Demand Side Strategic Plan

Utilities & Energy Management (UEM)

The University of Texas at Austin (UT Austin)

March 2017

Demand Side Strategic Plan Contents

Acknowledgements

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Message from the Associate Vice President

By Juan Ontiveros, Associate Vice President of Utilities, Energy & Facilities Management

Research universities today are widely recognized as the catalysts for economic and social transformation in their regions. In fulfilling this catalytic role, research universities must continue to grow. Growth at UT Austin is essential to accomplishing university goals. As the university undertakes an in-depth review and analysis of its planning options to meet future growth, energy supply and its utilization become critical components of an overall successful master plan.

The Demand Side Strategic Plan developed by the UT Austin Utilities & Energy Management Department provides a roadmap for the university's energy goals, highlights our major priorities for the next 15 years, and will be reflected in individual projects and programs. The energy strategies in this plan borrow upon the scope of work outlined in the 2012 Campus Master Plan. Moreover, this plan considers recommendations from the master plan and emphasizes the creation of a sustainable energy fund integrated with decision-making processes and tools.

I would like to commend the time and expertise provided by every member of the project team and the subject matter experts with whom they consulted. The UT Austin Demand Side Strategic Plan is the result of months of work by our Planning, Energy & Facilities staff. The objectives and strategies outlined in this plan are critical to advancing our energy goals and accommodating potential growth essential to building world class educational and research facilities.

Executive Summary

According to the 2012 Campus Master Plan, "Energy infrastructure at UT Austin is highly efficient on the supply side, and future opportunities for efficiency and investment relate to existing and new building systems and demand reduction." Those opportunities form the foundation of the Demand Side Strategic Plan, developed by Utilities & Energy Management (UEM) in partnership with Facilities Services, Project Management & Construction Services, Campus Planning, and the Office of Sustainability.

The strategic plan framework is based on the three topic areas of Existing Buildings, New Construction & Renovation and Conservation Behavior, since they address tasks outlined by the Campus Master Plan. Each topic area contains multiple objectives and strategies to achieve the overall mission and goal of the strategic plan.

MISSION

"Utilize innovative demand side energy management strategies to offset projected campus energy growth."

GOAL

Reduce the average energy use intensity (EUI) on main campus by at least 2 percent annually.

The mission and goal are described in more detail in Section 5.

Section 1: UT Austin Utility Overview

Often described as the largest and most integrated microgrid in the U.S., the UT Austin main campus features a Combined Heat and Power plant (CHP) with a total capacity of 134 MW power (63 MW campus peak) and 1.2 million lb/hr of steam generation capacity (300k campus peak). The single largest electrical load on campus is the cooling system, with the capacity to provide 60,600 tons (33,000 tons campus peak) of chilled water to the campus.

The Carl J. Eckhardt Combined Heating and Power Complex provides 100 percent of the electricity and heating and five chilling stations and two chilled water thermal storage tanks provide the cooling requirements for 18.8 million square feet in more than 150 buildings serving 74,000 faculty, students and staff. Connections to the City of Austin electrical grid exist only for emergency backup, providing the university independence in generating all utilities required for a campus the size of a small city.

Operating as a CHP and district energy system, the university is able to function at a much greater reliability and efficiency than that afforded through purchased energy. Typical power plants generate waste heat that is not used for electricity production and is generally expelled, either into the atmosphere through cooling towers or into local reservoirs. A CHP facility is able to convert this heat into useful work, such as space heating and hot water, thereby converting approximately 80 percent of the energy into useful work.

Figure 1 on the next page provides a general outline of how the university's utility system operates.

In 1996, the power plant's overall energy efficiency was 62 percent, compared to a typical power plant energy efficiency of only 40 percent. Through 2008, the power plant efficiency increased to 72 percent due to plant modifications and real time sophisticated modeling technology. A new gas turbine and chilling station operational in 2010 have contributed to reduced fuel consumption and increased efficiency of up to 87 percent. A Delta T initiative launched in 2011 also had a significant positive impact on chilled water and steam consumption.

Since 1996, the university has spent $150 million on CHP equipment and processes to increase the efficiency of the system. The efficiency gain reduced the amount of natural gas to produce the delivered campus energy. This avoided fuel cost has exceeded the debt service to improve the energy plants so the resulting savings in natural gas costs have paid for the system improvements. The new $89 million Dell Medical District Utility Plant consisting of Chilling Station 7 and a 5.5 million gallon thermal energy storage will continue the energy efficiency precedence of prior efforts.

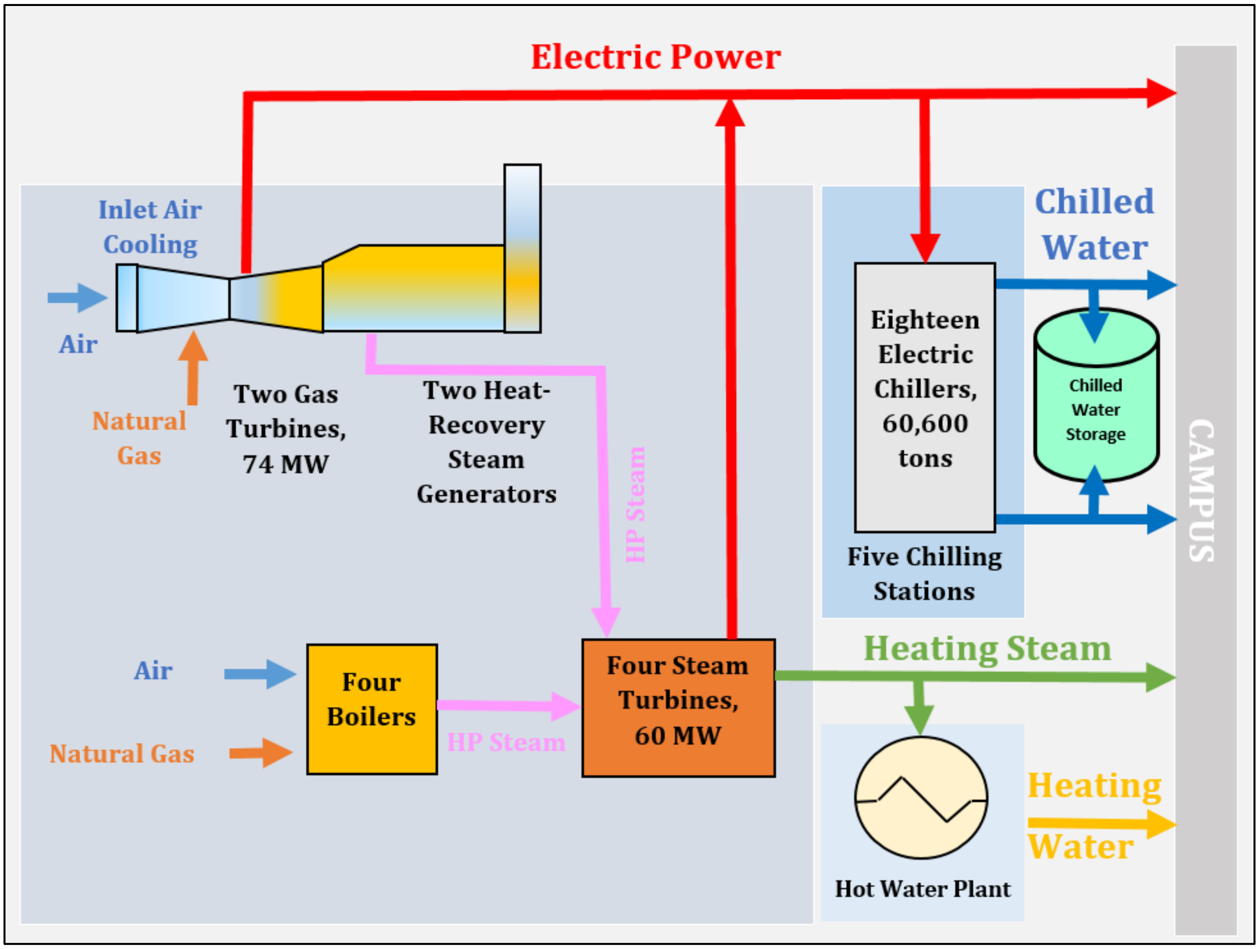

Figure 1. UT Austin Utility Overview: Waste heat from the gas turbine is recovered and output to the steam turbine. The recovered heat is then extracted as steam for heating and hot water generation in campus buildings.

The university's Energy & Water Conservation program, with limited funds, has aggressively pursued an active conservation program to reduce campus energy and water use through technical and campus engagement. There is also a goal to construct new buildings to LEED Silver in accordance with U.S. Green Building Council guidelines.

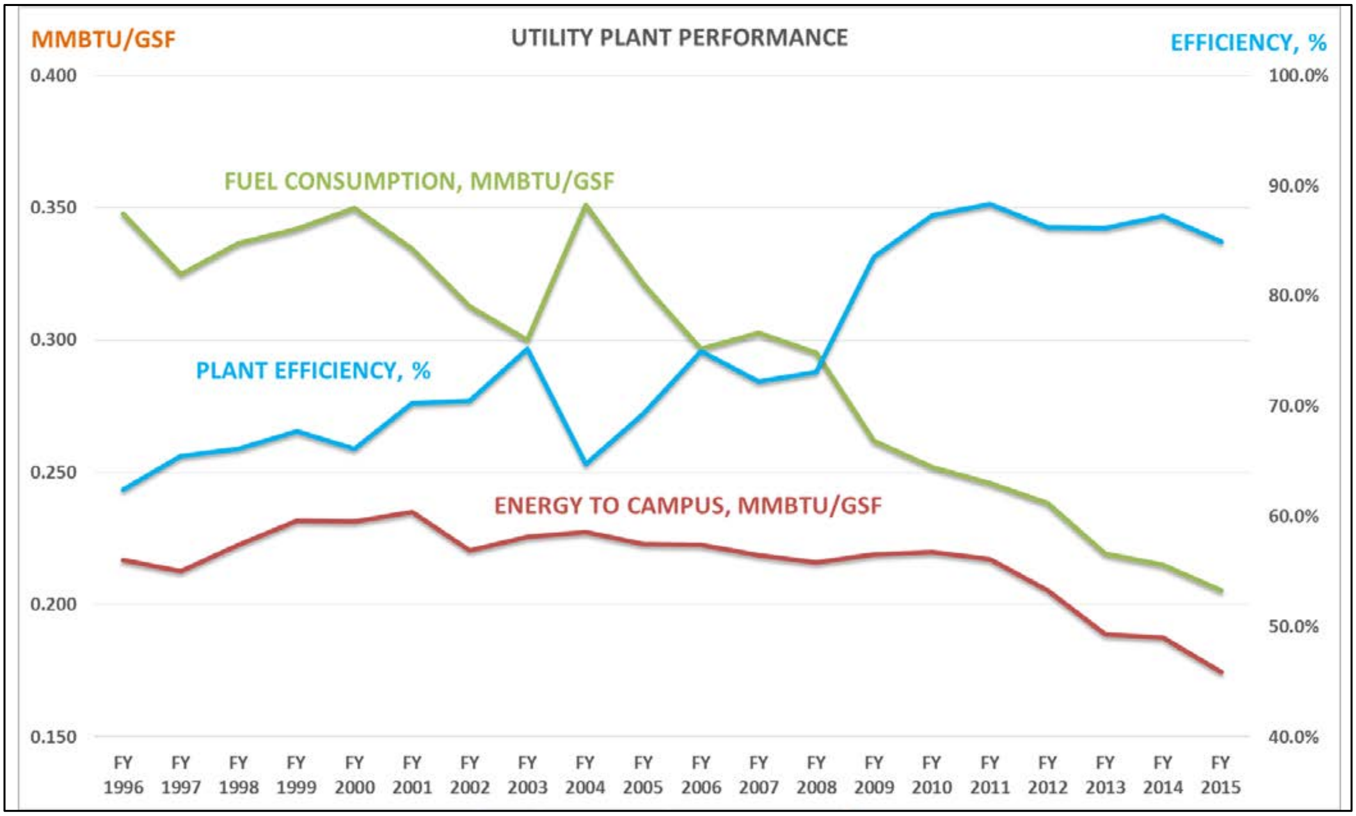

Figure 2. Carl J. Eckhardt Combined Heating and Power Complex has dramatically reduced fuel consumption and improved efficiency while maintaining energy flows to a growing campus between FY 1996 and today.

As evident in Figure 2, fuel consumption and plant efficiency have dramatically improved over the last decade, primarily due to plant improvements and demand side energy projects. However, plant efficiency is at theoretical maximum now, and any additional plant improvements will only result in incremental efficiency gains and will require much higher investments.

The power plant's newer equipment is most efficient and does most of the work. Older equipment, dating as far back as 1945, is used only when other equipment is under maintenance or demand rises enough to require additional power. Based on existing plant inventory, producing more than 70 MW electrical peak will require older equipment to be brought online, increasing operation and maintenance costs.

The Campus Master Plan developed in 2012 calls for accommodating potential space growth. Per the Master Plan, UT Austin will likely need approximately 7.2 million square feet of space over the course of the next 20 to 30 years. The UT Austin utility plants will also face higher loads when the Dell Medical School and the associated research and office facilities are expanded.

Managing peak requirements is critical to supporting the university's world-class research facilities and future space growth. However, it should be accomplished without adverse impact to plant reliability or energy cost.

- **Power Plant Expansion** – If peak power demand exceeds 80 MW, a power plant expansion will be required to ensure reliability and resiliency of the utility service. A cooling plant expansion is feasible but costly. A power plant expansion is both doubtful and costly, mainly due to space constraints on the UT Austin main campus.

- **Purchased Power** - Additional power requirements can be supplemented by purchasing electricity from Austin Energy, but this approach will negatively impact the reliability and resiliency of the utility service and purchased power is more expensive than campus generated power.

Section 2: UT Austin Demand Profile

The utility system at UT Austin continuously adjusts energy production to meet demand. Whether it is used for a science experiment in Welch Hall where uninterrupted power is critical or for recharging a phone in an outlet in the Flawn Academic Center, UT Austin power is reliable. The power system has been recognized as one of the best campus energy systems in the U.S.

The total cost of natural gas for generating the three campus utilities – electricity, chilled water (for cooling) and steam (for heating) – was near $17 million for FY 2015 (Figure 3).

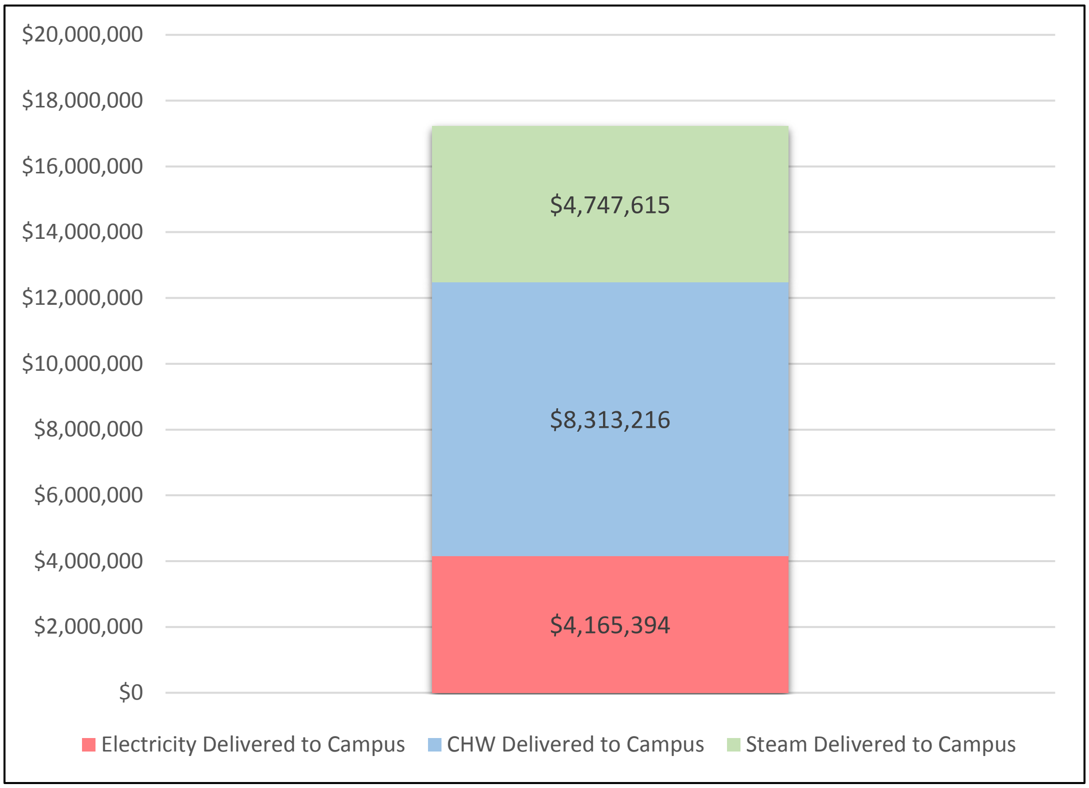

Figure 3. FY 2015 natural gas cost for generation

Figure 4 depicts the standardized natural gas fuel cost and consumption for the three campus utilities based on the area served (GSF).

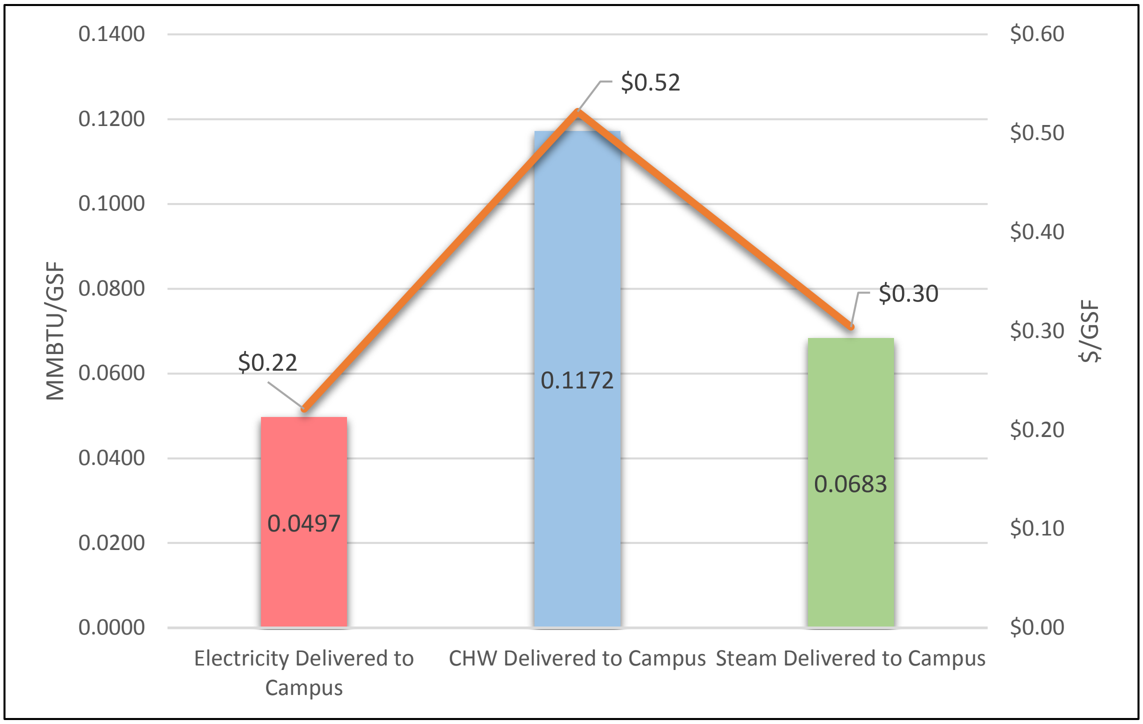

Figure 4. FY 2015 utilities standardized

Once each utility is delivered to campus, its consumption varies by building type. Figure 5 shows the breakdown of utilities consumption by the typical building categories on campus.

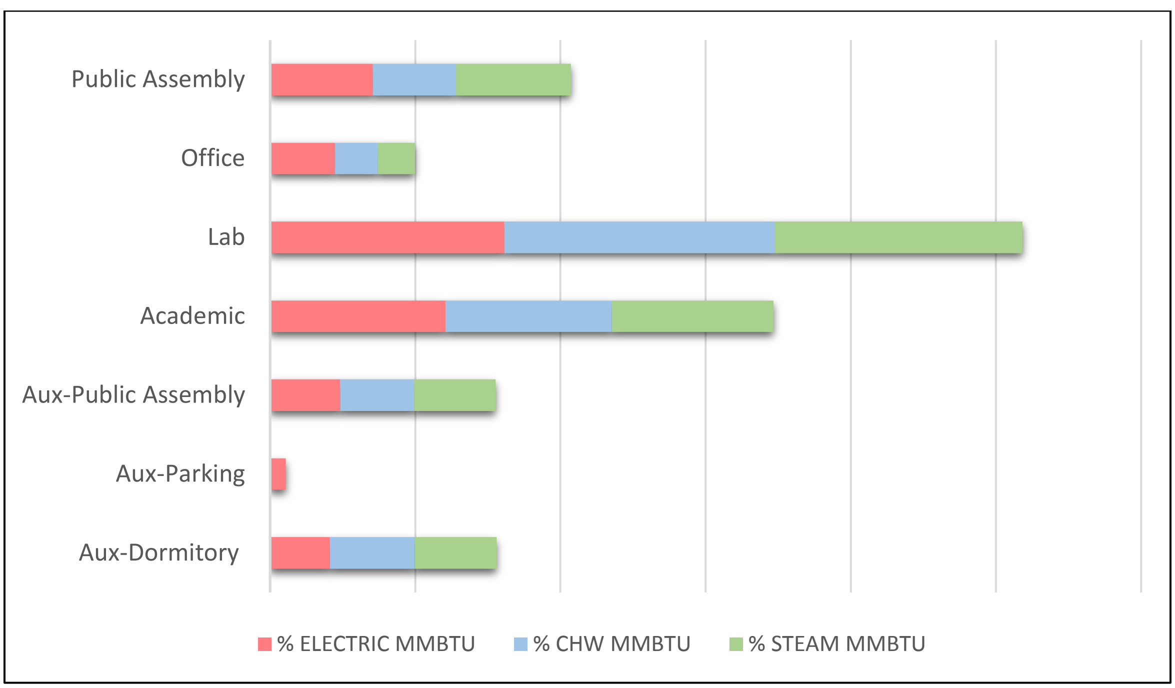

Figure 5. FY 2015 utilities breakdown by building type

As evident in Figure 5, lab buildings use the most energy on campus, followed by academic buildings. This is typical of any university with a majority of space dedicated to research and educational facilities.

The purpose of reviewing fiscal year energy data is two-fold. First, understanding current energy use data to use the information in identifying effective goals and strategies during planning ensures that the plan is focused on true gaps and needs and that the objectives identified are attainable. Second, the most current and complete energy data also serves as the baseline for forecasting future needs based on potential space growth.

To estimate potential growth, it is important to understand both historical and planned space growth. The space growth trend line in the 2012 Campus Master Plan indicates a requirement of 7.2 million GSF over the next 20 to 30 years, about 2.4 million GSF every decade.

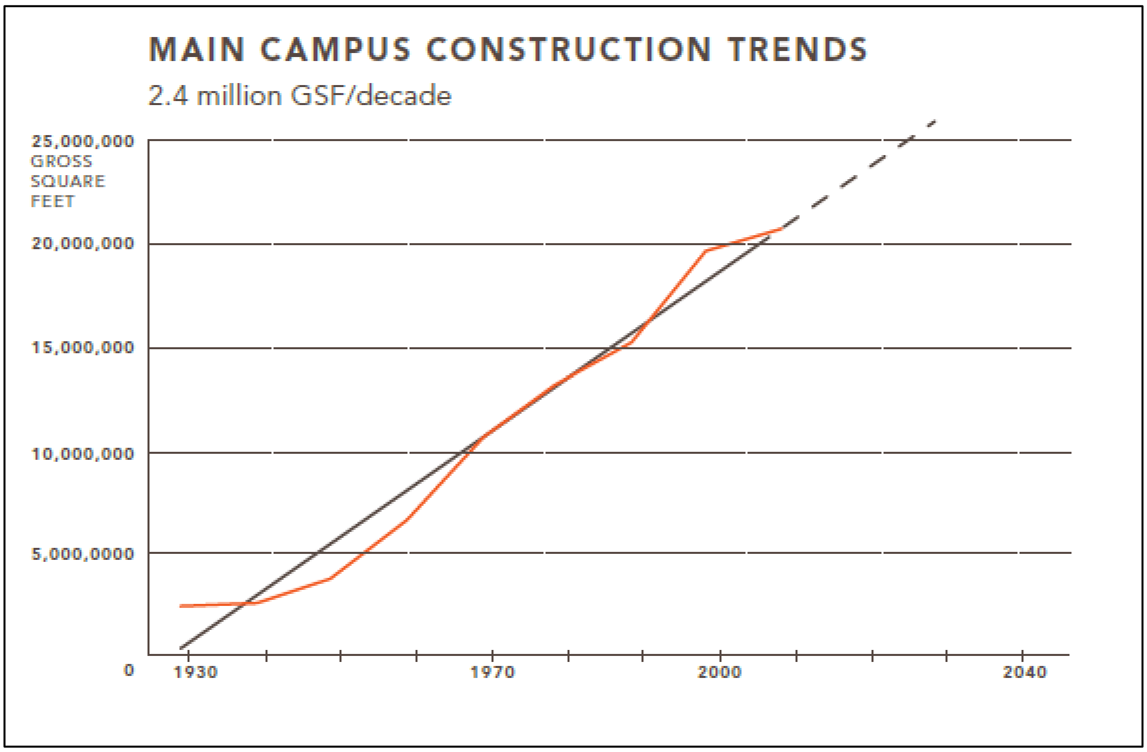

Figure 6. Growth trend line from 2012 Campus Master Plan

Energy Use Forecast

The project team reviewed planned construction and major renovation activity from the Campus Master Plan to forecast natural gas use until FY 2019. The forecast includes the following planned renovation and construction: Welch Hall renovation, Jesse H. Jones Communication Center – Building B (CMB) renovation, Dell Medical School Phase 1, Robert B. Rowling Hall, Engineering Education Research Center, Seton Hospital and East Campus Graduate Student Housing Complex.

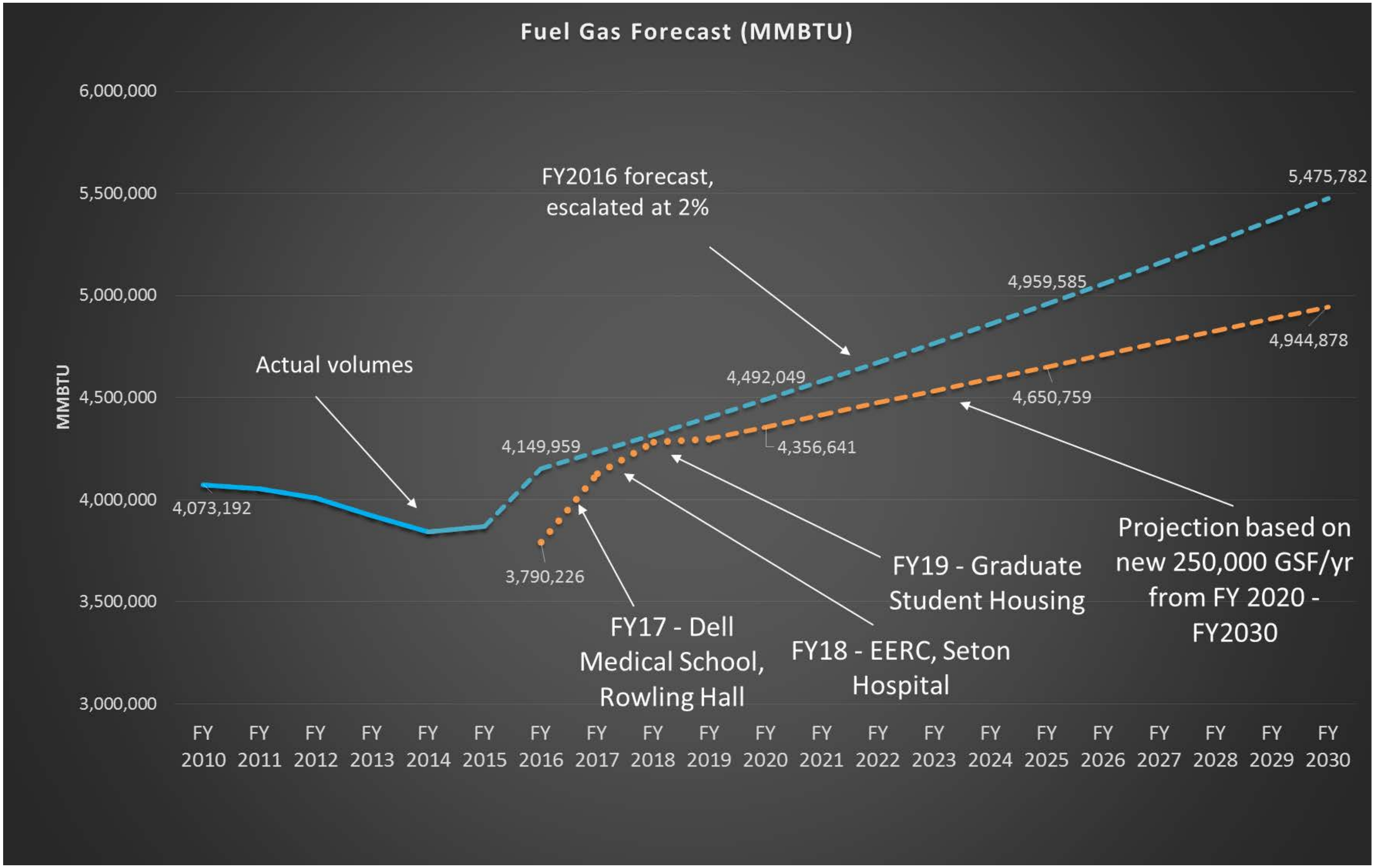

Figure 7. Natural gas forecast for FY 2016 - FY 2030

Figure 7 is a snapshot of the forecasted impact of campus growth on natural gas usage. The solid blue line indicates the actual volumes of natural gas used; the decline in usage from FY 2010 to FY 2015 shows the impact of power plant improvements and demand side efforts. The dashed blue line is a forecast for the campus natural gas usage based on historical 2 percent space growth per fiscal year. The dotted orange line is a forecast for the campus natural gas usage based on the planned renovation and construction to be operational between FY 2016 and FY 2019.

The small delta between both of the forecasts (dashed blue and dotted orange line) for FY 2019 natural gas usage validates the assumption of historical 2 percent space growth and serves as the basis for forecasting future fiscal years.

Peak Demand Forecast

Another important aspect of the energy forecast is reviewing the impact of space growth on the campus peak electrical demand. Figure 8 shows the actual and forecasted peak electrical demand. Forecasted demand for FY 2016 through FY 2019 was estimated by calculating peak loads of new buildings and renovated spaces coming online in those years. Assuming 2 percent space growth thereafter, the campus peak demand will exceed 70 MW by FY 2022.

Peak demand of over 70 MW will require older equipment to be used, thus driving up operation and maintenance costs. To maintain reliability and resiliency, both of which are critical to UT Austin operations, a power plant expansion may also be necessary. Any of these scenarios will increase the total cost of utility services to campus.

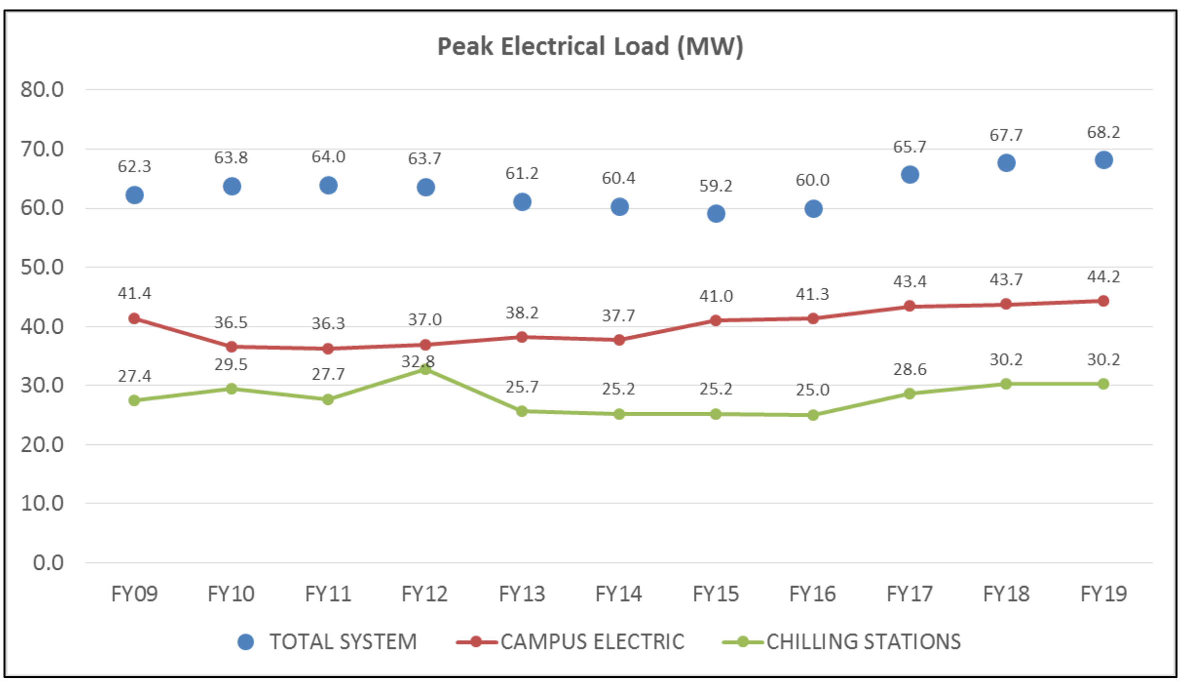

Figure 8. Peak electrical demand forecast (FY2016 - FY2019)

Section 3: Strategic Plan Development & Framework

Work on the Demand Side Strategic Plan began in the winter of FY 2016 with a project charter sponsored by the Associate Vice President of Utilities, Energy & Facilities Maintenance (UEFM). The project charter helped define the strategic plan purpose, deliverables and the project planning team. A copy of the project charter is provided as *Attachment A.*

The project team consisted of staff representing various divisions of the Planning, Energy & Facilities (PEF) organization. PEF is responsible for the planning, design, and construction management of all new buildings and major renovation projects at the university as well as generating campus energy. In all of its work, PEF advances environmental stewardship and sustainable practices.

Over the course of several months from February 2016 to August 2016, the Strategic Planning project team met bi-weekly to evaluate high-level organization strategy and investment decisions and to define the mission, goals, objectives and strategies. The team began by identifying the guiding principles for the strategic plan. These principles are the overarching objectives that inform all of the university's activities (not just energy-related ones), and reviewing and prioritizing these principles laid the foundation for the strategic plan.

Next, the project team used these guiding principles to create a focused energy mission statement that would represent the high priority principles and further solidify the foundation for the strategic plan.

In order to develop a strategic plan that will achieve the energy mission, the project team needed to understand the university's current energy profile and activities. A clear assessment of the kind of energy used and how it is used within the UT Austin campus was accomplished by studying the demand profile summarized in Section 2. Patterns of energy use are also molded by current policies, programs and projects at UT Austin, as well as by other energy activities already in place. Becoming familiar with this landscape helped the team identify ways to shape the strategic plan. An inventory of existing energy activities at UT Austin is included in *Attachment B*.

As the project team began to shape the strategic plan, it was also useful to think about the internal and external factors that were favorable and unfavorable to achieving the potential objectives and strategies. The team undertook a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) – a planning exercise to identify those internal and external factors that would enable or inhibit successful execution of the strategic plan actions.

Dr. Elida Lee, director for Human Resources Organization Effectiveness at UT Austin, facilitated the SWOT analysis. The Threats-Opportunities-Weaknesses-Strengths (TOWS) matrix tool was used to identify strategic options based on SWOT inputs provided by project team members. A TOWS matrix is a matching tool that helps develop four types of strategic options that can be used for setting goals, objectives and strategies:

- SO STRATEGIC OPTIONS - Use strengths to take advantage of opportunities
- WO STRATEGIC OPTIONS - Overcome weaknesses by taking advantage of opportunities
- ST STRATEGIC OPTIONS - Use strengths to avoid threats
- WT STRATEGIC OPTIONS - Minimize weaknesses and avoid threats

The SWOT inputs and TOWS matrix created by the project team are located in *Attachment C*.

Strategic Plan Framework

Clearly defined goals, objectives and strategies form the framework of a strategic plan's design and guide decisions about what actions (including policies, programs and projects) will be proposed.

- **Goals**: The energy goal(s) in this strategic plan are broad statements and aspirations that will move UT Austin toward its energy mission.
- **Objectives:** The objectives in this strategic plan define specific measurable results for the broad goal(s). Basically, these objectives are sub-goals and define how much of what will be accomplished by when.

  Objectives in this plan are developed in the form of a SMART+C framework:

  - ✓ Specific – target a specific topic area
  - ✓ Measureable - how much of what
  - ✓ Attainable – how much can be achieved, given available resources
  - ✓ Relevant - in line with the mission and other goals
  - ✓ Time Bound - by when
  - ✓ Challenging – stretch the objectives

  It is important to note that not all objectives can be quantifiable, and some objectives may be qualitative.

- **Strategies:** The strategies outline how this plan will reach its objectives and are designed to articulate the specific actions that collectively will achieve the objectives. The planning team further prioritized strategies as follows:

  - ✓ Critical – the one strategy most important to achieving the objective
  - ✓ High – strategies to further supplement the critical strategy OR next in importance
  - ✓ Normal – monitor actions relevant to strategies

- ✓ Low – focus once critical & high priority strategies are implemented

Section 4: Stakeholder Engagement

Stakeholder input is important throughout any strategic planning process. Therefore, identifying the right people and organizations to engage and developing an engagement strategy were priority tasks for the project team. The team guided the identification of stakeholders and planned the stakeholder engagement effort, with the project manager facilitating and managing the logistics.

Stakeholders were classified into these categories and roles:

- Technical - Solicit Expertise & Buy-In throughout the planning process
  - ✓ Utilities & Energy Management, Facilities Services, Project Management & Construction Services, Campus Planning
- Executive - Buy-In & Support
  - ✓ Vice President for University Operations, Associate Vice President for Campus Planning & Project Management
- Advisory– Solicit Input if strategies and actions impact scope of services
  - ✓ Auxiliary units, Purchasing, Environmental Health & Safety, Office of Sustainability, Office of Facilities Planning & Construction, building managers

The team sought and incorporated comments from the above stakeholders during development of the plan. Stakeholder comments addressing alternative concepts, priorities, and metrics were considered as objectives, and strategies were developed and refined.

Section 5: Strategic Plan – Mission, Goals, Objectives & Strategies

Guiding Principles

The guiding principles identified by the project team during the planning process are listed below, in no particular order:

- Comprehend unprecedented space growth currently underway.
- Minimize impact to capacity, high efficiency, long term reliability, resilience and operational costs of utility plants.
- Major capital improvements to plant and systems are likely not cost effective.
- Energy intensity resulting from increasing STEM research.
- Improve collaboration with auxiliary enterprise operations.
- Better utilization of existing space to slow down growth of energy consumption.
- Culture of conservation of campus resources that is integrated throughout campus.
- Innovative in approach and industry leader in the field.
- Maintain or improve indoor temperature, humidity, and air quality for occupants and research.
- Reduce maintenance calls and protect archives.
- Improve deferred maintenance backlogs.
- Sustainable energy funding framework to reinvest savings into future energy projects.

Mission

“Utilize innovative demand side energy management strategies to offset projected campus energy growth.”

The basis for the mission statement is that space and related energy growth forecasted in the demand profile cannot be supported by existing capacity and operations of the utility plant. The majority of the guiding principles point toward a common theme of improving energy use in existing building space, operations and processes.

Investment in improving energy usage of campus space is in alignment with the energy conservation task set out by the 2012 Campus Master Plan. The Master Plan states “Energy infrastructure at UT Austin is highly efficient on the supply side, and future opportunities for efficiency and investment relate to existing and new building systems and demand reduction.

Furthermore, investment in energy efficiency and conservation projects will also address Objective 3.1 of the UEM strategic plan developed in 2010 – 'Strike a balance between fuel use, generation of energy, and the use of energy by campus.'"

Goal

"Reduce the average EUI on main campus by at least 2% annually."

The basis for the goal is that, as noted in Section 2, power plant improvements and demand side efforts since FY 2009 have reduced fuel consumption and EUI significantly. This reduction is even more dramatic given that the actual campus area served by the power plant has increased by more than 3 million square feet between FY 2009 and FY 2015.

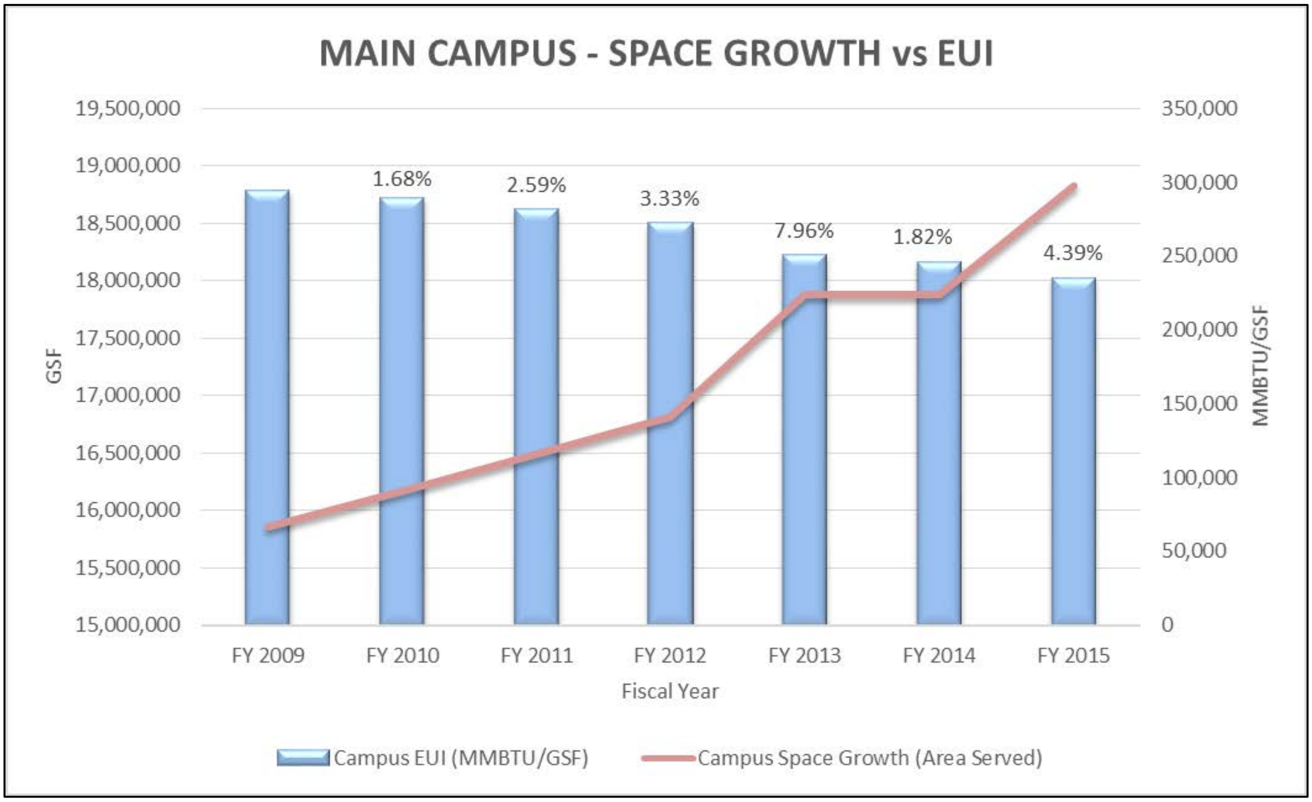

Figure 9. Campus EUI reduction

Energy Use Intensity, commonly referred to as EUI, is a metric that expresses energy use as a function of size or other characteristics. In this case, it is calculated by dividing the total energy consumed by the campus in one fiscal year (measured in MMBTU) by the total gross floor area served. Generally, a low EUI signifies good energy performance.

The UT Austin campus EUI has shown an average 4 percent reduction over the past five fiscal years despite space growth. This validates the impact of past and current energy activities and makes the case for a future goal to reduce the average EUI on main campus by at least 2 percent annually.

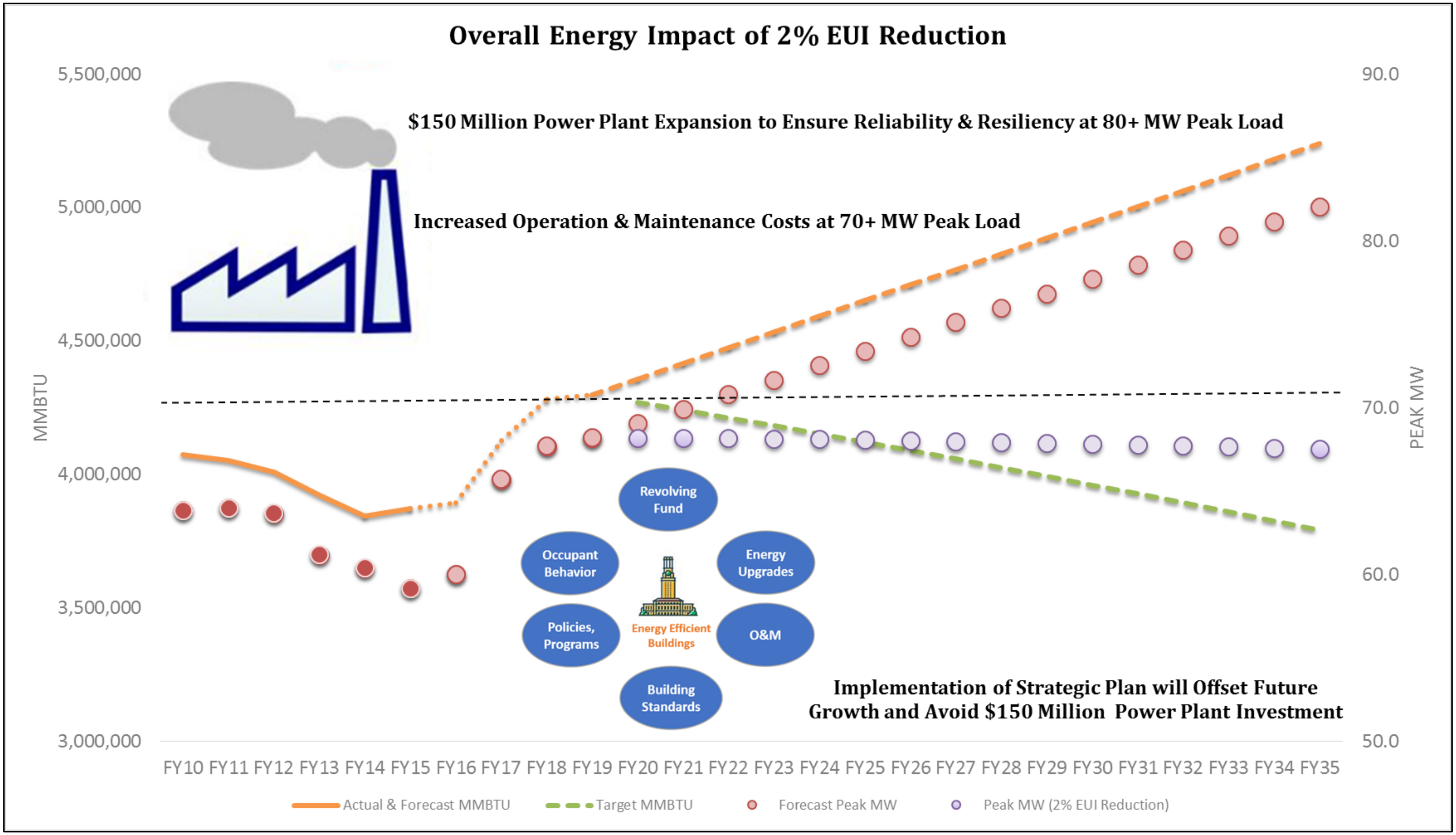

Figure10. Energy impact of the Demand Side Strategic Plan versus maintaining status quo

Figure 10 is a visualization of the analysis conducted to determine natural gas use and peak demand based on an annual goal of 2 percent EUI reduction. The analysis indicates that peak demand beyond FY 2035 will stay below 70 MW if 2 percent EUI reduction is maintained through investment in demand side energy efficiency and conservation projects. The analysis also indicates that a power plant expansion will be necessary in the near future if space growth is not offset by the 2 percent EUI reduction goal.

A power plant expansion currently estimated at $150 million will not be a cost effective solution for the university. On the other hand, investment in Demand Side Energy Projects requires relatively small capital cost and is a good business practice resulting in pure savings. Such investment should be made into a revolving fund to implement energy efficiency projects that generate savings. These savings will be tracked and then used to replenish the fund for the next round of energy efficiency investments.

Goal Topic Areas

The goal of 2 percent EUI reduction is attainable but also challenging given that the reduction has to be sustained annually until FY 2035. To address this challenge, the project team concluded that it was important to complement energy improvements in the physical space via operations and occupant behavior. The project team identified the following three topic areas for goal, objectives and strategy setting, since these areas encompass operations and occupants in both existing and new space.

- **Building Optimization, Operations & Maintenance (BOOM)**
  - ✓ Improve demand side energy efficiency while maintaining indoor environmental quality - Projects
  - ✓ Improve demand side energy efficiency while maintaining indoor environmental quality - Operations & Maintenance
- **Campus Construction & Renovation**
  - ✓ Maximize the energy efficiency of new construction & renovation projects while maintaining building environmental needs & operational effectiveness
- **Energy Conservation Culture**
  - ✓ Instill an enduring campus-wide culture of energy conservation at all levels of the institution

Objectives & Strategies

The project team developed the following objectives and strategies for the goal topic areas. Each objective is assigned a measurable (if applicable) using the SMART+C framework. The team prioritized strategies to focus on actions critical to the objective.

Building Optimization, Operations & Maintenance (BOOM)

Goal: Improve demand side energy efficiency while maintaining indoor environmental quality – Projects		
OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
1. Research and pursue available sources to maximize funding	1.1 Establish a revolving fund for energy efficiency projects	Critical
	1.2 Use Lone Star energy funds through State Energy Conservation Office (SECO)	Normal
	1.3 Investigate and pursue alternative funding sources	Normal
	1.4 Leverage creative financing opportunities offered by Energy Service Companies (ESCOs)	Low
	1.5 Use Replacement Renewal Program funds when applicable	High
	1.6 Use Green Fee funds when applicable	Normal
	1.7 Develop Cost Sharing mechanisms with E&G clients	High
	1.8 Assist auxiliary enterprises on a cost-recovery basis with project financing	High
Objective Measurable: Secure $7.5 million or higher to invest in demand side energy efficiency projects		
Objective Timeline: FY 2017 – FY 2019		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
2. Develop and execute a portfolio of projects	2.1 Implement a PPM process for optimal Energy Conservation Measures (ECM) selection (for revolving fund projects)	Critical
	2.2 Supplement other capital projects with ECM opportunities	High
	2.3 Utilize the existing Measurement & Verification (M&V) framework to ensure savings realization and sustenance	Normal
	2.4 Utilize in-house expertise to develop & deliver efficient & cost-effective projects	High
	2.5 Leverage external expertise to develop and deliver projects when practical	Normal
Objective Measurable: Maintain energy consumption at or below FY 2019 level		
Objective Timeline: FY 2020 – FY 2035		

Goal: Improve demand side energy efficiency while maintaining indoor environmental quality - Operations & Maintenance		
OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
3. Identify and implement control schemes in existing system levels	3.1 Continue using ECM criteria matrix to identify commissioning projects	High
	3.2 Develop M&V framework for O&M activities	Critical
	3.3 Evaluate and utilize innovative software tools	Normal
Objective Measurable: Implement control scheme improvements in at least 2-3 buildings per fiscal year		
Objective Timeline: FY 2017 – FY 2035		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
4. Identify and correct maintenance issues with energy impact	4.1 Utilize retro-commissioning resources to improve existing buildings and systems	Critical
	4.2 Collaborate with maintenance personnel to identify and correct deficiencies	High
	4.3 Evaluate and utilize innovative software tools	High
Objective Measurable: Investigate and resolve (as necessary) at least 20 maintenance issues per fiscal year		
Objective Timeline: FY 2017 – FY 2035		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
5. Ensure proper maintenance of ECMs to sustain energy objectives	5.1 Implement technologies that offset maintenance needs	Normal
	5.2 Identify and obtain resources to properly maintain ECMs	Critical
	5.3 Invest in training needs for new technologies	High
	5.4 Develop and implement a strong preventative maintenance program	High
Objective Measurable: Perform 100% of the critical preventative maintenance tasks established for the ECMs.		
Objective Timeline: FY 2020 – FY 2035		

Campus Construction & Renovation

Goal: Maximize the energy efficiency of new construction & renovation projects while maintaining building environmental needs & operational effectiveness		
OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
6. Meet or exceed the EUI targets for new construction	6.1 Evaluate and document options for effective space utilization	Normal
	6.2 Enforce technical reviews and standards for projects	High
	6.3 -Convince leaders and decision makers to emphasize life cycle costs versus first costs	Critical
	6.4 –Ensure design teams meet energy performance targets	Critical
Objective Measurable: Achieve or exceed proposed EUI targets for all new construction as established and updated in the "STOR" document.		
Objective Timeline: FY 2017 – FY 2035		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
7. Utilize renovation projects to improve building system efficiency & EUI	7.1 Evaluate and document options for effective space utilization	Normal
	7.2 Enforce technical reviews and standards for projects	Critical
	7.3 Maximize strategic implementation of Direct Digital Controls (DDC)	High
	7.4 Optimize energy savings for renovation projects during the planning stage	High
	7.5 Convince leaders and decision makers to emphasize life cycle costs versus first costs	Critical
Objective Measurable: Improve actual baseline EUI as established and updated in the "EUI Fiscal Year Spreadsheet"		
Objective Timeline: FY 2017 – FY 2035		

Conservation Culture

Goal: Instill an enduring campus wide culture of energy conservation at all levels of the institution		
OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
8. Engage campus executives & leadership to understand and endorse the importance of energy conservation	8.1 Provide portfolio level energy data	High
	8.2 Develop and institutionalize energy policies and purchasing standards	Critical
	8.3 Evaluate feasibility of implementing an energy efficient equipment purchase rebate program on campus	Normal
	8.4 Develop methodology for determining energy impact of current & future space utilization	Normal
Objective Measurable: Review and recommend energy policies and standards to be endorsed by the institution.		
Objective Timeline: FY 2017 – FY 2035		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
9. Continue to improve collaboration between internal PEF departments	9.1 Implement low cost recognition and communication programs to incentivize energy conservation efforts	Critical
	9.2 Support and encourage the use of internal energy expertise for renovation & new construction projects	High
Objective Measurable: N/A.		
Objective Timeline: FY 2017 – FY 2035		

OBJECTIVE	**STRATEGIES**	**PRIORITY LEVEL**
10. Continue to develop and implement energy behavior programs for students, staff & faculty	10.1 Increase participation in existing and new behavior programs	High
	10.2 Provide accessible and easy to understand energy information resources	High
	10.3 Educate on benefits of personal energy conservation behavior to reduce energy usage	Normal
Objective Measurable: Increase campus awareness, engagement and participation in energy conservation activities by X% every fiscal year. (measurable will be determined under strategy 10.1)		
Objective Timeline: FY 2020 – FY 2035		

Section 6: Strategic Plan Implementation

After finalizing objectives and strategies, an action plan was developed by the Utilities & Energy Management team. The action plan will assure focus on relevant activities and provide guidance to the implementation teams.

Currently, the action plan focuses on critical and high priority strategies and will be managed under direction by the Associate Vice President of UEFM.

Terms & Definitions

Auxiliary: Entities which exist primarily to provide goods and services to students, faculty, staff, and the general public.

Combined heat and power (CHP): CHP systems, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated system.

Direct digital control (DDC): DDC is the automated control of a condition or process by a digital device (computer).

Delta T: Delta T is the most common use of the word delta in the HVAC industry, meaning temperature difference between supply and return temperature of chilled and hot water.

Demand Side: Consumer demand for utilities such as electricity, cooling and heating.

District Energy System: District energy systems produce steam, hot water or chilled water at a central plant. The steam, hot water or chilled water is then piped underground to individual buildings for space heating, domestic hot water heating and air conditioning.

Educational & General (E&G): Educational and General entities such as colleges and departments.

Energy Service Companies (ESCO): A commercial or non-profit business providing a broad range of energy solutions including designs and implementation of energy savings projects.

Fiscal Year (FY): Fiscal Year (FY) at UT Austin runs from September 1 through August 31, e.g., FY 2015: September 2014 until August 2015.

Green Fee: UT Austin Green Fee program funds projects that advance sustainability on campus.

LEED: Leadership in Energy & Environmental Design (LEED) is a green building certification program sponsored by the U.S. Green Building Council that recognizes best-in-class building strategies and practices.

Life Cycle Cost: Sum of all recurring and one-time (non-recurring) costs over the full life span or a specified period of a good, service, structure, or system.

Measurement & Verification (M&V): M&V is the process of using measurement to reliably determine actual energy savings created within an individual facility or building.

Operations and Maintenance (O&M): O&M is required training and work practices to maintain equipment and facilities in good condition.

Peak Demand: Peak demand describes a period in which electrical power is expected to be provided for a sustained period at a significantly higher than average supply level.

Preventative Maintenance: Maintenance that is regularly performed on a piece of equipment to lessen the likelihood of it failing.

Project Portfolio Management (PPM): PPM is the centralized management of one or more portfolios, which includes identifying, prioritizing, authorizing, managing and controlling projects, programs or other related work to achieve specific strategic business objectives.

Replacement & Renewal: The Replacement and Renewal (R&R) Program, a branch of the UT Austin Project Management & Construction Services Department (PMCS), supports the university's operations by prioritizing and funding projects that help to keep our buildings operational and safe.

Retro-Commissioning: Retro-commissioning is the application of the commissioning process to existing buildings. Retro-commissioning is a process that seeks to improve how building equipment and systems function together.

Revolving Fund: An internal fund that provides financing to parties within an organization to implement energy efficiency projects that generate cost savings. These savings are tracked and used to replenish the fund for the next round of green investments.

State Energy Office (SECO): SECO partners with Texas consumers, businesses, educators and local governments to reduce energy costs and maximize efficiency.

STEM: The academic disciplines of science, technology, engineering and mathematics.

Supply Side: Energy resource utilization to ensure generation, transmission and distribution of utilities.

Attachment A: Project Charter

What Starts Here Changes The World
THE UNIVERSITY OF TEXAS AT AUSTIN

Utilities & Energy Management

Project Charter

Project Title: Demand Side Strategic Plan

Institution: The University of Texas at Austin (UT Austin)

Organization: Utilities, Energy & Facilities Management (UEFM)

Executive Sponsor Dr. Patricia Clubb, University Operations

Project Sponsor: Juan Ontiveros, UEFM

Project Manager: Tejas Pevekar, UEM

Date: June 28, 2016

Version: v1.4

Version History

Version #	Implemented By	Version Date	Approved By	Approval Date	Revisions included in next version
Draft	Tejas Pevekar	11/04/2015	Juan Ontiveros	11/05/2015	Revised timeline Revised project team
1.0	Tejas Pevekar	11/10/2015	Juan Ontiveros	12/14/2015	Updated project deliverables Revised timeline Updated project team
1.1	Tejas Pevekar	12/17/2015	Juan Ontiveros	1/5/2016	Updated resource plans in project scope
1.2	Tejas Pevekar	1/8/2016			Added project objective Revised timeline
1.3	Tejas Pevekar	3/8/2016			Specified stakeholders engagement Revised timeline
1.4	Tejas Pevekar	6/28/2016			

SECTION 1 – INTRODUCTION

1.01 Purpose of Project Charter

The Demand Side Strategic Plan charter outlines the project scope, objectives & timeline, identifies the main stakeholders, and provides delineation of roles and responsibilities for this project.

The intended audience of the Demand Side Strategic Plan project charter is the executive sponsor, project sponsor, senior leadership and project team members.

SECTION 2 – PROJECT OVERVIEW

2.01 Project Background

The Campus Master Plan developed in 2012 calls for accommodating potential space growth. Per the Master Plan, UT Austin will likely need ~6.5 million square feet of space over the course of the next 20 to 30 years. Such growth is essential and inevitable for a world-class research university. The challenge is to preserve and enhance the university's utility supply assets in the context of this growth. Continued investment in energy conservation projects for existing campus buildings will reduce utility demand and assist in managing peak electrical and cooling needs without large capital investments on the power plant side.

Investment in energy conservation projects will also address Objective 3.1 of the UEM strategic plan developed in 2010. UEFM will be restructuring existing FOM demand side programs into a new program "Efficiency & Optimization" to further address the energy conservation task outlined in the campus master plan. This program will utilize a Project Portfolio Management approach to <u>select</u> energy conservation measures (ECMs) that meet organizational objectives and strategies. Linking strategic plan to portfolio management will allow review and prioritization of high value ECMs.

2.02 Project Scope

This project envisions development of a demand side strategic plan evaluating high-level organization strategy/investment decisions and defining the mission, goals, objectives and strategies. The scope of the strategic plan should consider related strategies and directives included in existing plans, policies, and guidelines, including but not limited to the following:

- UEM Strategic Plan (2010)
- 2012 Campus Master Plan
- 2013 Medical District Master Plan
- 2015 East Campus Master Plan
- Natural Resources Conservation Plan (2012) & Progress Report (2014)
- UT Austin Sustainability Policy (2008)
- UT System Sustainability Policy (2009 & 2012)
- Energy & Water Conservation Program Strategic Goal (FY 2015/16)

- Utilities Master Plan (In Progress)

The strategic plan needs to consider organization core competencies and needs, and how those will be used to – manage stakeholder value, capitalize on opportunities, minimize the impact of future space growth and respond to changes in campus environment.

2.03 Project Objectives

The scope of this project is to develop a demand side strategic plan, primarily for existing campus buildings, and to define the following individual components:

- **Vision (The Dream)** – a representation of what the program wants to look like in the future.
- **Mission (The What & Why)** – the mission statement will describe *what* the program is going to do, and *why* it's going to do that.
- **Goals (Statements, Aspirations)** – these will be broad and inclusive, and will align with the mission.
- **Objectives (How much of what will be accomplished by when)** – will define specific measurable results for the programs broad goals.
- **Strategies (The how)** – will outline how the program will reach its objectives.

Figure 1. Alignment of Portfolio Management with Strategy

2.04 Project Deliverables

The following deliverables should be achieved in order for the project objectives to be satisfied:

- Development of short-term and long-term goals, with a clear definition of timelines.
- Establishment of quantifiable and time-constrained objectives to measure success and progress towards goals.
- Discussion of qualitative objectives that may not have clear measurable units.
- Analysis of a full range of energy strategies, with priority level of each strategy, and the indicators that will trigger adjustments to these strategies.
- Preliminary list of ECM benefits/criteria, objectively aligned to strategy.

2.05 Project Constraints & Boundaries

There is no budget allocation for this project. If expenditures for any reason are deemed necessary, specific authorization for expenses will be required.

The following items are not within the scope of this project:

- Governance and methodology of portfolio management approach
- Analysis of specific ECMs, technologies and tactics
- Analysis and strategies for power plant generation and efficiency

2.06 Project Timeline

- Distribution of Charter – Mid November, 2015
- Feedback & Approval of Charter – January 2016
- Project Kick-off Meeting –January 2016
- Strategic Planning Sessions –February, March, April, May, June & July 2016
- Stakeholder Communication & Feedback –March – July 2016
- 90% Draft of Strategic Plan – Mid July, 2016
- Final Version of Strategic Plan – Aug 30, 2016

SECTION 3 – PROJECT ORGANIZATION

3.01 Project Personnel & Stakeholders

Project team as proposed include key stakeholders representing as a minimum, UEM, Facilities Services, PMCS, Campus Planning and Office of Sustainability. Initially the project team will have the following members:

- Juan Ontiveros, UEFM
- Tejas Pevekar, UEM
- Mike Manoucheri, UEM
- Roberto DelReal, UEM
- Stephanie Perrone, UEM
- Amanda Berens, UEM
- Dean Hansen, Facilities Services
- Aziz Hussaini, PMCS
- Butch Kuecks, Campus Planning
- Jim Walker, Office of Sustainability
- Mark White, Facilities Services

Campus stakeholders will be kept informed about the status of the project via notifications and meetings. Campus stakeholders will be able to provide feedback on goals, objectives and strategies contained in the final plan. The stakeholders will be classified into the following listed categories.

- Technical – Solicit Expertise & Buy-In
  - UEM, Facilities, PMCS, Campus Planning
- Executive – Buy-In & Support
  - VP Operations, AVP CPPM
- Advisory – Solicit Input
  - Auxiliary Units, Purchasing, EH&S, Sustainability, OFPC, Building Mgrs.
- External – Inform & Educate, with feedback mechanism
  - Academic Units, Energy Groups, Student Groups

Engagement Milestones	Notification of DSSP Purpose	Feedback -Goals/ Objectives	Feedback - Strategies	Approval – Final DSSP
Technical	Email	One-on-one meetings	One-on-one meetings	X
Executive	Informed	One-on-one meetings	One-on-one meetings	X
Advisory	TBD		One-on-one meetings–as needed	
External				

3.02 Project Governance & Authority

Project team members will contribute constructively at planning sessions and seek to develop concurrence amongst stakeholders. If issues arise that cannot be resolved within the team, Project Sponsor shall escalate to Executive Sponsor for resolution.

Project Manager is tasked with responsibility for ensuring that the objectives, deliverables and timeline outlined in this project charter are achieved.

Project Sponsor will be responsible for approving all change requests to the project scope, objectives & timeline and final approval of the Strategic Plan.

SECTION 4 – PROJECT CHARTER APPROVAL

4.01 Approval

The undersigned acknowledge that they have reviewed and approve the Demand Side Strategic Plan project charter. Approval of the Charter indicates an understanding of the purpose and content of this charter. By signing this charter, each individual agrees that work will initiate on this project and necessary time and effort will be committed by team members.

Role	Name	Signature	Date
Executive Sponsor	Dr. Patricia Clubb		
Project Sponsor	Juan Ontiveros		

Role	Name	Signature	Date
Project Manager	Tejas Pevekar		
Project Team Member	Mike Manoucheri		
Project Team Member	Roberto Del Real		
Project Team Member	Stephanie Perrone		
Project Team Member	Amanda Berens		
Project Team Member	Dean Hansen		
Project Team Member	Aziz Hussaini		
Project Team Member	Butch Kuecks		
Project Team Member	Jim Walker		
Project Team Member	Mark White		

APPENDIX A: REFERENCES

Document Name and Version	Location
UEM Strategic Plan (2010)	https://www.utexas.edu/utilities/about/StrategicPlan2010.pdf
2012 Campus Master Plan 2013 Medical District Master Plan 2015 East Campus Master Plan	http://www.utexas.edu/campusplanning/masterplan/
Natural Resources Conservation Plan (2012) & Progress Report (2014)	http://www.utexas.edu/sustainability/documents/NaturalResourcePlan_Spring2012_final.pdf http://www.utexas.edu/sustainability/documents/NaturalResourceConservationPlan_Spring2014_ProgressReport.pdf
UT Austin Sustainability Policy (2008)	http://www.policies.utexas.edu/policies/campus-sustainability
UT System Sustainability Policy (2009 & 2012)	http://www.utsystem.edu/board-of-regents/policy-library/policies/uts169-sustainability-practices
Energy & Water Conservation Program Strategic Goal (FY 2015/16)	http://www.utexas.edu/facilities/EWC/documents/EWC-2015-2016-Strategic-Goals.pdf

APPENDIX B: VERSION REVISIONS

Version 1.0

- Section 2.01 – Added language pertaining to UEM 2010 strategic plan
- Section 2.02 – Listed EWC Strategic Goal document
- Section 2.03 – Labeled figure
- Section 2.06 – Revised project timeline
- Section 3.01 – Added Ryan Thompson and Amanda Berens as proposed project team members
- Section 4.01 – Updated table per the project team member revisions

Version 1.1

- Section 2.01 – Language edit
- Section 2.02 – Language edit
- Section 2.03 – Elaborated project objectives
- Section 2.04 – Revised and added project deliverables
- Section 2.06 – Revised timeline
- Section 3.01 & 4.01 – Revised project team
- Appendix – Updated document link

Version 1.2

- Section 2.02 – Revised and added resource plans
- Appendix A – Revised resource plans

Version 1.3

- Section 2.03 – Added project objective
- Section 2.06 – Revised timeline
- Section 3.01 – Updated department for project team members

Version 1.4

- Section 2.06 – Revised Timeline
- Section 3.01 – Specified campus stakeholders

Attachment B: Energy Activities

Inventory of Energy Activities

Inventory of existing and potential energy activities, including policies, programs, and projects, and other relevant jurisdictional plans

Activity #	Activity Type	Activity Title	What	Who	Status
1	Program	Behavior Program, Marketing & Communications	Longhorn Lights Out Program	EWC	Ongoing
2	Program	Behavior Program, Marketing & Communications	Horns Up, Sash Down Program	EWC	Ongoing
3	Program	Behavior Program, Marketing & Communications	HERO Program	EWC	Ongoing
4	Program	Behavior Program, Marketing & Communications	EWC Marketing and communication	EWC	Ongoing
5	Program	Behavior Program, Marketing & Communications	Training program for autoclaves management	EWC	Ongoing
6	Tool	Behavior Program, Marketing & Communications	UT JouleBug	EWC	Past
7	Program	Behavior Program, Marketing & Communications	Ultra Low Freezer Program	EWC	Past
8	Program	Behavior Program, Marketing & Communications	Power Down Assessments	EWC	Past
9	Project	Component Replacement	Valve Replacements	EWC, BOT	Ongoing
10	Project	Component Replacement	Sensor Replacements	EWC, BOT	Ongoing
11	Project	Component Replacement	Lighting Initiative Project	EWC	Ongoing
12	Project	Component Replacement	Global Sensor Project	EWC	Ongoing
13	Project	Component Replacement	VFD for AHU fans	FOM, BOT	Ongoing
14	Project	Component Replacement	Steam Trap Replacements	FOM, BOT	Ongoing

15	Project	Component Replacement	Clean & Repair Coils	FOM, BOT	Ongoing
16	Project	BAS Optimization	Programmed Schedules - AHU, Exhaust Fans, Fume Hoods	EWC, Building Analysts	Past
17	Project	BAS Optimization	Programmed Resets - AHUs, Waterside	EWC, Building Analysts	Past
18	Project	BAS Optimization	Unoccupied & Shutdown Scheduling	EWC, Building Analysts	Ongoing
19	Project	BAS Optimization	Ventilation Optimization	EWC, Building Analysts	Ongoing
20	Project	BAS Optimization	Limit simultaneous heating and cooling	EWC, Building Analysts	Ongoing
21	Project	BAS Optimization	BAS Upgrades	FOM	Ongoing
22	Project	BAS Optimization	Controls upgrades for HVAC & air distribution systems	PMCS	Ongoing
23	Project	Commissioning	Existing Building Cx	EWC	Ongoing
24	Project	Commissioning	Rouge Zone	EWC, Building Analysts	Ongoing
25	Tool	Commissioning	Variance Report	EWC	Ongoing
26	Project	Commissioning	Retrocommissioning	FOM	Ongoing
27	Tool	Commissioning	ECM Criteria Spreadsheet	EWC	Ongoing
28	Policy	Operational	Operational Policy- developed pending approval	EWC	Ongoing
29	Policy	Operational	Purchasing Policy- developed pending approval	EWC	Ongoing
30	Program	Operational	Verdiem computer power management	EWC	Ongoing
31	Other	Operational	Assessment of humidification systems in laboratories	EWC	Ongoing

32	Other	Operational	Assessment of air filters for AHUs-Filter Matrix	EWC	Ongoing
33	Tool	Operational	EUI Analysis	EWC	Ongoing
34	Tool	Operational	EBCx analysis	EWC	Ongoing
35	Project	Mechanical Systems	HVAC Systems Replacement & Renovation	PMCS	Ongoing
36	Project	Electrical Systems	Electrical Renovation	PMCS	Ongoing
37	Program	Building Metering	Electric, CHW, Steam & Water Meters	UEM	Ongoing
38	Tool	Measurement & Verification	Framework	UEM	Ongoing
39	Tool	Energy Dashboards	PRISM, Energy Portal	UEM	Ongoing
40	Program	Operational	Chilling Station Optimization	UEM	Ongoing

Attachment C: SWOT Inputs & TOWS Matrix

#	What are the internal strengths of to be leveraged?	#	What are the internal weaknesses to consider?
S1	**DIVERSE EXPERTISE**	W1	**PLANNING AND PROCESSES**
	Technical expertise in diverse areas		Determining what would follow a formal PPM process and what would not
	Team combine experience in setting up and meeting objectives and goals		Approved method for estimated savings for PPM process
	Diversity of technical expertise and skills of team		No formal project screening, selection and priortization
	Diversity of group - related to different pofessional backgrounds		Undefined Processes for Project Development & Engineering
	Diversity of group - related to different UT departements experiece and interests		Access to and systematic process for program and project files- modeling, LEED documentation, etc
	In-house Technical Expertise		Unclear specific staff roles and priorites to focus on most valuable efforts
	Behavioral & Conservation Expertise		
		W2	**RESOURCES AND TIME**
S2	**UTILITIES DATA**		Limited resources- funding, staffing, time
	Energy Data Capability & Availability		Time frame for this plan and avaialiblity of team to meet/contribute
	Existing data that Utilitites has on campus		Limited time to come up with strategies
	Utilities data availabilty and readiness		
		W3	**TECHNOLOGY**
S3	**DIVERSE STAKEHOLDER RELATIONSHIPS**		Lack of digital controls on all building systems
	Relationships with internal operational staff in PMCS and FOM		Lack of fault detection software and optimization software with associated protocol
	Diversity of group - relationship with different campus entities and exterior community		
	Relationships with clients on campus	W4	**NEW BUILDINGS**
			New buildings not necessarily the most energy efficient
S4	**TEAM EFFORT**		New buildings design with initial cost in mind and not life cycle cost
	Team work approach		Lack of energy focused standards for building constructuion
	Team engagement and interest in energy savings and programs		
			OTHER
	OTHER	W5	No incentives or rewards to encourage energy conservation across campus
S5	Management involvement	W6	Senior university administration buy-in
S6	Track record that Energy Stewards have with implementation on campus	W7	Organizational structure-Siloed structure-Size of the organization large
S7	Have a blank slate to work from - optimistic	W8	Workforce technical skills training
S8	Juan presence on OFPC part of executive leadership group	W9	Do not solve problems in a holistic manner
S9	VPUO support	W10	Segregated budgets
S10	Demand Side Program presence in the sustainability master plan	W11	Operating with current deficit budgets
		W12	Lack of sustaining existing ECMs

#	What external opportunities exist in the environment that we should be taking advantage of?	#	What external threats in the environment do we need to manage effectively?
O1	**PROCESSES**	T1	**DIFFERENT PRIORITIES**
	Proven Energy Project Development & Engineering Process		Priorities differences in various colleges
	Project Portfolio Management Approach		Research funding as a priority versus operational funding sources from leadership
	Continuous commissioning process		Different priorities at upper management level
	Measurement & Verification protocol		
		T2	**LACK OF EXECUTIVE SUPPORT**
O2	**TOOLS**		Not getting executive management support
	Energy Portal and analysis tools		Executive leadership support
	Energineering tools and calculators		
	Existing energy models and software		**OTHER**
		T3	Definition of objectives may not be the same for all external customers
O3	**BENCHMARKING**	T4	Not do anything and maintain status quo
	Benchmark with other universities	T5	Colleges, Executive management, board of regents may not be not looking at Life Cycle cost
	See what our peer institutions have done	T6	Reduced natural gas costs- drives a lower ROI
		T7	More energy intesive buildings
	OTHER	T8	Campus growth and renovations
O4	Billing E&G Space for Utility Data or distributing associated costs to differnet departments	T9	Potential future regulatory penalties on GHG emissions or use of fossil fuels
O5	Building life cycle cost consideration whcih may not have been taken into account before	T10	New energy projects may stretch existing resources
O6	Implementing operational policies (temperature and equipment operations) and purchaing policies at an executive level	T11	Legislature and other external entities perceive universities are not cost effective and inefficient-not great stewards
O7	Rebates for lab equipment purchases	T12	Declining low hanging fruit-Easy projects to generate savings will be gone-diminishing returns
O8	Reduced natural gas costs	T13	Retaining technical skill because job market is competitive
O9	Partnering with other campus departments to implement and possibly fund	T14	Lack of effective space management-under utilization of built space
O10	Partnering with campus newspaper/website/etc to market/inform/celebrate	T15	Outsourcing of maintenance
O11	Faculty and Student population have a positive conservation mindset		
O12	Low gas prices allow for budget savings that can be applied to energy conservation projects		
O13	More cost efficient technologies		
O14	Availability of ESCOS		
O15	Technical review group and standards integration		

#	SO STRATEGIES - Use strengths to take advantage of opportunities	WO STRATEGIES - Overcome weaknesses by taking advantage of opportunities
1	Leverage combined expertise to develop ECMs (S1, O13)	Consider utilizing opportunities such as E&G billing, low gas prices, PPM approach and ESCOs to assist with limited resources (W2, O1, O4, O8, O14)
2	Research what has been done at other universities (S1, O3)	Consider PPM approach, M&V protocol, methodology of savings to ensure optimal project selections and success (W1, O1, O2)
3	Leverage campus support for behavior programs (S1, O10, O11)	Use benchmarking, peer evaluation, new standards and technical reviews to ensure new construction efficiencies (W4, O3, O15)
4	Leverage availability of ESCOs and energy consultants for additional resources of funding/knowledge (S1, O14)	Leverage department staff and student buy-in via marketing efforts to solve problems in a holistic manner (W9, O11)
5	Research and leverage available rebates to maximize funding (S1, S4, O7)	Leverage PPM approach (project selection process & tool) to get senior leadership buy-in (W6, O1)
6	Leverage state purchasing power to maximize cost savings	Increase number of buildings with DDC to implement optimization technology (W3, O13)
7	Revise and develop campus purchasing standards for more efficient equipment (S1, O7)	Provide rebates for efficient lab & HVAC (renovation) equipment (W5, O7)
8	Develop effective PPM processes (S1, S4, O1)	Use M&V framework to ensure savings realization and sustainability (W12, O1)
9	Evaluate the use of appropriate energy tools - M&V, Predictive, Fault Detection, Optimization (S1, O1, O2)	
10	Evaluate use of emergent technology (S1, O13)	
11	Leverage low gas prices to fund ECMs through budget savings (O8, O12)	
12	Use Lone Star energy funds through SECO	
13	Utilize utility data to drive technical processes and decisions (S2, O1)	
14	Develop campus policies to further energy conservation efforts (S4, S9, O11)	
15	Develop energy portal to inform building occupants of energy use, therby shaping conservation behavior (S2, O11)	
16	Use Energy Star or other universities metrics to establish benchmarks for building types (S2, O3)	
17	Leverage campus client relationships to fund projects (S3, O9)	

#	ST STRATEGIES - Use strengths to avoid threats	WT STRATEGIES - Minimize weaknesses and avoid threats
1	Use VPUO support and energy steward relationships with clients to align priorities in various colleges (S9, S6, T1)	Develop effective educational and marketing materials to communicate demand side program goals and intent (T3)
2	Use utility data to get buy-in from VPUO for operational funding (S2, T1)	Develop ways to incentivize colleges to increase energy conservation (W5, T1)
3	PEF senior management, VPUO support and demand side management presenece in sustainability master plan mitigate not doing anything (S5, S9, S10, T4)	Educate leaders and decision makers on importance of life cycle process (W9, T5)
4	In-house expertise can be used to deliver projects cost-efficiently even if gas prices are low (S1, T6)	Improve facilities training program to match needs & new technology, to avoid outsourcing maintenance (W8, T15)
5	Utilize energy data to forecast future cost impacts on utility budget/rates to maintain operational funding as a priority (S2, T1)	Incentivize departments for effective space management and reduce under utilization of built space (W5, T14)

Attachment D: Demand Side Strategic Plan Quick Reference Guide – Goal, Objectives, Strategies

Overall Goal of the DSSP is to reduce the average EUI on main campus by at least 2% annually

GOALS	OBJECTIVES	OBJECTIVE MEASURABLE	OBJECTIVE TIMELINE	STRATEGIES	PRIORITY LEVEL
Improve demand side energy efficiency while maintaining indoor environmental quality - Projects	1 -Research and pursue available sources to maximize funding	Secure $7.5 million or higher to invest in demand side energy efficiency projects	FY2017 - FY2019	1.1 -Establish a revolving fund for energy efficiency projects	Critical
				1.2 -Use Lone Star energy funds through SECO	Normal
				1.3 -Investigate and pursue alternative funding sources	Normal
				1.4 -Leverage creative financing opportunities offered by ESCOs	Low
				1.5 -Use Repair & Replacement Program funds when applicable	High
				1.6 -Use Green Fee funds when applicable	Normal
				1.7 -Develop Cost Sharing mechanisms with E&G clients	High
				1.8 -Assist auxiliary enterprises on a cost-recovery basis with project financing	High
	2 -Develop and execute a portfolio of projects	Maintain energy consumption at or below FY2019 level	FY2020 - FY2035	2.1 -Implement a PPM process for optimal ECM selection (for revolving fund projects)	Critical
				2.2 -Supplement other capital projects with ECM opportunities	High
				2.3 -Utilize existing M&V framework to ensure savings realization and sustenance	Normal
				2.4 -Utilize in-house expertise to develop & deliver efficient & cost-effective projects	High
				2.5 -Leverage external expertise to develop and deliver projects when practical	Normal
Improve demand side energy efficiency while maintaining indoor environmental quality - Operations & Maintenance	3 -Identify and implement control schemes in existing system levels	Implement control scheme improvements in atleast 2-3 buildings per fiscal year	FY2017 - FY2035	3.1 -Continue using ECM criteria matrix to identify commissioning projects	High
				3.2 -Develop M&V framework for O&M activities	Critical
				3.3 -Evaluate and utilize innovative software tools (FDD, optimization, real-time modeling)	Normal
	4 -Identify corrective maintenance issues with energy impact	Investigate and resolve (as necessary) atleast 20 maintenance issues per fiscal year	FY2017 - FY2035	4.1 -Utilize retro-commissioning resources to improve existing buildings and systems	Critical
				4.2 - Collaborate with maintenance personnel to identify and correct deficiencies.	High
				4.3 -Evaluate and utilize innovative software tools	High
	5 -Ensure proper maintainance of ECMs to sustain energy objectives	Perform 100% of the critical preventative maintenance tasks established for the ECMs	FY2020 - FY2035	5.1 -Implement technologies that offset maintenance needs	Normal
				5.2 -Identify and obtain resources to properly maintain ECMs	Critical
				5.3 -Invest in training needs for new technologies	High
				5.4 -Develop and implement strong preventative maintenance program	High

Overall Goal of the DSSP is to reduce the average EUI on main campus by at least 2% annually

GOALS	OBJECTIVES	OBJECTIVE MEASURABLE	OBJECTIVE TIMELINE	STRATEGIES	PRIORITY LEVEL
Maximize the energy efficiency of new construction & renovation projects while maintaining building environmental needs & operational effectiveness	6 -Meet or exceed the EUI targets for new construction	Achieve or exceed proposed EUI targets for all new construction as established and updated in the "STOR" document.	FY2017 - FY2035	6.1 -Evaluate and document options for effective space utilization	Normal
				6.2 -Enforce technical reviews and standards for projects	High
				6.3 -Convince leaders and decision makers to emphasize life cycle costs versus first costs	Critical
				6.4 -Ensure design teams meet energy performance targets	Critical
	7 -Utilize renovation projects to improve building system efficiency & EUI	Improve actual baseline EUI as established and updated in the "EUI Fiscal Year Spreadsheet"	FY2017 - FY2035	7.1 -Evaluate and document options for effective space utilization	Normal
				7.2 -Enforce technical reviews and standards for projects	Critical
				7.3 -Maximize strategic implementation of DDC	High
				7.4 - Optimize energy savings for renovation projects during the planning stage	High
				7.5 - Convince leaders and decision makers to emphasize life cycle costs versus first costs	Critical

Overall Goal of the DSSP is to reduce the average EUI on main campus by at least 2% annually

GOALS	OBJECTIVES	OBJECTIVE MEASURABLE	OBJECTIVE TIMELINE	STRATEGIES	PRIORITY LEVEL
Instill an enduring campus wide culture of energy conservation at all levels of the institution	8 -Engage campus executives & leadership to understand and endorse the importance of energy conservation	Review & recommend energy policies/ standards to be endorsed by the institution.	FY2017 - FY2035	8.1 -Provide portfolio level energy data	High
				8.2 -Develop and institutionalize energy policies and purchasing standards	Critical
				8.3 -Evaluate feasibility of implementing an energy efficienct equipment purchase rebate program on campus	Normal
				8.4 -Develop methodology for determining energy impact of current & future space utilization	Normal
	9 -Continue to improve collaboration between internal PEF (including OFPC) departments	N/A	FY2017 - FY2035	9.1 -Implement low cost recognition and communication programs to incentivize energy conservation efforts (example: HERO program)	Critical
				9.2 -Support and encourage the use of internal energy expertise for renovation & new construction projects	High
	10 -Continue to support, develop and implement energy behavior programs for students, staff & faculty	Increase campus awareness, engagement and participation in energy conservation activities by X% every year.	FY2020 - FY2035	10.1 -Increase participation and awareness in existing and new behavior programs	High
				10.2 -Provide accessible and easy to understand energy information resources	High
				10.3 -Educate on benefits of personal energy conservation behavior to reduce energy usage	Normal

References

Document Name and Version	Location
UEM Strategic Plan (2010)	*https://www.utexas.edu/utilities/about/StrategicPlan2010.pdf*
2012 Campus Master Plan	*http://www.utexas.edu/campusplanning/masterplan/*