

THEME: *Implementation*

Evidence from interviews:

- “You know I guess they set tangible goals of zero carbon, no waste things like that. But no sort of mid-term goals of this is how we'll get the commitment we're making in terms of we are going to put this much money towards it and we're going to put this many staff, like FTE hours towards addressing this” - Peter McDonough, Program Coordinator of the Climate Change Studies Program, UM
- “So a good example of this, our Rec Center and Athletics have been super gung-ho on the sustainability piece. Like they're trying to lower all their energy usage. They're trying to like change all their facilities to be efficient. And I think the plan gave them a lot of cover and a lot of help in doing that”- Peter McDonough, Program Coordinator of the Climate Change Studies Program, UM
- “And then I have two staff who work totally on recycling and waste diversion. Any kind of additional composting efforts and things like that that we try on campus” - Eva Rocke, Sustainability Coordinator, UM
- “So my preference would be for us to create a 3 - 5 year plan that includes a whole lot of energy conservation, some on site renewables, behavior change, really addresses what I know we can do around footprint rather than, rather than setting us up for failure because we... can't use some of the biggest most important tools that universities have used for carbon neutrality” - Eva Rocke, Sustainability Coordinator, UM
- “All right, so we hired a lot of our own people to do a lot of this. On the front end, there was a lot of low hanging fruit. As we got into some of the thermal energy projects, we had to obviously hire that out. We were hiring that out, not through a 3rd party who was making money on those construction projects” - Steve Nabor, CFO, Weber
- “But we're, we're building all the solar panels covered parking. We're doing these thermal projects thermal energy projects” - Steve Nabor, CFO, Weber
- “Strong leadership that has hired, right? The right people.” - Steve Nabor, CFO, Weber
- “You want a good program, you want it always bigger than one person, right?” - Steve Nabor, CFO, Weber
- “We don't have a program that's established so we even created an academic program with this whole thing. So, the university has embraced it” - Steve Nabor, CFO, Weber
- “So putting LEDs in, making sure everything is insulated properly. And that everything is running as efficiently without making major mechanical changes. Electrification so electrifying our fleet on campus, electrifying buildings, this also includes...I guess the next one which is the addition of renewable energy to our campus. So we've been utilizing solar as well as I think something that is great for Utah and the Intermountain region in general” - K. Myers, Student Sustainability Communication Coordinator
- “So geothermal was implemented while I was at school I think last year. And it powers I think 80% of the heating and cooling in our social science building, which is a new big building. So that's really impressive. We added a solar covered parking lot” - K. Myers, Student Sustainability Communication Coordinator

- “So we pay for ourselves, the energy and sustainability office they have four interns because they have the money for that” - K. Myers, Student Sustainability Communication Coordinator
- “And then because of the success of that program we were able to implement the lawnmower exchange program. Which is kind of the same idea where people bring in their old gas mowers and get a new electric mower.” - K. Myers, Student Sustainability Communication Coordinator
- “we knew that there was a lot of low hanging fruit. Like LED lighting and insulating buildings, automatic lighting systems that shut off when someone is leaving the room. Those things save a lot of energy and save a lot of money, especially like buildings that don't get used very often. Like a facilities management boiler room or something like that.” - K. Myers, Student Sustainability Communication Coordinator
- “So environmental ambassadors is kind of like a classic sustainability club. They're kind of the overseers and then food recovery network deals with the campus food pantry. Organizes food drives and recovers food from campus that's not used and takes it to homeless shelters and packages it up for students to be able to eat the next day or something like that. The community garden which has a community garden at the dorms on campus.” - K. Myers, Student Sustainability Communication Coordinator
- “And we have a capital improvement plan laid out that shows exactly how we're going to be transitioning our infrastructure over to actually meet that 2040 goal” - J. Bodine, Sustainability Coordinator, Weber
- “So we for example built a nearly 2 megawatt solar array on our Davis campus which in Layton UT. And that solar array provides all of the energy needed for that entire campus. And then on the Ogden campus we just, we have several small arrays on the Ogden campus. And then our largest array was just installed, was a 500 KW array. And we did solar covered parking. And then we have plans to some additional solar covered parking on various parking lots. And then now we're actually negotiating schedule 32 arrangement with Rocky Mountain Power to purchase offsite solar through a power purchase agreement” - J. Bodine, Sustainability Coordinator, Weber
- “As an institution we decided we wanted to try to reduce our own emissions, our own direct emissions as much as we possibly can” - J. Bodine, Sustainability Coordinator, Weber
- “Which we have done that, right, we are transitioning our fleet over to hybrid electric or all electric vehicles over the course of time. As well as all of our landscape equipment and mowers right, we're going to be transitioning all of that. But we're also transitioning our buildings entirely over to all electric heat pump based buildings. So that's what I am talking about when I talking about the capital improvement plan that we have, is that we have a plan for every single time we are renovating a building or building a new building, it's being built to be what we call carbon neutral capable. It's being built so that it is an all electric building, so that all we have to do is implement step 3 which is source our energy from a renewable source and then that building is carbon neutral” - J. Bodine, Sustainability Coordinator, Weber
- “So that's the four steps, efficiency, electrification, renewable sourcing and then reinvestment in projects until at some point in time the entire infrastructure is completely turned over and it's carbon neutral” - J. Bodine, Sustainability Coordinator, Weber

- “What we had to do in the beginning though was when we were replacing those mechanical systems, instead of choosing to replace the mechanical system with yet another boiler chiller system, we chose to at that point in time replace the mechanical system with what's basically a variable refrigerant flow VRF heat pump system. So you are going to have to replace your mechanical system anyway. Why not utilize that opportunity to replace it with a carbon neutral capable system.” - J. Bodine, Sustainability Coordinator, Weber
- “So why wouldn't you choose an all electric system and get yourself ready to go on the carbon neutral front. Financially it's equivalent so there's no reason not to do it even in old buildings.” - J. Bodine, Sustainability Coordinator, Weber
- “But it's also been where we've seen drastic cuts beyond efficiency has been in the transition of our buildings over to these heat pump system buildings and then tying them into the ground source fields that we have on our campus. So that we can pre-heat and pre-cool essentially for free” - J. Bodine, Sustainability Coordinator, Weber
- “the other thing we've been playing with this year is the idea of putting a carbon tax on our parking permits.” - J. Bodine, Sustainability Coordinator, Weber
- “But then yeah it's kind of beefing up the infrastructure, whether it's the BRT or whether it's you know more pedestrian friendly, bike friendly, micro transit, scooters and electric bikes and stuff friendly.” - J. Bodine, Sustainability Coordinator, Weber
- “So I help with the water and the sewer and all that. But I also help with all the sustainability stuff. I am co-chair of the president's sustainability commission at CSU and that's a campus-wide commission that includes all the academic colleges.” - C Dollard
- “And we've always had it as a goal to come up with a local offset program that we're investing in energy efficiency and things that reduce that our carbon footprint at the university to offset airline travel and we just haven't gotten that going.” - C Dollard
- “Energy efficiency has been part of my job since I joined the university in 1999” - C Dollard
- “But in terms of my job day to day, energy and water efficiency were always a part of it. But when we got some mechanisms, it used to be we'd come up with projects and then we'd just ask for money right. And so I won't say that anything changed dramatically but we did come up with some more systematic ways to address items in the climate action plan.” - C Dollard
- “We have 21 solar projects in design. The first construction starts in April and we will finish in the summer of '22. So over the next 15 months we'll put in 21 solar systems totaling about just under 5 MW. And that will bring our campus total to well over 10 MW. I think approaching 12. So we're excited about that. Not near enough to carry our whole campus load but it's enough to make us feel like we're starting to do our part. And then the utilities putting in a lot of utility scale wind. I don't know if you have wind energy up there in Montana but we have a lot of it in eastern Colorado and the utilities are really embracing it.” - C Dollard
- “So even if we were perfect at recycling and did 100% no containment diversion of compostables, and so nothing went to the landfill, if we could make all of our emissions relative to our waste go to zero, we would still have 99% of our problem. So, we're trying to figure out how we can... I don't want to tell you not to care about composting or not to care about recycling. But right now, 50% of our emissions come from electricity because most of our electricity is generated by coal, burning coal. And another 25% of our

emissions comes from natural gas which is because we heat our buildings. So, 75% of our emissions right now are because of buildings and the energy that we use to operate those buildings, in and to operate those buildings. So that's why... So, we really want people to be aware of that so if you're going to get excited and engaged in a behavioral change or in an effort to help us reduce emissions, keep composting, keep recycling but also turn off lights in empty rooms and do all these other things that help us reduce the sources that matter more.” - Stacey Baumgarn, CSU

- “100% renewable electricity had been in the climate action plan since 2010, right? But did the President look at that, did the President care? I'm being flip, don't quote me on this part, right. But we work in facilities, we've been saying it all along. We should use more renewables, but we weren't making much progress. When 4000 students show up on the steps by signature of the administration building the president looked out the back door of the building and called over to Carol, hey Carol can I sign this thing? What's going to happen? And Carol is like we don't know how to do it, but we think you can sign it” - Stacy Baumgarn, CSU
- “So last year it finished but Carol maybe mentioned, she just completed a large geo exchange project. That was our first significant project, I mean it was a \$20M project where our Moby, what we call the Moby Complex, it's Moby Gym where the basketball team plays, volleyball plays and this set of offices and a whole other set of auxiliary gymnasiums and swimming pools and all that stuff. This huge giant complex of buildings, we were heating that building and those pools, etc. with steam. Well how do you make steam, you burn natural gas. You make hot water, and you make steam, blah, blah, blah. Well, we took that whole building and installed a giant geo exchange field and we drove 500 wells in the intramural fields adjacent to that building and today we heat and cool that building with ground source heat pumps and we no longer deliver steam to that building. So now we no longer burn any natural gas to heat and cool that building. We use a little bit more electricity right which in the short term is a penalty but by 2030 that building will kind of be net zero, right?! So, we're trying to do that. That was our first large geo exchange project. We have another pending, but it was put on hold because of the pandemic, and we didn't build a new building that we were planning to build. So, if and when that building comes back the plan is that building will have heating and cooling from geothermal or geo exchange heat pumps, ground source heat pumps. And then again Carol and I are always keeping our eye on what's going on in the utility industry and what's going on with prices. And so last year in the midst of the pandemic we got an RFP out on the street and we got a partner under contract and we're going to add 21 additional solar arrays on campus, construction starts next month. That will double the number of arrays and not quite double the amount of electricity that we get from solar on campus. But that's all happening right now too. So even though, and we did that because... this gets a little complicated, if you install solar through a power purchase agreement, a PPA which is the contractual approach that we took, we don't put any money on the table. A 3rdparty brings the money, builds the solar. We just agree to buy the electricity. And in this case negotiated that we would retain the RECs, those environmental attributes of the project as well. So, we will buy the electricity from those arrays and we will retain the RECs which is really important because then we can deduct it from our greenhouse gas inventory. If we didn't own the RECs, then whoever owned those RECs would be able to take it off their greenhouse gas inventory. So that's really powerful. And why does the

university want to do that? Well, we signed a PPA that says this is how much we're going to buy this electricity for the next 25 years. So, it's a fixed price. If you've paid your electricity bill in your apartment or if you asked your parents about paying an electricity bill at home, almost every year the cost of electricity goes up. We just agreed to a fixed rate, flat for the next 25 years. So, we're going to pay this much. The cost of electricity is going to do this and all that money. So, it will save the university millions of dollars over the 25-year period of that contract. Well why wouldn't you do that? So, we're going to generate more solar, green electrons, we're going to own the environmental attribute, so we're reduce our greenhouse gas inventory numbers, and we're going to save money. Who doesn't want that? That's a good deal!" - Stacey Baumgarn, CSU

- "And in January we had the first student funded solar array come online" - S Baumgarn
- "Yeah there's a few pieces. They're big projects and we used to struggle with that commuter survey as well. And then luckily about 5-6 years ago we were able to hire an alternative transportation manager, so a person who is dedicated, committed to reducing single occupancy vehicle trips to campus. And so Aaron, he and his group now have created a very, very robust commuter survey that goes out annually to... a sample of employees and a sample of students and we get a great data set. And now we have that for 5 years running, so we're also starting to see some great trends from that. Which getting a good survey, it's hard but it's really important." - Stacey Baumgarn, CSU
- "And then there are definitely other people involved in implementation. Our utility department, our energy manager, there have been a lot of other people who are instrumental in getting some of those goals done." - Alexi Lamm, USU
- "the University did commit to making all new buildings at least leed silver or above which helps somewhat with our new buildings and changes that could cost more being included in just the university requirement." - Alexi Lamm, USU
- "So I think because sustainability program got to the point that we had this like renewed interest and this second iteration of our greenhouse... we're calling it our greenhouse gas reduction plan, but it's basically climate action plan part 2." - Alexi Lamm, USU
- "The greenhouse gas reduction action plan ended up being much more focused." - A Lamm
- "And then we also have a group within our department, within energy management that does what's called retro commissioning. I don't know if that's a term you've heard of before, probably not. It's basically like you know with your car you try to tune it up every year or two or whatever. Buildings are the same way, as time goes on their performance drifts and they become less efficient. So we have a group that goes through and tries to optimize the performance of the buildings every 5 or 6 years." - Zac Cook, USU
- "All of our subcommittees developed lists of efforts and measures that could be taken. And we tried to come up with associate[d] costs impacts. And we developed a standardized cost of carbon so we could put the value of the reduced carbon into the decision making process on campus." - Zac Cook, USU
- "We do what's called combined heat and power so we produce a substantial portion of our power on campus using a gas turbine. We use the waste exhaust for heat" - Zac Cook, USU
- "it was really rewarding to see this because one of our efforts to meet our goals was to increase the rate at which we improve the efficiency of the LED lighting on campus. So we were able to get a substantial amount of money to go ahead and retrofit the entire

campus, and we're about 3/4s of the way done and we just had a lot of support.” - Zac Cook, USU

- “And I think that made the carbon action plan come together and have some more traction because people were all on the same page and same team.” - Zac Cook, USU

Evidence from plans:

- The greenhouse gas emissions reduction strategies herein originated in the ideas generated through the public involvement process. A Technical Working Group was then tasked with developing strategies from these ideas and analyzing them based on costs, savings, and GHG reduction potential - UM
- To implement this Climate Action Plan, the strategies identified will need to be prioritized, funded, and assigned for further action. Teams will need to be convened to research wind power, biomass energy generation, funding, and carbon offsetting options. -UM
- public involvement process was designed and implemented through public meetings, internet social networking, stakeholder meetings, media announcements, and an all-campus survey. Ideas to reduce greenhouse gas emissions were collected and analyzed using the Clean Air-Cool Planet campus carbon calculator. Strategies were then prioritized and a timeline developed to establish emission reduction interim goals and a target date for carbon neutrality. A draft plan was made publically available for review and comments incorporated in the final plan in as much as possible. - UM
- Further research will be needed to refine strategies as implementation goes forward. - UM
- To determine a reasonably aggressive interim goal, the energy efficiency, conservation, and alternative transportation emission reduction strategies were plotted on the Business as Usual graph. These strategies were chosen for priority implementation because they are mostly within the University’s ability to fund and public feedback indicated a desire to reduce energy consumption. - UM
- Starting by identifying barriers, then applying tools such as gaining a commitment from participants through personal contact. The next step is to pilot the community-based social marketing strategy and measure the results. Once effectiveness is established, broad implementation within a community is more easily accomplished. Ongoing monitoring provides evidence that a project is working and gains long-term commitment to the strategy. To optimize this strategy, staff (one full-time employee) should be added to accomplish the needed tasks. - UM
- “This will be achieved by (1) reducing campus energy consumption, (2) obtaining energy from renewable and sustainable sources, (3) institutionalizing a sustainable culture among students, faculty, and staff, and as a last resort (4) purchasing carbon offsets.” (USU, 4)
- “Detailed operational actions will be developed as a set of five-year plans, continually revised as new technologies and opportunities arise” (USU, 4)

- “The IT department has implemented an energy conservation program through purchasing Energy Star equipment and educating students on powering down equipment where appropriate” (USU, 10).
- **USU Summary:** USU has taken many measures to increase energy efficiency across campus, with a focus on energy, community engagement, and climate research. USU replaced its coal-generated power plant with both hydroelectric and co-generation installments. 3.5 million square feet of space was retrofitted with efficient fluorescent lighting, while four buildings in total benefitted from retrofitting. As of 2007, USU had two LEED-certified buildings receiving platinum certification. However, Utah has adopted policies requiring new state buildings to meet at least LEED silver certifications. USU incentivized biking to campus through Aggie Blue Bikes, a program enabling students to check out bikes for their own use. USU pledged to purchase vehicles that were hybrid or alternatively fueled. USU also offers an impressive recycling program, with 10,000 square feet of space and 11 employees. Lastly, USU committed itself to purchase carbon credits as a last resort.
- “The University has made significant strides in increasing building energy efficiency and identifying conservation opportunities in a number of its facilities. This strategy focuses on a number of energy efficiency opportunities, grouped into six phases, which can be implemented over the short, medium, and long term based on anticipated payback. (lighting upgrades, heat recovery, demand control ventilation, control upgrades, heat-exchange upgrades, variable-air-volume terminals” (CSU, 15).
- “Facilities Management has had a full time Recommissioning Engineer since FY13 who works with a Facilities Management Energy Team to troubleshoot and coordinate repairs of relatively small problems in building HVAC systems. In addition, he identifies larger capital needs in buildings that are using lots of energy and/or water or are challenged by big comfort or control problem.” (CSU, 22)
- **CSU Summary:** CSU set a carbon neutrality goal for 2050, and has since set an interim goal to derive electricity from 100% renewables by 2030. CSU outlines its emissions reduction strategies, split into short- (0-7 years), medium- (7-20 years), and long-term (>20 years) projects, which all together are projected to lower the universities emissions to neutrality by 2050. These strategies fall into a number of designated focusses, which each have several implementation fases that fit into the different implementation timelines. CSU focused heavily on implementation strategies aimed to reduce GHG emissions. Specifically, CSU’s agenda targeted energy-saving measures. Considering the infrastructure already existing on campus, CSU retrofitted old buildings. Energy efficiency measures such as lighting upgrades, heat recovery, demand control ventilation, control upgrades, heat-exchange upgrades, and variable-air-volume terminals were taken. Outreach remained an important cornerstone of CSU’s plan.

Summary of clear subthemes:

Development / Establishing a Baseline

One of the most pressed upon themes evident in the interviews is that of establishing a baseline. Steve Nabor of Weber and Zac Cook of USU in particular,

stressed the importance of doing so and doing so well because without establishing a baseline and a means of continuing to monitor it, there is simply no way to measure progress. Furthermore, it's important that the baseline and a means for monitoring it are established early in the development of a CAP as Steve Nabor particularly, stressed that it is borderline impossible to play catch up once the CAP has been launched. Lastly, it was frequently noted that there is no detail too small to be included in a well organized baseline and that while its data are reviewed annually, the facilities department should have the capacity to and frequently monitor the baseline on a minute by minute basis.

Oversight / Central Leadership

One of the most common barriers to success that was cited is related to interdepartmental collaboration. It was frequently noted that in the absence of the support from the president or the faculty senate, early renditions of CAP's were unsuccessful largely because the effort lacked meaningful collaboration. Even with strong interest and adequate resources, it was clear that universities struggled to implement the provisions of a CAP without high level and central support. This seemed particularly important the a CAP's successful implementation because it organized subcommittee's, provided the framework for interdepartmental collaboration and was clear in assigning roles and responsibilities to different departments and individuals across campus. Put simply, it made individual and departmental responsibilities clear and with a clear chain of command to report up to, engendered an increased level of responsibility among those assigned different roles to play.