



Improving the Air We Breathe:

EMISSION MITIGATION STRATEGIES FOR THE UNIVERSITY OF UTAH

Prepared by the **University of Utah Air Quality Task Force**
January 2015



Cover photo by Tony Frates/Flickr

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Acronym List

BBC	Better Buildings Challenge
CO2	Carbon dioxide
EPA	Environmental Protection Agency
EUI	Energy use intensity
EV	Electric vehicle
GHG	Greenhouse gas
IGCC	International Green Construction Code
LEED	Leadership in Energy and Environmental Design
NOx	Nitrogen Oxides
PM	Particulate matter
SCIF	Sustainable Campus Initiative Fund
SIP	State Implementation Plan
TZEV	Transitional zero-emissions vehicle
UTA	Utah Transit Authority
UDAQ	Utah Division of Air Quality
UDOT	Utah Department of Transportation
VOC	Volatile Organic Compound
WFRC	Wasatch Front Regional Council
ZEV	Zero-emissions vehicle

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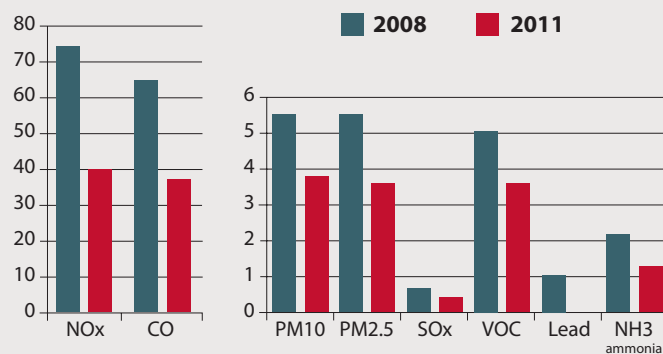
Introduction

The Salt Lake Valley, long recognized for its spectacular mountain views and abundant outdoor activities, has in recent years earned a negative reputation for its air quality problems. During winter months, the valleys of Northern Utah consistently rank among the worst places in the United States for air quality because of inversions that trap pollutants, including ozone and particulate matter (PM), close to the ground.¹

Since the 1990s the University of Utah, spearheaded by Environmental Health and Safety and Facilities Management, has been working to reduce its permitted air emissions. In fact, the University has been a significant leader in air quality emission reduction efforts. Initiatives in transportation, energy and building efficiency, renewable energy, waste reduction, and education have been responsible for major reductions in both regulated and non-regulated emission categories. Large reductions in the emissions of criteria pollutants, or the air pollutants that contribute to locally unhealthy conditions, have been achieved.²

In spite of these on-going emission-reduction efforts, the University of Utah, as one of the state's largest employers, is often perceived as a significant contributor to pollutants through commuting, energy and natural gas use, and other operations. Although many major sources of poor air quality along the Wasatch front are outside the control of the University of Utah, many of the University's activities and operations do contribute to this problem. In response to increasing awareness of the

Emissions in tons per year



The University of Utah has cut air emissions by over 69 tons/year. These reductions were achieved *despite the addition of several hundreds of thousands of square feet of classroom, research and clinical space.*

Salt Lake Valley's air quality problems, Vice President Arnold Combe and Senior Vice Presidents Vivian Lee and Ruth Watkins organized the Air Quality Task Force in 2013. The committee was tasked with recommending strategies that will reduce emissions from the University of Utah and lessen the institution's overall contribution to poor air quality events in the Salt Lake Valley.

This report is a compilation of recommendations from seven months of exploration and deliberation on short- to mid-term strategies that will reduce the University's contribution to poor air quality events. The Task Force tackled topics both large and small that could help the University cut its emissions.

¹The Salt Lake City-Provo-Orem and Logan, UT-ID metropolitan areas rank No. 8 and No. 11 respectively in levels of short-term (24-hour) particle pollution in the American Lung Association's State of the Air 2014 report.

²Unhealthy, or "Red" air quality days occur when pollution levels (specifically PM 2.5 and ozone in Utah) reach levels that are unhealthy for the general population based on Utah Division of Air Quality Salt Lake County Current Conditions (www.airquality.utah.gov/aqp/currentconditions.php?id=slc). Everyone has the potential to experience ill effects from the pollutants, and sensitive groups (including the elderly, children, and inhabitants with heart and/or lung conditions) experience more serious effects.

INTRODUCTION

The report begins with context for the creation of the Task Force and an explanation of its process, and then delves into what the Task Force concluded is a fundamental component of any emissions-reducing strategy—increasing the extent to which decision-making at the University takes into account the impact of those decisions on air quality, along with initiatives for unhealthy air quality days, and best management practices.

The strategies outlined in this report include administrative, planning, financial, and operational mechanisms that will contribute toward the University's leadership on air quality issues and meaningful reductions in University-related emissions. If you could plot these graphically, these strategies would place the University on ***or ahead of*** a curve that represents a current standard of stewardship on air quality. Conversely, inaction could result in tangible risks and costs, including:

- Long-range plans and future growth impacted if the University's emissions are not on target with State and Federal government expectations;
- Fines and penalties if the University fails to meet permit obligations;
- Negative publicity if the general public perceives that the University is not doing its fair share to reduce emissions;
- Potential to impact faculty recruitment and retention if air quality problems continue to worsen;
- Missed opportunities to capture valuable emissions credits, which the University could either transfer for revenue, or use to accommodate its own growth;
- Our reputation as a community leader diminished.

In light of the potential benefits of positive action, and the potential consequences of inaction, we believe the University is in a strong position to demonstrate its talent for developing pragmatic, replicable strategies that are proven to cut emissions without affecting business and/or operations.

Necessary—Not Visionary—Steps

Strategies recommended in this report are current best practices for how a conscientious organization operates. The measures—largely low-hanging fruit—are conservative in nature and represent only solutions that can be readily implemented in the near term. The changes recommended in this document do not represent “visionary” changes, but rather necessary changes to bring the University in line with today's best practices for large institutions of higher education.

As the University makes changes to reduce emissions associated with its practices, it must recognize that it does so in an airshed with increased regulation because of quantifiable air quality problems. At times during the winter, Salt Lake County's PM 2.5 levels exceed the 24-hour standard of 35µg/m³, which is why it is designated as a non-attainment area¹. Elevated levels of PM 2.5 are associated with a myriad of health complications, including asthma, bronchitis, and shortness of breath and painful breathing².

The State of Utah has until 2019 to bring the PM 2.5 levels into compliance. However, standards may tighten in the coming years with policy changes and as research identifies additional health effects from air quality issues. It is also likely the U will need to do more in the future as health science research in this area advances.

¹ www.deq.utah.gov/FactSheets/docs/handouts/pm25sipfs.pdf

² www.epa.gov/region4/sesd/pm25/p2.html

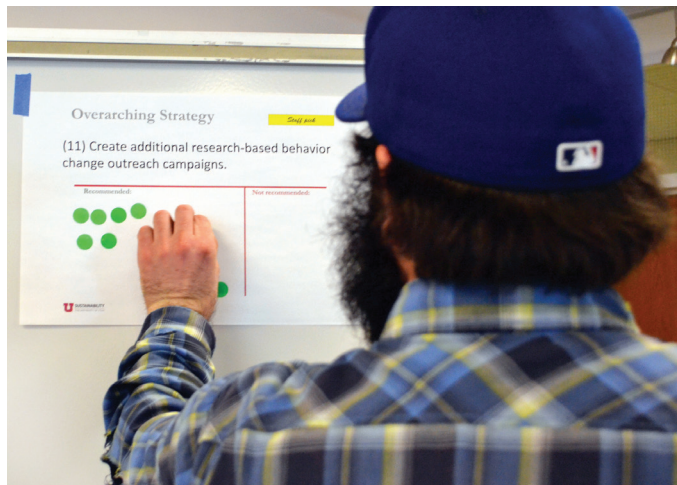


CHANGE
AHEAD

CONTEXT FOR ACTION

The opportunity for the University of Utah to identify proactive, tangible actions it can execute to improve local air quality has accelerated in recent years. Public awareness of air quality problems seems to increase with every winter inversion, every national ranking of “worst cities for air quality,” and each protest rally or press event. The peak moments of awareness for the public and University administrators arguably arrived during the past two winter-inversion seasons when:

- Evidence of the health impacts stemming from poor air quality has become more numerous and available to the public³;
- The number of “Voluntary” and “Mandatory” Action days issued by the Utah Department of Environmental Quality increased dramatically;
- The U.S. Environmental Protection Agency demanded and received an updated State Implementation Plan (SIP) from the Utah Division of Air Quality (UDAQ), which included specific targets and dates for attainment;
- The Utah State Legislature required and received from its agencies, institutions, and school districts plans for air quality mitigation, and several air quality bills were introduced for consideration (read the U of U mitigation plan online at sustainability.utah.edu/airquality/UniversityofUtah-HB168plan.pdf);
- The mayor of Salt Lake City devoted his entire 2014 State of the City address to the issue of air quality improvement;
- Business and University leaders, community activists, representatives of both political parties, parents, the media, health professionals, faculty, air quality professionals, and lay persons formed a critical mass of attention the likes of which even long-term residents had never seen previously.



There are many contributors to air quality degradation on the Wasatch Front, including commuters who are not members of the University community, the various point sources, and the use of wood-burning stoves by residents to heat their homes. For better or worse, the University is also perceived as a major contributor to the Salt Lake Valley's air quality issues due to its position as one of the largest employers in the region.

Public perception aside, the University's activities do contribute to the air quality issues along the Wasatch Front. The following University activities represent areas where changes in University operations could help reduce the amount of pollutants attributable to the University:

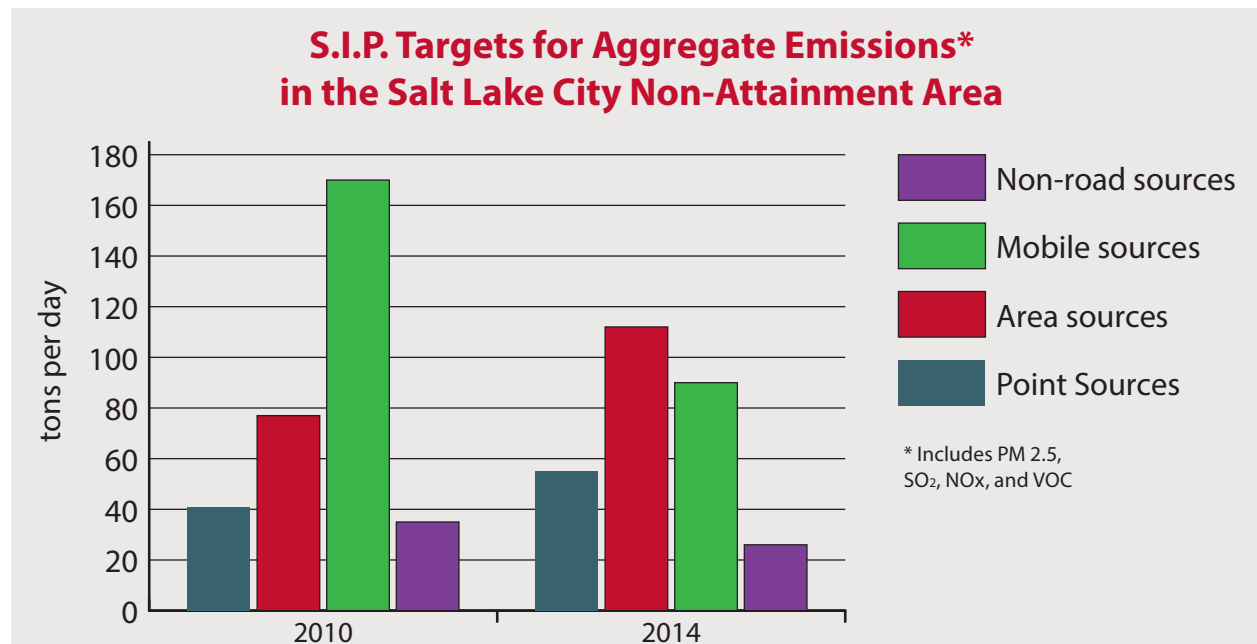
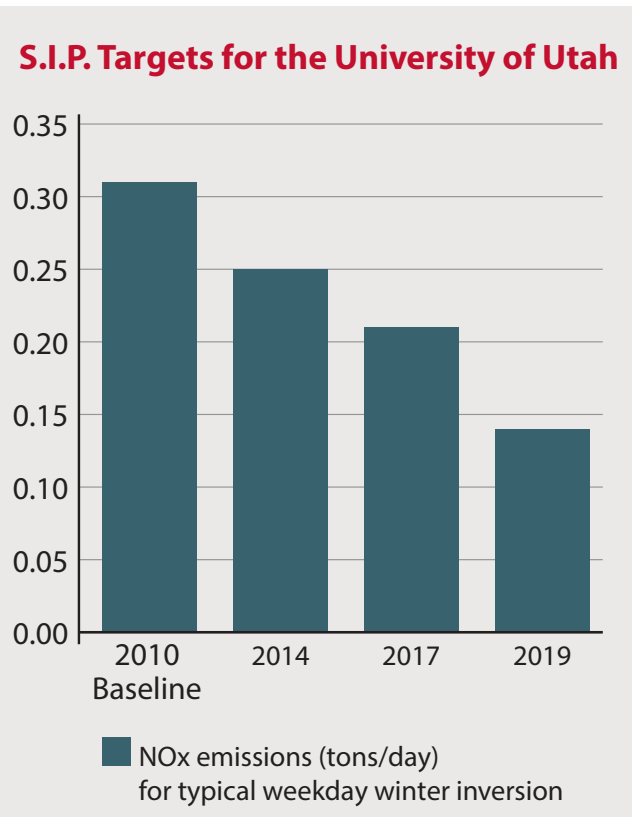
- The U is one of 28 “major” point sources⁴ of air quality emissions in the Salt Lake Non-Attainment Area, primarily due to combustion of natural gas for building heating, which produces nitrogen oxides (NOx), precursors to the small particulates that degrade air quality and help form inversions in the winter. Although the University accounts for less than 2 percent of the NOx generated by these 28 major sources, its annual pollutant load falls somewhere between a small commercial operation and a typical refinery;

³US Environmental Protection Agency: www.airnow.gov/index.cfm?action=topics.health, and World Health Organization: <http://www.who.int/mediacentre/factsheets/fs313/en/>

CONTEXT FOR ACTION

- In addition to its natural gas use, a wide variety of other pollutants and greenhouse gases are generated from activities that the University undertakes on a daily basis, including general operations and maintenance, research and academics, commuting, and campus living. Although these sources of pollutants and greenhouse gases are incrementally minor, the sheer scale of the University's operations represents a significant opportunity to reduce emissions from these mobile and area sources. Recognizing this, State and Federal air quality rules are being implemented to effect reductions in emissions from these sources⁵.
- Both scientific and regulatory professionals are gaining increased understanding of the relationship between the aggregate of emission sources, and how SIP policies can improve air quality.

Air quality issues have captured the attention, passion, and conversation of the Salt Lake and University communities. Communities rely on universities for many contributions, and leadership is a significant part of that responsibility.



⁴A source with the potential to emit at least 100 tons per year of any pollutant (Utah R307-101-2).
⁵R307-300

TASK FORCE PROCESS



Vice President for Administrative Services Arnold Combe selected the core members of the Task Force, with assistance from Senior Vice Presidents Ruth Watkins and Vivian Lee. Task Force Co-Chairs Marty Shaub and Myron Willson included several faculty experts and staff professionals responsible for operations with air quality impacts, e.g., Facility Operations, Environmental Health and Safety, and Commuter Services. Michele Straube, director of the Wallace Stegner Center Environmental Dispute Resolution Program, facilitated Task Force meetings.

A working committee of Task Force members and staff helped organize agendas, gather relevant information, and coordinate with University departments. These individuals also wrote drafts of initiatives for the Task Force report. Working Committee members included:

Marty Shaub, co-chair and managing director for Environmental Health and Safety

Myron Willson, co-chair and director of the Sustainability Resource Center

Michael Brehm, environmental protection section leader for Environmental Health and Safety

Stephanie Dolmat-Connell, Facilities Management sustainability manager

Jen Colby, sustainability coordinator for the Sustainability Resource Center

Michele Straube, director of the Environmental Dispute Resolution Program

Ayrel Clark-Proffitt, outreach coordinator for the Sustainability Resource Center

Content experts from the community were consulted and provided presentations or background material for the Task Force to review and were present to answer questions and assist in discussions. These experts included staff members from UDAQ, Wasatch Front Regional Council (WFRC), and the Utah Department of Transportation (UDOT).

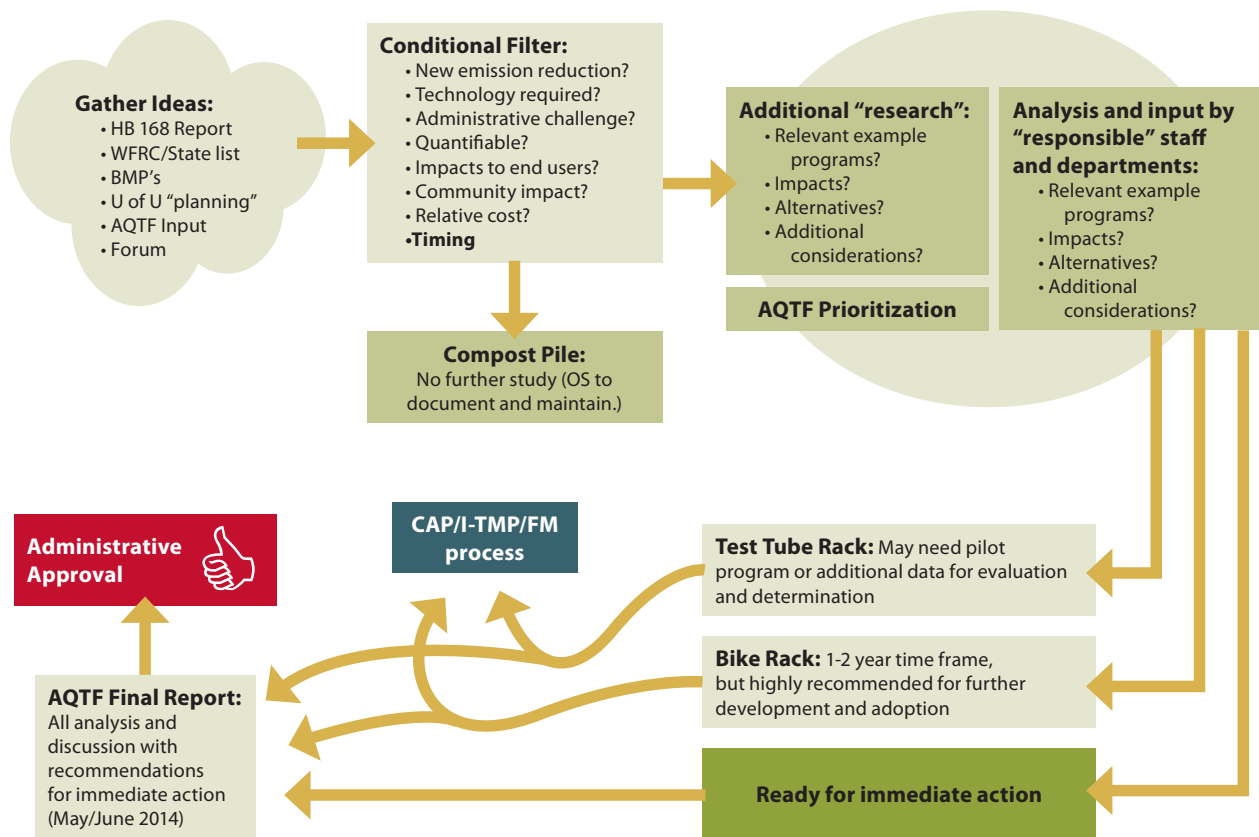
Discussions were organized into topic areas to aid information gathering and analysis. Topic areas included:

- Transportation emissions resulting from University-related commuting;
- Point source emissions from central heating plants and other campus natural gas consumption;
- Area sources occurring within building interiors: paints, adhesives, solvents, cleaners, printing, etc.;
- Area sources occurring in exterior spaces: grounds equipment, emergency generators, construction-site and road dust, etc.

TASK FORCE PROCESS

In order to provide effective recommendations and feedback, the Task Force focused on potential strategies with the following characteristics:

- Initiative likely to positively impact air quality through reduced emissions⁶;
- Initiative can be implemented within two years (See Appendix for longer-term strategies discussed by Task Force);
- Outcomes of initiative are controlled by University;
- Initiative is not already part of an ongoing process expected to resolve and improve emissions (i.e., Transportation Master Plan);
- Impacts can be measured (either through direct emission reduction or public exposure);
- Impacts balanced with potential costs (e.g., strategies with very high cost but low impact were tabled).



⁶For example, cancellation of the University on red alert days not recommended because evidence suggests students and employees will use vehicle for other travel.



USE OF THIS REPORT

This report serves to document the range and depth of initiatives that were conceived and considered by the Task Force through the completion of its service in October 2014. It is intended to provide specific actionable recommendations for use by administration. It may also serve as a foundation for additional work by a designated point person, if one were named.

This report should be considered dynamic, for several important reasons. Many of the initiatives and strategies described are subject to developing University plans and priorities, regulatory changes, the will of the University and surrounding communities, market forces, and even advancing benchmarks. Periodic updates are strongly recommended.

Strategies that did not meet the criteria established by the Task Force are not included in this report. However, these ideas have been recorded for future consideration as an Appendix, which is available in the online version (visit sustainability.utah.edu).

SUMMARY OF AIR QUALITY TASK FORCE RESULTS

BASED ON CATEGORIES ESTABLISHED BY ARNIE COMBE, VICE PRESIDENT FOR ADMINISTRATIVE SERVICES

Communication strategies and policies

Communication strategies are included throughout the recommended strategies, especially ones that rely on behavior change by faculty, students, staff, and departments responsible for altering existing actions that produce harmful emissions. Whether the additional communication comes from responsible departments, University Marketing & Communications, the Sustainability Office, Environmental Health and Safety, or a newly created position, additional resources will need to be available.

Education strategies

Similar to communication strategies listed above, education strategies will need to be developed to help put new policies and requirements into the context of reducing the University's impact on air quality so that faculty, staff, and students understand why they may be asked to deviate from past behaviors.

Desirable and acceptable strategies for telecommuting or other alternatives

Several strategies suggest reinforcement and expansion of the University's telecommuting policy but stress the need to ensure that service to students, research, and the community is not negatively impacted.

Process to determine if/when classes or events are or can be canceled

There was not enough evidence to suggest to the Air Quality Task Force that cancelling classes or events would lead to substantial reductions in emissions. In fact, some studies suggest that increased driving due to having a "free day" might lead to more emissions than a typical commute, especially when more than one-third of faculty, students, and staff currently take public transit. No recommendations were made for this topic.

Strategies for adjusting class schedules or incorporating online course availability

The Task Force felt that it was premature to weigh in on this issue based on the lack of information about what the University might adopt as a result of the ongoing study initiated by Senior Vice President Ruth Watkins. The Strategic Scheduling Team is working actively to distribute courses more evenly across the day and evening in order to efficiently utilize classroom space on campus.

This issue should be revisited in the future based on the findings and recommendations of that effort.

Expectations of core services and functions

No recommendations were made that impact core functions or potential levels of service. The bulk of the Task Force recommendations are related to increasing efficiency of systems, looking for alternative equipment and processes with reduced air-quality impacts, and communicating these strategies to the campus and regional community. While a small portion of the strategies may have financial implications, the potential for ongoing energy savings will help overcome potential barriers. In addition, the likelihood of existing and future regulatory requirements should drive administration to be proactive in finding less-polluting alternatives.

The degree to which any actionable item is implemented based on the severity of air pollution

The Task Force has bundled several strategies to be considered for non-attainment days that put the health of at-risk populations in jeopardy. See section 3.

2

Principal Strategies

The strategies outlined in this section are crucial to all recommendations contained in this report and the overall efficacy of the University's actions on emissions reductions. These strategies set the stage for success by improving leadership on air quality issues, collecting data to better understand the University's baseline and opportunities for improvement, and instituting a policy that will help reduce emissions from the start of a purchase and/or project. Making these changes will allow administrators to make informed decisions that cross department boundaries and reduce the University's air quality impacts.

These recommendations include:

- A** Designate a Point Person (s) to Provide Campus-Wide Coordination and Strategic Leadership
- B** Collect and Analyze Data for Effective Planning
- C** Include Air Quality as a Decision-Making Factor

A / Designate a Point Person(s) to Provide Campus-Wide Coordination and Strategic Leadership

The Task Force believes that a fundamental step toward implementing the changes identified in this report is to enhance the consideration of air quality in all levels of University decision-making. This can most effectively be accomplished by designating one campus leader as the point person for working with different University units to implement the recommendations proposed here. Until now, University units have each considered air quality issues in relation to that unit's operational needs. The Task Force believes that providing greater direction on air quality from the perspective of the institution as a whole can significantly bolster the effectiveness of efforts to reduce air quality emissions.

Many changes explored by the Task Force will require a concerted campus-wide effort to be effective. Because of the breadth of operations on campus, the number of systems involved and, the potentially broad impact on members of the University community, coordinating and managing campus-wide efforts will take time, persistence, and devoted effort. The Task Force believes that identifying a designated air-quality point person to work closely with University units in their decision-making processes will help ensure that air-quality priorities are integrated into those processes and will demonstrate the value the University places on air quality improvements.

Responsibilities for the Designated Point Person(s) include:

- Direct staff to provide appropriate inventories of activities and materials responsible for regulated emissions;
- Set emission-reduction goals;
- Direct further analysis where needed;
- Monitor progress towards fulfilling commitments;
- Prioritize initiatives as needed; and
- Provide top administrative guidance to help individual units weigh potential (conflicts) between emission-reduction and program expectations/goals.

The Task Force members believe that having the right person or team, placed at the appropriate level

within the University to direct implementation of the strategies within this report, would be critical for success. Dramatic changes require leaders with creativity, vision, and openness to innovation and the appropriate authority to make a real difference. The right leader can direct implementation of strategies more expeditiously than a mid-level individual or multi-departmental committee.

How to implement this initiative

Establish a responsible party to pursue this initiative. The designated point person will need to: a) Develop relationships with involved departments for planning and implementation; b) Understand the work of operating units to accurately identify what will impact air quality; and c) Establish evaluation criteria and metrics to track progress.

In addition, the designated point person(s) will:

- Establish "teams" to implement the recommended strategies (See Strategic Leadership Team Organizational Chart). As needed, teams may include:
 - o Leadership council: Communicate strategy with team members;
 - o Strategy Working Group: Define what needs to happen, not how;
 - o Operating units: Determine implementation process and work with leadership council to establish reasonable evaluation criteria.

(Note: The direction can change if there is a need for a mid-course correction.)
- Review strategies on an annual basis using established performance measures and evaluation criteria;
- Periodically report results of air quality improvement strategies at Cabinet-level meetings and effect of strategies on the Climate Action Plan;
- Include air quality impact statements at construction project planning meetings;
- Communicate results to campus and broader communities.

Proposed Strategic Leadership Team Organizational Chart

VISION

Executive Leadership

Senior VP Health Sciences	Chief Budget Officer	Senior VP Academic Affairs	VP Administrative Services
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STRATEGY

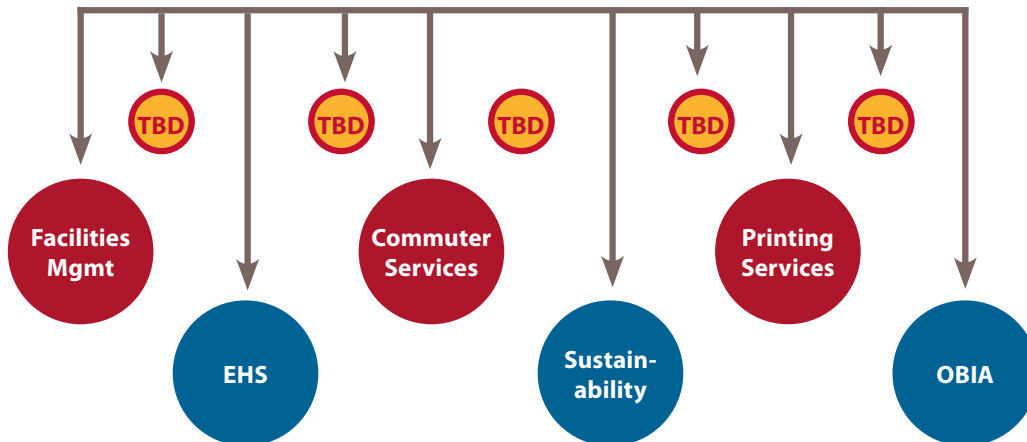
Strategy Working Group

Chief Sustainability Officer	Associate Vice President Facilities	Associate Vice President Auxiliaries	Associate Vice President Student Affairs
TBD	TBD	TBD	Chief HR Office



OPERATIONAL SUPPORT

Operating Units + Supporting Departments



B / Collect and Analyze Data for Effective Planning

Another fundamental issue that impacts the viability of every strategy considered by the Task Force is the issue of determining what University changes will yield the most substantial results. To that end, the Task Force believes another priority is establishing mechanisms for gathering data regarding each pollution source. The data and accompanying analysis will allow prioritization of strategies and save time and resources by concentrating on those with the largest impacts. Once the University designates a responsible party(s) for air quality leadership, that person(s) will need current and accurate information to aid decision-making.

We recommend efforts to implement this strategy begin immediately, with benefits accruing during implementation and beyond. Planning for energy-use reductions, transportation and commuting, and many operational processes can have major implications for air quality emissions and greenhouse gas (GHG) production.

The Air Quality Task Force recommends that the U complete utility metering for all campus buildings in order to better collect and analyze building information and conduct annual surveys—specifically the commuter survey—to better understand trends.

How to implement this initiative

Pursue data collection through both the installation of technology and with campus-wide surveys. First and foremost, fully fund the installation of metering in all campus buildings. Approximately three-quarters of the University's GHG production comes from building energy use, making building-level data key to reducing the institution's overall contribution to air quality issues. It will cost approximately \$800,000 to complete building metering and will require one full-time employee to maintain current and future meters.

In addition to building-level data, campus-wide surveys, such as the commuter survey, will help the University determine trends to better understand and target specific behaviors.

Implementing departments

Data collection will include many parts of campus, though Facilities Management will be at the forefront of the effort. Other partners include Commuter Services, Administrative Services, Health Sciences, Hospitals and Clinics, Housing & Residential Education, Stadium and Events, and other similar organizations.

C / Include Air Quality as a Decision-Making Factor

The Task Force recommends that the University's air quality designated point person(s) be empowered to work with all campus units to ensure that air quality implications and potential emissions reductions are considered as factors in campus planning and operational decisions. While this may frequently be done by individual campus units, guarantee that it is considered in light of State and Federal regulations and campus-wide initiatives and priorities will help ensure it is given appropriate weight in relevant deliberations. Further, by integrating real-time data into the process, the University will be able to prioritize emissions reduction strategies that will have the greatest impact on air quality and make smarter choices for equipment replacement, growth, and other outcomes.

Including air quality impacts as an explicit factor in decision-making for operations and maintenance issues will increase the likelihood of actual emissions reductions over time. We recommend efforts to implement this strategy begin immediately. In addition, this strategy will demonstrate a potential best practice for other institutions in Utah to follow as the state copes with air quality concerns.

How to implement this strategy

Immediately initiate a policy-making effort to add air quality impacts as a factor for equipment purchase, building leasing, maintenance schedules, and other activities that affect air quality. The air quality responsible party will need to work with stakeholder departments to determine the areas and project scopes in which air quality should be included in decision-making.

Some staff time will be required; no direct costs are associated with this strategy.

Implementing departments

Facilities Management will be the main contact to determine how air quality impacts can be included in operational decisions. Other stakeholder departments include: Auxiliary Services (Commuter Services, Stadium and Events, University Student Apartments), Administrative Services, Health Sciences, Hospitals and Clinics, and Housing & Residential Education.

3

Air Quality Day Initiatives

The UDAQ has developed a new air quality alert system to better communicate the complex health implications and activity restrictions based on real-time pollution monitoring data. The new alert system consists of a symbol code for action alerts and a color code for health guidance. (See www.deq.utah.gov/FactSheets/docs/handouts/aqalert.pdf)

The new alert system uses three basic symbols to indicate unrestricted, voluntary, and mandatory actions. Changing levels of pollution trigger restrictions on various types of activities and opportunities to voluntarily adjust other types of activities.

Using the UDAQ's Salt Lake County Forecast (air.utah.gov/forecast.php?id=slc), we recommend the University modify operations as recommended in the following strategies when conditions reach "Voluntary" and "Mandatory" status.

1. When the "Voluntary" action level is proposed, the University should

New Air Quality Alert System

Box Elder Cache Duchesne SLC / Davis Tooele Uintah Utah Washington Weber

Tuesday	Wednesday	Thursday
Health	Health	Health
Good	Moderate	Unhealthy for Sensitive Groups
Unrestricted Action	Voluntary Action	Mandatory Action

deploy communication measures (Strategy 3A) such as text messages and email alerts to get the word out to the campus community that conditions are serious and request campus community members take specific actions to mitigate personal contributions. Messages should be sent at the beginning of each event—not every day—to avoid becoming commonplace and ignored.

2. When "Mandatory" action level is advised, the University should enact strategies 3B, 3C, and 3D.

3A / Communicate Request for Emission-Reduction Actions

Proposed Initiative

Deploy communication measures to get the word out to the campus community when conditions are serious and significant behavior modifications should be taken.

This strategy includes sending text messages and/or emails to request actions to reduce single-occupant driving to campus. The Designated Point Person(s) would also evaluate the potential to use the University website, internal TV screens, and other forms of communication.

There would be two stages of messages. Stage 1 would be tied to voluntary action and sent to those who have opted into the alerts. Stage 2 would be sent to the entire campus community at the onset of mandatory action alerts. The duration and frequency of follow up alerts is to be determined.

Impacts

Implementing department(s): Campus Alert office.

Impacted populations: This strategy has the potential to affect members of the community signed up to receive campus alerts.

Timeframe

As soon as possible; ideally before the next inversion season. Senior-level administration should work with Campus Alert to determine any barriers to implementation.

Community Engagement

This strategy directly engages the community and asks it to take action to reduce pollutants emitted during poor air quality events.

Air Quality Benefits

Direct benefits during poor air quality events, but total emissions reduction depends on how many members of the community take action.

Cost

Need to work with Campus Alert office to determine additional costs. There may be additional marketing costs to promote Campus Alert system to the community.

3B / Adjust Temperature Setpoints

Proposed Initiative

Reduce winter temperature setpoints in campus buildings to 65 degrees during inversions.

The University of Utah's central heating plants are responsible for more than one-half of the campus emissions during winter conditions. A slight adjustment to temperature settings inside campus buildings could reduce nitrogen oxides (NOx) emissions by 8-10 percent per day and provide direct monetary savings. This policy would be implemented in all campus buildings except for health care facilities and where the specific temperatures are required for ongoing research.

A marketing and communication plan should accompany this strategy to help educate students, faculty, and staff and persuade them that by dressing warmly they can help reduce the U's impacts on air quality in significant and measurable ways.

Impacted populations: All students, faculty, and staff would need to remember to dress accordingly.

Timeframe

Immediate. Administration could implement a temperature reduction to 65 degrees next winter during inversion events to track campus response and to pilot implementation.

Community Engagement

This strategy has direct applicability to other businesses, institutions, residences, etc.

Air Quality Benefits

Based on calculations from Facilities Management, reducing NOx by 10 percent in central plants would be the equivalent of taking approximately 2,750 commuting cars off the road in the Salt Lake Valley.⁴

Impacts

Implementing department(s): Facilities Operations in Facilities Management would be responsible for adjusting building temperature settings for each building it manages based on pollution levels and proposed responses. Leadership will also need to work with facility managers for buildings that are not operated by Facilities Management.

The Sustainability Office and senior administration would work directly with University Marketing & Communications to share the importance of this initiative and how a minor adjustment in attire can make a difference.

Cost

Administrative time required to change building temperature setpoints will be offset by reduced natural gas usage. Depending on frequency and duration of air quality events, additional University utility savings will accrue.

There will be some cost for marketing collateral, such as posters and advertisements. Additional ideas, such as giving away free items like fleece lap-blankets, could be purchased with savings from decreased energy use.

⁴The commuting vehicle miles traveled are based on the Fall 2013 U of U Commuter Survey. The NOx emissions from the vehicle miles traveled were calculated using the U.S. EPA's Motor Vehicle Emission Simulator model for Salt Lake County winter conditions, which includes 2013 average passenger car emissions for vehicle miles traveled and cold starts.

3C / Generator Maintenance Scheduling

Proposed Initiative

Adjust the emergency generator test schedule to avoid examining equipment during impaired air quality episodes.

The University's fleet of diesel-powered emergency generators, which must be regularly operated to maintain their integrity, represent an important element of the University's permitted emissions portfolio. In this strategy, crews will adjust the extensive maintenance schedule to avoid testing them during air quality episodes, to the maximum extent possible. Care must be taken to insure generators that back up life-safety systems are tested on schedule as required by code regardless of air quality conditions.

Impacts

Implementing department(s): Facility Operations in Facilities Maintenance. This will disrupt the current program by requiring periodic adjustments to the maintenance schedule. This schedule of maintenance is currently delivered by one full-time employee. Periodically avoiding planned maintenance would require additional staff (and cost) to accelerate and recover the schedule during other periods because of the need for additional staff to allow simultaneous testing.

Impacted populations: No negative impacts on specific populations predicted.

Timeframe

Immediate. This opportunity would be ongoing and irregular, but would typically present itself one to three times per winter, for periods averaging two weeks in duration.

Community Engagement

Implementation of this strategy would send the clear message of the importance of minimizing generator emissions during impaired air quality episodes.

Air Quality Benefits

If this point source strategy is deployed at above-average frequencies, the benefits would be direct and immediate.

In addition, an unintended negative message is sent to the campus community when generators emit a visible black cloud of soot when turned back on after being idle for several weeks, particularly during a poor air quality event.

Financial Impact

An additional estimated 0.25 FTE would be required in order to avoid delaying maintenance. Delaying or avoiding maintenance testing of these generators would risk violating the warranties and/or damaging the units beyond repair.

3D / Ban on Two-Stroke Engines on Poor Air Quality Days

Proposed Initiative

Curtail use of all two-stroke engine equipment during Air Alert days until such time as they are removed from University inventory.

The Landscape Maintenance department implemented a pilot ban on leaf blowers on red air quality alert days in February 2014. The Task Force proposes that this policy be mandatory for all units with two-stroke engine equipment on mandatory alert days and highly restricted on voluntary action days, until all such equipment is replaced by cleaner four-stroke or electric equipment. Facilities Management will continue to conduct research into four-stroke and electric options to replace two-stroke engine equipment; other departments that own two-stroke equipment will be encouraged to do the same.



funding and feasibility to upgrade two-stroke engines to four-stroke or electric engine equipment.

Impacts

Implementing Departments: Facility Operations and other departments that use two-stroke engine equipment. Departments that own two-stroke equipment not listed on the current inventories will need to be identified and may be responsible for implementing and enforcing the proposed equipment ban.

Impacted populations: The University community would see some effects of the policy during Air Alert events, including unblown leaves and walkways and lawns left untrimmed.

Timeframe

The ban on two-stroke engine equipment could be drafted and put into place relatively quickly; the policy would need to be communicated to all relevant departments and enforcement mechanisms would need to be explored. Departments may also need additional time and assistance in order to explore and determine

Community Engagement

A University-wide ban on two-stroke engines could be used to prompt other institutions and large-scale organizations in the Salt Lake Valley to adopt similar policies. Salt Lake City has already voted to eliminate two-stroke equipment by 2017.

Air Quality Benefits

Two-stroke engines contribute disproportionately to NO_x, VOC, and particulate matter emissions, so curbing use during air quality events will reduce emissions considerably. In addition, curtailing the use of this equipment would provide a visible reminder of the University's commitment to emission reduction.

Cost

To implement the ban, the only monetary cost is staff time.

4

Best Management Practices

Emissions harmful to air quality come from many sources and operations around campus. The Task Force evaluated more than 150 potential initiatives that could help reduce emissions from University operations. After filtering these ideas for effectiveness and timing, there are still too many to list as separate recommendations for adoption. Consequently, we have bundled the strategies together into “best management practices” and organized them according to the following categories:

- 4A** Behavior change and communication (applies to all categories)
- 4B** Mobile sources
 - Student, faculty, and staff commuting
 - University Fleet & operations
- 4C** Point sources (natural gas combustion on campus)
- 4D** Area sources (grounds equipment, solvents, cleaning supplies paints, etc.)

The above categories are filtered by additional groupings that include:



BEHAVIOR CHANGE



INFRASTRUCTURE IMPROVEMENTS



POLICIES, RULES, & PROGRAMS



FINANCIAL MECHANISMS & INCENTIVES



PLANNING & COORDINATION



OPERATIONAL ADJUSTMENTS

4A

Behavior Change & Communication

Initiatives to change behavior and actions on campus will be much more effective when they are designed using *s* from social psychology. Successful campaigns require significant expertise to design, pilot, assess, and implement.

A University community features an ever-changing population of students, as well as employee turnover. Therefore, both behavior-change and information-based awareness campaigns need to be deployed and updated on a regular basis to assure that employees and students know about existing programs.

Community-based social marketing is more effective than simple informational campaigns because it uses a set of tools that have been identified as being particularly effective in fostering behavior change. Tools include:

- Identifying the barriers to a behavior;
- Developing and piloting a program to overcome these barriers;
- Implementing the program across a community;
- Evaluating the effectiveness of the program.⁵

⁵Adapted from "Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing" by Doug McKenzie-Mohr, St. Thomas University (<http://www.toolsofchange.com/en/programs/community-based-social-marketing/>).



4A-1 / Research-Based Behavior Change Campaigns

Proposed Initiative

Create and/or expand targeted behavior change and awareness campaigns; develop campaigns by topic.

University departments currently involved in air quality issues (Commuter Services, Energy Management, Purchasing, Sustainability) do not currently have sufficient expertise and capacity to conduct effective behavior-change campaigns. This strategy proposes to add needed capacity through staff hires and consulting contracts, as appropriate. In particular, the University should hire a full-time behavior change specialist to develop campaigns and encourage departments and the campus community to take action. This person should work closely with the outreach and education coordinator in the Sustainability Resource Center.

Impacts

Implementing department(s): Commuter Services, Sustainability Resource Center, Facilities Management, and academic departments including Psychology and Public Administration.

Impacted populations: No direct impacts are anticipated.

Timeframe

Within 1-2 years.

Community Engagement

Well-designed, targeted behavior change and information campaigns that result in modified actions that improve air quality may provide good engagement opportunities and enhanced institutional reputation.

Air Quality Benefits

Proven and effective campaigns can impact energy use by 5-20 percent and have been shown to reduce commuting by 5-10 percent.

Cost

A full-time, benefitted staff hire with requisite skills may require \$60,000-\$80,000 in total funding (including benefit costs). Cost for the position should be shared by Commuter Services, Facilities Management, Sustainability Office, Environmental Health and Safety, Marketing and Communications, Health Sciences, and other departments which benefit from these campaigns.



4A-2 / Add Alternative Transportation to Orientations

Proposed Initiative

Add information about alternative transportation options to student and employee orientations.

Life transitions such as starting a new job or beginning college are time periods when individuals are likely to make corresponding behavior changes, including changing their regular travel modes. It will likely be the first time new employees and students have access to a monthly transit pass, which significantly reduces a barrier to transit ridership. The Task Force proposes the University distribute educational materials and develop online training modules for new employee and student orientations to promote alternatives to single-occupant vehicle travel.

Impacts

Implementing department(s): Human Resources, Student Affairs (Orientation & Leadership Development), Commuter Services, and Sustainability.

Impacted populations: New employees and students will benefit from earlier and more-timely commute information and be more likely to try alternatives. Human Resources and Orientation & Leadership staff already need to cover a lot of information and may find it challenging to expand information on commuting alternatives into existing training periods.

Timeframe

With adequate staff time allocated to this initiative, it could be designed and implemented within a year. Additionally, the Office of Orientation & Leadership Office already offers tabling opportunities at orientation sessions to Commuter Services, so preliminary efforts could begin immediately.

Community Engagement

The initiative will be focused on new employees and students. To the extent that it reduces single-occupant vehicle trips to and from University facilities, it will have a positive community impact through traffic reduction and by emphasizing the University's commitment to sustainable transportation.

Air Quality Benefits

Direct air quality benefits depend on new employee and student decisions. An assessment component to track program effectiveness and impact on commute choice should be developed.

Cost

The program development planning could be accomplished with internal staff resources but will take a commitment of time and expertise, especially if staff must create a statistically valid assessment program. The Smart CommUte internship, funded by SCIF, could undertake some efforts in FY15. Printed education materials, including posters and A-Frame signs, may cost several hundred dollars for student orientation. New employee orientation is web-based. The costs to create a transportation module that matches the current format of employee orientation would be minimal, and could be incorporated into ongoing Sustainability and Commuter Services efforts.

4B

Mobile Sources – Commuting

Mobile sources contribute disproportionately to air quality problems in the Salt Lake Valley. The University of Utah, as one of the state’s largest employers, contributes to mobile-source pollution largely through commutes to and from the campus. At present, approximately one-third of all campus commuters travel by means other than single-occupant vehicles—a high percentage for a “commuter campus”—and the University is committed to identifying non-motorized transportation opportunities in its forthcoming Transportation Master Plan. The Task Force focused on strategies to reduce single-occupant vehicle trips, as well as promote active and public transportation, reduce the number of high polluting cars on campus, and strengthen the institution’s anti-idling policies.

According to local transportation planners and expert faculty from the University, two major factors impact commuting behavior more than any others: cost and convenience. The recommendations in this section focus on one or both of these factors.



4B-1 / Guaranteed Ride Home with UTA

Proposed Initiative

Provide Guaranteed Ride Home program with the EdPass program.

One barrier to transit use that is commonly cited by commuters is the fear of missing the last transit ride home and becoming stranded, or needing to leave work or school abruptly due to a family emergency or other situation. UTA currently provides a Guaranteed Ride Home service to Eco-passholders, but not EdPass users. We recommend the administration work with UTA to provide this benefit to the University community or that the University create a similar program for the campus community. Guaranteed Ride Home provides an alternative ride—nearby transit, a ride from a UTA supervisor, or a taxi—only in the case of illness, family emergency, or unexpected and involuntary work schedule change.

Impacts

Implementing department(s): Commuter Services, Sustainability, Marketing & Communications.

Impacted populations: The primary group of commuters who would benefit from this strategy are those who are potential transit riders for whom fear of being stranded is a significant barrier. Current riders would also benefit if they take advantage of the program when needed.

Timeframe

The initial marketing campaign can be developed within 3-6 months. Once the program has been established, it should be reassessed and updated as needed.

Community Engagement

The Guaranteed Ride Home program provides some opportunity for community engagement, primarily as a benefit to employees and their families.

Air Quality Benefits

This strategy is likely to have fairly minimal but positive air quality impacts to the extent that awareness of the Guaranteed Ride Home program encourages some commuters to switch from driving alone to riding transit.

Cost

The Guaranteed Ride Home program already exists and operational costs are the responsibility of UTA. If UTA is willing to add this benefit to the existing contract, there would likely be an additional cost. With likely low utilization, this should be minimal, however. If the U were to create its own program, staff time and program operational costs would likely be greater.



4B-2 / Develop Clear the Air Winter Challenge

Proposed Initiative

Create an annual winter-season Clear the Air Challenge for the U.

The Clear the Air Challenge is a month-long, statewide behavior change campaign to reduce single-occupant vehicle trips and associated air emissions. The competition was started by Salt Lake City Solutions and funded by an EPA grant. Since the end of the grant, the Salt Lake Chamber has hosted the challenge. More than 1,000 University of Utah employees, faculty, and students participate annually despite the challenge occurring in the summer when the student population is low.

In addition, the campaign misses the winter inversion and PM 2.5 peak season, so we recommend the University develop a U-specific wintertime challenge using the existing Clear the Air Challenge platform during the peak season for air quality issues.



winter challenge in January or February of 2016. If the program is popular and has measurable results, it would become an annual competition.

Community Engagement

The winter U Clear the Air Challenge provides positive news and public relations stories and regional benefits, and it may lead to other organizations developing winter air quality competitions.

Impacts

Implementing department(s): Commuter Services, Sustainability, University Marketing & Communications.

Impacted populations: The winter challenge will be open to all current University employees, faculty, and students. The challenge will affect commuters by providing positive motivation and support to find new transportation strategies to reduce emissions and save money.

Timeframe

The new Utah Department of Transportation Travelwise Tracker system, the basis for the challenge, will allow ready customization for a winter, U-only challenge. Planning for the first winter challenge should begin during FY15, with six weeks of heavy promotion leading to the first

Air Quality Benefits

Each avoided trip in an internal combustion engine eliminates a cold start as well as trip-long emissions, so benefits of this strategy would be direct. In addition, some community members may choose to continue the new behavior.

Cost

The new Travelwise Tracker will require minimal programming support for a custom challenge. Associated costs will be: website development by challenge contractor PPBH (estimated \$1,000); marketing and design costs (estimated \$1,000); prizes for participants (\$1,000, plus donations and sponsorships); and staff time for coordination and event management.



4B-3 / Update University Anti-Idling Policy

Proposed Initiative

Update and expand University Rule 3-215.A.III.E.10, University Motor Vehicle Idling, to be consistent with the 2012 Salt Lake City ordinance and expand to include non-University vehicles.

In 2012, the Salt Lake City Council adopted an ordinance that amended city code to prohibit idling of vehicles within city limits. However, the policy does not currently apply to University property because of jurisdictional issues. The University of Utah does have an anti-idling policy, Rule 3-215, which applies to University fleet motor vehicles. The policy states: "University vehicles and equipment are prohibited from idling except under certain pre-determined conditions." See regulations.utah.edu/administration/3-215.php.

This initiative would amend the current policy and rule to extend the anti-idling requirement to private motor vehicles on University property.

Impacts

Implementing department(s): Institutional Policy Committee, Office of General Counsel, Academic Senate, President and Cabinet, Board of Trustees, Commuter Services, Sustainability.

Impacted populations: Drivers who idle vehicles at campus facilities will potentially face education and enforcement actions; positive benefits to them may be fuel and money savings from reduced idling if they change behavior. Possible negative impacts to affected populations and enforcement staff include some level of resentment of and opposition to the policy. Conversely, Commuter Services and Sustainability regularly receive complaints from the public about idling vehicles. The public will benefit from reduced idling.

Timeframe

A policy update can be accomplished within a year and integrated into existing staff work schedules. Once the policy is in force, an ongoing education and enforcement effort will be needed. The implementation plans for this program should be developed simultaneously with the policy and include outreach to departments with fleet vehicles to strengthen anti-idling behaviors by University vehicle drivers.

Community Engagement

Establishment of a policy consistent with Salt Lake City's ordinance will enhance the existing working relationship with the local municipal government. An education-focused enforcement campaign can generate positive community support.

Air Quality Benefits

An assessment component to track idling frequency should be developed to measure program results.

Cost

Printed education materials similar to the Salt Lake City Solutions program may cost \$1,000-2,000 annually. To the extent that enforcement can be integrated into existing parking enforcement, the cost may be minimal.



4B-4 / Include Anti-Idling Policy in Vendor Contracts

Proposed Initiative

Include an anti-idling requirement in relevant vendor contracts.

An anti-idling requirement is currently included as a component of Facilities Management contractor agreements. The Task Force requests this strategy be expanded to include all University vendors using motor vehicles.

Impacts

Implementing department(s): Purchasing, Office of General Counsel.

Impacted populations: Commercial drivers who currently idle vehicles at campus facilities. Possible negative impacts to affected populations and enforcement staff include some level of resentment of and opposition to the policy. Conversely, Commuter Services and Sustainability regularly receive complaints from the public about idling vehicles, including commercial vehicles. The public will benefit from reduced idling.

Timeframe

A contract language update can be accomplished within a year and integrated into existing staff work schedules. Once the contract language is in force, it will be implemented over time as contracts are renewed or initiated. An ongoing education and enforcement effort will be needed.

Community Engagement

Establishment of a policy consistent with Salt Lake City's anti-idling ordinance will enhance the existing working relationship with local municipal government. An education-focused enforcement campaign can generate positive community support.

Air Quality Benefits

An assessment component to track idling frequency should be developed to measure program results.

Cost

The contract language development and enforcement program planning can be accomplished with current staff resources. To the extent that enforcement can be integrated into existing parking enforcement, the cost may be minimal.



4B-5 / Expand Transit Passes for Visitors to Campus Events

Proposed Initiative

Expand campus visitor UTA transit pass program to non-Athletics ticketed events.

In 2013, Commuter Services contracted with UTA to provide round-trip public transit service for athletics event attendees. Under the pilot program, tickets to University of Utah athletics events serve as transit passes and proof of payment. We invite the University to expand this program to a wider array of cultural and public events hosted by the University of Utah and its affiliates.

Impacts

Implementing department(s): Commuter Services, cultural and event-hosting departments.

Impacted populations: Directors of event-hosting departments and cultural institutions will need to secure the funding for program expansion and market the program to audiences. Event patrons will benefit from additional travel options; however, low UTA bus service levels during evenings and weekends may limit usability for some patrons.

Timeframe

The full implementation of this strategy would be carried out over time. Once the program is extended to additional events and venues, it would continue annually, pending regular review of benefits and costs and subject to periodic contract renegotiation with UTA.

Community Engagement

This program—if significantly expanded and if UTA can meet needed capacity—could have a significant positive public and community relations benefits. First, event attendees who utilize the program will enjoy complimentary UTA access. For those attendees who drive, they may encounter less congestion and more convenient parking. Finally, the nearby neighborhoods may experience reduced on-street parking during events, as well as less pre-and post-event congestion.

Air Quality Benefits

Cultural and academic events are significant generators of automobile traffic. Each vehicle trip avoided results in a direct air quality benefit.

Cost

Currently, the negotiated cost with UTA is roughly \$1.25 per available seat per venue, based on event capacity. The annual cost of expanding the UTA round-trip pass to event ticket holders will depend on the number of participating venues, the events covered by the new program, and contract negotiations. Cost savings may be realized if transit use by attendees reduces the need for after-hours shuttle services and parking lot staffing. Conversely, this may result in some reduction of parking revenue for any events at which parking fees are charged.



4B-6 / Smoking Vehicle Program

Proposed Initiative

Create strategies to prevent “smoking” vehicles on campus.

Create a campaign that builds upon existing state regulation (41-6a-1626.2a) and encourages individuals to report “smoking vehicles” to Salt Lake County authorities through an information campaign. According to the Salt Lake County Health Department, “Poorly maintained motor vehicles are major contributors to air pollution which can cause serious health problems.” Vehicles registered in Wasatch Front communities require emissions testing on a semi-annual basis, but students, faculty, staff, and visitors to campus include people outside of the emission-control area. (See Salt Lake County portal online at slcohealth.org/programs/airpollutioncontrol/smokingvehicles.html)

Impacts

Implementing department(s): Commuter Services, Environmental Health and Safety. This initiative would require training for Commuter Services employees tasked with providing parking tickets to recognize exhaust/emissions from “smoking” vehicles. Additionally, Environmental Health and Safety staff would be responsible for managing the reporting system and leading the information campaign.

Impacted populations: Drivers of “smoking” vehicles would be affected, but all other campus community members would benefit from the removal of these vehicles.

Timeframe

Training to recognize “smoking” vehicles should begin immediately.

Emissions from one smoking vehicle equal emissions from up to 20 properly maintained vehicles.

Community Engagement

All University community members who purchase parking permits would be educated about “smoking” vehicles and all campus members would be encouraged to report problem vehicles to the Salt Lake County Health Department. The University could also publicly promote its prevention of smoking vehicles on the University of Utah campus.

Air Quality Benefits

Smoking vehicles can contribute up to 20 times the particulate emissions of a properly maintained and operated vehicle. Direct benefits would be the elimination of these vehicles from campus. Indirect benefits would be the education of owners, potential owners, or associates of owners of “smoking” vehicles regarding the air quality implications.

Financial Impact

There would be some direct cost in the form of staff involvement in designing and implementing the program.



4B-7 / Flexible Schedules and Telecommuting for Staff

Proposed Initiative

Develop a statement of support signed by senior administrators to affirm their approval for employees and departments to increase telecommuting and flexible schedules to reduce air quality impacts.

Revise Policy 5-140: Telecommuting for Staff Employees to include statement of support from senior administration and communicate with deans and directors to implement telecommuting practices for the benefit of employees not required to be available for direct contact with the University community. In addition, the Task Force recommends administrators allow flexible schedules and/or shift the timing of some operations to coordinate with public transportation schedules to allow more employees to take public transportation.

Timeframe

Immediately.

Community Engagement

Strategy presents an opportunity to engage the public as operations shift.

Air Quality Benefits

Direct opportunity to reduce single-occupant vehicle trips to the campus.

Cost

No direct costs. There may be small administrative costs to evaluate and manage employees with alternative schedules.

Impacts

Implementing department(s): All University operations will need to evaluate employee duties to consider the potential to work from home (including mixed office and home alternatives) and to accommodate each employee's situation relative to UTA schedules and required on-site duties.

Impacted populations: Unknown. The intent is to help accommodate some non-essential employee functions as needed to minimize air quality impacts from driving at peak times and when not required to maintain University operations.



4B-8 / Promote Carpool Technology

Proposed Initiative

Increase the number of carpool participants by using social-media based software and programs.

Previous rideshare and carpool solutions did not produce significant results due to lack of flexibility and choice in finding rideshare partners based on neighborhoods, schedules, and other social factors. However, Zimride—a rideshare system that connects passengers through social media—has had success attracting the critical mass necessary to build a reliable form of transportation. It is built specifically for each institution with email verified sign-up and is easy to use. It also requires minimal staff oversight and can be integrated with other transportation initiatives at the University, such as the annual Clear the Air Challenge.



Community Engagement

As the U of U reduces its commuting footprint through carpooling, success stories and best practices can be shared with neighbors, other companies and institutions, news outlets, and the public at large.

Air Quality Benefits

Each carpool arranged has a direct benefit by reducing the number of single-occupant vehicle trips to campus.

Impacts

Implementing department(s): Commuter Services will manage the contract with Zimride and share program information with the campus through the new Smart Commute intern funded by a Sustainable Campus Initiative Fund (SCIF) grant. The Sustainability Resource Center will also help to promote the program through ASUU, Human Resources, Orientation, Health Sciences, and with its general outreach tools (tabling, website, social media, blog, etc.).

Impacted populations: The committee does not predict any negative impacts.

Timeframe

Zimride received funding from SCIF for three years. Data will be acquired and analyzed to study potential for future contracts.

Cost

The cost for a three-year Zimride contract is \$27,000, which has been funded by a SCIF grant awarded to students in the Global Change & Sustainability Center. Further participation by the University will be based on success over the next three years.



4B-9 / Transit Standard for Real Estate Leases and Purchases

Proposed Initiative

Create and implement a transit standard for all off-campus University leases and property purchases.

As the University expands clinic, research, and operational activities to areas beyond the physical campus boundary, it is important to ensure that convenient and low-emission transit access between facilities is available. This is most easily accomplished by siting proposed facilities along transit corridors where possible.

The Task Force recommends that the University include financial and emissions impacts from transportation between facilities when determining life cycle cost evaluations for proposed leases and/or property purchase agreements.

Impacts

Implementing department(s): Real Estate Administration should include estimated impacts when looking at alternative sites. In addition, every effort should be made to procure project sites near major public transit routes. If suitable locations around major transit routes are not available, the University should negotiate with UTA and other entities to evaluate the potential for transit service.

Impacted populations: University operations looking to expand into the community may experience slightly higher initial costs for off-site facilities, but future departments, staff, students, and clients will experience fewer transportation costs and associated emissions.

Timeframe

The policy could be effective immediately, with results accruing as facilities are acquired with effective transit access.

Community Engagement

Understanding that all University facilities are accessible by public transit will impact the community positively.

Air Quality Benefits

Substantial future benefits will accrue but will be difficult to measure. Without the policy in place, new facilities may generate a considerable amount of single-occupant vehicle travel.

Cost

Potential increased costs for leases and property adjacent to transit lines will be offset by decreased future need for parking spaces for single-occupant vehicles.



4B-10 / Anti-Idling Signage and Campaign

Proposed Initiative

Install anti-idling signs at key areas around campus, including parking lots, delivery zones, and park and wait zones, to reduce idling emissions.

An anti-idling signage and behavior change campaign will visually demonstrate the U's commitment to air quality improvement. In addition, a U campaign will align with Salt Lake City's anti-idling campaign and signs; the U's signs could be designed with a similar look for consistency across jurisdictions.

Impacts

Implementing Departments: Commuter Services and Facilities Management. Commuter Services will help identify locations for signs; FM will design, print, and install signs.

Impacted populations: Commuters, delivery vehicles, and visitors to the U.

Timeframe

First round of signs could be designed, printed, and installed in a short amount of time. Additional signs could be added on an as-needed basis.

Community Engagement

Partner with health and community groups to promote anti-idling citywide.

Air Quality Benefits

Reduction in idling simultaneously reduces emissions of carbon dioxide, NOx, carbon monoxide, and particulate matter; however, exact amounts are unknown because of a lack of data on current idling levels.

Cost

Each sign costs \$39 plus \$40 per hour for installation on existing structures or signposts, with increased cost if new signposts are installed. Facilities Management could consider including anti-idling signs in design standards so that subsequent signs needed for new locations would be the responsibility of the project owner.

4B-11 / Enhance Shuttle System Routing on Campus

Proposed Initiative

Create additional shuttle routes through campus to reduce travel times for passengers and to make the system more efficient to operate.

The current campus layout with perimeter circulation directly impacts the distance the shuttle routes must travel to effectively move students and visitors around campus. Commuter Services reports that both the University of Kentucky and Colorado shuttle bus fleets travel 50 percent fewer miles per year and transport more riders at one-half the cost per passenger. By creating more through-campus routes like the one planned for the new electric shuttle, the University can create efficiencies and reduce emissions produced by shuttles.

Impacts

Implementing department(s): The Campus Master Plan and Transportation Plan are being updated by Commuter Services and Campus Planning. The Campus Master Plan identifies at least two main routes, Central Campus and HPER Mall, which should be developed to enhance effectiveness of the campus shuttles. Current fire lanes and service routes could be utilized to minimize costs.

Impacted populations: Pedestrians, bicyclists, and service vehicles could be required to share access with slow-moving shuttles (10 MPH speed limit; EV or natural gas shuttles only). Travel times across campus should be reduced significantly as a result of these new routes, increasing the number of riders who might currently be using private vehicles to circulate around campus.

Timeframe

The new route for the north-south electric shuttle should be in service by late fall of 2014 or early spring of 2015. Future east-west routes near HPER Mall (Baliff Road) and into Fort Douglas should be endorsed as soon as possible in order to begin the planning process and identify potential funding.

Community Engagement

Faculty, students, and staff, as well as visitors to campus, will be exposed to clean running shuttle vehicles and receive positive reinforcement as to their effectiveness around campus and in the community.

Air Quality Benefits

Direct benefits will occur as a result of fewer shuttle miles traveled annually to carry the same number of passengers. In addition, indirect benefits can occur when money saved through efficiency can be redirected toward more shuttle coverage or other Commuter Services programs.

Cost

Initial cost of new east-west shuttle route, including remote-controlled traffic barriers and potential additional signals at Mario Capecchi and Wasatch Boulevard, have not been calculated.



4B-12 / Fund Active Transportation Infrastructure

Proposed Initiative

Accelerate funding for infrastructure recommended in the Bicycle Master Plan.

Active transportation (bicycling, skateboarding, and walking) is increasing nation-wide as an alternative to single-occupant vehicle use. The benefits to the campus include reduced infrastructure and maintenance costs for vehicle parking and circulation. Benefits to students, faculty, and staff include healthier lifestyles, decreased costs for transportation, and typically a faster way to get around campus.

The University of Utah Bicycle Master Plan identified several barriers to those considering a bicycle or other active forms of mobility. Barriers include incomplete campus routes, conflicts with autos and pedestrians, lack of connections to Salt Lake City bicycle routes, inadequate parking racks near most buildings, and low potential to change clothes and shower after long commutes.



Timeframe

The Bicycle Master Plan outlines a phased approach to add infrastructure as areas of campus are developed and money becomes available. There are also some critical gaps to be addressed in the next two to three years.

Community Engagement

The University can engage and educate the community regarding the benefits of active transportation by enhancing programs and infrastructure, as well as receive recognition through initiatives like the “Bicycle Friendly University” certification. Additionally, it can create a better link with the Salt Lake community through integrated paths.

Air Quality Benefits

Increasing active transportation users will decrease auto-related emissions.

Cost

See Bicycle Master Plan for preliminary estimates and proposed phasing for improvements.

Impacts

Implementing department(s): Bicycle infrastructure improvements can be implemented in two ways. First, as individual capital projects shape the landscape, bikeway improvements within their site boundaries are identified and implemented when feasible. Secondly, the University should allocate a percentage of its annual transportation budget toward incremental improvements prioritized in Section 6: Infrastructure Recommendations of the Bicycle Master Plan.

Impacted populations: Active transportation users will benefit from enhanced pathways. More bicycle and active transportation may create some conflicts with pedestrians, which will have to be managed through design and enforcement.

4B-13 / Expand Electric Vehicle (EV) Charging Infrastructure

Proposed Initiative

Expand electric vehicle (EV) charging infrastructure.

Electric vehicles (EVs) are still a small proportion of private vehicles in Utah. However, the EV market share is projected to increase as technology improves and vehicle purchase costs decrease. For those employees and students who currently own or lease EVs, access to charging on campus has been a significant issue and barrier. This initiative would demonstrate the University's support for clean vehicles and may encourage more University-affiliated individuals to consider buying or leasing an EV in the future.

Currently, existing parking structures contain standard 110V electrical outlets at which parking-pass-holders may plug in and charge their vehicles, using their own extension cords, while they are parked. EV drivers are not given priority for stalls with charging stations and so must compete with non-EV drivers for the stalls.

This initiative integrates the addition of 1-2 stations for each new campus project or parking structure as a component of LEED design and construction. As the demand for charging outlet access grows, Commuter Services may also add more stations in existing parking areas based on funding availability and feasibility.

Impacts

Implementing department(s): Commuter Services, Facilities Management.

Impacted populations: Employees and students who own or lease plug-in electric or hybrid vehicles will benefit from the ability to extend driving range and charge vehicles on campus. This is of particular concern to residents of campus housing who have

an EV or are considering purchasing one since they do not have access to off-campus alternatives for charging vehicles. At this time, EV drivers do not directly pay the cost of electricity for vehicle charging but this is currently minimal. As EV usage increases this issue may be revisited.

Timeframe

Immediately.

Community Engagement

Encouraging private ownership and use of EVs by providing charging stations on campus provides opportunities to showcase the University's commitment to reducing emissions from commuter vehicles and willingness to provide this benefit to early adopters of EVs. Conversely, the lack of charging stations for employees and students, coupled with previous policies to issue tickets to those who charged their vehicles at standard outlets, led to negative publicity.

Air Quality Benefits

Electric vehicles produce no direct, local emissions and thus for every EV that replaces a petroleum- or compressed natural gas vehicle, emissions are reduced within the airshed.

Cost

Current costs to add additional charging outlets are estimated at \$5,000-\$22,000, depending on the type of charging technology (standard 110V outlet, fast-charging station, etc.), and available electrical infrastructure.



4B-14 / Support Clean-Air Vehicles: Preferred Parking

Proposed Initiative

Create preferred parking for Zero-Emissions Vehicles (ZEVs) and Transitional Zero-Emissions Vehicles (TZEVs)² in Faculty/Staff “A” parking zones.

The University should provide incentives to encourage the use of clean vehicles. We propose priority parking for low-emitting and fuel-efficient vehicles up to a cap of 5 percent of the total spaces based on a ZEV or TZEVE designation by the CA Air Resources Board³.

Impacts

Implementing department(s): Commuter Services should designate 5 percent of “A” parking spaces (closest to building entries and adjacent to ADA parking) for clean vehicles and monitor for compliance and use. Vehicles would need to be registered as a “clean vehicle” with Commuter Services; the program would be similar to Salt Lake City’s Green Vehicle parking permit program. Commuter Services may incur additional administrative costs during parking pass registration to verify that a vehicle is eligible for the designation.

Impacted populations: The initiative rewards owners of clean-air vehicles and provides incentive for others to purchase cleaner options. There could be some negative response by users without clean-air vehicles.

Timeframe

Due to the ongoing major changes to the parking system, such as no hang-tags and construction, we recommend delaying this initiative until the summer or fall of 2015. The changes should be preceded by a marketing campaign to encourage faculty and staff to make cleaner vehicle choices and about the new priority parking incentives.

Community Engagement

The initiative sends a strong message to the campus community and region that the University is serious about taking actions that benefit air quality.

Air Quality Benefits

A 5-percent shift toward ZEVs would reduce commuting emissions by a corresponding 5 percent.

Cost

There will be an initial cost of roughly \$100 per space for signage, along with some ongoing administrative costs to manage the program. Requiring a small initial fee (approximately \$25), similar to Salt Lake City’s initiative, could offset administrative costs.

² Zero Emissions Vehicles (ZEV) or Federal Inherently Low Emission Vehicles: 100 percent battery electric and hydrogen fuel cell and compressed natural gas vehicles. Transitional zero emission vehicles (TZEVE): Typically plug-in hybrids and hydrogen vehicles (not hydrogen fuel cell listed above). These vehicles must achieve both Super Ultra Low Emission Vehicle exhaust emissions and zero evaporative (fuel system) emissions, as well as warranty their traction battery for 10 years or 150,000 miles.

³The board has designated roughly 230 models as of June 2014, half of which are independent natural gas or electric-vehicle conversions and mirrors a credit for LEED New Construction certification.



4B-15 / Support Clean Fuel Vehicles: Discounted Parking

Proposed Initiative

Create discounted rate for Zero Emissions Vehicles (ZEVs) and Transitional Zero Emissions Vehicles (TZEVs)⁸ in Faculty/Staff “A” parking zones.

The University should provide incentives to encourage the use of clean-fuel vehicles. In addition to providing priority parking for ZEVs and TZEVs (see strategy 4B-14), we propose the University discount parking rates for these types of vehicles. This initiative calls for a roughly \$70 discount for an “A” parking pass for drivers of clean-fuel vehicles. Lost revenue could be made up by increasing rates by approximately \$5 for the 95 percent of vehicles that do not use cleaner fuels.

Impacts

Implementing department(s): A 20-percent discount would be available for all parking pass levels for clean-fuel vehicles. Commuter Services may incur administrative costs during registration for parking passes to verify that a vehicle is eligible for the designation (similar to SLC’s “Green Vehicle” parking permit program).

Impacted populations: The initiative rewards owners of clean-fuel vehicles.

Timeframe

Due to the ongoing major changes to the parking system, such as no hangtags and construction, we recommend delaying this initiative until the summer or fall of 2015. The changes should be preceded by a marketing campaign to encourage faculty and staff to make cleaner vehicle choices and about the new priority parking incentives.

Community Engagement

There is an opportunity to educate the community that the University is serious about cleaning up the air and that vehicles emit at very different rates.

Air Quality Benefits

A 5-percent shift toward ZEVs would reduce driving emissions by a corresponding 5 percent.

Cost

There will be some ongoing administrative costs to manage the program. Increasing parking pass costs for other permit holders could offset administrative costs and discounts. If the number of applicants exceeds 5 percent, the program could be capped by eliminating discounts for TZEVs and targeting only ZEVs.

⁸Zero Emissions Vehicles (ZEV) or Federal Inherently Low Emission Vehicles: 100 percent battery electric and hydrogen fuel cell and compressed natural gas vehicles.

Transitional zero emission vehicles (TZEV): Typically **plug-in hybrids** and **hydrogen vehicles** (not hydrogen fuel cell listed above). These vehicles must achieve both **Super Ultra Low Emission Vehicle** exhaust emissions and zero evaporative (fuel system) emissions, as well as warranty their traction battery for 10 years or 150,000 miles.



4B-16 / Implement Parking Rate Increases

Proposed Initiative

Implement parking rate increases as currently approved by Board of Trustees.

Commuter Services has initiated an increased fee structure to help offset the loss of surface parking capacity, as well as the increased cost of parking structures currently under construction. We recommend that these fees be implemented as proposed in order to discourage single-occupant vehicle travel.

Impacts

Implementing department(s): Commuter Services is responsible for all parking fees, collection, and enforcement. Administrative costs should not be affected by an increase in rates.

Impacted populations: Paying a higher rate for parking will impact students, faculty, staff, and visitors. However, the increases fall in line with parking costs at peer institutions. In addition, fees are proposed to increase substantially more for staff and faculty than for students.

Timeframe

The new fees will be increased annually over a 10-year period to help reduce unexpected impacts to students, faculty, and staff.

Community Engagement

There is an opportunity to educate the community about the true cost of parking and its impact on community design, commuting, air quality, etc.

Air Quality Benefits

Raising parking fees can be an important factor to help reduce travel by single-occupant vehicles to campus. According to the U.S. Department of Transportation, paying more for parking “can reduce the number of people who drive alone, maximize the utilization of transportation facilities, and encourage more efficient land use.”

Cost

There are no expected additional administrative costs. The schedule for permit increases is shown below.

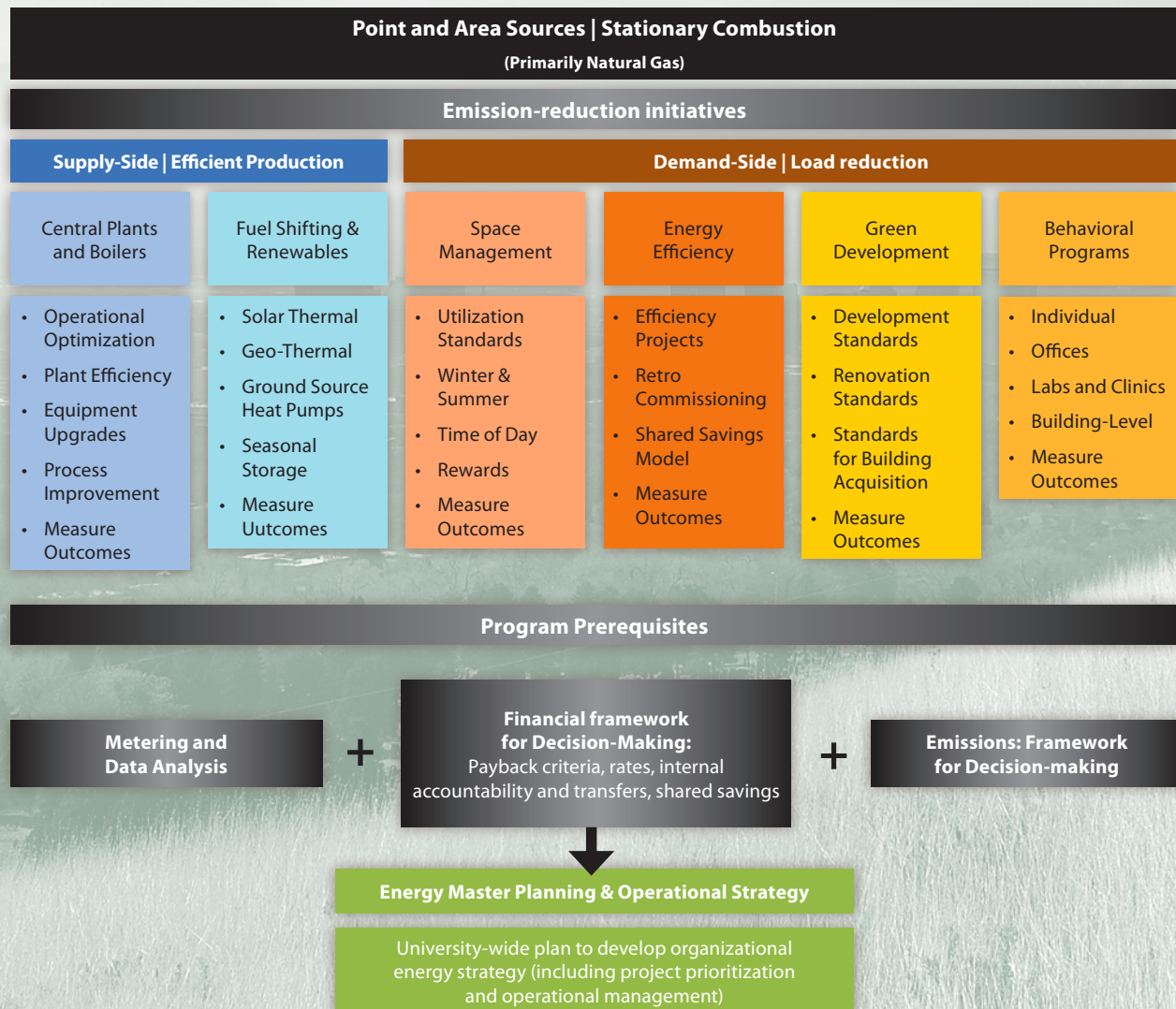
Approved Parking Permit Rate Increases

	FY14	FY17	FY20	FY23
E permit	\$100	\$140	\$165	\$180
U permit	\$180	\$240	\$270	\$300
A permit	\$348	\$582	\$648	\$720
R (reserved)	\$1,458	\$1,680	\$1,860	\$2,040

4C

Point Sources

Point source pollution comes from a single identifiable source, such as power plants, boilers, refineries, etc. The University of Utah contributes to point source pollution through its production and use of natural gas in central high temperature water plants and in individual building furnaces and water heaters. The following strategies identify steps for the University to take to reduce pollution from these areas.





4C-1 / Fully Fund the Better Buildings Challenge

Proposed Initiative

Fund current Facilities Management efforts to reduce energy use on campus by 20 percent by 2020 through the Better Buildings Challenge (BBC).

Administrators at all levels supported the proposal of the BBC, a U.S. Department of Energy-led commitment to reduce the energy-use intensity (EUI) of our 14 million square feet of building stock. Specifically, this means reducing the EUI from 190 kBtu/sq.ft./year to 152 kBtu/sq.ft./year. The funding levels for the BBC have not been secured and Phase I construction has not yet commenced, except for the behavioral component to engage building occupants, which already has funding from Facilities Management. Secure funding for completion of the entire effort, which would reduce the campus EUI, would reduce emissions and save money in the long term.

Impacts

Implementing Departments: Facilities Management, with participation by several other entities on campus (Health Sciences, Hospitals and Clinics, Real Estate Administration, Housing & Residential Education, etc.).

Impacted populations: None.

Implementation of the BBC will substantially reduce the University's energy costs moving forward. Once the investments for BBC programs are complete, the energy savings will continue to accrue to the institution.

Timeframe

The University has until 2020 to meet the goal; this program needs secure funding for all phases to be able to move forward.



The BBC will provide \$35.2 million in positive cash flow over 16 years and an annual energy savings of \$9.4 million in 2020.

Community Engagement

This nationally visible program has the potential to showcase the University as a leader in energy efficiency if the U achieves its commitments.

Air Quality Benefits

Reducing energy use intensity by 20 percent will have a significant impact on campus air emissions by lowering the usage of natural gas that heats and cools buildings. Electricity use will also decline.

Cost

The total funding requirements for energy improvements, as well as the retro-commissioning program, is \$64 million. Implementation of the BBC will substantially reduce the University's energy costs moving forward. Facilities Management estimates benefits such as \$35.2 million in positive cash flow over 16 years and an annual energy savings of \$9.4 million in 2020.



4C-2 / Equipment/Emissions Coordination and Financial Decision-Making

Proposed Initiative

This initiative establishes a framework for linking emissions implications and costs to administrative decisions on campus utilities (new equipment, upgrades, etc.).

The Task Force proposes the University create a systematic plan to consider emission-reduction implications in addition to life cycle, operational, and planning impact costs when comparing and selecting alternate equipment for plant heating and cooling.

Impacts

Implementing department(s): Facilities Management (specifically Facility Operations), Environmental Health and Safety, Sustainability, Health Sciences, and the Utah Division of Facilities Construction and Management. This initiative will require the attention and efforts of the aforementioned stakeholder groups. It will also require the creation of a viable and repeatable methodology for including the market value of emissions into the life-cycle analysis.

Impacted populations: No impacts beyond individuals directly involved with planning and decision-making at the project and strategic levels

Timeframe

Ongoing.

Community Engagement

The general University population would not be directly impacted by this initiative. The University could also publicly promote its life-cycle framework to convince other organizations to adopt the practice.

Air Quality Benefits

The selection of higher-efficiency equipment—based on both energy and emissions—would have an immediate benefit to our mission of air quality improvement. These benefits would be both direct (linear reductions in emissions based on combustion performance) and indirect (less energy used and therefore reduced NOx emissions). Incorporation of co-generation equipment where appropriate is exemplary of this initiative, as co-gen technology inherently supports both an energy conservation strategy and a reduced carbon and emissions footprint for the same energy produced.

Cost

Emissions technology is rapidly developing, resulting in reduced cost per ton of saved emissions. When a true life-cycle cost analysis is applied—which also factors the costs and risks of managing an expanding emissions portfolio in a non-attainment area such as Salt Lake County—the selection of ultra-efficient equipment is justifiable. In the long-run, when both operation and maintenance and emission costs are included, financial savings should result.



4C-3 / University-Wide Energy and Utility Strategic Plan

Proposed Initiative

Develop an energy and utility strategic plan to reduce energy costs, meet sustainability goals, and help the University comply with state/federal regulations.

The University of Utah has seen record levels of building development since the last campus utility study, which was conducted in 2003. As a result, the current methods for supplying electricity, water, natural gas, heating, and cooling may challenge the University's ability to reduce emissions and may even constrain future development. An energy and utility strategic plan would both move the campus toward compliance, as well as simultaneously achieve energy-cost reductions and sustainability goals.

An energy and utility strategic plan would address:

- Prioritization of capital funding needs for renewal of utility systems;
- Identification of utility supply capacity and confirmation of utility redundancies for both campus and utility suppliers;
- Creation of a phased approach to projects required to meet new building demands;
- Establishment of a baseline for measurement and verification of building efficiency, operations and maintenance, and energy conservation measures;
- Definition of pathways to address GHG reduction commitments;
- Identification of potential utility system reliability issues and mitigation plans;
- Guidance for the campus to comply with Utah's Air Quality requirements/State Implementation Plan;
- Systematic way to meet campus sustainability goals and commitments.

Impacts

Implementing Department(s): Facilities Management would lead the effort, with support from Sustainability, Health Sciences, Auxiliary units, and Budgeting & Planning.

Impacted populations: University decision-makers will be given information from which they will be able to plan future major investments

situation and would demonstrate pathways to reductions in energy use, increases in energy efficiency and renewable energy strategies, and reduction in emissions in accordance with State Implementation Plan guidelines.

Timeframe

Begin FY16 and continuing into FY17.

Air Quality Benefits

By determining both ways to use less energy as well as funding mechanisms to improve efficiency, the University will contribute fewer emissions to the Salt Lake Valley airshed while meeting state commitments.

Community Engagement

While the energy and utility strategic plan would not directly engage the community at large, it would engage several departments on campus in the realities of the current energy

Cost

Cost of study: \$250,000–\$500,000. Cost of implementation and accompanying savings are yet to be determined.



4C-4 / Boiler Efficiency Prioritization

Proposed Initiative

Optimize an existing program by prioritizing boiler replacement decisions based on both energy and emissions performance.

The University currently has a program of replacement of the older, energy-inefficient boilers. In this strategy, the highest emitting of the energy-inefficient boilers would be updated first. In addition, consideration should be given to the purchase of low NOx emitting boilers.

Impacts

Implementing department(s): Facility Operations in Facilities Management. Facility Operations would need to re-evaluate the current priorities list.

Impacted populations: No negative impacts on specific populations predicted.

Timeframe

Ongoing, with expected replacement of all inefficient and high-emitting boilers by 2017 at the current pace of funding.

Community Engagement

The University should promote the prioritization as a replicable policy for other organizations and institutions.

Air Quality Benefits

The primary benefit of this initiative would be to expand awareness and capture some “credit” for what the University is already doing in this area. Energy efficiency and emissions reductions are expected to result from this initiative.

Cost

There are no additional costs for this proposal. The proposal prioritizes high-emitting boilers but continues with the same funding already allocated to boiler replacement.



4C-5 / Energy Standard for Renovations

Proposed Initiative

Create and implement an energy standard for renovation and small projects not impacted by State Division of Facilities Construction and Management standards.

In FY14, the University of Utah spent millions of dollars on building renovations. While new remodel work must meet current building code and accessibility standards, most do not address underlying inefficiencies with regard to energy use. Adoption of a standard such as the International Green Construction Code (IGCC), especially for existing building renovations, would help reduce the use of natural gas and electricity over the life of the building.

Impacts

Implementing department(s): Facilities Construction and Operations in Facilities Management would be responsible to adopt and implement the standard by including it in contracts with design professionals and contractors.

Impacted populations: First costs for construction projects would increase from 2-10 percent, depending on the extent of the remodel; this initial cost would be borne by the party requesting the remodel, but energy savings would accrue to the energy account for the University.

Timeframe

The standard could be implemented immediately, with results following for years to come.

Community Engagement

There is an opportunity to share a low-cost green standard with the design and construction community, as well as building owners and operators.

Air Quality Benefits

It is difficult to estimate exact figures for emissions savings because each project will impact energy use to a different degree; however, all energy reductions will lead to less greenhouse gas produced by the University.

Cost

Initial study indicates a 2-10 percent premium over existing construction costs, with potential savings to University energy costs returning to the annual energy account. As major deficiencies are identified during project scoping, major system replacements could be financed by Facilities Management's energy management program (assuming financial parameters are satisfied).



4C-6 / Develop Building Acquisition Energy Standard

Proposed Initiative

Include energy-use intensity and building emissions as factors when evaluating buildings for purchase or lease.

The University should supplement purchase price, location, and program functionality with information about a facility's energy use and resulting emissions when purchasing or leasing a structure. Buildings constructed prior to new energy codes (pre-2007) vary considerably with respect to energy use and emissions generated per square foot.

Consider adding a requirement for a minimum Energy Star Score of 50 (median score for building type and climate) to evaluation criteria, with buildings scoring 69 or better to receive additional consideration.

Impacts

Implementing department(s): Facilities Management should be engaged to analyze the proposed facilities' previous energy bills, along with on-site analysis of HVAC equipment age, thermal performance, and percentage of window area. To the best extent possible, a corresponding Energy Star score should be calculated.

Impacted populations: Real estate transactions will be affected as potential locations could be eliminated, making some acquisitions more difficult. However, future operations and maintenance costs would become more transparent and high energy using and potentially polluting facilities would be avoided.

Timeframe

The strategy can be implemented immediately, with positive impacts accruing over decades.

Community Engagement

Minimal opportunity to directly engage the public, but the University can showcase its commitment to building energy efficiency and emission reduction.

Air Quality Benefits

Direct benefits will occur as a result of lower energy use, especially natural gas use. Building emission rates can vary by a factor of 2-3 for the same internal activity or function.

Cost

While the initial purchase price might increase 2-5 percent for more efficient features, the long-term cost of ownership will be significantly less through reduced energy costs and greater occupant comfort.



4C-7 / Adjust Temperature Setpoints

Proposed Initiative

Reduce winter and increase summer temperature setpoints in campus buildings.

Reduce winter temperature setpoints to 68 degrees and raise summer setpoints in buildings to 78 degrees to reduce emissions from heating and cooling. (Also see strategy 3B.)

A marketing and communication plan should accompany this strategy to help educate students, faculty, and staff and persuade them that by dressing accordingly they can help reduce the U's impacts on air quality in significant and measurable ways.

Impacts

Implementing department(s): Facilities Operations in Facilities Management would be responsible for adjusting building temperature settings for each building based on air quality levels and proposed responses. Leadership will also need to work with facility managers for buildings that are not operated by Facilities Management.

The Sustainability Office and senior administration would work directly with University Marketing & Communications to share the importance of this initiative and how a minor adjustment to attire can make a difference.

Impacted populations: All students, faculty, and staff would be slightly inconvenienced and need to remember to dress accordingly.

Timeframe

Immediate.

Community Engagement

This strategy has direct applicability to other businesses, institutions, residences, etc.

Air Quality Benefits

NOx emissions from central plants will be reduced 4-5 percent and emissions from electrical-generating power plants (particularly demand-response peaking generators) will be reduced as a result of decreased electricity use. In addition, CO2 emissions will be reduced by approximately 140 tons per day from the heating load reductions alone.

Cost

Current metering data available at the University is insufficient to estimate exact savings of adjusting the temperature setpoints. However, the U.S. Department of Energy estimates a 3-percent reduction in cost per degree of setback. Based on this standard, Facilities Management estimates that the U would save \$300,000 per year in heating and \$250,000 annually in cooling.

There will be some cost for marketing collateral, such as posters and advertisements. Additional ideas, such as giving away free items like fleece lap-blankets, could be purchased with savings from decreased energy use.



4C-8 / Optimization of Central Plant Operation

Proposed Initiative

Optimize the central plant operation to minimize both energy costs and emissions.

Optimize plant operations so that production assets are allocated based on life-cycle costs and emissions profiles, not just operational reliability or ease. Boilers are currently kept on “hot standby” because of limited staffing and the premium placed on facility reliability.

Impacts

Implementing department(s): Facility Operations and Capital Projects/New Construction in Facilities Management. The staff in charge of operations and capital projects would have to re-evaluate current priorities related to reliability and the protocols on “hot standby” of boilers.

Impacted populations: The general University population would not be directly impacted by or even aware of this initiative.

Timeframe

Initial evaluation of emissions profiles and plant efficiency can begin immediately.

Community Engagement

The University should promote its efforts as a replicable policy for other organizations and universities.

Air Quality Benefits

The benefit would be direct and immediate. Further, this strategy has the potential to both generate and document emissions credits that could be captured and banked or sold on the emerging market.

Cost

Potential costs include some additional staffing to offset the “hot standby” modes and for the purchase of boilers that have a higher reliability rating. However, decreased fuel costs and longer equipment life would help offset the costs of increased staffing needs. Some potential emission credits are possible.

4D

Area Sources

The University's area source pollution represents another way for the institution to reduce its overall contribution to Salt Lake Valley's air quality concerns. Area sources are defined as emissions too small to be treated as point sources, such as solvents, printing equipment, etc. Though emissions from individual area sources are often relatively small, collectively their emissions can be of concern—particularly where large numbers of sources are located in heavily populated areas. (For additional information, see www.epa.gov/ttnatw01/pollsour.html). Improvements in this area will also contribute to human health by reducing employee exposure to harmful off-gassing and chemicals.



4D-1 / Printing Operational Improvements

Proposed Initiative

Coordinate with University Print & Mail Services to identify opportunities to purchase and utilize materials and equipment that have the potential to reduce emissions.

This initiative recommends closer coordination and education of Print & Mail Services regarding the availability and importance of purchasing and using low-emitting products and equipment. In particular, the replacement or acquisition of major capital equipment will be evaluated, as this represents a long-lead planning opportunity. Opportunities for equipment modernization and replacement would also be identified.

Impacts

Implementing department(s): University Print & Mail Services. Management and staff who procure and use print shop materials and equipment would lead this initiative, with the assistance of Environmental Health and Safety, which will help identify current technologies that meet upcoming emissions guidelines.

Impacted populations: The University community may be impacted if the higher cost of replacement equipment is passed on to the customer. However, it is likely that all high-volume printing operations in the airshed will make similar improvements to equipment and processes.

Timeframe

There would be an initial assessment in coordination with Print & Mail Services representatives, followed by periodic reviews at the time of air quality permit updates or at emissions reporting milestones.

Community Engagement

Agency peers would learn about our implementation of this strategy through our permit reporting requirements, and respond approvingly, particularly for its contribution to meeting SIP goals.

Air Quality Benefits

Relative to the Salt Lake County non-attainment area, this initiative represents the potential for modest air quality improvements. In addition, improvements to indoor and localized air quality would be significant.

Cost

The incremental cost increase of low-emitting printing equipment and materials is estimated at between 10 and 30 percent. However, the printing sector has recently emerged as a State and Federal regulatory target, and the University could minimize the impact of unplanned investments in printing equipment by anticipating this trend and planning for strategic purchases now.



4D-2 / Develop Best Practices for Remodel & Maintenance Materials

Proposed Initiative

Institutionalize best management practices that have already been identified in Federal and industry guidance (e.g., LEED) and Utah's State Implementation Plan (SIP).

Use LEED criteria and identified best management practices for potential emission-reduction opportunities related to the paints, sealants, and adhesives that are used for remodeling and maintaining campus facilities. These products are already required for capital projects on campus over \$2.5 million, and should be extended to all campus construction.

We recommend the University adopt LEED standards because it will surpass all state requirements and create a consistent standard for projects of all sizes.

campus construction materials and custodial products. (See www.rules.utah.gov/publicat/code/r307/r307.htm). R307-342 "Adhesives and Sealants" and R307-367 "Architectural Coatings" now require the University of Utah to use materials with lower volatile organic compounds (VOC). The University should be in compliance with these standards and evaluate materials with even lower VOCs than required.

Community Engagement

The general University population would not be directly impacted by this initiative.

Air Quality Benefits

The benefit would be direct and immediate. It is difficult to quantify the benefits of this initiative without an inventory of existing materials and applications. However, State and Federal rules are increasingly focused on these emission sources.

Impacts

Implementing department(s): Construction Project Delivery in Facilities Management, Facility Operations, Housing, Hospital Facilities, Purchasing, and the Sustainability Resource Center. University staff (Purchasing, design, custodial, Facilities) would work with representatives of the Sustainability Resource Center to identify opportunities to modify material selections. This could be accomplished within existing training sessions and by evaluating design code language for remodeling projects.

Impacted populations: Campus members may be affected by changes to purchasing options.

Cost

Low-emitting materials range in cost from no added cost to as much as 10 percent higher than standard products. For example, painting material costs represent about one-third to one-half of the total cost to paint, which translates to about 2-5 percent total increase in painting costs. There will be added health benefits for painting crews who are exposed to these products with VOCs on a daily basis and improvement to indoor air quality.

Timeframe

Immediate. On Nov. 1, 2014, the state of Utah adopted new air quality rules that impact both



4D-3 / Develop Best Management Practices for Custodial Products

Proposed Initiative

Assist maintenance and custodial teams in transitioning toward Green Seal or equivalent third-party certified products.

Federal and industry guidance and UDAQ Rule R307-357 include information identifying potential emission-reduction opportunities related to cleaning products that are used to clean and maintain campus facilities. The Task Force proposes the University adopt use of third-party certified products to improve air quality and benefit the health of custodial and maintenance staff.



Impacts

Implementing department(s): Purchasing, custodial units in Facility Operations, Housing and Residential Education, Hospital Facilities, and the Sustainability Resource Center. University staff (Purchasing, Facilities) would work with representatives of the Sustainability Resource Center to identify opportunities to modify product selections.

Impacted populations: The general University population would not be directly impacted by or even aware of this initiative. Custodial staff would be positively affected through safer product choices.

Timeframe

Immediate. On Nov. 1, 2014, the state of Utah adopted new air quality rules that impact both campus construction materials and custodial products. (See www.rules.utah.gov/publicat/code/r307/r307.htm). R307-357 "Consumer Products" now requires the University of Utah to use materials with lower VOCs. The University should be in compliance with these standards and evaluate materials with even lower VOCs than required.

Community Engagement

The University should promote its efforts as a replicable policy for other organizations and universities.

Air Quality Benefits

The benefit would be direct and immediate. It is difficult to quantify the benefits of this initiative without an inventory of existing products in use. However, State and Federal rules are increasingly focused on these emission sources.

Cost

Green Seal and other certified products may cost more than current choices, but it is difficult to determine total cost increases without an inventory of current products. It is also difficult to provide a dollar figure for improved health for the University's custodial staff and potential for increased productivity resulting from reduced absenteeism.

APPENDIX

For Future Consideration

Strategies listed in the Appendix either took longer than two years to implement or the Task Force felt it did not have enough information to include the recommendations in the main sections of this report.



Class Scheduling

Proposed Initiative

Revise scheduling to distribute class courses throughout the day and evening.

Building on the efforts of the Strategic Scheduling Team (initiated by Senior Vice President Watkins), explore and implement ways to more efficiently utilize classroom and other spaces.

Impacts

Implementing department(s): Senior vice president Academic Affairs, Registrar/Scheduling, and Space Planning will be working with academic units to explore opportunities for implementation.

Impacted populations: Academic units will work with students and faculty to overcome barriers associated with evenly distributed class times.

Timeframe

The Strategic Scheduling Team is anticipating a report with recommendations by fall of 2015. Further work to adjust scheduling will proceed from that time forward.

Community Engagement

Adjusted class times may provide an opportunity to promote public transportation to students and faculty that previously attended courses in the evening, when public transportation frequency is less.

Air Quality Benefits

Air quality would be improved in two ways. First, peak traffic and idling are increased at congestion times associated with current class schedules. Spreading classes throughout the available day and evening would help to reduce AM and PM peak commutes.

In addition, a more efficient use of space on campus would help to reduce demands for new space, leading to a reduction in natural gas and electrical use in the future.

Cost

Costs associated with revised class scheduling will be more than offset by reduced building growth resulting from more efficient use of space.



Revise Energy Standard for New Construction

Proposed Initiative

Revise the design standards for future construction projects to include air quality emissions, energy-use intensity (EUI), and total GHG emissions, in addition to the “Energy Cost Index” as currently required by LEED.

Not all emission-reduction strategies produce energy savings. In addition, “total cost of ownership” is the current methodology used to determine when energy-efficiency features are included in a new-project scope. Consequently, energy cost at present rates is currently the deciding factor when looking at energy components. As a result, air quality and GHG emissions continue to increase because they are not factored into decision-making.

Impacts

Implementing Departments: Facilities Management.

Impacted populations: Departments with a new qualifying project may see project costs increase 1-3 percent to cover the increased first costs for high-performance buildings.

Timeframe

This would be a one-time design standard update (with subsequent updates possible to refine the requirement) and could be implemented quickly. A process for communication to all interested parties (owners of projects, architects and engineers, project managers) would need to be identified.

Community Engagement

The community is not directly impacted by this effort; however, this effort demonstrates the University’s commitment to air quality and sustainability efforts.

Air Quality Benefits

Including air quality emissions in decision-making will help alleviate future costs, including GHG emissions and EUI, and will help the U to benchmark future buildings against current standards to determine impacts and reduce future emissions per square foot.

Cost

The majority of cost implications will be borne by individual projects. The project would likely incur additional upfront costs for more efficient, less-emitting equipment; however, savings in energy costs and by avoiding regulatory burdens from SIP commitments will save money over the life of the structure. A funding mechanism to pay for incremental cost should be explored.



Curtail Use of Non-Essential Carts without Emissions-Reduction Equipment

Proposed Initiative

Develop inventory of all University off-road vehicles to determine which vehicles do not meet current air quality guidelines and stop use of those vehicles on poor air quality days.

The University has dozens of off-road vehicles (carts) used around campus to provide mobility for staff, faculty, and students. These vehicles have not traditionally been subject to the same clean-air standards as passenger vehicles and typically emit emissions at a much higher rate. In 2011, the EPA began introducing requirements for emission-reduction in these vehicles.

The University should do an inventory of these vehicles across campus to determine which ones meet or exceed current air quality guidelines. Vehicles not in compliance with guidelines should not be used during air quality events. In addition, the University should implement a plan to transition all existing vehicles to cleaner options.

Impacts

Implementing Departments: We have not determined which department will be the responsible for monitoring and enforcing this guideline.

Impacted populations: All campus entities and functions that have non-complying carts and the services they provide. Carts that provide essential services like mobility for ADA programs or Environmental Health and Safety would be exempted.

Timeframe

Estimated six months to conduct inventory and create a plan for entities to curtail cart use during air quality events.

Community Engagement

The University can share this initiative with other efforts to show the community its commitment to making changes, both small and large, to improve the Salt Lake Valley's air issues.

Air Quality Benefits

Exact benefits can be evaluated and tallied after the inventory of vehicles is complete.

Cost

There are no direct costs associated with a ban on nonessential cart use.



Continue Transition to Campus Shuttle Vehicles with Reduced Tailpipe Emissions

Proposed Initiative

Continue transition to natural gas and electric shuttle vehicles based on cost, performance, operations and maintenance, and air emissions.

Commuter Services has a plan in place to move forward with converting its shuttle fleet to natural gas based on fuel savings and cost analysis. The University should help to accelerate that plan by recommending air quality emissions be a factor for any new shuttle vehicle purchase. Shuttle fleet conversion to clean fuels such as natural gas should be completed as soon as possible

Impacts

Implementing Departments: Commuter Services

Impacted populations: Commuter Services

Timeframe

Commuter Services has been following a schedule to convert its shuttle fleet from gasoline-fueled shuttles to natural gas and electric shuttles based on cost and fuel savings. As of 2014, Commuter Services has 11 compressed natural gas buses, 9 diesel buses, and 1 electric shuttle. Commuter Services is on track to replace all diesel buses with natural gas versions by 2018, the deadline in the Climate Action Plan.

By adding air quality as a consideration for transition to alternative fuel vehicles, this could influence either the timing of shuttle replacement or the types of shuttle purchased. A reasonable timeline should be proposed for switching the shuttle fleet out to low or zero emissions shuttles.

Community Engagement

Shuttles are a visible part of the campus community; signs or advertisements on the buses themselves to show the cleaner types of fuel/ electric nature of the shuttles will demonstrate the U's commitment to cleaner fuels and reducing emissions.

Air Quality Benefits

Although the shuttle fleet is not large in numbers, in fuel consumption it makes up approximately 1/3 of total campus vehicle fuel usage due to the high mileage of the shuttles. Lower emitting shuttles, given the high mileage and frequency with which the shuttles run, would reduce pollutants currently emitted from traditional fuels.

Cost

Depending on the technology chosen, Commuter Services may incur additional incremental costs for shuttle purchases. However, operating costs from substantially lower natural gas fuels offsets purchase price and the natural gas shuttles have a lower total cost of ownership than diesel shuttles.



Include Air Quality Emissions as a Factor in All Vehicle Purchases

Proposed Initiative

Include air quality emissions as a factor in all vehicle purchases, including passenger cars, light- and heavy-duty trucks and equipment, and carts.

Facilities Management Fleet Services purchases all campus vehicles either on behalf of campus departments or as part of a leasable pool. Currently, departments choose a vehicle or equipment based on cost and needs. Air quality emissions should also be incorporated as a factor in vehicle purchases so as to assess the impact of those vehicles and to encourage the purchase of vehicles with lower emissions.

Impacts

Implementing Departments: Fleet Services in Facilities Management.

Impacted populations: Departments that purchase vehicles and equipment.

Timeframe

A purchasing policy could be in effect within six months; the fleet would be impacted immediately thereafter. This policy would need to be researched to identify the best strategy for incorporation but could be implemented fairly quickly once a method is determined for how to proceed.

Community Engagement

This action has opportunities for education associated with the University's air quality commitment and its effect on fleet purchases.

Air Quality Benefits

The specific policy implemented would determine the level of benefit on air quality.

Cost

Some departments may find a higher initial cost for their vehicle or equipment; however, increasing fuel efficiency associated with lower emissions will help to balance higher initial costs with lower operating costs.



Enhance Public Transportation with Intermodal Hub

Proposed Initiative

Work closely with UTA, Salt Lake City, WFRC, UDOT, and other agencies to create an intermodal hub on the University of Utah campus.

Decreased travel times, expanded services areas, and more frequent service will make public transportation to campus more effective. All three aspects are predominantly controlled by UTA, along with Salt Lake City, UDOT, and WFRC. University of Utah's public transportation participation rates are directly related to these factors and can be positively impacted with the addition of an intermodal hub on campus. This facility could help accommodate additional bus, TRAX, and shuttle service, as well as enhance cycling and pedestrian movement and the interaction between active and public transportation.

Impacts

Implementing department(s): Several departments have interests in an intermodal hub, including Commuter Services, Facilities Management, and Sustainability. Property would be required for this facility, potentially making it unavailable for traditional campus uses. However, increases in public transportation use would decrease the need for parking facilities and free up other areas for campus development. Required ongoing maintenance and operating funds have not been identified.

Impacted populations: No negative impacts are currently anticipated.

Timeframe

This is a long-range strategy, but planning and coordination should begin immediately.

Community Engagement

An intermodal transportation hub located on or near campus would provide tremendous benefits to the community, as well as directly to the U. Operations for UTA would be enhanced with more direct routes to serve east-side users, connections to Summit County, and connections to bring the community to campus for sporting events, lectures, etc.

Air Quality Benefits

Direct benefits will occur as public transportation is enhanced and commuters and visitors are able to minimize private vehicle use.

Cost

Direct costs in property, paved road infrastructure, pedestrian improvements, shelters, and rider enhancements would occur but have not been estimated. Future cost savings would occur from reduced need for parking infrastructure and its maintenance.



Convert Department-Owned Fleet Vehicles to Lease

Proposed Initiative

Convert department-owned fleet vehicles to a leased-vehicle program through Facilities Management Fleet Services.

By paying a monthly leasing fee, many departments that have old, inefficient and/or infrequently used vehicles in their fleet will be incentivized to either upgrade to new, cleaner vehicles or choose to get rid of their vehicle and opt to rent a vehicle through Facilities Management on an as-needed basis. This program has the potential to reduce the size of the U's current fleet as well as to decrease the average age of vehicles, both of which would have a positive impact on air quality.

Impacts

Implementing Departments: Fleet Services in Facilities Management.

Impacted populations: Departments that purchase vehicles and equipment.

Timeframe

The Task Force recommends a phased approach to lessen capital costs.

Community Engagement

No direct implications foreseen.

Air Quality Benefits

Individual department-owned vehicles consist of approximately 60 percent of the current fleet and tend to be older vehicles than the vehicles in the Facilities-managed leasing fleet. By reducing the amount of overall vehicles in the University fleet, the University fleet will be newer in age and leaner, both of which would have a positive impact on reducing emissions.

Cost

Fleet Services recommends a phased approach for this project. Total costs over a three-year period would include: 1) A departmental-level cost for paying a lease (an average of ~ \$300-500 per month per vehicle) instead of a one-time vehicle purchase; and 2) Capital costs needed for Fleet Services to replace older vehicles with new, leased vehicles. A total capital cost to convert all vehicles to a leasing structure was roughly estimated by Fleet Services at \$2 million, which could be phased over three years.



Ban Two-Stroke Engines

Proposed Initiative

Eliminate all two-stroke engine equipment from University inventory.

Two-stroke engines emit harmful pollutants at rates far exceeding four-stroke alternatives (electrical devices are even better).

Impacts

Implementing Departments: Facilities Management and other departments that use two-stroke engine equipment.

Impacted populations: Landscaping and grounds crews may require more time to perform functions due to reduced functionality. Two-stroke engines are lighter and more powerful than their four-stroke alternatives. Electrical equipment requires chords or is impacted by increased weight from batteries and reduced operational life.

Timeframe

The ban on two-stroke engine equipment could be drafted and put into place relatively quickly; the policy would need to be communicated to all relevant parties. Departments may also need additional time and assistance in order to explore and determine funding and feasibility to upgrade two-stroke engines to four-stroke or electric engine equipment.

Community Engagement

A University-wide ban on two-stroke engines could be used to prompt other institutions and large-scale organizations in the Salt Lake Valley to adopt similar policies.

Air Quality Benefits

Two-stroke engines contribute disproportionately to NO_x, VOC, and particulate matter emissions, so curbing use will reduce emissions considerably. The amount of pollution prevented varies by machine.

Cost

Potential costs include additional staff time due to reduced functionality of alternative equipment. However, reducing the frequency of grounds maintenance could offset additional costs. The cost and feasibility of upgrading all two-stroke equipment to four-stroke or electric options is not yet known.



Point Sources: Incentivize Energy Reductions

Proposed Initiative

Create a financial reward structure to incentivize colleges and other campus operations to reduce energy use through behavior, operations, and energy project implementation.

While the University has progressive goals to reduce energy use in new construction and through programs like the Better Buildings Challenge, there is currently no direct incentive to encourage participation by building occupants and administrators to help reduce energy use on campus. This stifles active participation from units outside Facilities Management and can lead to direct conflicts over how resources are allocated during construction.

By creating a program to share savings directly attributable to actions by building occupants (based on metered data), departments might actively participate in energy-reduction campaigns. Efforts could include items as simple as adjusting thermostats and turning off unused lights, to more active efforts to implement energy-saving equipment.

Impacts

Implementing department(s): Facilities Management would help develop a framework for cost sharing by establishing baseline data for each space possible. Some of the net energy savings would remain with Facilities in order to maintain the programs and to move forward with campus-wide efforts to reduce emissions and meet climate goals.

Impacted populations: the program will negatively impact no particular campus segment. Positive results in the form of returned energy dollars will accrue to units that can document savings based on direct action. Actions will be voluntary.

Timeframe

Not all buildings have the meters required to establish a baseline for energy use. However, a few buildings have been metered for several years for some utilities and could be used in a pilot program to define program details. If appropriate, a small program could be implemented next fiscal year.

Community Engagement

Departments that lead the way could provide an example to private business leadership by showing how individual efforts (when organized in Green Teams or through administrative action) can improve air quality and save money for the company.

Air Quality Benefits

Efforts by campus departments to reduce energy will reduce building-level emissions on campus.

Cost

Net neutral because colleges and departments would be supplied with a budget equal to current funding levels. The small administrative cost to track and bill departments for energy use would be covered by energy savings shared with Facilities Management

