Due date FRIDAY 4/2 4pm

THEME: Baseline Data

Evidence from interviews:

- You have to start a baseline. You have to establish a baseline. (Steve Nabor, Senior Associate Vice President for Financial Services & CFO Weber State)
- So this baseline is critical because if you don't have that baseline and add some adjustments to it, you're just, you don't really know if you're saving energy, right. So you have, we started with a certain amount of square footage and buildings and, you know, there's price increases on utilities. So, I mean, you can't control that. So, as you go on each year, you have to make adjustments to to that baseline. And you add buildings to that baseline so you have to make appropriate adjustments to that baseline, so you don't fool yourself into thinking that you're saving money, or you're not saving money. (Steve Nabor, Senior Associate Vice President for Financial Services & CFO Weber State)
- And once we establish that trust on the baseline, we all kind of went like this with our fingers the 1st year, in the 2nd year and so on. We go over all the baseline adjustments. We really we did a critique for the first 5 years but we haven't had any turnover in that area so we have, we have trust in that baseline's getting the adjusted each year appropriately so you can understand that. What is your, what are you going into Dominic? Are you an engineer? What's your degree in? (Steve Nabor, Senior Associate Vice President for Financial Services & CFO Weber State)
- All right, so, that is, you know, we talked about the financing, but if we didn't have if we hadn't establish that baseline properly we would have probably had problems. (Steve Nabor, Senior Associate Vice President for Financial Services & CFO Weber State)

- So in this updated plan we're going to be moving from being carbon neutral in 2050 to carbon neutral in 2040. (Jennifer Bodine, Energy and Sustainability Office (ESO), Weber State University)
- And conducted an investment grade audit a couple of times along the way to identify a whole suite of energy efficiency projects with good returns on investment that we wanted to tackle. (Jennifer Bodine, Energy and Sustainability Office (ESO), Weber State University)

- Yeah I mean we have some of the strategies outlined in our climate action plan have been implemented. And it definitely provided a foundation of research and quantitative data for us to use when figuring out where we're going to get the most bang for our buck in terms of emissions reductions. It just... it served the purpose of creating structure to some of the work that I do and the work that our sustainable campus committee does. So yeah there were things that were useful about it for sure. I am definitely glad we did it. There's no part of me that thinks it was a useless exercise. (Eva Rocke, Sustainability Coordinator, University of Montana)
- Cut and paste evidence from each of the coded transcripts here. Mark every quotation with the interviewee's name, title, and school, for example:

"Our plan process was really fast." – Kate Smith, Sustainability Program Mgr, Utah State University, 3/1/2021

- We just, and this is Carol but we kind of decided it was almost easier to do a greenhouse gas inventory every year, which sounds funny because you're doing more work than you have to. Because you're having to do all this outreach to all kinds of other people around campus to get data and information, people forget. But if you come back to them every year and it's at this kind of predictable time and then you say hey Nicole, remember last year when I sent you that email and asked for the numbers related to something, something, something and you go yeah, I guess I kind of do. People get accustomed to it, so it turned out to be kind of easier to do it... or really not that much more work to do it every year. And it kind of kept us, it just kept us on a real steady cycle. (Stacey, energy coordinator, CSU)
- We show the trend of those emissions on a per student basis which accounts for growth. And then we show those emissions per square foot. (Stacey, energy coordinator, CSU)

- So we have a group that goes through and tries to optimize the performance of the buildings every 5 or 6 years. (Zac Cook, Utilities Senior Energy Manager, USU)
- the different subcommittees went through and analyzed each of the areas that they could impact as far as carbon emissions and kind of developed a list of potential measures that could be taken. (Zac Cook, Utilities Senior Energy Manager, USU)
- And so the results and the data were really erratic, so we really couldn't gauge if we were improving? Are we getting worse, because the data was just very inconsistent. So we've been developing a process to make that more meaningful data. (Zac Cook, Utilities Senior Energy Manager, USU)

Evidence from plans:

- "In 2008, a Greenhouse Gas (GHG) Inventory was completed that identified UM's primary sources of emissions as well as a steadily increasing trend due to growth. On-campus production of steam (On-campus stationary)for heating buildings is the highest contributor with 36.1% of total campus emissions. Close behind is transportation which accounts for 31.6% of total emissions. Transportation includes air travel, commuting, and University fleet. The third highest emitter is purchased electricity used to power buildings and other campus operations which makes up 30.8%" (UM, 2).
- "In 2009, energy audits were conducted in sixteen buildings on campus as well as a campus-wide lighting audit. The audit identified significant energy saving opportunities from improvements to building infrastructure" (UM, 20)
- "Student commuting contributes to 30.3% of total transportation GHG emissions at UM. Using data from a 2003 student survey to measure commuting habits, the percentage takes into account student travel while attending school but not to and from their home towns to Missoula. The survey found that 56% of students walk, bike or rides the bus to campus, 35% of students drive alone to campus, and 9% carpool to campus. Faculty and staff commuting comprise 14.4% of total transportation GHG emissions at UM. A survey conducted in 2006 by the ASUM Office of Transportation (ASUM OT) found that 35% of faculty and staff drive alone to campus, 32% bike or walk, 17% ride the bus and 16% carpool" (UM, 36).

- “Currently, an estimated 4,000 students, faculty, staff and visitors bike to campus daily (ASUM OT survey 2008)” (UM, 38).
- “In the 2007/2008 school year 7,403 students registered for a full year parking pass while 2,791 registered for a half year” (UM, 40).
- “In the 2008/2009 school year mid-size sedans and compact sedans took a total of 800 trips, averaging to 350 miles a trip. If 10% of those were combined trips 28,000 less miles a year would be driven” (UM, 48).
- “According to the greenhouse gas inventory, in 2007 the University traveled 8,007,646 miles and spent $2,001,911 on air flights” (UM, 49).
- “When President Dennison signed the American College and University Presidents Climate Commitment, he pledged UM to achieve climate neutrality as soon as possible. Determining a timeline and steps to reach no net greenhouse gas (GHG) emissions started with the Greenhouse Gas Inventory and culminates in this Climate Action Plan” (UM, 57).

- (UM Baseline Summary written for worksheet) To establish a baseline of carbon emissions, a GHG inventory report was drafted in 2008 detailing sources of emissions from the university. Along with this, an energy audit was conducted in 2009 to determine the university’s infrastructure energy consumption. This information created a baseline for future planning and goal-setting. A primary goal set was to reach carbon neutrality by 2020, in accordance with the ACUPCC. Goals and implementation plans are referenced to the “No Action,” or business as usual, base case where no action is taken against mitigating emissions.

- “In order to determine the effectiveness of the greenhouse gas emissions reduction program, a data baseline must be determined. An inventory of greenhouse gas emitters will be prepared and an analysis conducted to determine the amount of greenhouse gasses being emitted from each source at the starting point for reductions.” (WSU, 8)
- “Because the university does not have every individual facility metered for every utility, total consumption data has been aggregated and will be addressed for the university as a whole to establish an energy consumption and carbon emissions data baseline” (WSU, 9)
- “From the baseline year of 2007, WSU has reduced its electricityconsumption by 26% and its natural gas consumption by over 25% thanks to the completion of several key energy efficiency and renewable energy projects.” (WSU Progress Report, 12)

- (WSU Baseline Summary written for worksheet) The CAP sets the goal for the university to become carbon neutral, defines the term, and explains why it is a necessary goal. Scope 1 emissions include: central heat plant, stand-alone building heating systems, emergency power generators, University vehicle fleet, fugitive emissions, and other equipment emissions. Scope 2 emissions include: purchased utilities. Scope 3 emissions include University-sponsored air travel, vehicle travel, and commuter travel. The progress report references 2007 as the baseline.
- (CSU)“Develop a greenhouse gas (GHG) emissions inventory. Inventories are publicly available for fiscal years FY06-FY17.” (4)

- (CSU) “The University’s greenhouse gas inventory is prepared annually using the Campus Carbon Calculator (CCC), created by Second Nature in partnership with UNH. The CCC tool was developed specifically to provide higher education institutions with a consistent approach to calculating campus greenhouse gas emissions and is recognized as an acceptable tool by the higher education community.” (7).
- (CSU) “The inventory is based on utility data, other University records, discussions with staff, and an annual online campus commuting survey. The units of metric tons of carbon dioxide equivalent (MTCO2e) are used in the inventory and throughout this plan to account for the collective global warming potential of all six greenhouse gases including carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and various refrigerants.” (7).
- (CSU) “The University has completed inventories for fiscal years FY06 through FY17 as shown in Figure 1 below.” (7)
- (CSU) “Following ACUPCC guidance, CSU’s inventory includes all direct emissions, or “Scope 1” emissions such as those from on-campus stationary fuel combustion, fleet vehicles, agricultural activities, fertilizers, and refrigerants. Indirect energy emissions, or “Scope 2” emissions, from electricity purchases are also included. Other indirect emissions, or “Scope 3” emissions from directly financed air travel, student commuting, faculty/staff commuting, electrical transmission and distribution losses, and solid waste disposal are also included.” (8).

- (USU)“In 2008 USU created a GHG emissions portfolio, which primarily focused on scope one, two, and several significant scope three emissions. The largest portion of emissions was from travel, electricity generation, and natural gas consumption, suggesting that the largest opportunities for emissions related to energy use on campus.” (7).
- (USU) “Attaining carbon neutrality by 2050 will require major shifts in behaviors, policy, economics, and technology.” (8).
- (USU) “USU used the Greenhouse Gas Inventory Calculator (volume 5.0), which is developed specifically for universities to generate a GHG inventory”. (36).
- (USU) “The majority of emissions were from travel, electricity, and natural gas consumption. This is approximately the amount of GHG emitted by 20,720 cars per year”. (43).
- (USU) “The largest opportunities for GHG emissions are related to electricity and natural gas consumption”. (44).
- (USU) “Utilizing the intensity index, we assume that each of the 625 new students per year will increase USU’s GHG emissions by 6.25 MTCO2e per year. We utilize this projection as a baseline from which we can quantify the emissions reductions that would be required to meet particular reduction targets through 2022.” (45).

Summary of clear subthemes:

When examining if baselines are crucial in developing a successful climate action plan, multiple subthemes emerge:

Creating a baseline is essential for a successful climate action plan as it allows a measure for an institution to assess its progress on improvement based on established goals. This baseline needs to be flexible and easily adjustable for the continued evolving changes that occur on campus such as new buildings or growing student population. This is evident in most plans such as Colorado State University, where they needed to make multiple adjustments due to the growth of the university geography and increase in the use of new clean energy sources. These adjustments commonly accrue every two to three years, however, some universities such as Colorado State University, update their baseline every year to help create a process to ensure the plan remains relevant and a focus of the faculty.

To understand a university's energy consumption, many conduct an energy audit to assess their GHG emissions. By performing audits, universities can create this outline by assessing scope one, scope two and scope three. Scope one inventories measure on-campus stationary fuel combustion, fleet vehicles, agricultural activities, fertilizers, and refrigerants. Scope two inventories measure indirect energy emissions and electrical purchases. Scope three measures: directly financed air travel by the university, student commuting, faculty/staff commuting, electrical transmission and distribution losses, and solid waste disposal. Many universities use different tools to conduct these GHG emission inventories, but a common tool of measure used was the Campus Carbon Calculator created by Second Nature specifically to be used by higher education institutions.

After establishing an energy audit of GHG emissions, it is crucial for a university to conduct an investment audit. An investment audit can help the university to identify which projects would be considered energy efficiency projects with good returns on investment that not only help the environment but generate income. This information helps to create an inventory of which projects may be more suitable for specific needs at that time.

After conducting investment and energy audits, a university can create future feasible goals that motivate and focus new environmentally conscious behaviors on campus. Most universities share a common goal of carbon neutrality, achieving net-zero carbon dioxide emissions, by 2050. Some universities, such as University of Montana, have set a more aggressive carbon neutrality goal benchmark for 2020 that has proven to be a harder goal to achieve.