

# Climate Action Planning Analysis Worksheet: University of Montana (UM)

## A) Summary and Main Takeaways:

University of Montana's Climate Action Plan is a very comprehensive document that mainly focuses on reaching carbon neutrality by the year 2020. Throughout the document, numerous different carbon emission mitigation techniques are listed and detailed. The plan makes it very clear the cost of each strategy and the challenges that each will face when being implemented. It is also apparent that the plan is largely focused on engaging stakeholders and the community as a whole through various outreach programs and education opportunities. Within the climate action goals section of the document, various projections and future scenarios are outlined, starting with "Business as Usual Emissions Projection," then the following scenarios of carbon offsets, direct emission reduction strategies and wind power, and lastly direct emission reduction, wind power, biomass energy generation, and carbon offsets. They address multiple potential paths of action, with graphs and estimates for potential costs, savings, and emission reductions.

Smart Building Initiative (revolving green fund) -- how does the language/function of that program work? KREL (student fee/student mgd fund for sustainability investments in student bldgs)

## B) Potential Interviewing Questions and Curiosities:

- Are there any other documents available, such as progress reports or plan updates?
- Why was such an ambitious carbon neutrality goal of 2020 set when drafting this plan? What is the new carbon neutrality goal?
- ASUM Sustainability Coordinator: "Overall, I feel this campus is largely mixed in opinion when it comes to a Climate Action Plan. This may be a result of Montanan culture and opinions, difficult financial times, and personal responsibility versus administration and government responsibility" (85). Has this opinion changed since this plan was drafted over 10 years ago?
- More information on sources of funding for the CAP.

## C) Analysis Questions:

### 1. Does the CAP include information on creating a baseline?

*Does the plan discuss its baseline? In other words, does the plan reference its natural greenhouse gas emissions (GHG) levels used to inform planning, goal-setting, and climate policy structure? There are several possibilities for setting a baseline. Some plans*

*may focus on a single historical emissions level, while others may reference future baseline projections.*

- “The University of Montana’s Climate Action Plan (CAP) outlines strategies for achieving climate neutrality by 2020” (1).
- “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%” (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” (20)
- “Transportation is a major source of greenhouse gas emissions at UM accounting for 31.6% of total emissions. The primary emission sources within transportation are student, staff and faculty commuting, the University fleet and air travel” (35).
- “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” (36).
- “Currently, an estimated 4,000 students, faculty, staff and visitors bike to campus daily (ASUM OT survey 2008)” (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” (40).
- “According to a Missoula in Motion 2006 transportation survey, 74% of 506 UM faculty and staff commute 3 miles or greater to campus daily” (43).

- “According to Resident’s Life, about 3,000 students live in on-campus dorms, making up about 21% of the student population. That leaves 79% of students living off campus” (44).
- “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” (48).
- “According to the greenhouse gas inventory, in 2007 the University traveled 8,007,646 miles and spent \$2,001,911 on air flights” (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” (57).
- “If no action is taken, UM’s GHG emissions will continue to grow as shown on the graph below. Clean Air Cool Planet carbon calculator was used to develop this graph and growth in population and building square footage were assumed to be similar to UM’s growth pattern over the last 15 years...UM’s GHG emissions will nearly double in 40 years if no action is taken to reduce emissions” (58).
- “Recommended GHG Emission Reduction Goals: The National Wildlife Federation (NWF) published a guide to campus climate action planning in 2008 advocating for greenhouse gas emissions reduction of at least 80% by 2050. This is based on current recommendations by scientists, although this may be changing to become more aggressive in light of new evidence. The NWF suggests a “2% pathway – steady, verifiable progress in emissions reduction averaging at least 2% per year below a 2005 baseline level across all sectors of society (see graph).” (David J. Eagan, 2008) The NWF pathway results in a 30% reduction in emissions by 2020 and greater than 80% by 2050” (83).

**Summary:** 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.

## 2. By what measure is success tracked and reported?

*Does this plan discuss how progress is tracked and reported? Does the plan reference a system that assesses its sustainability performance? Many different approaches can be used, but make sure to take note of STARS and AASHE.*

- “Interim goals are as important, if not more so, than a carbon neutrality target date. Interim goals are short term, provide the opportunity to measure progress, and encourage starting the downward trend toward carbon neutrality sooner.” (4, 63)
- “The Sustainable Campus Committee, with the support of the Office of Sustainability, will monitor and report on progress as well as recommend future updates and revisions to the Climate Action Plan” (8).
- “For the purpose of planning, it is assumed that energy audits will continue every three years until all buildings are completed and resulting identified projects will be funded and implemented” (21).
- “Students of the University of Montana are typically very active and involved in solving a variety of environmental issues. They, along with faculty and staff, would most likely embrace the opportunity to work on behavior changing campaigns and initiatives along with monitoring success rates.” (22)
- “In order to assess the updated commuting habits of students, faculty and staff, further surveys should be completed on a bi-yearly basis” (35)

**Summary:** The CAP’s success will be tracked and reported by the Sustainable Campus Committee along with the Office of Sustainability, with students potentially helping to monitor “success rates.” Energy audits will be conducted every three years to monitor progress. As an interim goal, surveys will be conducted every other year, along with others intended to keep UM on track for the 2020 carbon neutrality target.

## 3. Does the CAP set goals, strategies, or action items for implementation?

*Does the plan address potential next steps for the plan to be carried out? Take note if plans mention tracking progress or improvements. Does the plan provide recommendations, contain reduction and mitigation strategies, or set interim goals to ensure implementation?*

- “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. Graphing results are shown below and indicate an interim target of 10% below 2007 emission levels by 2015” (4-5).
  
- “Goal: Establish Sustainability and Climate Change as recognized, emphasized, and common themes across the University curriculum. In order to achieve this goal, UM should consider the following strategies:
  - Offer Green Thread or other initiatives on a regular basis to help faculty integrate sustainability into existing courses
  - Develop a plan for all students to encounter sustainability education
  - Develop a network of faculty (at least one per department) to promote sustainability pedagogy across campus
  - Increase number of relevant courses to create a “sustainability track” in General Education
  - Create a Sustainability Literacy Assessment similar to Writing Proficiency Assessment” (6)
  
- “Goal: Make Sustainability and Climate Change a center of academic excellence for the University. In order to advance this goal, UM may:
  - Establish new faculty lines to support Sustainability areas in EVST and Climate Change Studies minor
  - Engage in strategic hiring in other departments and programs to strengthen Sustainability and Climate Change
  - Facilitate opportunities for innovative research and teaching across departments, with COT, and with other sectors of the University” (6)
  
- “Goal: Supplement formal education on Sustainability and Climate Change with informal, practical, and career-oriented education that enhances relationships between UM and community partners. In order to advance this goal, UM may:
  - Support service-learning and project-oriented pedagogy that makes UM a more sustainable member of the community
  - Make sustainability and climate change prominent features of Orientation, residence hall programming
  - Make sustainability and climate change prominent features of UM events and programs that attract off-campus participants (public lectures, extracurricular activities, alumni events, etc.)

- Strengthen relationships with external organizations for internships and work-based learning
  - Develop new funding streams to support expanding Energy Technology program” (6)
- “The following are recommended as a priority for implementation:
    - Energy Efficiency and Conservation
      - oEnergy efficiency upgrades (including lighting retrofits)
      - oBehavior modification
      - o4-day work week
      - oReduce building energy consumption over breaks
      - oRetro-commissioning
      - oReduce vending
      - oTurn-off drinking fountain coolers
      - oCompact fluorescent light bulbs for on-campus residents
      - oEnergy-wise IT
    - Transportation
      - oBehavior modification to increase use of alternative transportation
      - oReplace rental fleet with more fuel-efficient vehicles as much as possible
      - oReduced commuting due to a 4-day work week” (7)
- “To effect the greatest change in GHG emissions, UM’s planning effort focused on developing strategies to reduce energy consumption and transportation-related emissions, then to finding alternatives to using conventional fossil fuels” (15).
- “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 that include:
    - Lighting retrofits
    - Lighting motion sensors and timers
    - Ventilation changes
    - Equipment upgrades
    - Steam trap replacement
    - Improving building envelopes” (20)
- “The existing lighting systems in many of the buildings on campus are T-12 fluorescent lamps and magnetic ballasts, screw-in incandescent lamps, and a mixture of LED and non-energy efficient exit signs. The proposed retrofit project would replace energy inefficient lighting with T-8 lamps and electronic ballasts, screw-in compact fluorescents, and LED exit signs” (20).

- “Energy conservation measures identified by the audit include equipment upgrades, stream trap replacements, ventilation changes, and improvements to building envelopes in many of the same buildings previously listed under the lighting project” (20).
- “One of the most cost-effective ways to save energy and reduce GHG emissions is through changing energy-consuming habits and behaviors. Education and social marketing can result in energy-conscious actions such as turning off unneeded lights, adjusting building temperatures, shutting off equipment, using less hot water, and closing windows and doors” (22).
- “Instituting a 4-day work week can reduce the amount of heating, cooling, lighting, and commuting needed to operate a university” (23).
- “During summer session and over breaks there are far fewer people on campus. Therefore, it may be possible to consolidate areas of use and to close some buildings. Energy savings would then be realized from lower heating and cooling needs, less lighting and equipment use” (24).
- “UM’s vending contract does require energy efficient machines and reducing the number of machines would decrease electricity consumption even more. To replace the service, beverage fill stations could be piloted where people can fill their own containers at a cost” (25-26).
- “This strategy entails providing CFL light bulbs to students living in the dorms to be used in their task lighting” (26).
- “Planting trees on the south and west sides of some buildings could add shading in the summer and reduce the cooling needs. The trees should be deciduous to allow sunshine to warm buildings in the winter” (27).
- “Two strategies using woody biomass are included in UM’s Climate Action Plan: an on-campus wood-fired boiler and an off-campus biomass to syngas (synthetic natural gas) plant. Research into the feasibility is already underway for the off-campus biomass to syngas plant and that strategy is used for worst-case cost estimates in this plan as it is the most expensive option” (28).
- “The 2009 energy audit project identified and estimated installing solar water heating for Grizzly Pool. Currently steam heat is used to maintain pool water temperature. Either evacuated tube or flat plate solar water heating panels could be installed on the south facing roof of the pool building to capture the sun’s energy for partial pool heating” (31).

- “Estimates indicate that installing a 1.5 MW wind turbine in a location with an excellent wind resource would offset almost 11% UM’s purchased electricity and reduce our carbon footprint by 1,788 MT cCO<sub>2</sub>. More 1.5 MW turbines could be purchased in the same way, resulting in even higher GHG reduction” (33).
- “Another option is to certify existing buildings as LEED EBOM (Existing Buildings, Operation, and Maintenance). This certification ensures that all buildings are brought up to stringent energy efficiency standards and conserve the use of other resources. LEED EBOM is currently being evaluated for the Lommasson Center to determine the cost, energy savings, water conservation, and other green standards” (34).
- “In order to increase the ridership of this route the plan suggests increasing the frequency of pick up to every 10 minutes. ASUM OT believes this will double ridership to 32,112 people annually causing 69,040 miles saved from individual commuters annually” (37).
- “ASUM OT predicts a 5% increase of bus ridership if more incentives were put into place. The plan suggests continued visibility of ASUM OT through internet services such as Facebook, Twitter, a device to show the next bus arrival on a cell phone, real time bus digital maps on every bus stop and other outreach efforts” (38).
- “To keep up with the greater Missoula biking culture, ASUM OT is interested in creating a stronger biking campus community by constructing a bike hub that would promote biking to and from campus” (38).
- “One way to increase the University rideshare program is to put up a physical rideshare board in the University Center. Already a board for housing exists, and students can contact the advertisers at their own risk. In addition, the dorms can put up a physical rideshare board in their lobbies. Both of these actions would make it easy for students to contact each other without the complications of an internet rideshare program” (40).
- “In order to promote more carpooling the plan suggests creating more education outreach to students who own cars and providing incentives. Incentives to carpooling can include creating parking spots that are closer to buildings that are designated carpool spaces only, and making carpool permits free” (40).
- “Raise the price of parking permits for events based on where people park. Raise the price of parking permits based on the lots closest to buildings on campus”(42).



- “One option UM can take to encourage more faculty and staff to purchase homes closer to campus is to offer housing assistance programs” (43).
- “Instituting a 4-day work week can reduce commuting to and from campus” (45).
- “If we replace our 8 midsize vehicles with 8 compact cars we would save approximately 1,325 gallons of gasoline per year” (46).
- “If we replace three SUVs with minivans we would save 3,386 gallons of gasoline per year...If the fleet replaced 3 SUVs with 3 Mini Vans there would be 7 total Mini Vans and only 3 SUVs contributing to a cost savings of \$6,493 per new purchased vehicle” (46).
- “The plan suggests purchasing smaller cars that are not necessarily hybrids to save money and fuel” (48).
- “The plan recommends giving incentives to faculty that utilize video and teleconferencing instead of traveling to conferences. The University can set up a videoconferencing center, perhaps in the UC, that is equipped with appropriate technology such as screens and microphones. This center could hold large amounts of people and become a regional videoconferencing hub for Montana. Encouraging more people to visit UM would generate revenue for the University in multiple forms” (50).
- “The offset company in Missoula, Clear Sky Climate Solutions, provides projects that sequester carbon funded by carbon offsets. Two of these projects are in Montana and include a responsible rangeland project and a dairy methane capture project. Purchasing from this company is one avenue the University can take to offset its carbon emissions through air travel” (50).
- “Scenario 1 – Carbon Offsets: This scenario assumes all emissions will be offset using carbon credits, or offsets. The concept of offsetting carbon is explained in detail in Chapter 4. For this scenario, it is assumed that all University emissions will be offset by purchasing quality carbon offsets from the open market” (59).
- “Scenario 2 – Direct Emission Reduction Strategies and Wind Power: This scenario assumes GHG emissions will be reduced by a combination of energy efficiency and conservation, alternative transportation, and wind power. The wind and biomass strategies, along with carbon offsets, offer the primary mechanisms to achieve carbon neutrality” (60).

- “Scenario 3 – Direct Emission Reduction, Wind Power, Biomass Energy Generation, and Carbon Offsets: This scenario assumes GHG emissions will be reduced by a combination of energy efficiency and conservation, alternative transportation, wind power, biomass energy generation, and carbon offsets. Biomass was not scaled similar to wind power because costs to do so become unreasonable. By combining a variety of strategies, the University can diversify its greenhouse gas emission reduction options in the most cost effective way” (61).
- “The Technical Working Group recommends a high priority on implementing direct emission reductions such as those that can be achieved through energy efficiency and conservation and alternative transportation” (65).
- “The Technical Working Group also recommends seeking funding for wind power and a biomass energy generation project. Finally, the Technical Working Group recommends looking into using carbon offsets to offset the greenhouse gas emissions from air travel” (65).

**Summary:** The university CAP sets an interim goal of reaching 10% of 2007 level emissions by the year 2015. To reach this goal, multiple emission mitigation strategies are suggested. These strategies are mostly focused on integrating climate change into the university curriculum, energy efficiency upgrades to facilities, transportation recommendations, and community wide behavioral changes. The CAP also proposes three scenarios that the university may choose to follow. Scenario 1: all emissions are offset using carbon credits. Scenario 2: emissions will be reduced using a combination of energy efficiency upgrades, alternative transportation, and wind power. Scenario 3: emissions will be reduced using a combination of energy efficiency upgrades, alternative transportation, wind power, biomass generation, and carbon offsets. These scenarios are the proposed alternatives to continuing business as usual.

#### 4. How is the CAP funded?

*Does the plan discuss funding efforts? In particular, where do sources of funding come from? Are these sources public or private entities?*

- “Not all of the emission reduction strategies in the diverse portfolio identified are within the funding ability of the University. Overall success of the plan is dependent on obtaining external funding for a few strategies with large emissions reduction potential.” (1)
- “Funding for these projects was received in 2009 through the state of Montana’s Long Range Building Program in the amount of roughly \$1,800,000” (20).

- “Funding for this effort (future energy efficiency upgrades) is unknown at this time, but including these projects in the Climate Action Plan will show the GHG emission reductions that could be realized.” (21)
- “Funding and/or the development of a performance contract will need to be accomplished for the 2012 and 2015 Energy Audit projects.” (21)
- “As this strategy is an expensive endeavor, more research on possible grant funding will need to be conducted in order to evaluate the feasibility of this project.” (39)
- “It is important to note that some strategies with large emission reduction potential, i.e. energy from biomass, and wind power, do not presently have funding sources. External funding from grants or other means would need to be obtained before these strategies could be implemented.” (57)
- “UM also has a new application-based educational opportunity available for students. The Renewable Energy Loan Fund (RELF) is a campaign aimed at starting a campus-wide fund to help pay for energy efficiency and waste reduction projects. In 2009, UM students supported a student fee that sets aside money to implement energy reduction projects” (73).

**Summary:** Two sources of funding were recognized in the CAP: the state of Montana’s Long Range Building Program and the campus-wide Renewable Energy Loan Fund (RELF). The introduction acknowledges that external funding will be pivotal in achieving larger-scale success and in reaching the 2020 carbon neutrality goal but does not specify potential funding sources. Funding is listed as a barrier/challenge.

## 5. How did the CAP inform/engage stakeholders?

*Did the plan include discussions about stakeholder involvement? Specifically, how did the plan address engaging stakeholders in participating in the CAP?*

- “Many people offered ideas, technical assistance, and logistical support in the development of The University of Montana’s first Climate Action Plan. We are grateful to everyone who participated in Open Houses, surveys, meetings, and conversations that lead to new ways of thinking about the challenges of climate change. The dedication and insight of the Technical and Education Working Groups, input from the Sustainable Campus Committee, departments, and members of the Missoula community, as well as the passion of students, including members of UM Climate Action Now, made this plan a community effort. The spirit of collaboration that emerged through this planning process will be integral to its successful implementation.” (Acknowledgements)

- “Completing this Climate Action Plan was undertaken as a community effort. A public involvement process was designed and implemented through public meetings, internet social networking, stakeholder meetings, media announcements, and an all-campus survey” (1).
- “The Climate Action Plan was coauthored primarily by UM’s Sustainability Coordinator and ASUM’s Sustainability Coordinator with input from a Technical Working Group that met every two weeks during plan development. Technical Working Group members included campus professionals and local topic experts were occasionally invited. An Education Working Group convened to write the section of the plan detailing goals and strategies to incorporate sustainability in curriculum, research, and community outreach. The Sustainable Campus Committee made up of staff, students, faculty, and administrators provided guidance and served as advisory authority. University Executive Officers were the final decision making authority” (1).
- “Public feedback indicated strong support for energy efficiency and conservation” (3).
- “Completing this Climate Action Plan was undertaken as a community effort. A public involvement process was designed and implemented through public meetings, internet social networking, stakeholder meetings, media announcements, and an all-campus survey” (10).
- “Figure 4. Public Involvement Process” (11)
- “In 2008, a Greenhouse Gas (GHG) Inventory was completed by Jessie Davie, ASUM Sustainability Coordinator, with help from students Kendra Kallevig, Sky Orndoff, and JJ VanDette, and oversight and guidance from Phil Condon, Environmental Studies Professor, and members of the SCC” (14).
- “Information about the Climate Action Plan and opportunities to comment were posted on Greening UM’s blog, Facebook page, LinkedIn, and Twitter. Comments on the initial draft of this Climate Action Plan were gathered at open house meetings and compiled in the notes located at: <http://www.umt.edu/greeningum/documents/PublicComments.pdf>” (13)
- “Students of the University of Montana are typically very active and involved in solving a variety of environmental issues. They, along with faculty and staff, would most likely embrace the opportunity to work on behavior changing campaigns and initiatives along with monitoring success rates” (22).

- “Minimizing the number of vending machines on campus is a strategy that was identified during the public involvement process” (25).
- “Even so, UM could take advantage of the state’s wind resource by funding, partially or completely, installation of one or more turbines off-site. This could be done through a cooperative-type arrangement, where investors pool their resources to fund the development of a wind farm” (32).
- “It would be in the best interest of the University and all transportation entities on campus to conduct surveys to the campus community to gauge the interest and acceptance level of administering these changes” (35).
- “In order to create a stronger bike culture, students can generate points throughout the year and win cash prizes depending on how many days they walked or biked to campus. Another idea is for students to log their bike days and receive credit toward graduation, or even win free bike gear from participating stores. The idea is to reward students who bike and showcase their efforts, therefore encouraging other commuters to bike or walk to campus” (39).
- “Currently, there is no way of knowing how many miles away students live off campus. However, a survey conducted is scheduled to go out to the student body this Fall asking where students live, their method of transportation, and barriers to taking public transport. The results of this survey will be very helpful creating more opportunities for transportation options” (44).
- “The Off-Campus Rental Center suggests creating a partnership between UM and private housing developers” (44).
- “The plan encourages UM to become actively involved in promoting Amtrak route construction through Missoula. A train could potentially decrease the number of cars students bring to campus every year which would help with congestion on campus and lower commuter emissions” (44).
- “Because there is no longer a local supplier, the University can start a program through the College of Technology and other departments to teach students how to produce, manufacture and store biodiesel. Another idea is to use fryer grease from Dining Services to turn into fuel. Not only would this turn our current ASUM diesel buses into biodiesel, but it would develop hands-on research opportunities for students and faculty” (48).

- “The strategies below represent ideas generated by stakeholder groups including the Athletic department” (49).
- “The offset company in Missoula, Clear Sky Climate Solutions, provides projects that sequester carbon funded by carbon offsets. Two of these projects are in Montana and include a responsible rangeland project and a dairy methane capture project. Purchasing from this company is one avenue the University can take to offset its carbon emissions through air travel” (50).
- “Although feedback from the all-campus survey indicated reluctance to purchase carbon offsets, they are included in some scenarios for the sake of comparison” (58).
- “When the draft of this plan was released for comment, a carbon neutrality date was not included. It was left open to assess the will as well as financial ability of the University. Through the public comment process, a date of 2020 was put forth by students” (59).
- “Public feedback indicated general consensus that emissions directly produced by UM should be the first priority for reduction. These include emissions from the use of buildings and transportation related to UM” (59).
- “The University of Montana has implemented a faculty development program on sustainability called the Green Thread Initiative. This initiative features a two-day faculty development workshop each spring and is intended to infuse issues of sustainability into courses across the UM curriculum.” (67).
- “Local Solutions to Climate Change is a graduate course that emphasizes local and state policy approaches to climate change. Students work on a variety of applied research projects that have included assessing the potential of wind power for the University of Montana” (68).
- “The University of Montana offers one of the nation's first undergraduate interdisciplinary minors in Climate Change Studies. This minor combines the strengths of a focused, interdisciplinary examination of climate change with the applied, solutions-oriented learning demanded by the topic” (68).
- “The School of Journalism recently revamped its Master’s degree program, changing it from a general journalism graduate program to one focused on Environmental and Natural Resource Journalism. The new program was approved by the Board of Regents last year and is in its first year of operation. The new program responds to a critical need

for journalists trained to tell compelling stories that illuminate the complex relationship between nature and society” (69).

- “Inspired by the Green Thread workshop, WRIT 101, the freshman writing composition course, integrated sustainability as its primary writing theme beginning fall of 2009” (70).
- “One such program is Eco-Reps, a peer to peer outreach forum that utilizes student environmental champions. Founded by Tufts University, this program encourages students living in the dorms to participate in weekly meetings and focus on educating their dorm-mates about environmental issues and encouraging fellow students to live in a more eco-friendly way. This program could become a credit-earning class or internship so that students are motivated to attend meetings and become active in engaging other students” (71).
- “During the 2007/2008 school year, students and faculty completed the first greenhouse gas inventory for UM. Led by the ASUM Sustainability Coordinator and supervised by an Environmental Studies faculty member, the inventory acted as a research project that required students to compile carbon emission data from all sectors of campus, including utilities, transportation, solid waste, and grounds. The data gathered was then entered into the Clean Air-Cool Planet calculator and analyzed by students. Not only did this inventory enable UM to establish its baseline, it also provided a meaningful learning opportunity for students to become engaged in campus operations” (72).
- “We intend to expand opportunities for students to engage with climate mitigation and adaptation, both through campus initiatives and work with organizations at the national and international levels. This will involve developing and maintaining a network of campus, community, national, and international partners to develop internships and service learning opportunities” (73).
- “On February 21, 2009, the theme of the men's basketball game at UM was “green.” The "Go Green" game was an effort to bring the University's commitment to sustainability initiatives and environmental stewardship to Griz fans. During the game, fans could purchase a variety of Farm to College food items, including MT-made hot dogs and buns. Student volunteers provided fans with information about the efforts of UM Recycling on campus. Waste was recycled and composted. Finally, students helped to raise enough money to purchase enough carbon offsets to offset half of the emissions associated with the game. The game was a collaborative effort of ASUM Sustainability Center, UM Dining Services, UM Athletics, UM Recycling, and UM student group volunteers (UM Climate Action Network and Students for Real Food)” (74).

- “The survey results indicated that overall students advocated for more aggressive interim goals and carbon neutrality date, while responding that the plan’s goals looked good. Some students replied that the goals seemed arbitrary or they did not understand where the goals came from. Only a few responded that the plan appears costly, unachievable or that global warming does not exist. Most staff and faculty responded similarly, however more seemed doubtful that the University would reach these proposed goals” (85).
- “Both faculty and staff seemed more resistant to carbon offsets, again wondering how this benefits the university and would be economically feasible. Some did support offsetting and were enthusiastic about the process” (85).

**Summary:** Overall, the university’s CAP included a fairly high level of stakeholder engagement from drafting the plan to implementation. The CAP makes a sustained effort to recognize which climate mitigation strategies are most favored by students, faculty, and staff, and to implement these actions first. The university realizes that change requires effort from the entire community and attempts to engage the entire community when planning. There is an emphasis on implementing sustainability-based education in the university curriculum and incorporating climate/sustainability literacy into the lives of students and faculty alike.

## 6. Does the CAP mention gaps in data, uncertainties, or other challenges encountered?

*Does the CAP address where data may be insufficient or unavailable? Take note of barriers to planning and implementation, uncertainties in climate projections or future emission scenarios, inconsistencies in data collection, etc.*

- “The Technical Working Group used best available data to develop the GHG reduction scenarios but there is great uncertainty as to what might be possible in the future. Detailed engineering analyses are needed to determine the most cost-effective ways to implement this plan” (4).
- “The 2009 energy audit estimated lighting upgrades across campus, in approximately 35 buildings, will cost \$1,945,000 (high estimate)” (20)
- “Funding for this effort is unknown at this time, but including these projects in the Climate Action Plan will show the GHG emission reductions that could be realized” (21).
- “Funding and/or the development of a performance contract will need to be accomplished for the 2012 and 2015 Energy Audit projects” (21).



- “One of the most significant barriers to this strategy is the present inability to measure results accurately. In order to do this, a metering system or some other method of measuring energy savings would need be designed and funded. Lack of evidence that behavior modifications are working is a barrier to gaining broad and long-term commitment to the strategy” (23).
- “A more detailed study is needed however to verify the change is worth the benefits [of a 4-day work week]” (23).
- “Challenges to implementing this strategy include getting buy-in from staff, faculty, and students. Not every position will be eligible for a 4/10 schedule which may require more buildings to be operated than desired for maximum savings. This alternative schedule may also have impacts on child care and the ability to utilize carpools/vanpools” (24).
- “Further study is needed to tell exactly which buildings could be closed. Events and staff schedules need to be considered” (25).
- “Several concerns and potential solutions were raised about an on-campus wood-fired boiler during the planning process which must be addressed when determining the feasibility of this strategy. They include:
  - Air pollution concerns
  - Impacts to the historic character of the current steam plant
  - Safety issues with several large trucks a day delivering wood chips to campus
  - Reliability of the sources of woodchips
  - Operation and maintenance costs” (29)
- “Similar concerns are associated with the biomass to syngas technology. They are:
  - Ensuring a reliable source of wood for the long term
  - The technology is still in the development stage
  - Commercial viability is not yet determined
  - Overall costs of development and cost of syngas over the long term in comparison to fossil natural gas” (29)
- “Developing a wind farm takes considerable coordination between landowners, developer, utility company, and permitting agencies. Ideally this work is done by a developer” (33).
- “As this strategy is an expensive endeavor, more research on possible grant funding will need to be conducted in order to evaluate the feasibility of this project” (39).

- “Discussions about banning freshman from bringing personal vehicles to campus have circulated in transportation plan meeting. However, until Montana institutes better public transportation methods state-wide and inter-regionally, ASUM OT and the Office of Public Safety do not see this as a viable option because many freshmen rely on their cars to drive home for breaks” (40).
- “Students may be utilizing other online ridesharing tools such as craigslist.org or making personal connections. Tracking rideshares is difficult for the University and distributing a campus wide survey could allow ASUM OT to make better estimates of ridesharing” (40).
- “Strategies to eliminate parking permits would most likely spur up a fair amount of resistance from commuters due to the inconvenience of purchasing a daily parking pass. Although it is difficult to determine, the Office of Public Safety may lose revenue which in turn would effect funding for campus security. The plan suggests evaluating how the Office of Public Safety receives its funding and possibly finding other sources of funding so that driving to campus is not continually incentivized” (41).
- “Rising housing prices within the University district and the urban core are a main contributor to urban sprawl, preventing a large percentage of faculty and staff from biking or walking to campus” (43).
- “Currently, we do not have the data to know how far people live from campus to calculate commuter miles saved” (43).
- “The cost of this plan was not analyzed in detail because it is difficult to determine how much each new buyer would need for a down payment or loan. This strategy is highly dependent on market forces and the greater Missoula community development plan” (43).
- “The fleet vehicles respond to demand from campus and must meet the needs of users. Some trips require off-road travel which a mini-van would not be able to handle and where an SUV may be necessary. Therefore, replacing as many vehicles as possible with more fuel efficient ones is advised, but understood that not all vehicles will be able to downsize” (47).
- “The electric truck currently used is not heavy enough to carry all the maintenance tools and so there is resistance from the maintenance staff to use more electrics. The hybrid car that is scheduled to replace a truck is also facing some resistance because a truck is needed to carry the tools” (47).

- “This data did not include athletic travel because that information was not available at the time of the inventory. Travel from student’s home to campus was also not included,” (49).
- “Significantly reducing the University’s air travel is challenging because in order to continue the athletic program, study abroad and other university related travel, traveling by air is the most time efficient and sometimes the only means of transportation” (49).
- “At this time more data is needed to adequately address which departmental units on campus are the highest air travelers...As shown, the only specific data calculated was from Athletics while the rest of campus was calculated as one. In order to move forward in reducing carbon emissions through air travel and developing a strong carbon offset program comprehensive data analysis research will be required” (49).
- “It is important to note that some strategies with large emission reduction potential, i.e. energy from biomass, and wind power, do not presently have funding sources” (57).
- “To maintain carbon neutrality, carbon offsets would also need to be purchased in increasing quantities as emissions grow” (59).
- “By combining a variety of strategies, the University can diversify its greenhouse gas emission reduction options in the most cost effective way. As noted for several elements of this plan, more in-depth analysis is needed to determine the specific mix. This scenario is offered for the sake of comparison” (61).
- “Sustaining the workshop remains a challenge in light of existing financial resources. For persistent and pervasive exposure to sustainability in the university curriculum, the workshop needs a commitment of ongoing financial support from UM, as well as support in seeking external funding or developing an entrepreneurial dimension to the program” (67).

**Summary:** The CAP does a good job of addressing challenges that action items may face in their implementation. Some of these challenges include high costs, lack of stakeholder support, and environmental concerns. There are many instances throughout the CAP where insufficient data is available and more detailed study is needed for implementation.

## 7. What purpose do the appendices serve?

*How extensive is the appendices section? Take note if they include extra graphs, tables, data, methodology, further detail and explanations, information on the planning process, etc.*

- **“APPENDIX A:** Following is a complete list of ideas suggested through the Climate Action Planning public involvement process:” (79)
- **“APPENDIX B:** Recommended GHG Emission Reduction Goals: The National Wildlife Federation (NWF) published a guide to campus climate action planning in 2008 advocating for greenhouse gas emissions reduction of at least 80% by 2050. This is based on current recommendations by scientists, although this may be changing to become more aggressive in light of new evidence. The NWF suggests a “2% pathway – steady, verifiable progress in emissions reduction averaging at least 2% per year below a 2005 baseline level across all sectors of society (see graph).” (David J. Eagan, 2008) The NWF pathway results in a 30% reduction in emissions by 2020 and greater than 80% by 2050” (83).
- **“Comparison with other Universities:** UM is not alone in its quest to set GHG emission reduction targets. Some universities have already identified goals and are on their way to lowering emissions, while others just recently completed Climate Action Plans for the ACUPCC. The universities in our region have the same plan deadline as UM so their information is not yet available. The table below outlines the emission targets for a few of the leading universities” (84).
- **“APPENDIX C:** Synopsis of the All-Campus Survey Results written by the ASUM Sustainability Coordinator:” (85)
- “Bibliography and Endnotes from Section 4.5 Carbon Offsetting” (87)

**Summary:** The purpose of the appendices section is to act as a space for information that is too lengthy to include in the body of the CAP. Included in the appendices are survey results, public suggestions, emission reduction goals compared to other universities, a bibliography, and endnotes.

## 8. Interesting notes and observations:

*Does this CAP discuss anything else of interest? What observations did you make that might be of value further exploring? What about this CAP seems particularly unique or noteworthy?*

- “Table 3. Strategy 4.1.1 Data - Energy Efficiency Upgrades” (21).

- A table with GHG reduction strategies is shown and each strategy's annual energy savings and carbon reduction is shown.
- “Mike Crowley of the University of California at San Francisco recently worked on a project where buildings were sub-metered and data collected before and after a social marketing campaign. They observed a 9% reduction in energy use that they believed was associated with their efforts” (23).-example from other University.
- “At least two universities, Utah State and California State Polytechnic University in Pomona, have implemented a 4-day work week and are thus far finding it worthwhile. Cal Poly estimated they have reduced their GHG emissions by 0.4%. The University of New Mexico tried a 4-day work week and found their energy consumption increased due to air conditioning needs so they stopped the program” (24).
- “The concept of carbon offsets may be confusing or little understood by some people and this section is an attempt to demystify the topic. We will briefly consider a working definition, utilization, history, quality issues, quality assurance, and market data” (51).
- “People recommended that more student involvement and awareness about this plan is needed” (85).

**Summary:** Some of the most notable parts of the plan that are not included elsewhere on this Master Worksheet are energy efficiency upgrades, implementing a 4-day work week with reference to other universities, confusion surrounding carbon offsets, and advice to educate and share this plan with more students.