The City of Laramie

EMISSIONS REDUCTION MANAGEMENT OUTLINE

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ENR 4600 Campus Sustainability

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EXECUTIVE SUMMARY

In February of 2020 the City of Laramie adopted a bill to become carbon neutral by 2050. The first step in reducing Laramie's emissions will be focused on municipal operations. Cities and municipalities across the country are already working on reducing emissions and can provide guidance on how Laramie can best achieve the ambitious but important goal of carbon neutrality.

As a team we have researched and gathered knowledge from several cities' climate action plans; municipalities of similar size or of similar climate to Laramie were especially of interest. We compiled the information into an outline for a municipal emissions reduction plan, a list of emission reducing actions for city operations specific to Laramie, and a matrix for evaluating the impact and cost of those actions.

The proposed management plan outline and action items take into consideration Laramie's baseline emissions which comes from emissions inventories done in 2019 and 2020. The inventory has made it possible to see opportunities for emission reduction and studying other management plans has allowed us to see how we can make these reductions.

Our outline, action list, and matrix will serve as a framework for future use in the city. Our hope is that our preliminary data will be used by city personnel to create a finalized emissions reduction plan that will be implemented in the near future.

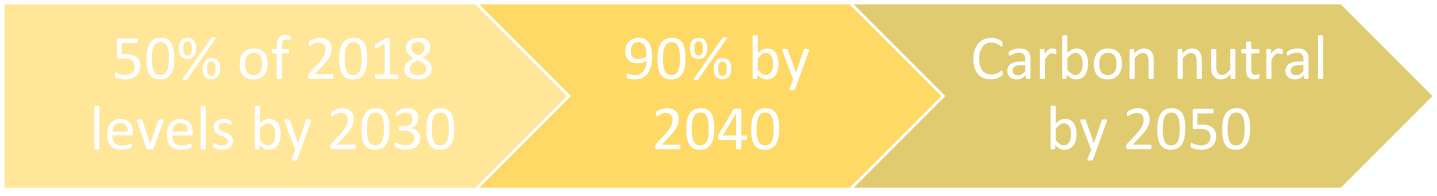

Figure 1: Laramie's municipal emission reduction goals compared to 2018 baseline data

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INTRODUCTION

In February of 2020, the Laramie City Council unanimously voted yes to adopt resolution 2020-14: Establishing the Intent of the Governing Body to Immediately Reduce Carbon Emissions from Municipal Government Operations and Pursue a Net Zero, Carbon Neutral Future for the City of Laramie, Wyoming (City of Laramie, 2020).

The adoption of this resolution entails cutting greenhouse gas emissions where possible and sequestering carbon where emissions cannot be cut out completely. The combination of reducing emissions and storing carbon is how the city will achieve carbon neutrality.

The resolution is based on broad recommendations made by the Environmental Advisory Committee (EAC, 2020); a committee appointed by the city council to advise on environmental issues facing the city and/or brought to attention by the public. The recommendations established 10, 20, and 30-year goals for emission reduction including city operations being carbon neutral by 2050. The community organization, Alliance for Renewable Energy (ARE), requested the development of such goals in the Fall of 2019 and were influential in Laramie committing to emissions reductions through their continued public engagement.

The reduction goals will be compared to a 2019/20 emissions inventory. The inventory will provide an emissions baseline making it possible to track progress over time as plans to reduce emissions are put into action. The initial efforts creating an inventory for Laramie's city operations came through a student project in Campus Sustainability course offered by the Haub School of ENR. During the Spring of 2019, the student group used an emission calculator to calculate Laramie's municipal emissions by sector.

Wyoming is the highest emitter of CO2 per capita in the country (EIA, 2020), yet there is little talk about reducing emissions around the state. The adoption of the 2020 resolutions and the development of a comprehensive emissions reduction plan will put Laramie at the forefront of climate action in Wyoming. In addition, Laramie will join other communities in the mountain west lowering their carbon footprint to mitigate for climate change and promote sustainable development (ICLEI, 2020). It is also the hope of the EAC that reducing emissions will not only mitigate climate change but also reduce expenses for Laramie and its residents over time.

CO2: carbon dioxide
GHG: the greenhouse gasses: carbon dioxide, methane, nitrous oxide
GHGe: greenhouse gas emissions
Emissions: emissions from GHG
Sequestration: capture and storage of CO2 removing it from the atmosphere

We have researched and gathered knowledge from several cities' climate action plans; municipals of similar size or experiencing similar climate as Laramie were especially of interest. We compiled the information into an outline for a municipal emissions reduction plan and a list mapping emission reducing actions for city operations specific to Laramie.

Community-wide emission reduction is not addressed in this document. An inventory for the entire city of Laramie does not currently exist; a community-wide inventory is in progress and will be released later this year. When a full inventory is released, it will provide the baseline needed to assess, reduce, and measure progress for city-wide carbon reduction. While the greater community is not included in this management outline, it will be needed in the future when pursuing a carbon-neutral community.

BACKGROUND

In October of 2018, the United Nations Intergovernmental Panel on Climate Change (IPCC), released a report detailing the possible effects of a 1°C increase in temperature on our planet. A few consequences are rising sea levels, shrinking sea ice, and extreme weather (IPCC, 2018). The United Nations states that reaching even a 1.5°C increase will lead to irreversible changes such as the complete loss of certain ecosystems and impacts on human health and wellbeing (IPCC, 2018). Humans are a major contributor to global temperature increases via greenhouse gas emissions. Municipalities have the power, scope, and money to reduce emissions more than communities do. In order to create a sustainable, clean Earth for future generations, there are steps that these municipalities can take to reduce emissions.

Wyoming, located in the mountain west United States, has an economy that is heavily dependent on extraction (coal and oil) (Britannica, 2020). However, Laramie itself does not have a large history in terms of attempting to reduce emissions. In 2005, the Campus Sustainability Committee was created along with Students for a Sustainable Environment. In 2007, the University of Wyoming (UW) became a member of the American College and University Presidents' Climate Committee. Due to this membership, UW conducted greenhouse gas inventories for 2007 and 2008 and implemented more sustainable practices. The university also created a Climate Action Plan detailing future commitment to reducing campus-wide greenhouse gas emissions. The plan was created in 2009 and contained a comprehensive plan for UW to reduce its carbon footprint. Goals included: "reducing greenhouse gas emissions to 15 percent below 2005 levels by 2015, reducing greenhouse gas emissions to 25 percent below 2005 levels by 2020, and achieving carbon neutrality by 2050" (University of Wyoming, 2009). The document was intended to be "living" and updated as new technologies emerged.

Until very recently, the City of Laramie has not pursued strategic emissions reductions or climate action planning. Within the community of Laramie, UW has historically pursued this but even that effort disappeared in 2018, under President Nichols, when UW pulled out of the American College and University Presidents' Climate Committee. This was mostly due to the university's incompatibility with the program and the need for a sustainability plan that better fits the campus. Now, UW is a member of AASHE STARS (Association for the Advancement of Sustainability, Sustainability Tracking, Assessment and Rating System) and holds a bronze rating (STARS, 2019). Being a member of AASHE STARS helps to advance the culture of sustainability on campus by providing comparisons to similar universities and access to sustainability resources.

UW's progress in sustainability has been instrumental in bringing that momentum to the municipal level. In 2019, a Laramie Greenhouse Gas Inventory for the year of 2018 was completed, as mentioned above. The conclusions of this inventory found that the department that produces the most emissions is the Public Works, with 20% of the total municipal emissions. The majority of methane is produced by waste generation and carbon dioxide by mobile combustion (Yorke et. al., 2019). The findings from this inventory serve as a baseline for the Emissions Reduction Plan by showing in which sectors emissions reduction could make the most impact.

Cities that are similar to Laramie both geographically and politically, have successfully implemented municipal reduction plans in addition to a larger community-wide emissions reduction plan. Cities such as Missoula, MT, Fort Collins, CO, and Reno, NV share aspects of Laramie in various forms.

Missoula, MT is home to the University of Montana and is a relatively small mountain town, with a population of around 73,000 people (City of Missoula, 2012). In 2008, the mayor of Missoula asked students at the university to assist conducting a municipal GHGe inventory from previous years. After the inventory was complete, the students then put together a list of recommendations for the city to take action on. The city decided on going carbon neutral by 2025, which is a shorter time span than the goal of Laramie, which is carbon neutral by 2050. The similarities in the size, presence of a university, and baseline inventory make Missoula's plan a good parallel on which to base Laramie's plan.

Reno, NV is a large mountain town with a population exceeding 200,000 and is where the University of Nevada, Reno resides (City of Reno, 2019). The city partnered with the university in a few different ways. In a collective effort, the city paired with the university as well as regional

water resource agencies to form the Nevada Water Innovation Institute to investigate the conservation of water and purification technologies. The university also assisted in studies that gathered information to measure GHGe community wide. As a result of this plan, the university is now more committed to implementing sustainable practices and infrastructure. This plan was implemented in 2019 so information provided in the document is up to date and relevant to Laramie.

Fort Collins, CO is a short drive away from Laramie and shares similar geographic features including climate and elevation. It is also home to Colorado State University, which is a land grant school like UW (City of Fort Collins, 2015). Although Fort Collins is larger than Laramie, it still serves as a good model due to the fact that it has over three decades of sustainability history.

The municipal emissions reduction plan will allow for future community and campus emissions reduction plans by including the public as well as students from UW. Due to the novelty of sustainability in Wyoming, we can look at other cities as models and can additionally look internally at our own actions at the municipal level to provide guidance on how to move forward for Laramie, and in the future, Wyoming as a whole.

PROJECT DESCRIPTION

Since being assigned to the Municipal Emissions Reduction Plan project in Rachael Budowle's Campus Sustainability course, our first step was to get in contact with our mentor, Darren Parkin, the Natural Resource Manager for the City of Laramie. From his initial contact, we were introduced to the EAC and Alec Muthig, who helped us to define the scope of our project. The EAC created a recommendation document that stressed that Laramie needs to take initiative in their response to climate change concerns. The recommendation proposes that the city should develop a comprehensive plan that "provide[s] a detailed roadmap for actions and budget toward net zero emissions and includes potential avenues for reducing emissions, developing renewable energy sources, and enhancing carbon sequestration opportunities" (EAC, 2020). The document outlines some possible implementation items, including outreach, training, and solar installation programs, streamlined procedures, upgrades to fleet vehicles, maintenance equipment, and building energy efficiency, solid waste emissions solutions, and carbon capture opportunities (EAC, 2020). From this foundation work, Alec and other members of the EAC, helped to develop the outline for our project including statistics to support the foundation for a municipal reduction plan. Using their background research and outline for their reduction plans, our group specified how the city of Laramie can reach their reduction objectives. After meeting with Janine Jordan, City Manager, and Joe Shumway, Mayor of Laramie, we received a better

perspective of: 1) what is feasible for what the city of Laramie can do, 2) the key sectors that could be targeted to reach our goals, and 3) what, if any, political contention there be against our plan. This was important in establishing what support we could expect from local Laramie officials and how we should conduct our project.

We began our investigation by researching cities that have created similar municipal reduction plans. To get the most value as possible, each group member found four plans with models that Laramie could imitate. These cities were narrowed down based on similarities in either Laramie's characteristics or the goals of the city of Laramie including population, political views, implementation plans, heavy emission producing sectors, etc. From there we identified four cities who we, along with Darren and Alec, have found to be the most capable of paralleling what objectives we have for Laramie. We decided that Missoula, MT, Fort Collins, CO, Golden, CO, and Reno, NV had implemented the best plans for us to consider.

After finding the four cities with the models that we wanted to embody in our plans, we were able to create an initial timeline. Our initial timeline was composed of five phases of implementation: Phase One: Identify Laramie's Sectors That Are Most Capable of Reduction; Phase Two: Find Sector-Related Reduction Possibilities; Phase Three: Discover Costs/Variables Related to These Projects; Phase Four: Create a Timeline; Phase Five: Consolidate All Information into a Report. Specific action items within each timeline are shown in Appendix 1.

Due to the limitations brought by COVID-19 and related measures, the timeline for the was necessarily altered. The phases of implementation that were changed are shown using a coloring system. (Refer to Appendix 1) Those action items that were removed due to changes in ability to meet/communicate are shown in yellow, those that changed because of lacking information are shown in gray, and those that changed due to a lack of ability to develop the project are shown in black. The yellow coded items were restricted due to quarantine restrictions that both prohibited us from meeting, as well as changed priorities and focuses for some of our contacts. (Refer to Appendix 1a,1b) Since COVID-19, we could no longer pursue interviews and pertinent information in the same way, so our new objective for the project was to create a strong basis for a reduction plan that the city of Laramie and future students can make improvements/alterations to. This altered objective didn't allow for a fully comprehensive plan due to Laramie specific information that was lacking This included all details that could have created a more solidified plan: budgetary restrictions, specific sector comparisons, and potential feasibility. Those action items that were affected by the changed objective are shown by the color gray. (Refer to Appendix 1d) The format of the Rachael Budowle's Campus Sustainability class also switched focus. Due to the University of Wyoming's switch to an online delivery format,

certain project expectations and outcomes had to be altered. These are displayed by the color black. (Refer to Appendix 1e)

There were additional action items that we completed that complimented our initial action items to produce our final report. Since our project changed from a detailed comprehensive plan to an outlined plan that allows for new updates, different things had to be considered. The following action items were introduced after COVID-19, in accordance with our previous timeline. They were deemed needed action items so we could produce an organized and informative report while providing a foundation for people to continue this project in the future.

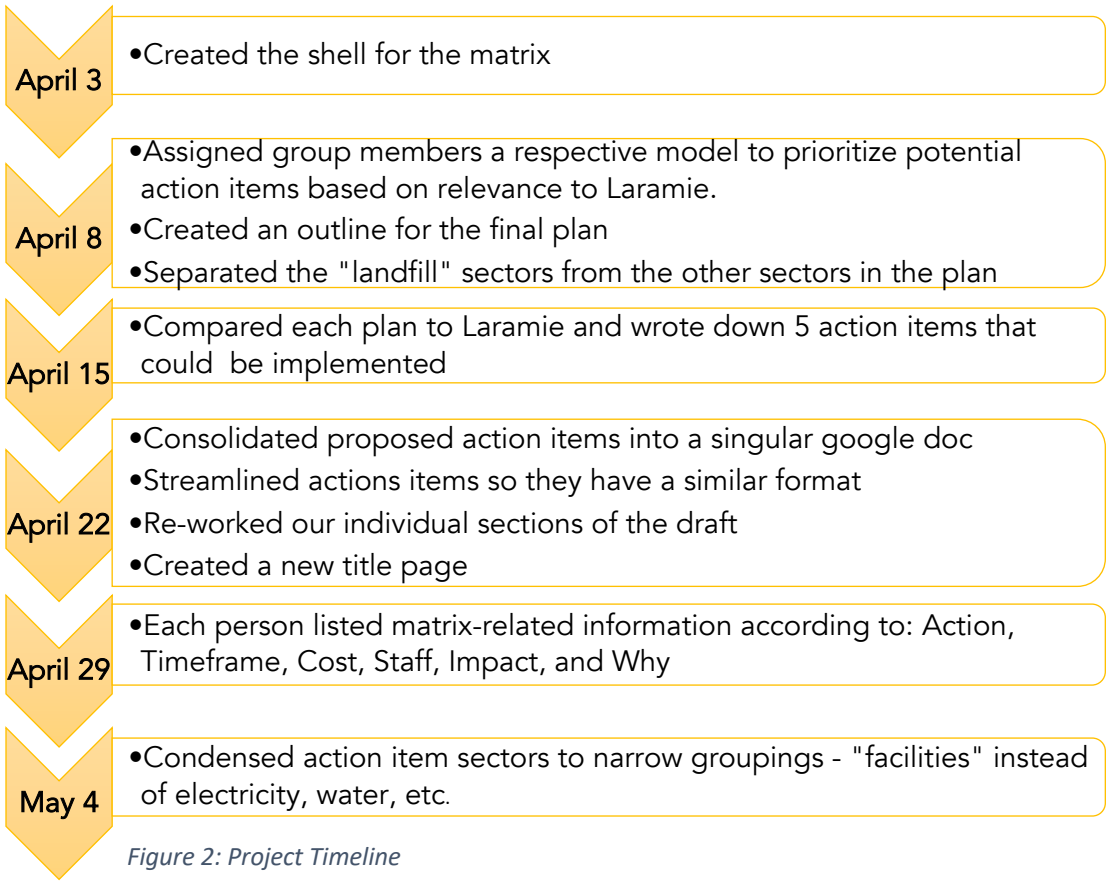


Figure 2: Project Timeline

OUTCOMES

We set out working on this project with the goal of developing a preliminary management plan for the reduction of municipal GHGe in the city of Laramie. As the project developed, it became clear that we had to narrow the scope to better fit the Campus Sustainability Course timeline and adjust to the uncertain times following the closure of campus and the City due to COVID-19.

Instead of creating a management plan, we have developed an outline of sections that should be present in a comprehensive management plan and a document with action items with broad and specific steps for reducing municipal emissions; the action items are also compiled in a matrix for quick reference. These deliverables can be used as a framework for city personnel to reduce emissions now and in the future.

The sections outlined for a management plan and the list of action items build on other climate action plans from cities in our regions such as Missoula, Golden, and Fort Collins; as well as the recommendations published by the EAC at the beginning of 2020. Building on other plans together with advice and recommendations from our project mentors allowed us to adjust our deliverables to best fit Laramie's needs and tackle the specific challenges found here.

The outline will be especially important for developing a comprehensive management plan to systematically reduce emissions. A management plan will provide direction for implementing reduction measures over time to ensure Laramie stays on track to reach the 10-, 20-, and 30-year goals for reducing emissions and reaching carbon neutrality by 2050; we recommend that a management plan is finalized as soon as possible by the city.

We also recommend separate management plans for reducing municipal emissions and city-wide emissions; this follows the format of the emission inventories. Further, landfill emission can be added as a separate component to a municipal plan. Landfill emission is one of the biggest contributors to emissions in Laramie. Unfortunately, there is limited information on municipals' landfills and how they deal with solid waste emissions; a landfill section will require more research before planning and implementing changes. In theory, this means Laramie can have three separate management plans or can choose to combine two, or all three of these components into a single plan.

As mentioned in the introduction, few communities in Wyoming are officially committed to reducing their emissions. This makes it even more important for Laramie to go forth as a good example and lay the foundation for what emission reduction can look like in Wyoming. Hence, the groundwork done for this project will not only be beneficial to Laramie but can also be adopted around the state.

This emission reduction project has saved the city of Laramie employee resources while allowing us to step up as student leaders in our community. We also had the opportunity to form

relationships between the City, University, us as students, and our project mentors. Even though this project is wrapping up for this semester, we are hoping that the connections we made will make it possible for other students to work with the city and assist Laramie in reaching carbon neutrality in the future.

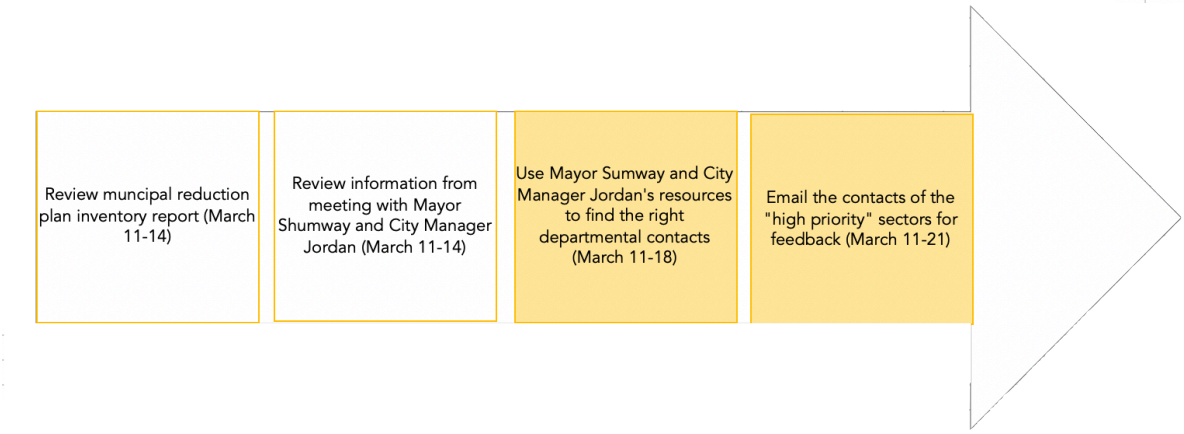
APPENDICES

APPENDIX 1:

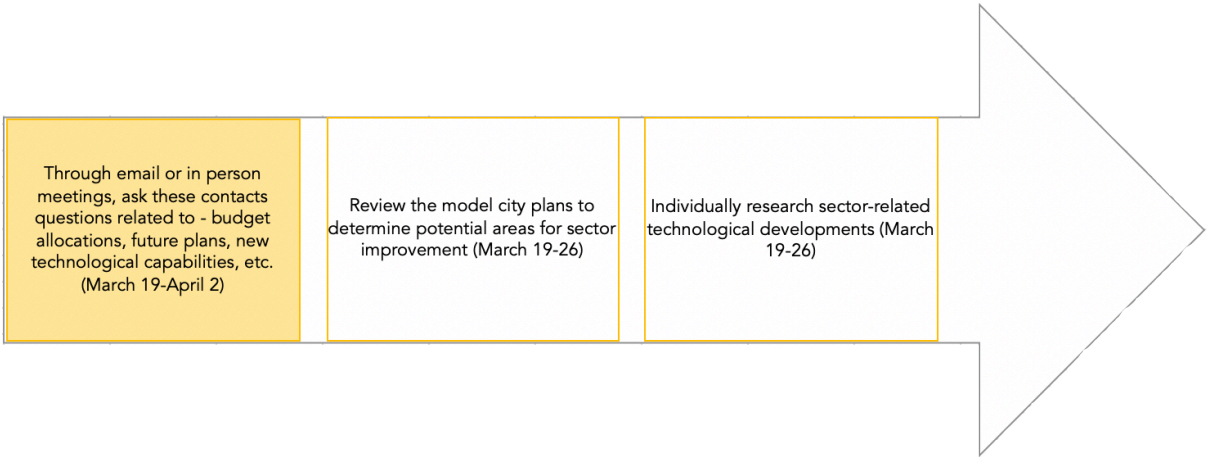
The phases of implementation that were changed are shown using the following coloring system:

Yellow: action items that were removed due to changes in ability to meet/communicate
Gray: action items that changed because of lacking information
Black: action items that changed due to changes in project objectives or a lack of ability to fully develop the project
White: action items that did not change over the course of the project

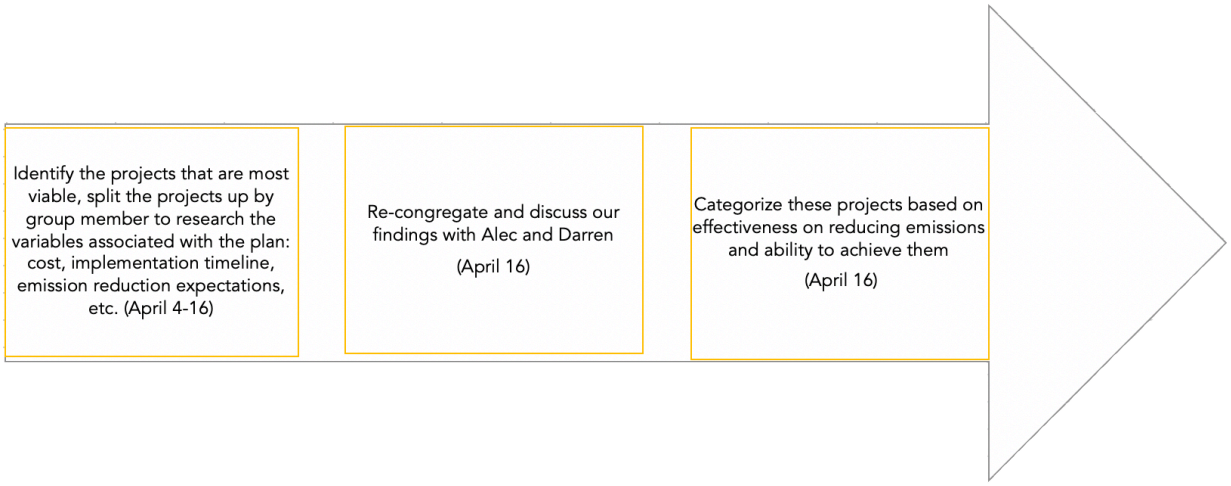
APPENDIX 1a: Phase One: Identify Laramie's Sectors That Are Most Capable of Reduction



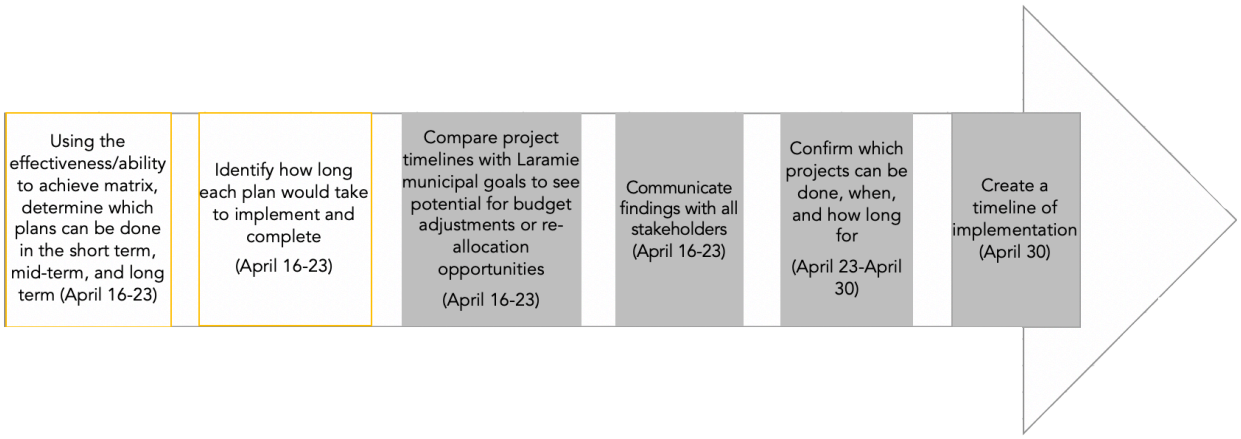
APPENDIX 1b: Phase Two: Find Sector-Related Reduction Possibilities



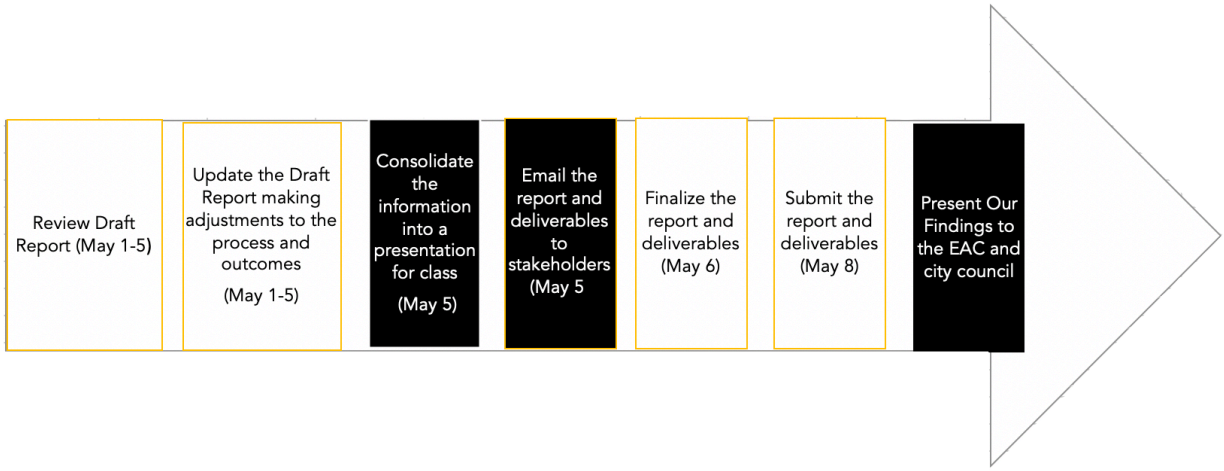
APPENDIX 1c: Phase Three: Discover Costs/Variables Related to These Projects



APPENDIX 1d: Phase Four: Create a Timeline



APPENDIX 1e: Consolidate All Information into a Report



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