of 80%

reduction in Metric Tons of Carbon Equivalent (MTCO2e) emissions from 2005 levels by 2050 on a gross square foot (gsf) basis of facilities-controlled buildings and transportation" the goal of becoming a carbon-free campus seems feasible (NUSAP, 2010). One major challenge to achieving NU's goal of becoming an example of a carbon-free and resilient institution is the former Senior Vice President of the Exxon Mobil Corporation, Edward Galante, who sits on the board of trustees for the university as the Vice Chairman. Another set back is Northeastern's investments into fossil fuels. NUDivest has been urging the university to divest from fossil fuels since 2016 with little to no avail. To ensure that Northeastern University becomes a fully carbon-free institution we have to ensure that the campus not only relies on renewable energy but only invests in them as well.

Project Goals

(1) To research what other universities are doing to transition to renewable energy and what challenges they have faced.
(2) Provide recommendations for what Northeastern can do as a university to be a renewable energy leader in its community.
(3) Provide research-based action items for relevant bodies of authority (e.g. the Board).

Specific Project Outcomes

The projected outcomes of this project will be to establish an understanding of what universities like Northeastern are doing/can do in order to transition to renewable energy with the help and input of local communities. The students in this group will assist the Sustainability Hub with exploring the ways higher education can implement sustainability goals by partnering with local communities to advance equity in clean energy. In order to examine what universities are currently doing and can do for the renewable energy transition and energy justice we will examine colleges throughout the U.S. in the form of case studies. This will take the form of reports, independent research, and interviews with leaders and planners to shape the final result of the CJAP. The final resulting report will be a local renewable energy action plan to demonstrate recommended actions and ideas for the university and how to connect the action plan to the local community to ensure a just and equitable transition.

Case Studies:

- Santa Clara University: Initiative on Environmental Justice and the Common Good
- University of Michigan: Planet Blue Energy Access and Economic Mobility
- University of Colorado Boulder: Environmental Center Climate and Energy Justice Program
- UC Davis: Environmental Justice Leaders Program

Work Plan

Tentative except for listed due dates

10/21 - Connect with the Sustainability Hub
10/23 - Project Proposal Due
10/28 - Assemble relevant initial findings into presentation
11/03 - Midterm Presentations Due
11/08 - Reading Day/Project Development
12/11 - Finish incorporating project results into final product
12/16 - Final Team Project Due

Team-Member Roles

Michael - coordination and research
Radhika - research and report-writing
Trinity - research and strategy analyst
Kat- research and editing

Resources and References

NU CJAP Website
NU Sustainable Action Plan (NUSAP, 2010)
Greenhouse Gas Emissions from U.S. Institutions of Higher Education (Sinha et al., 2012)
The Campus Carbon Footprint Hiding in Plain Sight
Northeastern falls behind local universities in fossil fuel divestment plans - The Huntington News (huntnewsnu.com) (Cussen, 2021)
Boston energy-efficient housing powered by Northeastern students - News @ Northeastern (Conti, 2022)
Board Of Trustees - Northeastern University
Put Your Money Where Your Mouth Is: Fossil Fuel Divestment at Northeastern | Northeastern Disorientation
GHG, Energy, and Water Management – Facilities (northeastern.edu)