ENERGY EFFICIENCY PLAN

OFFICE OF SUSTAINABILITY | 2025

UTA

Foreword

A LETTER FROM THE PRESIDENT

I know that we can come together to understand, plan, and take action that is needed to protect these walls and spaces, but more importantly, the people that pass through them.

Jennifer Cowley | UTA PRESIDENT

In 1992, global leaders convened for the “Earth Summit”, the first international gathering that provided consensus on creating action to create a “new charter” to set new norms to guide the transition towards sustainable development. Perhaps an even smaller known fact is that it was a Texan President who signed this declaration that promised to deliver the framework that ensured any further economic development would need to meet the needs of the present without compromising the ability of future generations to meet their own needs. We at UTA quickly followed suit, and shortly after the Earth Summit, began establishing our own programs to ensure that our actions here on campus would help contribute towards a more sustainable future for all.

In the more than 20 years that have followed, paralleling the evolving global sustainability landscape, our goals at UTA have significantly advanced. Over the next year, we will gather groups of leaders made up of faculty, staff, and students to envision the physical development of UTA’s future in the Campus Master Plan. At the same time, we have also chosen this time to launch our new Energy Efficiency Plan (EEP). This document will update our goals around a variety of topics and will provide a pathway towards sustainable energy resources by 2040. This plan will also act as our main policy document to ensure that the development outlined in our Campus Master Plan is synergistic with our sustainability goals. The Energy Efficiency Plan will outline actions that can be taken, but also the accountability and structure of people needed to deliver those actions. Finally, it recognizes that dramatic action comes with a price, most likely more than our historical development, and will look to outline, attract, and structure projects in alignment with new investment opportunities.

This plan is an exciting opportunity to shape a better future for ourselves and our region. I encourage you to not only contribute today, but in all the days that follow, in helping to craft and act upon the plan as it takes place and continues to evolve over the next few years.







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Introduction to the Plan

The University of Texas at Arlington (UTA) stands at a pivotal moment in its institutional history. As a leading academic institution in the Dallas-Fort Worth (DFW) metroplex, UTA's growth in both size and prominence brings new opportunities and responsibilities in resource management and campus operations. Recent extreme weather events across Texas have highlighted the importance of maintaining reliable campus operations, while rising energy costs and aging infrastructure systems present increasing challenges to the university's operational efficiency.

Why this Plan Matters

UTA's commitment to responsible resource management dates back to the early 1990s, when the institution first began establishing programs to ensure sustainable campus operations. Today's challenges, however, require an evolved and more holistic approach that addresses both immediate needs and long-term resilience.

The DFW area faces unique environmental challenges that directly impact campus operations. Summer temperatures regularly exceed 95°F for extended periods, creating significant demands on cooling systems and affecting outdoor campus spaces. Winter storms, like the event in February 2021 that disrupted campus operations, highlight vulnerabilities in existing infrastructure systems. Meanwhile, rapid regional growth continues to put pressure on energy resources and municipal systems that the campus relies upon.

These challenges intersect with UTA's institutional priorities in several key ways:

- **Academic Excellence and Research:** Modern, reliable infrastructure is essential for supporting UTA's research mission and maintaining comfortable learning environments. Laboratory spaces, in particular, require precise environmental controls and uninterrupted power supply.
- **Operational Efficiency:** Rising energy costs and aging systems impact the university's operational budget. Strategic improvements in building performance and energy infrastructure can help control these costs while improving service reliability.
- **Campus Experience:** The quality of UTA's physical environment directly affects student success, faculty retention, and community engagement. As extreme weather events become more frequent, maintaining comfortable indoor and outdoor spaces becomes increasingly challenging.
- **Regional Leadership:** As one of the largest institutions in North Texas, UTA's approach to campus operations influences regional practices and sets standards for institutional excellence. The University's choices in energy systems and infrastructure improvements ripple beyond campus boundaries.

Through careful analysis of campus conditions, energy use patterns, and infrastructure needs, the Energy Efficiency Plan aims to address identified challenges while advancing UTA's broader institutional mission, recognizing that true campus resilience emerges from the combined strength of physical infrastructure, operational practices, and community engagement. This plan charts a course toward a more resilient and sustainable campus through 2040, integrating infrastructure improvements, energy system modernization, and operational practices into a cohesive framework for action.

ESTABLISHING OUR ROOTS

A timeline of sustainability at UTA

1990

1994
Campus-wide recycling program receives presidential approval

2000

2004-05
Tarrant County Corporate Recycling Council Environmental Vision Awards for recycling

2006
Hispanic Outlook in Higher Education Magazine Top 100 four-year colleges for Hispanics ranking granted

2007
University Sustainability Committee forms
AASHE membership begins
Composting program receives multiple awards
American Association of State Colleges & Universities Recognized as trailblazer in "closing the gap" between Hispanic and non-Hispanic white students

2008
Green roof on campus, receives multiple awards
Preliminary carbon footprint analysis completed
National Wildlife Federation Exemplary rating in Sustainability

2009
Maverick Office Green Team launches

2010
EPA Food Recovery Challenge participation begins

2011
AASHE STARS Bronze achieved
Organic community garden created
Engineering Research Building achieves LEED Gold
PV panels at College Park parking garage in operation

2012
The Green at College Park receives multiple awards
College Park Centers achieves LEED Gold
The Center for Metropolitan Density established
Public transit 2-year pilot project announced
EPA Food Recovery Challenge Certificate of Achievement

2013
North Texas Commission Working for Clean Air Award: Best University
AASHE STARS Silver rating achieved

2014
EPA First of three Leadership Awards for Food Recovery Challenge granted (2014, 2018, 2021)

2015
Launched Institute for Sustainability & Global Impact
Partnered with Zipcar for on-campus car-sharing
First GRI Report launched

2016
AASHE STARS Silver rating achieved
CAPPA is established

2017
First Bike Share Program launched
Sierra Magazine Named "Cool School"for sustainability efforts on campus

2018
EPA Sun Belt Conference largest green power user
NACUBO Excellence in Sustainability Award

2019
STARS NTx + NTCRA Outstanding Composting Program
UNU-IAS Acknowledged Flagship Project
Strategic Plan is updated

2010

2020
UNU Honorable Mention for work on SDG6 for the Upper Trinity River Water Quality Report Card
Strategic Plan is updated
President announces eight DEI commitments

2021
THE Impact Ranks 1st
UNU-IAS Sustainable Cities Challenge ESD Contributions
Texas Tier 1 Designation
#1 in Texas awarding degrees to African-American students

2022
THE Impact Ranks 8th
AASHE STARS Silver rating achieved
US News & World Report Ranks third in Ethnic Diversity
NACUBO Excellence in Sustainability Award

2023
D CEO Magazine Ranks 14th among American higher ed. Non-profit & Corporate Citizenship Award Finalist

2024
IDC Future Enterprise Awards North American Special Award for Sustainability won for Sustainability Dashboards
State of Texas Alliance for Recycling Environmental Leadership Award for Innovative Organics

2020

EEP 02

The Importance of an EEP

UTA's path toward improved resilience requires a comprehensive understanding of how energy and resources are used across campus. This understanding forms the foundation for strategic improvements in infrastructure and operations.

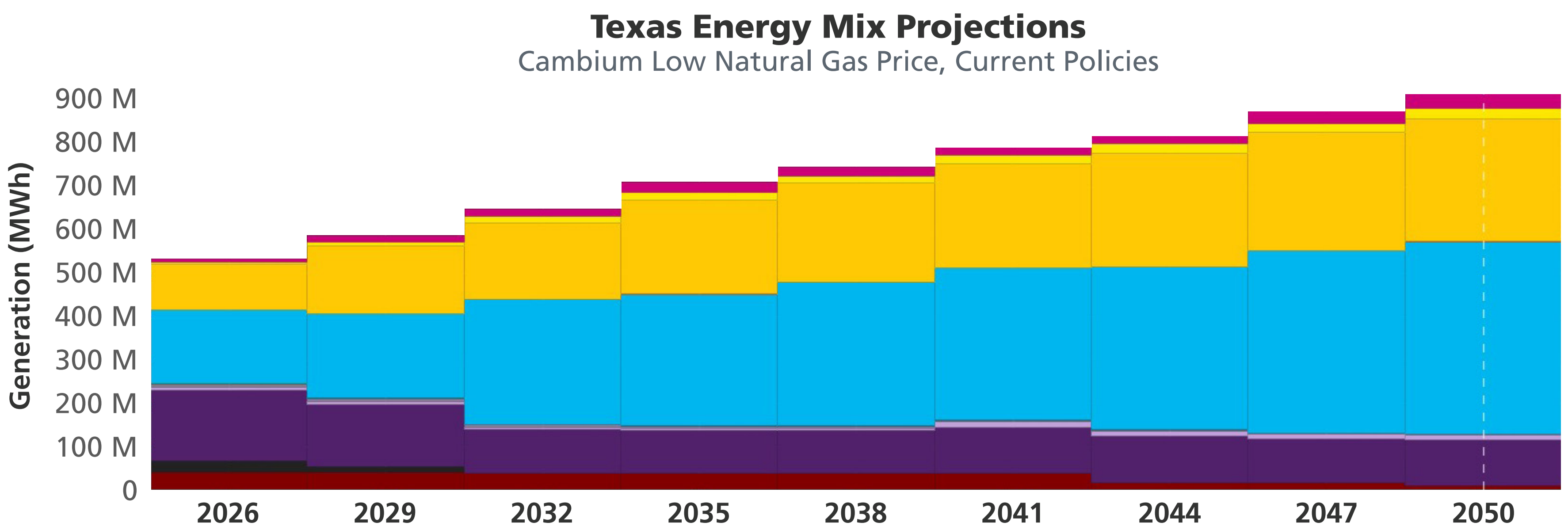
Understanding Energy Use

Texas Grid Evolution and Campus Infrastructure Challenges

The Texas electric grid, operated by ERCOT, is undergoing a fundamental transformation in its generation mix. While projections show wind and solar becoming dominant resources by 2035, UTA faces several immediate challenges in managing its infrastructure modernization.

Recent events have highlighted the grid's vulnerability, most notably during Winter Storm Uri in February 2021, when millions of Texans lost power for days during extreme cold weather. The grid has also faced strain during intense summer heat waves, requiring emergency conservation measures to prevent blackouts. For an R1 research institution like UTA, these reliability issues pose significant risks to critical research infrastructure, laboratory operations, and sensitive equipment.

These challenges present an opportunity for UTA to develop innovative electrical management approaches, including microgrid technologies, advanced energy storage systems, and smart demand response programs. Such solutions could not only enhance the university's energy resilience but also serve as a model for other large institutions operating within ERCOT's jurisdiction.



The campus faces several interconnected infrastructure considerations. The existing electrical service capacity requires feeder upgrades to accommodate new development and future electrification needs. Additionally, the regional grid's current energy mix means that purchased electricity has a higher carbon intensity compared to on-site natural gas usage, which adds complexity to electrification planning decisions. Furthermore, the limited building-level metering infrastructure affects the University's ability to precisely evaluate and implement efficiency measures, which could impact equipment sizing and investment decisions.

These challenges, combined with the grid's on-going evolution, emphasize the need for a carefully phased approach to campus energy improvements. While the increasing share of renewables in ERCOT's generation mix will eventually support UTA's sustainability goals, immediate focus must be placed on upgrading basic infrastructure and improving energy monitoring capabilities.

Energy Consumption Patterns

Campus energy use follows distinct seasonal patterns that align with both academic calendars and regional climate conditions. The university's energy profile shows peak demands during extreme temperature periods, with significant variation between academic and low-activity periods.

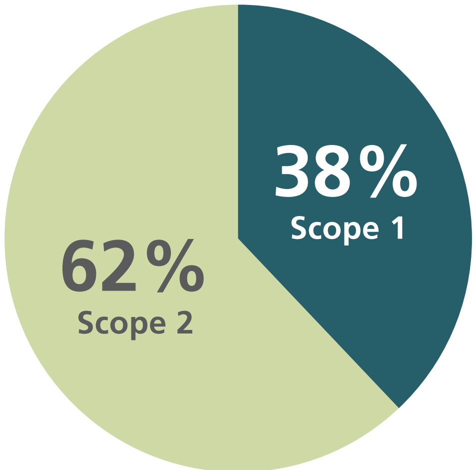
While heating requirements show a gradual decline over recent years, cooling demands continue to rise. This shift creates new challenges for campus infrastructure originally designed for different conditions. Longer cooling seasons mean extended periods of peak demand on district systems, while variable winter conditions still require maintaining flexible heating capabilities.

Resource Consumption Intensity

Energy Use

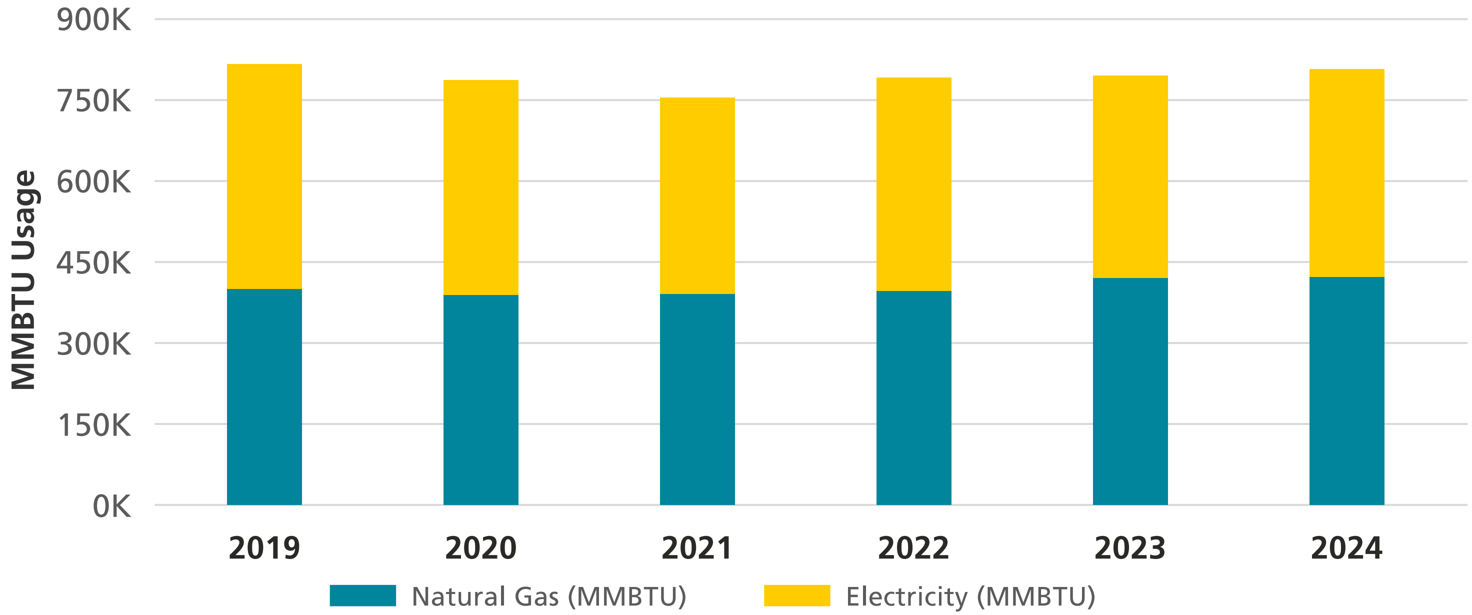
Based on reporting from 2023, UTA consumes over 110 million kilowatt-hours of electricity every year, and 410 million cubic feet of natural gas in order to operate campus. In terms of energy demand, there is a 50/50 split between electricity and on-site fossil fuel consumption. Given the Texas grid's reliance on coal, however, 62% of UTA's emissions come from purchasing power from the grid, with the remaining 38% sourced from burning fossil fuels on-site. Moving away from a reliance on coal and natural gas is essential to a low-carbon future, and recommendations in later sections of this report delve into the details of how to handle a phased transition away from fossil fuel sources to renewably sourced electric energy.

Currently, there is minimal development of renewables on campus. Solar panels are mostly used for teaching and demonstration.



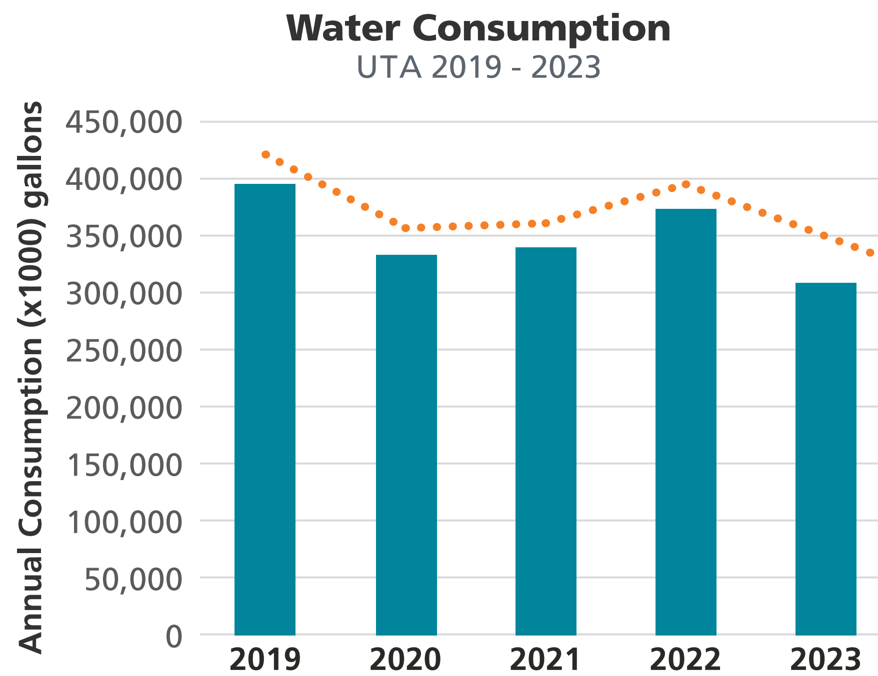
Scope 1 & 2 Emissions
UTA FY 2024

Historic Electric Consumption
Electricity (plus Steam and Chilled Water) and Natural Gas (On-Campus Stationary Sources)



Water Use

Water consumption across the campus stems from demand for potable water consumption, steam and chilled water distribution for heating and cooling, and landscape irrigation. Water usage per square foot has drastically reduced from 66 gal/sf in 2009 to 45 gal/sf in 2023, a 32% reduction. Total overall water consumption has increased as the campus has grown but UTA has incorporated water-wise habitat designs for all new campus development to increase water efficiency. Further reductions in water consumption are in progress, the University is taking steps to reduce its water demand for irrigation by planting local and drought-resistant plants. The Special Events Center and Campus Green Park features native and stress-tolerant plants that consume approximately 70% less water than a typical landscape for the area.[1] At the Central Plant, water (steam for heating) is used to deliver heating and cooling via district distribution loops. Atypical to other energy plans, this plan has integrated water considerations, such as reducing consumption in energy systems and exploring water-efficient technologies for thermal energy demand to develop long-term strategies.



	2019	2020	2021	2022	2023
Annual	394,971	332,627	338,879	372,143	308,065
Average Monthly	32,914	27,719	28,240	31,012	25,672

1 Water - Administration and Campus Operations | UT Arlington

Approach

Developing the Plan: Process, Methods, and Engagement

The development of UTA's Energy Efficiency Plan followed a structured five-phase process designed to ensure both technical rigor and meaningful community input. The project began with extensive preparation and data collection, gathering baseline information about campus infrastructure, energy consumption, and operational practices. The planning team utilized specialized energy modeling software to analyze campus systems and evaluate potential improvements, while also conducting structured interviews with key stakeholders to understand operational challenges and opportunities.

Community input shaped the plan's development through two interactive workshops that engaged more than 215 participants from across the university. Students, faculty, staff, and external stakeholders contributed diverse perspectives on campus sustainability and helped identify priority areas for action. These sessions revealed strong alignment between institutional capabilities and community aspirations, particularly regarding UTA's potential to serve as a regional leader in sustainability innovation. The engagement process included detailed surveys to gather quantitative feedback on proposed strategies and priorities.

An Engaging Discussion

While the EEP is specific to UT Arlington, this plan addresses challenges that extend beyond the UTA campus. The University must be a leader in addressing the challenges that come with changing weather and energy demands through its educational programs, research, operations, finance, and community engagement initiatives. As such, holding these workshops helped to identify opportunities, barriers, and major areas of transformation that this plan must deliver.

PHASE 1
Preparation & Kickoff

- Project Planning
- Engagement Planning
- Communication Plan

PHASE 2
Data Collection & Analysis

- Benchmarking & Research
- Engagement
- Data Collection
- Energy & Emissions Baseline

PHASE 3
Goals & Strategies Development

- Focus Group Workshops
- Preliminary Goals & Strategies
- Follow-up Surveys

PHASE 4
Plan & Tools Development

- Metrics and Supporting Policies
- Financing the Plan
- Implementation & Tracking

PHASE 5
Presentation & Approval

- University Leadership Presentation
- Approval of the Energy Efficiency Plan

During the engagement workshops, noteworthy themes were expressed by students, staff, and stakeholders. These insights have been instrumental in shaping the Energy Efficiency Plan, ensuring that it aligns with the specific needs and objectives of the UTA community.

Groups convened across campus to discuss the implementation of energy initiatives, research in technology, large-scale changes in policies related to sustainability, behavioral changes, and funding for these endeavors.

In alignment with the Strategic Plan and Master Plan, the EEP complements the University's ability to thrive in the changing landscape of higher education as a leader, innovator and problem-solver tackling one of society's most pressing challenges.

The UTA community left us with a clear understanding that this plan must take action in the following:

CELEBRATE SUSTAINABILITY!

Recognizing the hard work and achievements of UTA to date

REACTIVE TO PROACTIVE: A HEALTHY CAMPUS IS A SUSTAINABLE CAMPUS

Preventative measures are the most important for protecting the campus overall

DEEPEN THE COMMUNICATIONS FABRIC OF UTA'S SUSTAINABILITY STORIES

Enhance visibility through signage, art, and student activities

EXPAND ON WASTE LEADERSHIP TO TACKLE THE FOOD-WATER-ENERGY NEXUS

Create programming that integrates UTA dining services, waste management practices, and state of the art energy solutions

CREATE A PHYSICAL GROUNDING POINT FOR INTERDISCIPLINARY WORK

Collaboration needs an intentional home to bring together researchers and students across different department

GET AGGRESSIVE ON THE INFRASTRUCTURE MODERNIZATION

Prioritize the strategies (and financing!) needed to deliver action on energy security

INNOVATE THROUGH RESILIENCE!

The changing climate needs new technologies and ideas in order to protect the plan immediately. Utilize the brainpower at UTA to turn vulnerabilities into opportunities

STRENGTHEN THE REGIONAL IDENTITY OF SUSTAINABILITY

Did you know DFW is the first net-zero airport in the US? Or that UTA will be collaborating on the World Cup's sustainability actions in Dallas? UTA and its partner need to create a clear brand identity that puts sustainability front and center

Survey

Stakeholders were invited to participate in shaping the future of sustainability at UTA through an online survey. Survey respondents had the opportunity to provide feedback on current initiatives, identify areas for improvement, and contribute ideas for innovative solutions. These responses helped provide an understanding of a feasible timeline for implementation and provided additional feedback to be incorporated into the plan.

Summary of Qualitative Findings

This engagement point verified the priorities and actions of the University and a broad variety of its stakeholders. Engagement point one asked the question **what are the major goals that this plan needs to achieve**. The survey asked the question **how does UTA go about achieving these goals**. The last engagement series of the data assessment asked **which of these actions and strategies are of priority and what is the appropriate timeline for achievement**.

Over the summer, the EEP team focused on aggregating the recommended strategies, creating metrics for tracking progress, and ultimately confirming the robust governance structure that allows for clear achievement and accountability on each of the respective goals.

Takeaways from the Engagement Process

Following the analysis and engagement phases, the team synthesized findings to develop comprehensive strategies for campus transformation. This work included detailed technical assessments of building performance, infrastructure systems, and operational practices, along with careful consideration of implementation requirements and institutional capabilities. Through these focused stakeholder discussions and additional community feedback, the team refined recommendations to ensure they provided practical, actionable solutions while maintaining alignment with UTA's broader institutional goals. This collaborative approach resulted in a flexible framework that can guide UTA's infrastructure modernization while adapting to changing conditions and opportunities.

An Ecosystem for Change

The UTA campus represents a complex ecosystem where academic excellence, research innovation, and community engagement converge. As extreme weather events become more frequent and demand on university spaces intensifies, the built environment must move beyond basic functionality, evolving to meet higher performance standards while protecting and improving watershed ecosystems connected to Johnson Creek.

Through both mitigation and adaptation strategies, this plan envisions a campus environment that does more than simply withstand challenges - it adapts and thrives in the face of change. By improving infrastructure, operations, and community engagement, UTA will create spaces that support excellence in teaching, research, and student life while demonstrating leadership in campus resilience.

Source: UTA Athletics | Jason MacBain

WHAT	Identify strategies & changes needed in order to reach our goals
WHEN	**2040**
WHY	To improve environmental, social, and economic resources for the next generation of UTA students
HOW	Through collaboration, communication, & innovation

THE BIG PICTURE

Key Themes

These eight themes emerged from community engagement and stakeholder conversations are what comprise the EEP.

SOCIAL IMPACT

Highlight UTA as an exemplar university for research in sustainability

OPERATIONS & FINANCE

Utilize environmental impact in operational and financial decision-making

HIGH-PERFORMANCE BUILDINGS

Retrofit and design high-performance buildings across campus

ENERGY INFRASTRUCTURE

Shift to low-carbon energy infrastructure

FOOD & WASTE

Reduce food and waste by moving towards circular economy

ECONOMIC DEVELOPMENT & INNOVATION

Position the DFW region as a leader in sustainability and innovation

CULTURE & COMMUNICATION

Enhance the role of sustainability in culture & communications through story-telling and collaboration

MOBILITY

Shift to sustainable mobility patterns

Current & Future Conditions

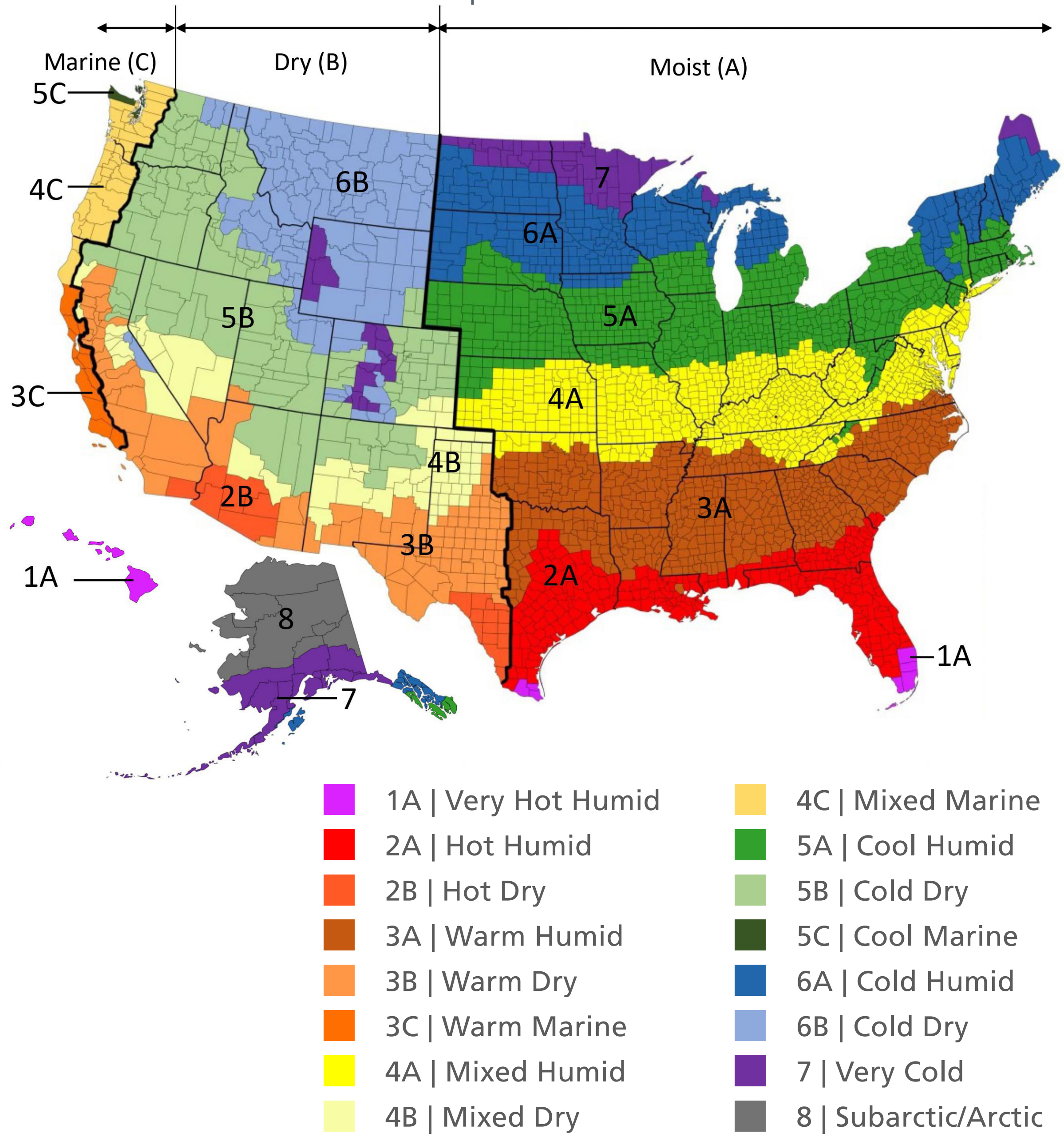
04

This plan's approach to infrastructure modernization and resilience begins with a comprehensive understanding of how climate patterns affect daily campus life. From student comfort to infrastructure demands, climate conditions and the need for resilience in Texas are interrelated and will shape the present and future of the university's operational requirements.

Climate Conditions

The DFW area experiences a humid subtropical climate (represented by IECC Climate Zone 2A), characterized by hot summers and mild winters. Summer highs average between 85-93°F, and maximum temperatures often exceed 100°F. Winters typically bring about lows that fall between 39-52°F, with the potential for extreme cold that can dive into negative digits. Moderate rainfall usually occurs during seasonal shifts (typically in the months of May and October), with occasional light snowfall in winter months. The region experiences pleasant weather during the spring and fall seasons.[2,3]

IECC Climate Zones
Updated 2021



Source: US DOE

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2 Dallas/Fort Worth Climate Narrative

3 NOWData | NOAA - NWS

Forever Cooling

The cooling season in the region is long, typically starting in Spring and extending into early Fall. Extreme heat during the summers necessitates the use of air conditioning to maintain comfortable indoor environments for the campus community. The high humidity also makes walking outdoors around the campus uncomfortable and necessitates the use of dehumidification in indoor cooling systems. The campus is still operational in the summer for research, short courses and events requiring buildings without occupancy sensors and humidity control to fully operate chillers to avoid damage due to mold and humidity. This extended period of full cooling thermal demand results in high energy costs as it also coincides with higher energy rates during the summers and potentially straining power distribution infrastructure. This can also have a waterfall effect on the grid infrastructure within and outside of UTA, and possibly the wider city power networks.

The Need for Heat

Heating thermal demand on campus is expectedly driven by the relatively mild winters. While the cold season is not as long, heat demand across the campus throughout the year persists from heating loads for athletics, research labs, and healthcare facilities. Natural gas is used to meet all heating demands on campus through boilers at the Central Plant and distributed via a district loop. Heating demand in the future could also likely reduce as winter average temperatures increase.

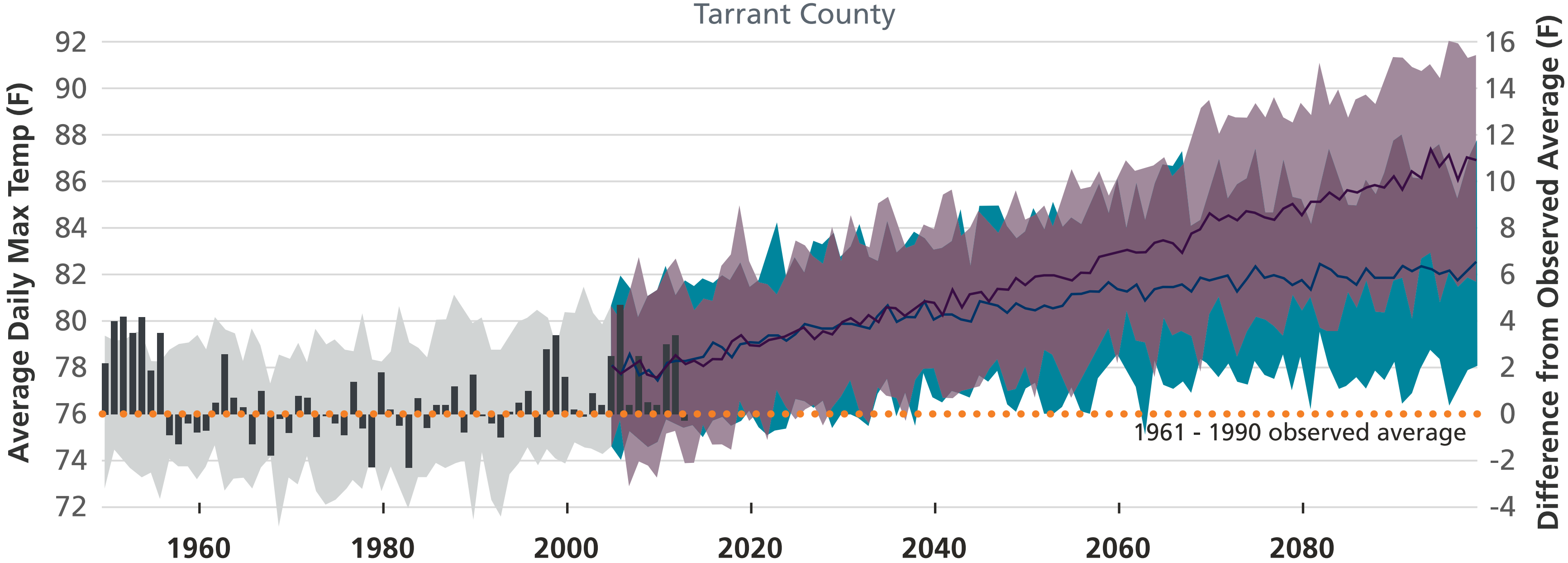
What have we learned?

UTA can be best prepared for extreme temperatures by:

- Increasing shading by planting trees and using artificial shade structures
- Using of misting machines for high traffic outdoor walking paths
- Creating maps with shortest path routes for visitors and campus community
- Designing thermal systems at buildings to consider future climate conditions
- Providing access to cooling centers and water dispensers during severe heat emergencies

Average Daily Maximum Temperature

Tarrant County



Adapted from Climate Explorer

Projections for Mid-Century (2035 - 2064)

Higher Emissions Scenario

135.9

Annual Days Max Temp >90F

111.1°F

Annual Single Highest Max Temperature

Microgrids can provide additional resilience on campus and provide a great opportunity to teach students alternative ways to power the future.

Securing Energy Resilience

Texas is the only state to operate its own power grid; it doesn't have significant interconnections to the grids serving the eastern and western grids of the country. The Texas Interconnection is managed by the Electric Reliability Council of Texas (ERCOT) and is responsible for power dispatched by 1,250 power generation units through 54,100 miles of transmission lines to more than 27 million customers.[4]

Without major interconnections to other grid operators across the country, the state cannot import power leaving it susceptible to outages and failures during weather or grid emergency events. Texas utility companies have interstate links allowing them to import and export power as and when needed. However, the grid as we know it was not built to withstand the stressors it faces today and in the future. This unfortunately has already become a reality in recent years.

Texas had the most weather-related power outages, 210 to be precise, between 2000 to 2023, as per the nonprofit Climate Central based on power outage data from the U.S. Department of Energy.[5] The frigid temperatures brought about during the Great Freeze in 2021 resulted in power generation outages and electricity distribution service disruptions, resulting in the unfortunate loss of 33 lives in the Dallas and Tarrant counties.[6] That wasn't just a one-off, more than 650,000 customers had their electricity knocked out in the DFW area after severe storms in May 2024.[7]

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4 About | ERCOT

5 Weather-related Power Outages Rising | Climate Central

6 Texas winter storm deaths: 246 total, 22 in Dallas County | wfaa.com

7 Oncor: May storm most damaging in Dallas County's history | wfaa.com

The University purchases all its power and fuel through long term utility contracts to provide energy for heating, cooling, lighting, and electricity demands across the campus. This means it is as exposed to energy-related events just as any other customer of the Texas grid. As much as 75% of UTA's total GHG emissions come only from utility energy consumption.[8]

With utility costs soaring due to large-scale grid infrastructure upgrades, reducing energy consumption and associated emissions while maintaining energy security is imperative for the safety of its community.

What have we learned?

UTA should plan to:

- Reduce energy consumption at buildings through Energy Cost Reduction Measures (ECRM's)
- Implement energy metering and monitoring to enlist all campus buildings in Demand Response programs by the grid operator or distributor
- Upgrade utility feeder and power distribution line weatherization as applicable
- Increase on-site energy generation through clean and renewable energy sources
- Secure redundant power and thermal energy supply for all buildings
- Equip the campus with generators and energy storage systems for backup and emergency power and thermal energy demand at critical campus buildings including student residences

8 UTA FY2023 Greenhouse Gas Emissions Report

UTA's Administration and Facilities Management is implementing an energy conservation program through 18 ECRM's including the following:

- a new 4,000-ton satellite chilled water plant
- transformer upgrades
- lighting retrofits
- occupancy sensors
- air handling unit replacement
- high efficiency motor upgrades
- HVAC improvements

Click here to see the list of projects

Weathering Extremes

As global average temperatures increase, this will result in summer seasons in Arlington extending longer, and winters becoming shorter and less frigid. Moreover, weather patterns are also becoming more erratic resulting in more extreme weather events as witnessed during The Great Texas Freeze in 2021.

Combining extreme weather events with an increase in average temperatures can push the operations of the Central Utility Plant and power distribution systems to peak conditions more often and for longer periods of time. North Texas is no stranger to snowstorms and incessant rain; and in Arlington, these events have led to grid blackouts and flooding across campus and at creeks in surrounding areas.

Heat stress in the summers is typically avoided since most classes are adjourned during periods of peak summer heat. However this can change as peak hot days also occur during the shoulder seasons of Spring and Fall. Prolonged periods without rain will also lead to drought where soil becomes dry and hard, making it difficult for soil to absorb water when it eventually rains. An extreme rainfall event after a serious drought can overwhelm natural drainage and lead to increased runoff and larger volumes of stormwater to be dealt with.

Planning for future weather extremes is essential to ensure safety and operational resilience for the UTA community and its neighbors. Recent weather extremes across the state of Texas and in the DFW area have highlighted the need for this plan. A "resilience-based" approach to the proactive planning of social, environmental, ecological, and infrastructure systems on campus will help it withstand the test of time and mitigate the increasing impacts of weather extremes while also reducing financial burdens in the future.

Source: NOAA CMRA | Higher Emissions Scenario

Historical

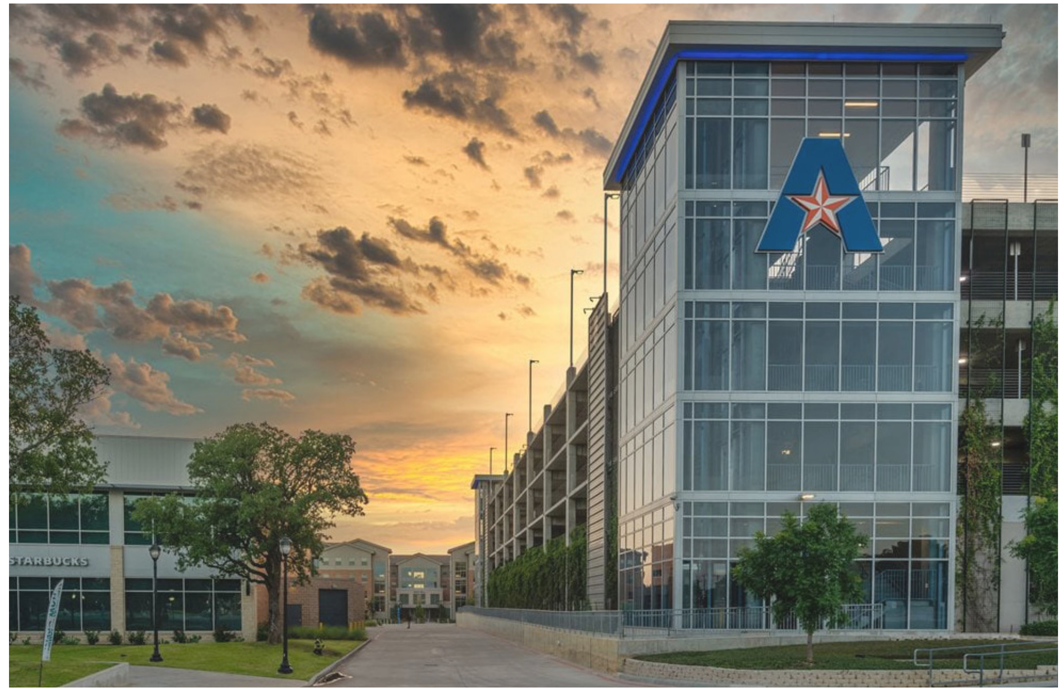
33.9 IN
AVERAGE
(1976-2005)

97.2 DAYS
OVER 90F
(1976-2005)

Projected

33.5 IN
AVERAGE
(BY MID-CENTURY)

135.9 DAYS
OVER 90F
(BY MID-CENTURY)



Source: Left | The Shorthorn . Top Right | UTA . Bottom Right | Dallas News

The Great Texas Freeze

In February 2021, Winter Storm Uri delivered the coldest temperatures North Texas had experienced in 30 years, exposing critical vulnerabilities in UTA's infrastructure systems. During the week-long campus closure, cascading failures affected every aspect of operations - from the central steam plant struggling to heat 31 buildings to widespread water system failures and power disruptions that forced approximately 100 students to seek emergency shelter in campus facilities.

This unprecedented event became a catalyst for transforming UTA's approach to infrastructure resilience. The University responded with immediate improvements: installing new backup generators at critical facilities, developing a dedicated water well for campus heating and cooling systems, and establishing new protocols for protecting vulnerable systems during extreme weather. More significantly, the experience fundamentally changed how UTA approaches infrastructure planning, shifting weather resilience from an emergency response consideration to a central factor in design and operations.[9]

The lessons learned from this historic event directly inform the strategies and priorities outlined in this plan, ensuring UTA is better prepared for whatever challenges the future may bring.

9 Storm Recovery | City of Arlington

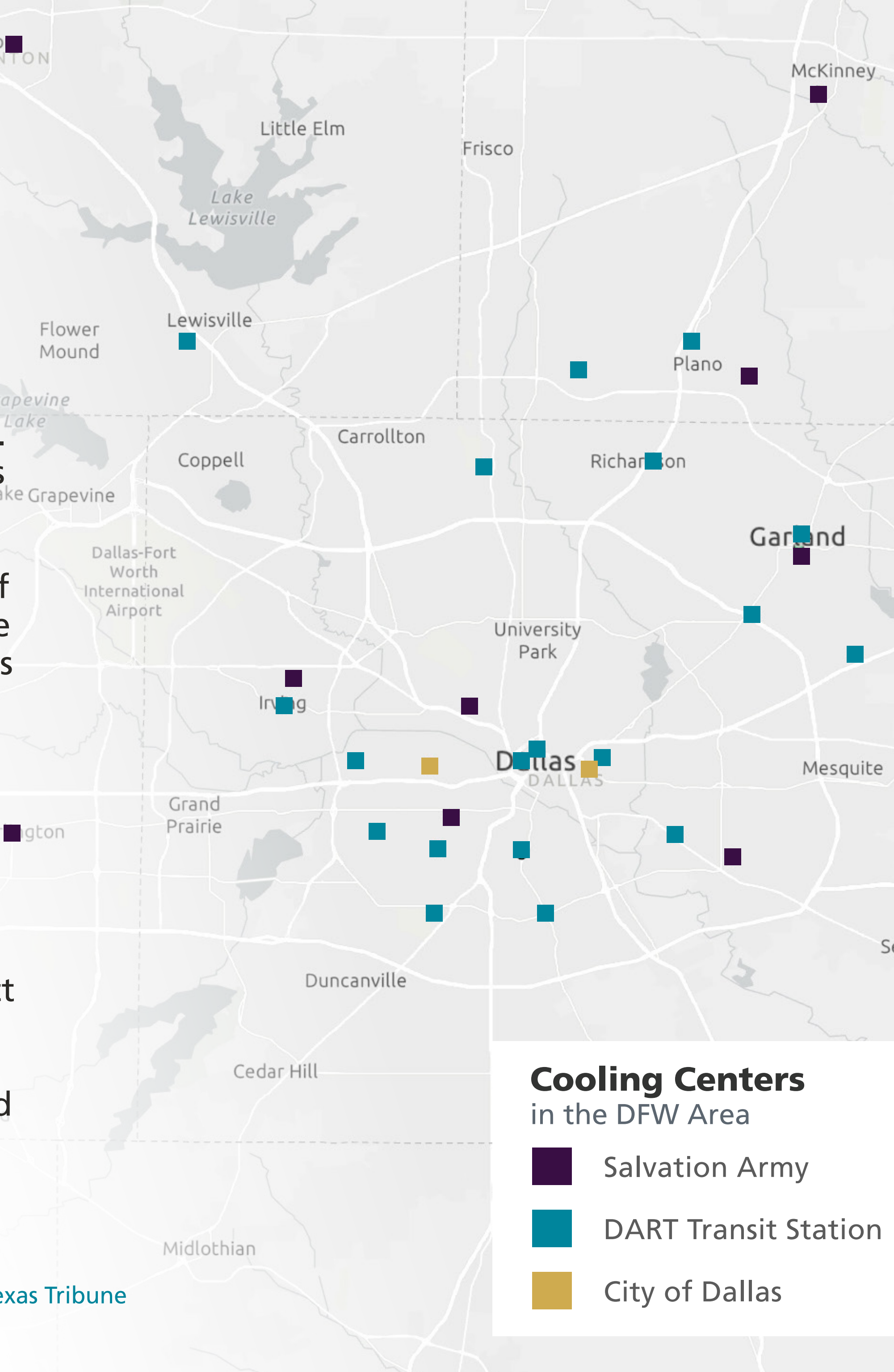
Source: The Shorthorn

Managing Heat Stress

Heat stress is a significant health concern in North Texas and the rest of the state due to temperatures frequently exceeding 100°F in the summers that can lead to various heat-related illnesses. Heat stress can be fatal especially for vulnerable populations if not addressed promptly. In 2023, 334 people died from heat-related causes in Texas according to state published data - more than double the number recorded in 2011, which was the record high until 2021.[10] The frequency of these heatwave events is expected to increase due to climate change. Moreover, if high temperatures coincide with days of high humidity this can be very demanding on the cooling systems.

Impacts from extreme heat are especially exacerbated in urban areas. Dense urban areas have a high concentration of buildings, roads, and impervious surfaces, which absorb and retain heat leading to a phenomenon known as urban heat island (UHI) effect. On campus, the UHI effect can lead to temperatures being several degrees higher in denser parts of the campus. With high heat days, exponential increase of energy demand for cooling results in pushing grid operators to implement rolling blackouts and power outages further worsening the heat impacts.

10 Texas saw a record number of heat-related deaths in 2023 | The Texas Tribune

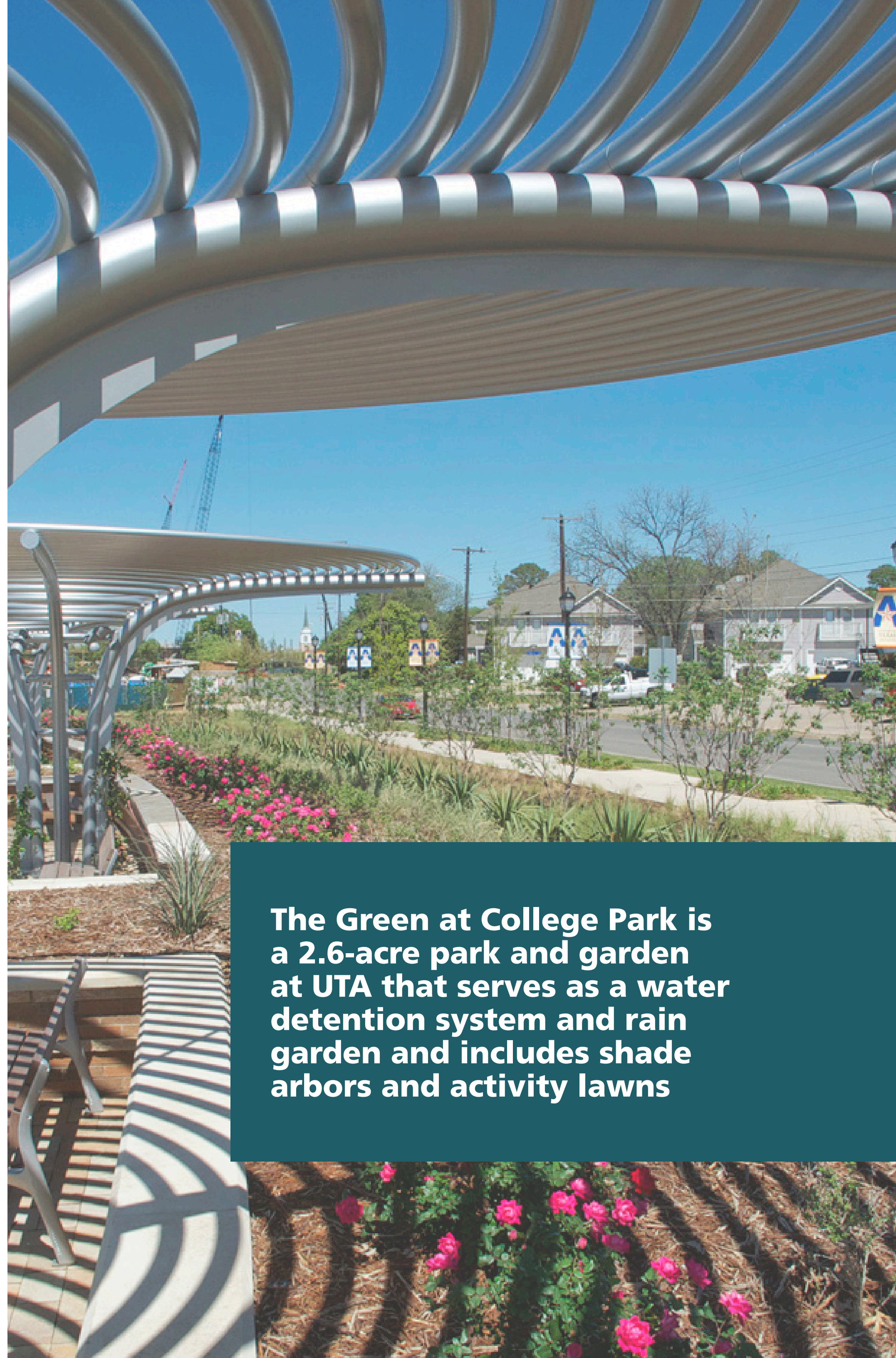


Adapted from Dallas News

Dry Spells to Downpours

As recently as 2024, the DFW area went 34 consecutive days without any precipitation, its eighth longest without rain per the National Weather Service. These events have also become more frequent and longer-lasting over the past five years.[11]

Extended drought conditions can cause stormwater infrastructure to accumulate dirt and debris which are not washed away by regular rainfall. Moreover, droughts also impact the natural ability of soils to absorb water. This buildup in pipes and drains, and the soil's loss of infiltration, can lead to more damaging impacts from stormwater runoff due to reduced natural and infrastructure systems capacity. If we follow the region's typical climate pattern, these drought conditions are followed by precipitation. These first rains can wash accumulated particles that are harmful to the local ecosystems into nearby water bodies further impacting the wider Johnson Creek watershed.



The Green at College Park is a 2.6-acre park and garden at UTA that serves as a water detention system and rain garden and includes shade arbors and activity lawns

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11 DFW - Consecutive Days Without Precipitation | NOAA - NWS

UTA

Source: UTA Magazine

What have we learned?

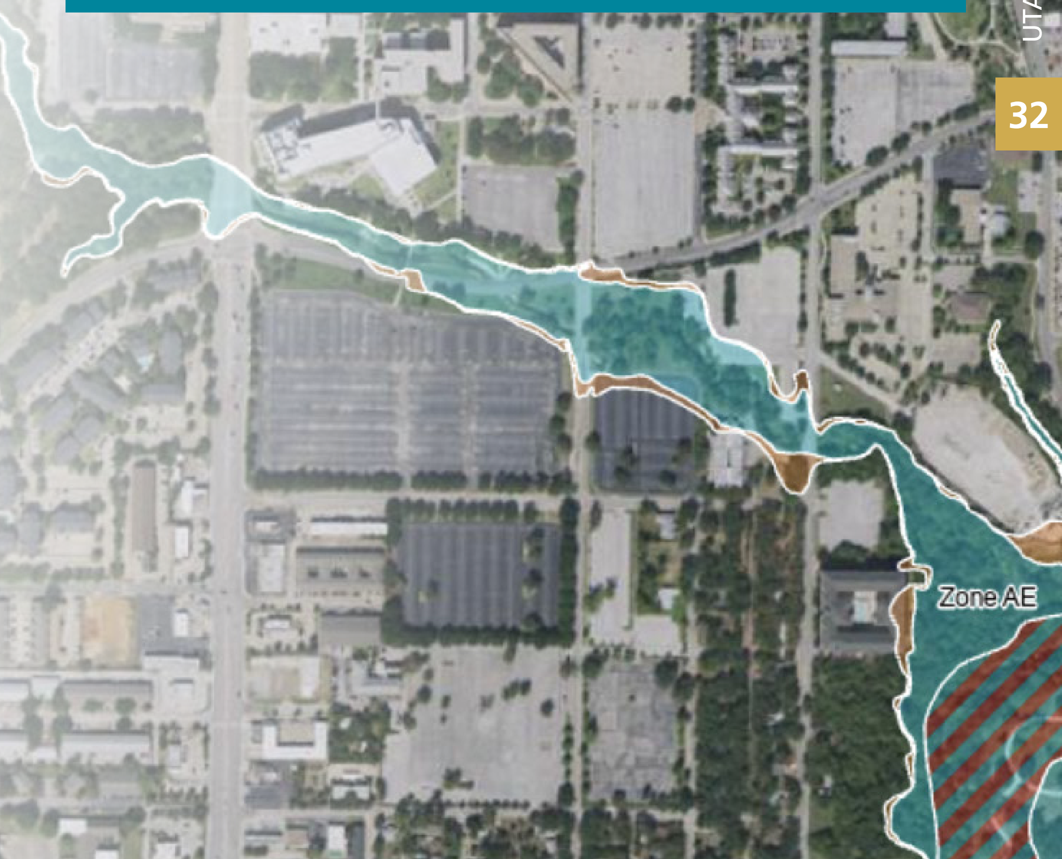
To ensure a resilient future, UTA should implement:

- Active and pre-emptive emergency communication networks and systems
- Redundant power and thermal energy supplies
- Energy storage for backup and emergency power and thermal energy demand at critical campus buildings including student residences
- Campus utility systems weatherization (where applicable)
- Regular maintenance and strict adherence to prescribed standards for management of campus stormwater infrastructure
- Increase percentage of green cover across campus
- Increase stormwater flow capacity and detention of creek to prevent flooding of campus areas
- On-site stormwater management including managing stormwater flows to building rain barrels and underground collection tanks
- Strict pre- and post-construction waste management standards to reduce pollutants entering runoff to local watershed

Did you know?

The Johnson Creek tributary which passes the SEIR building on UTA's campus drains into the Johnson Creek watershed, the second largest in Arlington. In 2022, Johnson Creek was listed on the TCEQ 303(d) list with an impairment for bacteria in the water.

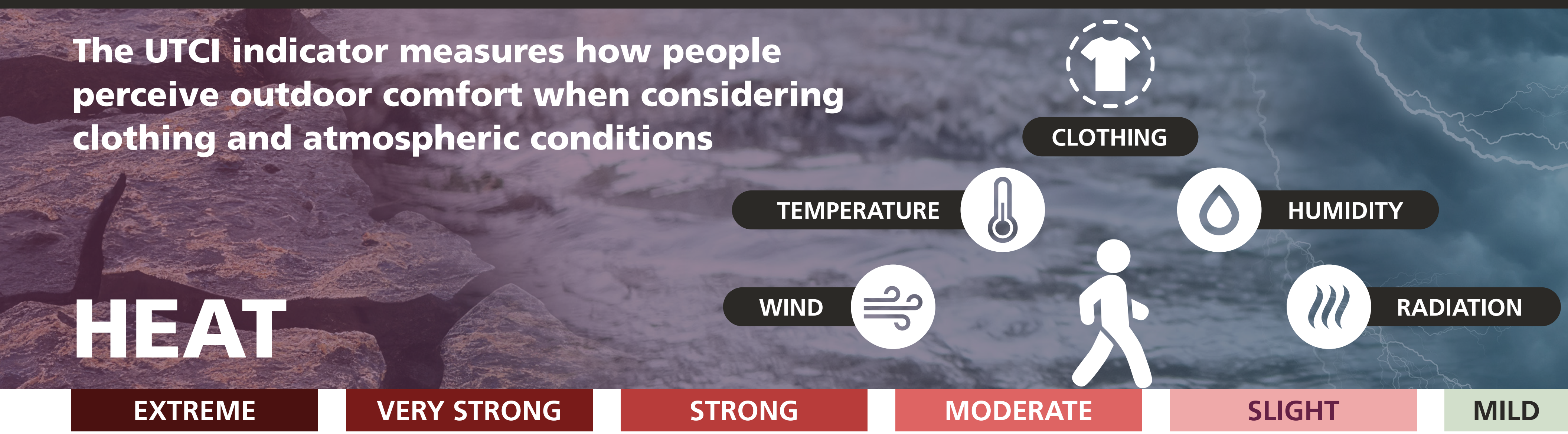
Source: City of Arlington Environmental Management



Campus Comfort Analysis

To understand heat stress conditions throughout the year, a Universal Thermal Climate Index (UTCI) study was completed. The UTCI is an internationally recognized standard that evaluates how the human body responds to outdoor conditions. This comprehensive metric proves particularly valuable in Texas, where the combination of intense solar radiation, high humidity, and variable winds creates complex comfort challenges throughout the academic year.

33 Universal Thermal Climate Index



UTA Spring Comfort Time

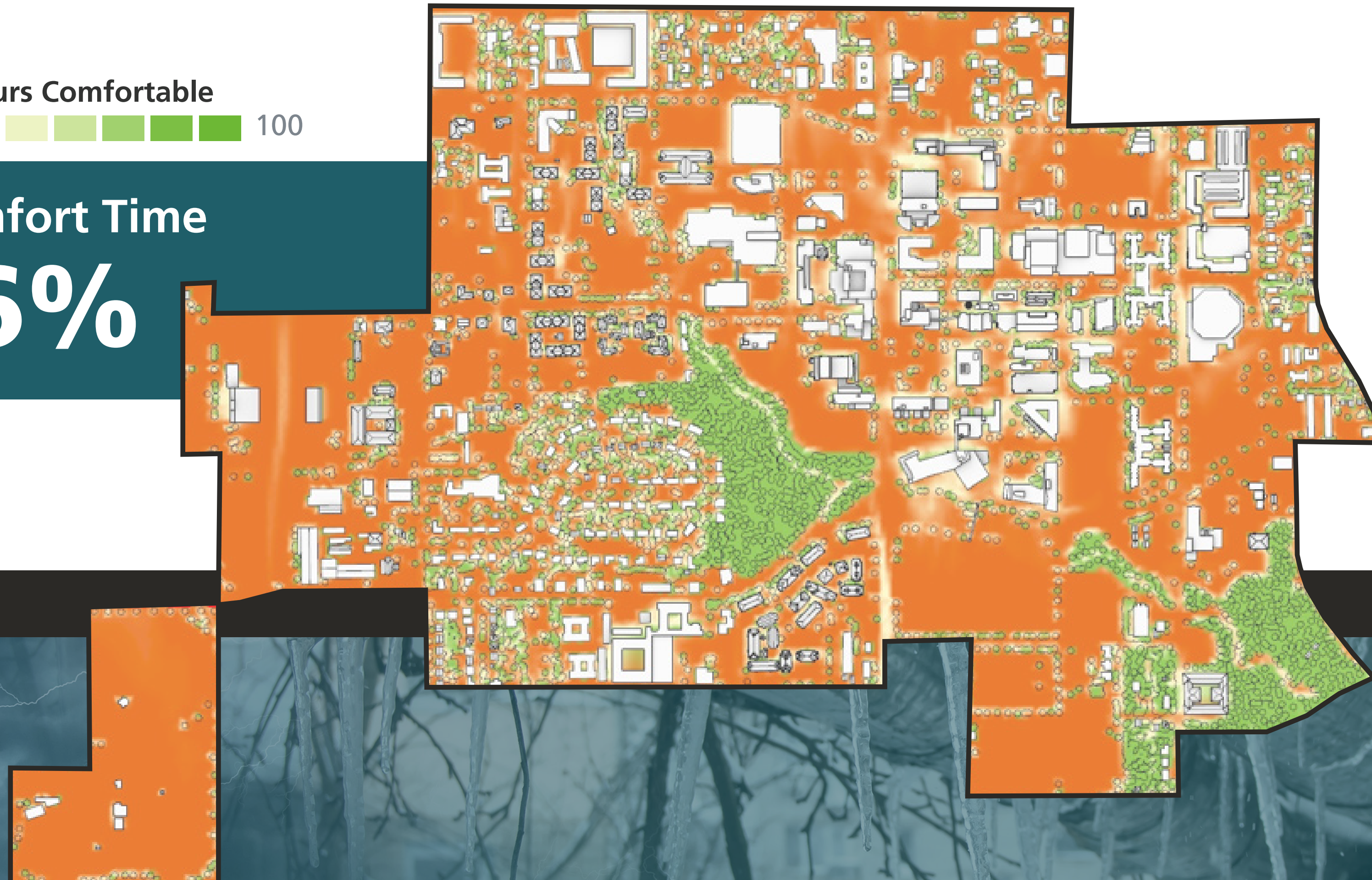
46.36%

Percentage of Hours Comfortable

0 100

Outdoor Thermal Comfort

% of Hours Comfortable from March to May

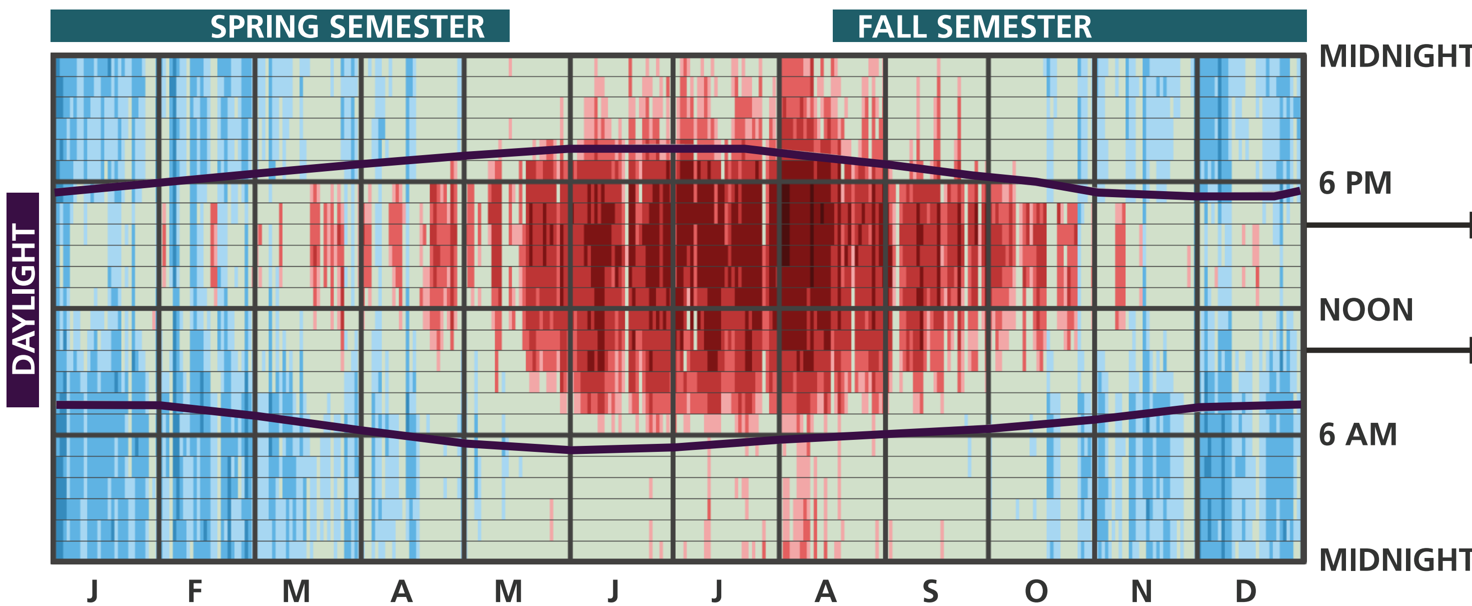


COLD

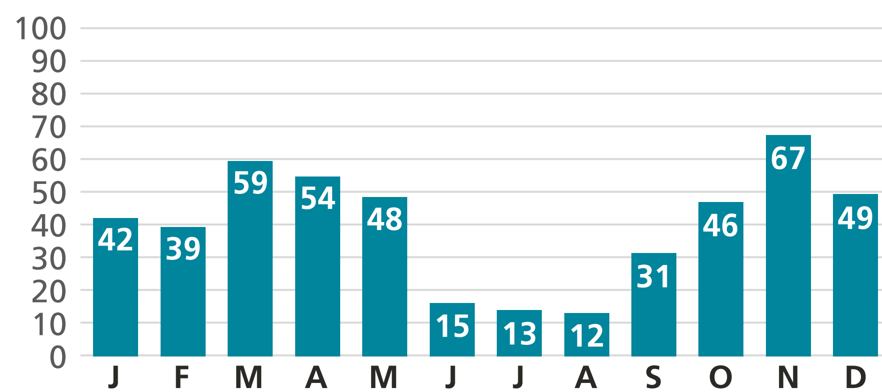
MILD | SLIGHT | MODERATE | STRONG | VERY | EXTREME

The UTA campus, situated in the heart of Arlington, experiences the full range of North Texas weather patterns. The most challenging periods occur between May and October, which notably overlap with both the end of spring semester and the beginning of fall semester - important times in the academic calendar. During these months, outdoor spaces experience sustained heat stress during peak class hours, with conditions often exceeding comfortable thresholds between late morning and early evening. This timing particularly impacts students moving between classes or studying in outdoor spaces. While early morning and evening hours provide some relief, the extended Texas summer means that uncomfortable conditions can persist well into the fall semester.

24-Hour Thermal Comfort Patterns



Outdoor Thermal Comfort
Percentage of comfortable daytime hours



UTA

As shown in the spring comfort analysis, well-designed spaces incorporating shade and proper air movement can double the number of comfortable hours - from approximately 35% to 75% during March through May. This dramatic improvement over unprotected areas demonstrates the potential impact of strategic design interventions. The difference becomes even more pronounced during summer months, when shaded areas can provide critical relief during peak heat periods.

Building arrangement and landscape design significantly influence these patterns. Areas with mature tree canopy show markedly better performance, maintaining usable conditions even during challenging spring and fall seasons. Similarly, spaces that benefit from building shade while allowing adequate air movement demonstrate notably higher comfort ratings. However, some building configurations create problematic conditions - either blocking beneficial breezes or creating uncomfortable wind tunnel effects.

The comfort analysis highlights priority areas for intervention, particularly along major pedestrian routes where exposure to extreme conditions is unavoidable. High-traffic paths between academic buildings, popular gathering spaces, and transition zones between indoor and outdoor environments require attention for maintaining usable conditions as temperatures continue to rise.

Managing Sun and Shade

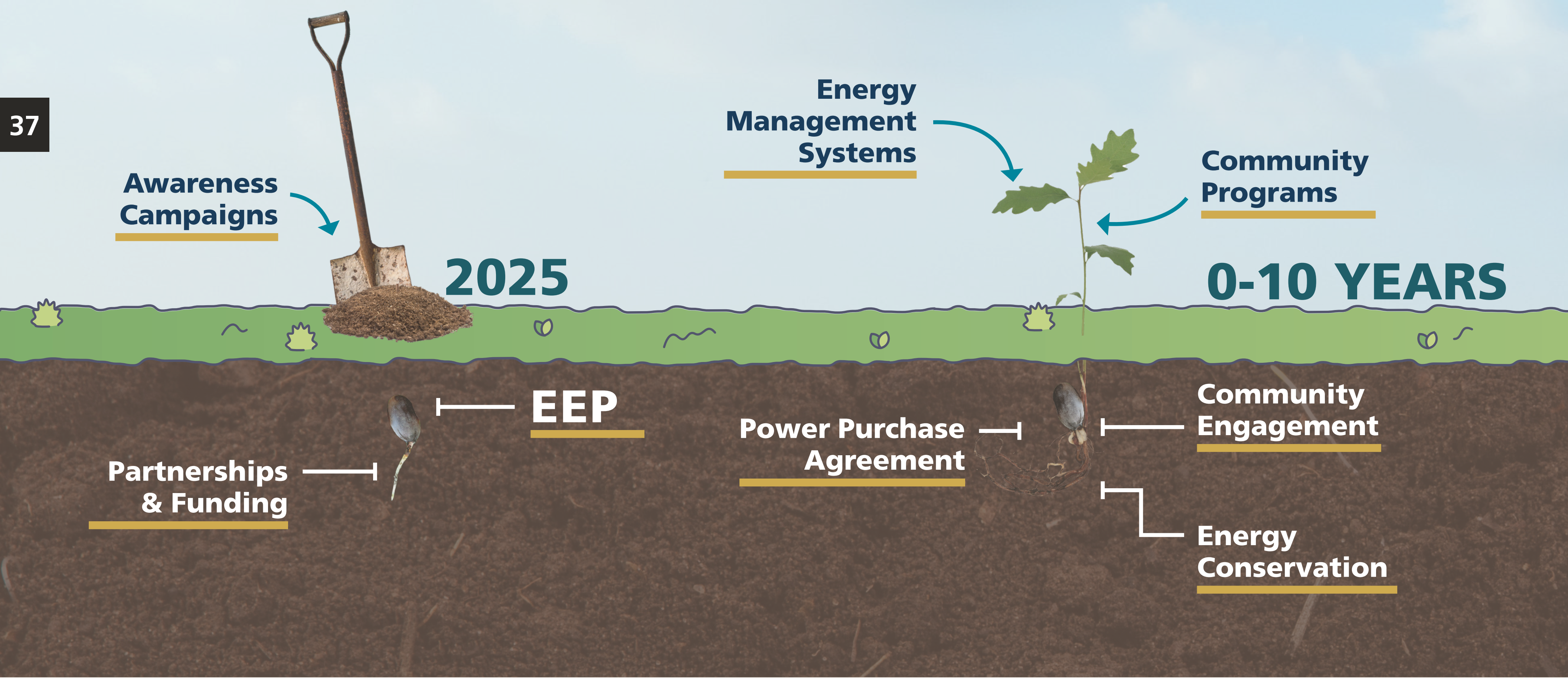
In Texas, shade becomes a key resource for extending the usability of outdoor spaces. The analysis shows that strategic shade placement can dramatically improve summer comfort conditions, proving especially pertinent given UTA's role as a largely pedestrian campus where students often need to walk significant distances between classes. Targeted shade deployment could significantly improve the campus experience during the hottest months while having minimal impact during Texas' typically mild winters.

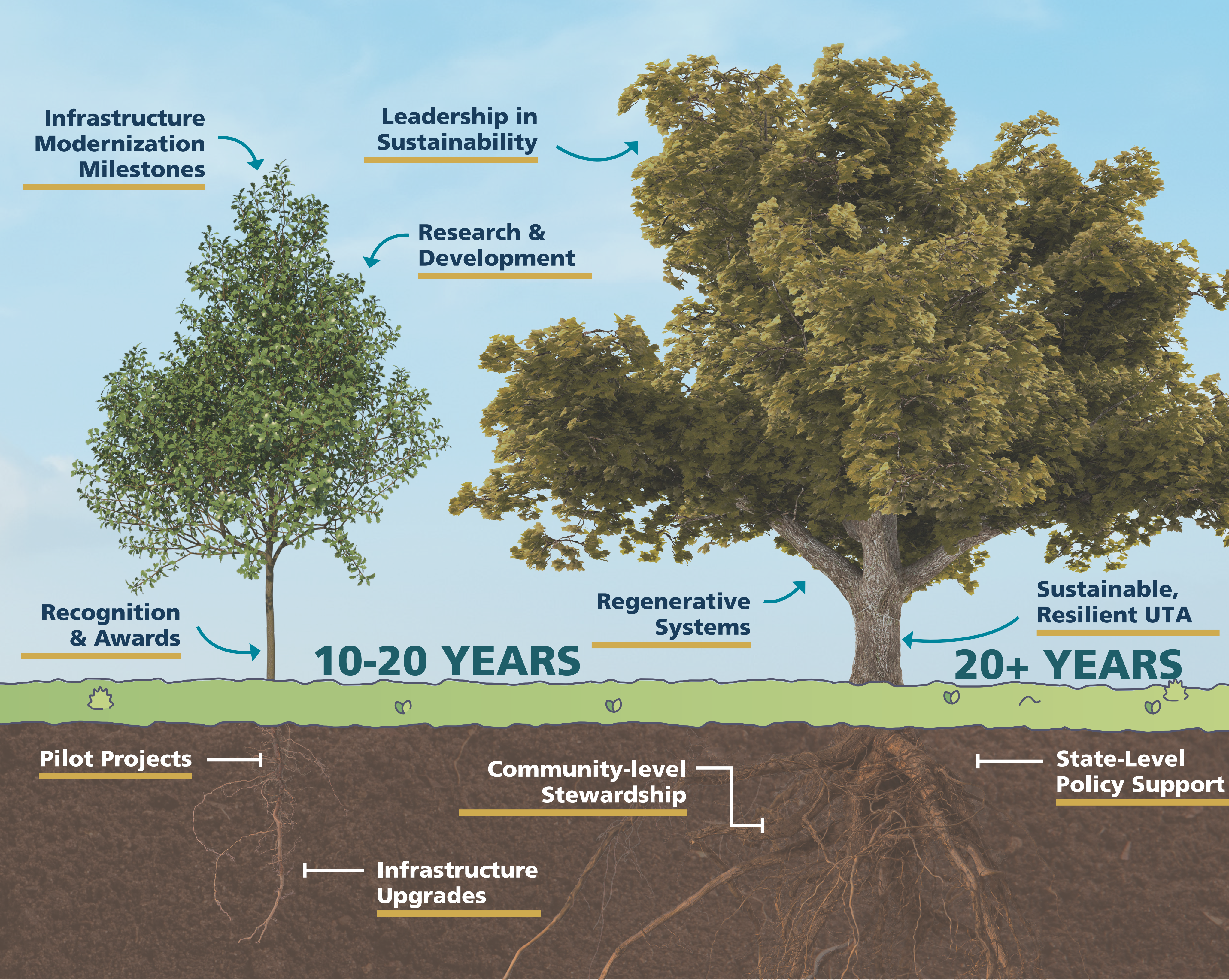
Wind Patterns and Natural Ventilation

Arlington's location in the southern Great Plains, combined with its position relative to the Trinity River basin, shapes its characteristic wind patterns. These regional features create predominant southerly winds averaging 9.1 mph, with stronger winds common throughout the year. This natural ventilation can help improve comfort during warmer months, but only when building arrangements and landscape features work with these patterns rather than against them. The campus analysis reveals areas where building configurations either block these beneficial southern breezes or create uncomfortable wind tunnel effects, suggesting opportunities for strategic interventions that better manage air movement across campus spaces.

Stabilizing our foundation

The Energy Efficiency Plan plants a seed of new opportunity, helping UTA's established roots become stronger through beneficial policies and strategies that assist the University's growth over the next 20 years and into the future.




Infrastructure Modernization Milestones
Leadership in Sustainability
Research & Development
Recognition & Awards
10-20 YEARS
Regenerative Systems
Sustainable, Resilient UTA
20+ YEARS
Pilot Projects
Community-level Stewardship
State-Level Policy Support
Infrastructure Upgrades

Reading the Plan

The EEP is organized around eight interconnected Key Themes that together create a comprehensive approach to campus sustainability and resilience. This guide explains how each theme is structured and how to navigate the detailed information within them.

Initiatives are the overarching approach toward improving upon the Key Themes

The Lead is the responsible party to ensure action items are progressing over time

The **definition** provides detail of what the chapter's Key Theme aims to accomplish

Co-benefits are shared positive gains that are achieved through a Key Theme, leading to faster and more cost-effective improvements

Initiative

Shift to resilient, low-carbon energy infrastructure

LEAD: Office of Facilities Management
with support from the Office of Sustainability

Definition

The key element of UTA's future is charting a path toward low-carbon operations. This section is an integration of much of what has been discussed before: high-performance buildings, improving resiliency on campus, understanding the constraints around the Texas grid, and tying them together to create a cohesive narrative around transitioning the university away from fossil fuels. This plan proposes a hybrid solution, leaving some legacy infrastructure in place to accommodate unforeseen peaks and extreme scenarios, but focuses primarily on the development of low-carbon options to guide UTA's future development.

The end of each section includes a table of strategies with identified goals for each Key Theme. The goals are ranked by priority and include detailed action items that will help UTA to progress in each.

Within each Key Theme, you'll find tabbed **sections** for the following:

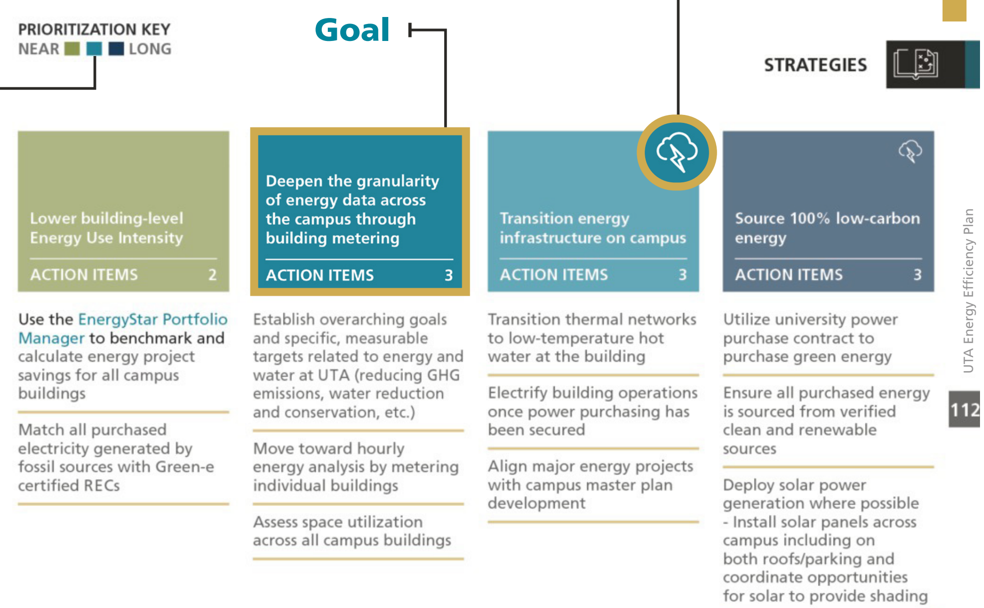
Overview
Analysis of Conditions
Opportunities
Strategies

A goal with a cloud symbol is directly focused on long-term **resilience**

The colors in the **prioritization key** identify if a goal should be approached in the near, mid, or long term

Goal

Supportive **action items** are beneath each goal



PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

STRATEGIES

Lower building-level Energy Use Intensity	Deepen the granularity of energy data across the campus through building metering	Transition energy infrastructure on campus	Source 100% low-carbon energy
ACTION ITEMS 2	ACTION ITEMS 3	ACTION ITEMS 3	ACTION ITEMS 3
Use the EnergyStar Portfolio Manager to benchmark and calculate energy project savings for all campus buildings	Establish overarching goals and specific, measurable targets related to energy and water at UTA (reducing GHG emissions, water reduction and conservation, etc.)	Transition thermal networks to low-temperature hot water at the building	Utilize university power purchase contract to purchase green energy
Match all purchased electricity generated by fossil sources with Green-e certified RECs	Move toward hourly energy analysis by metering individual buildings	Electrify building operations once power purchasing has been secured	Ensure all purchased energy is sourced from verified clean and renewable sources
	Assess space utilization across all campus buildings	Align major energy projects with campus master plan development	Deploy solar power generation where possible - Install solar panels across campus including on both roofs/parking and coordinate opportunities for solar to provide shading

UTA Energy Efficiency Plan 112

Culture & Communication

EEP

05

Initiative

Enhance the role of sustainability in culture and communications through story-telling and collaboration

LEAD: **Media Relations**
with support from the Office of Sustainability

Definition

To promote a culture of sustainability, efforts are made to increase cross-university communication on sustainable initiatives and stories. Departments are encouraged to highlight their positive impact, and signage across campus is encouraged to raise awareness of sustainability and efforts to address climate change. Moreover, there's an emphasis on communicating sustainability content effectively, aligning messaging with recruitment efforts, providing educational walking tours, and highlighting the sustainability programs at new student orientations.

Resilience Co-benefits

- Builds Community Connections
- Grows Green Jobs & Opportunities
- Supports Community Health
- Enhances Environmental Quality
- Fosters a Culture of Sustainability
- Establishes UTA as a Regional Leader

Sustainability Messaging

The Office of Sustainability leads digital sustainability communication through its Instagram account which reaches nearly 900 people. Posts are made several times per month and feature events, campus amenities, volunteer opportunities, and interviews with students, staff, and visitors. While other UTA accounts amplify this messaging by tagging @gogreenuta in related events or activities, the digital strategy appears fragmented. Occasional newsletters provide updates about recent initiatives and events, and the Office attempted a Sustainability Blog beginning and ending in 2022. Student-led organizations like Mavs Go Green (active between 2020 and 2023), the Environmental Science Club, and the United Nations Association Mavericks demonstrate that there is a strong interest in sustainability, however there are challenges with continuous engagement that may be due to outgoing student leadership and a lack of transitional strategy.

This disconnected approach to sustainability messaging extends beyond social media and long-form content. While the UTA Eco-Map identifies some helpful features such as bike racks and repair stations, recycling dumpster locations, and some student resources, this map fails to create a complete picture of UTA's campus assets, leaving out helpful waypoints like water bottle refill stations, recycling bins, and the Community Garden.

Untapped Potential for Knowledge Sharing

As an R1 Institution, UTA is recognized nationally to exist at the forefront of innovative research. This work is publicly available through UTA Libraries, which showcases journal articles across a wide array of topics, including circular economy, windfarm optimization, embodied carbon, and energy-saving investments, among other valuable research. While thought-leadership content, interviews with faculty and students, and sustainability workshops occur, they do not appear to be part of a coordinated and consistent strategy. The University lacks a systemic way to promote and celebrate this vast sustainability research and does not appear to be fully engaged with its potential for deeper engagement and discussion with students as well as the wider Arlington community.

MASTER PLAN ALIGNMENT
Include educational signage with Johnson Creek corridor improvements

Sustainability Communications

Educational Signage & Wayfinding

Transforming UTA's campus into an interactive learning environment through educational signage can help to passively increase interest in and awareness of the University's sustainability initiatives and research. This can be done through signage explaining how environmental features around campus like pollinator gardens, green infrastructure, native plantings, and wetlands benefit the community. Illustrating the impact of sustainable infrastructure can also be brought indoors by highlighting features like low-flow bathroom fixtures, energy and water conservation measures, and sharing the importance of reducing food waste. Further, strategic placement of sustainability-focused signage around the city of Arlington can serve both educational and promotional purposes, raising awareness of UTA's environmental commitments as well as showcasing University research or assets. Together with intentional identification of important waypoints which make sustainable choices more visible and accessible, this approach can help to transform campus navigation into opportunities for increased community engagement and recruitment of students interested in sustainability.

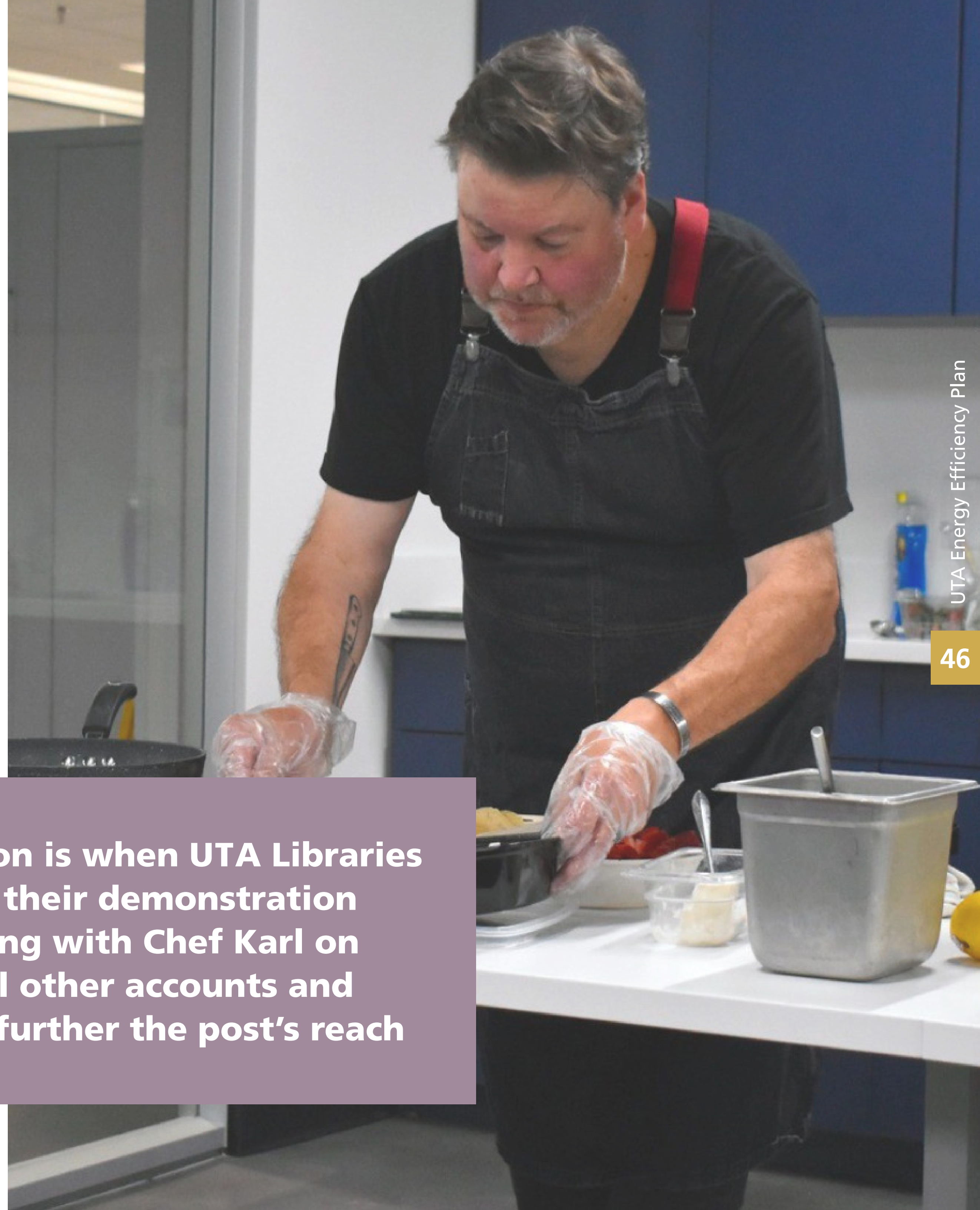
Source: University of Louisiana - Lafayette

Green Influencers

Transforming UTA's fragmented sustainability messaging relies on a strategic approach for digital communication. Partnering with the Department of Communications to develop and implement digital marketing campaigns as part of student coursework can help provide consistency in content production. This academic integration ensures professional oversight of content quality while also giving students practical experience in an emerging field. Maintaining momentum through student leadership transitions will depend on the creation of a comprehensive communications playbook in partnership with the University's staff marketing team. This guide will include content calendars, best practices, lessons learned, and protocols to ensure a smooth transfer between graduating and incoming students.

Considering expanding social media presence into other content platforms can extend the University's reach to a younger audience seeking authentic insight into life on UTA's campus. Regular content competitions with prizes can encourage student participation. This approach can increase the Office of Sustainability's capacity to continue a regular stream of content while reflecting genuine student perspectives.

Those involved in UTA's Green Teams can expand their roles as ambassadors by serving as bridges between digital engagement and in-person events. Challenging these teams to grow their influence by coordinating messaging efforts can help ensure their departments are actively involved not only in interdepartmental activities but also in external efforts to strengthen sustainability messaging for new faculty, staff, and students ensuring all incoming Mavericks are involved in UTA's sustainability culture from day one.



An example of this in action is when UTA Libraries posted information about their demonstration of zero-waste vegan cooking with Chef Karl on Instagram, tagging several other accounts and using related hashtags to further the post's reach

Source: UTA Libraries

Harmonizing with Campus Strategy

In alignment with the UTA Strategic Plan 2030 vision, the Office of Sustainability can establish a bi-weekly or monthly seminar series to connect more meaningfully with the wider community. This can be done through structured seminars showcasing leadership in sustainability. By inviting faculty, graduate students, and outside guests to present their research, these sessions can provide open discussion, garner interest in niche topics related to sustainability, and create valuable networking opportunities. These regular meetings can also provide ample short- and long-form content to be shared across social media platforms, helping to increase reach and garner outside interest in the sustainability research being done at UTA.

Further alignment with the Strategic Plan's goal of maximizing UTA's impact in the communities it serves through leadership and advocacy can be accomplished by championing the following efforts.

Enhancing in-class learning experiences by integrating sustainability initiatives into classwork can provide students with course credit while also creating impactful connections with the greater Arlington community. This can include implementing community-based research projects in partnership with organizations that are working at the local level to address the impact of climate on people and the environment and developing educational programming for K-12 students in which UTA students serve as mentors, guiding the next generation of sustainability champions.

Partnering with local businesses to develop training programs focused on Texas' energy future can ensure the local economy is engaged and prepared for this paradigm shift and provide internships for students so they can acquire the skills needed to successfully enter the workforce directly after graduation. This effort can include the establishment of innovation hubs that provide a space for faculty and students to interact with entrepreneurs and business operational leaders.

Developing a tracking system for volunteer hours can be helpful in maintaining detailed records of all University engagement efforts. This can provide both qualitative and quantitative data to use in applications for grant funding and awards by providing evidence of a sustained commitment to create a positive impact in the community. Students can assist the University in gathering this data through a portal where volunteer hours can be logged. UTA can incentivize this participation by providing an honors pathway where students can achieve recognition upon graduation for service to their community.

PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

Increase cross-university communications on sustainable stories

ACTION ITEMS 4

- Coordinate sustainability messaging to be part of campus on-boarding
- Track all departments to understand how activities positively impact UTA through channels like e-newsletters and social media
- Involve Communications students in developing awareness campaigns and social media presence as part of curriculum
- Create a comprehensive playbook defining protocols for sustainability communications

Further the "story" of sustainability across UTA

ACTION ITEMS 4

- Increase signage and visual indicators across campus with small notes about what has already been done to combat climate change
- Distribute the UTA Sustainability story across key sustainability contributors in the region
- Increase dynamism of sustainability communications and change how UTA communicates by embracing short form, highly visual content
- Engage alumni network in sustainability success at UTA

Continue to expand community service opportunities on campus

ACTION ITEMS 4

- Organize formal community events such as charity runs/walks/bike rides which involve volunteer efforts, fundraising opportunities, and outreach activities
- Provide honors pathways at graduation that involve volunteer hours completed
- Clearly define the social impacts of sustainability and how it relates to campus life
- Seek partnerships with local organizations, K-12 programs, and businesses to influence sustainability initiatives across Arlington

Expand office "Green Teams" program

ACTION ITEMS 3

- Assign at least one sustainability champion per department to be included in all departmental decisions
- Facilitate peer-to-peer support for 100% of UTA staff through sustainability-focused events, opportunities, and training sessions
- Coordinate participation of green teams in social media to celebrate their efforts

Food & Waste

EEP 06

Initiative

Increase waste diversion and improve food access

LEAD: **University Center** and **Office of Facilities Management**
with support from the Office of Sustainability

Definition

This strategy aims to advance UTA's urban agriculture movement, expand food access, and promote responsible consumption. Efforts are made to establish a campus greenhouse for research and partnerships with local businesses. Managing waste focuses on promoting a culture of reuse, enhancing recycling and composting processes, and increasing waste diversion. This includes streamlining waste management, making it easier to recycle and compost, and instilling a culture of reuse and repair.

Resilience Co-benefits

- Shrinks Carbon Footprint
- Grows Green Jobs & Opportunities
- Builds Community Connections
- Supports Community Health
- Fosters a Culture of Sustainability
- Establishes UTA as a Regional Leader

Food Access & Organic Waste

Campus Crops

UTA's Community Garden initiative began in 2011 in collaboration with the City of Arlington to provide students and residents a place to learn about organic gardening, grow food, and interact with others who are interested in urban agriculture. UTA does not currently host a plot in the garden, though students are encouraged to participate as community members. The University maintains regular upkeep of the property around the garden plots. Today, the half-acre garden's 78 plots are in high demand and quickly outgrowing their current home.

The garden is set behind the Military and Veteran Services building at Summit Avenue & UTA Boulevard, however the UTA website campus map and wayfinding signage along the road do not indicate where the garden is located.

Source: Google Maps

Food Donation & Composting

UTA has an award-winning composting program that processes over 30 tons of food waste annually;[12] this compost is used as mulch and soil amendment for the campus grounds and community garden. The University has received leadership recognition from the US EPA[13] for campus initiatives and programming for waste diversion and reduction.

Notable efforts across campus include:

- Seminars covering waste education, sustainable dining, and food security
- Donation through Maverick Food Pantry
- Student-led research for operations relating to food entering and exiting Maverick dining halls
- Pre- and post-consumer food waste collection and composting from on- and off-campus dining services, coffee shops, hospitals, and yard waste
- Use of Waste Not to measure, track, and reduce back of house waste in residential dining, kitchen scraps are composted

12 Office of Sustainability - Composting | UTA

13 US EPA Food Recovery Challenge National Award Winners

Remaining Waste

There are 22 recycling bins and 18 e-waste recycling locations serving over 100 buildings across UTA's campus.[14] While 10-20%[15] of waste is successfully diverted annually via reduction programming, all remaining waste is sent to landfill. Since UTA's Office of Sustainability began tracking recycling volumes in 2012, the most consistently recycled material by weight has been corrugated containers, while plastic is found to be the least recycled material. The average recycling contamination rate is 14%,[16] with most contamination incident tickets originating from The Commons and Vandergriff Hall.

14 Waste Management - The University of Texas at Arlington

15 UTA Office of Sustainability, 2024

16 UTA 2022 Sustainability Report

Recycling bins across campus are inconsistent in color coding and signage is not prominent. Bins are not often located in high traffic areas

Source: UBuffalo

Enhancing Effortlessness

Increasing the availability and visibility of recycling, e-waste, and organics bins along with information about how to use each bin at the point a decision is made can help to improve efficacy rates while at the same time reduce contamination rates.[17] This can be done by providing recycling and compost stations in a common or prominent location on all floors of each building on campus as well as in UTA's dining halls, residence halls, and apartment community spaces. Additionally, having consistency in color-coding of bins and providing clear procedural signage can provide a sense of familiarity and help to reduce uncertainty of desired behaviors. This can also help to streamline processes across all buildings on campus, ensuring students, faculty, staff, and visitors are all participating in a unified goal of successful recycling.

As mentioned previously, further improvements can be made by enhancing internal and external wayfinding across campus for destinations that enhance sustainability, which may include signage noting the location of recycling centers and other points of interest such as the Community Garden and the Maverick Pantry.

17 Effects of bin proximity and informational prompts on recycling and contamination | Sonny Rosenthal, Noah Linder

Innovation through Urban Agriculture

The Community Garden and Maverick Pantry have already demonstrated success through integrated coursework related to food availability and access to healthy fruits and vegetables, creating a strong foundation for the expansion of UTA's urban agriculture movement. The Master Plan allows space for this expansion through a community garden placed along the creek corridor, near the east campus proposed housing. Encouraging collaboration between colleges to work toward the implementation of more gardens across campus and within the City of Arlington can give students real-world experience working on multi-disciplinary teams, seeking and attaining funding, and engaging with University leadership and local stakeholders. Through the collaboration of students studying landscape architecture, business management, health and nutrition, communications, planning, and political science, the Community Garden and Maverick Pantry have the opportunity to grow into a community resource, providing fresh, locally sourced produce to students and residents.

In addition to growing food on UTA's campus to provide healthier options, there is an opportunity to use Texas-based distributors through The Common Market to expand the availability of high-quality herbs, fruits, and vegetables on dining service's menu while also supporting local farmers. The TASTE Project, a pay-what-you-can restaurant movement, has recently opened a location near the UTA campus and could be also be an opportunity for collaboration in expanding food access.

Further, expanding the university's composting program can complement UTA's urban agriculture effort by not only providing nutrient-dense compost to amend soil in community garden spaces, but it can also give students the material needed for researching and finding innovative practices for rapid decomposition and alternative uses of organic materials.

This integrated approach transforms classroom theory into hands-on experience for students, equipping them with marketable skills, all while expanding food access and promoting environmental and economic resilience. This initiative positions UTA as a leader in sustainability research, innovation, implementation, and communication while at the same time creating improvements in food security.

MASTER PLAN ALIGNMENT
Opportunity for the proposed garden along the creek near South Mitchell

Closing the Loop

Typical product waste streams follow a linear process, beginning with extraction of raw materials and ending at a landfill after use. Introducing the practices of reuse, repair, and recycling helps to close the loop on this process, creating a more circular economy of things. UTA can participate in this practice by inspiring a cultural shift in its student body that encourages sharing, donating, and restoring.

Incoming students tend to purchase new items for their dorm rooms,[18] which may include furniture, lighting, office supplies, electronics, and other items to make them feel at home. Outgoing students often discard many of these items before the end of the school year. This cycle introduces a demand for virgin resources while also creating a massive increase of landfill waste. Institutions like UT Austin and Bowling Green State University are combating this issue by operating secondhand stores, open year-round, that provide a place for students to donate unwanted items and purchase used items. Another way to encourage this practice is to host an annual move out event where donation stations are placed around campus to encourage students to offload unwanted items before going home for the summer.

18 NRF | Back to School

Source: UT - Austin

UTA Libraries already offers technology, tools, books, and media to borrow, reducing the need for students to buy new items when they are only needed for a short time. This practice can be expanded upon by offering long-term rentals for small appliances, seasonal clothing, travel gear, and other items that might be needed for longer intervals than typical library loan periods.

As the Library rental program grows, maintenance of UTA's inventory will become increasingly important. The establishment of a Repair Café naturally complements this need while also providing a space for students to bring their torn, broken, or malfunctioning items. Universities across the nation have adopted this model, using a mix of students and staff volunteers. This creates an opportunity for students in engineering, design, and other programs to practice problem-solving, gain familiarity with electronics, machinery, and clothing disassembly and reassembly, and acquire valuable experience to bring into their future careers.

Construction & Demolition Waste

As the UTA campus continues to evolve, managing construction and demolition (C&D) waste will require a robust approach for handling discarded metals, concrete and asphalt, wood, brick and masonry, glass, plastics, roofing, and insulation, among other materials. A comprehensive sustainable materials management policy can help to reduce the reuseable materials sent to landfill by establishing a set of guidelines as well as specific waste diversion targets. This policy should create clear protocols for materials sorting and prioritize reuse on site whenever feasible.

Opportunities for material recovery extend beyond easy to remove fixtures like doors, windows, and hardware. Other valuable materials such as concrete and brick can be recycled on-site to be used as aggregate for roads and pathways, and wood that is no longer structurally useful can be chipped on-site and used as groundcover, mulch, and erosion control. Other materials can find new life in future projects or benefit organizations like Habitat for Humanity.

There are substantial economic advantages in adopting sustainable C&D waste management practices. Beyond reduced disposal costs, UTA can realize additional savings through better planning and use of materials and decreased raw resources purchases. Digital tracking can help streamline material management flows and make it easier for contractors to comply with University-specified requirements. This can also help to satisfy LEED credits by providing documentation for percentage of waste diversion.

PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

STRATEGIES

Increase awareness and participation in on-campus community garden program

ACTION ITEMS 5

- Add garden location to wayfinding signage
- Create a student-led awareness campaign and events to learn about urban agriculture and composting
- Explore ways to increase garden bed capacity to respond to increase in demand for space
- Have Landscape Architecture students design garden spaces for multi-purpose community areas
- Add community garden to online Campus Map

Provide education on responsible food consumption

ACTION ITEMS 3

- Emphasize the importance of minimizing food waste
- Provide clear signage about where to get and how to use to-go containers
- Have varied and balanced vegan meal options available at every meal

Enhance visibility, accessibility, and knowledge about recycling, composting, and landfill waste

ACTION ITEMS 5

- Standardize and color code bins and locate them in prominent, high traffic locations
- Increase quantity of recycling bins across campus, include at least one bin per building level
- Provide simple, large signage with educational graphics that explain what goes in each bin
- Increase visibility/improve accessibility of waste and recycling assets using Tactile WasteFinder floor mats
- Expand donations and composting in catering services

Seek local sourcing for campus dining

ACTION ITEMS 2

- Partner with local farmers through The Common Market - Texas to establish a preferred supplier program for UTA dining services (prioritize fresh produce, dairy, and proteins)
- Create a farm-to-table dining services practice through the expansion of UTA's growing capacity. This may include the establishment of a campus greenhouse and UTA-owned garden plots
- Partner with local restaurants and campus dining

Promote a culture of repair and reuse

ACTION ITEMS 2

Start a Repair Café, which specializes in teaching consumers the skills necessary to repair their own goods, rather than replacing them

Expand upon the existing collection of discarded items by creating a campus surplus/reuse store where used items can be donated and found by students. Hold monthly in-person events that offer items for free to students, faculty, and staff

Develop an Integrated Waste Management Plan to increase waste diversion

ACTION ITEMS 5

Create a centralized recycling center on campus

Research and improve methods and logistics for campus composting and recycling operations

Streamline waste management process by partnering with a service for evaluation and customized programming

Reduce single use plastics in dining halls and eliminate all remaining Styrofoam from dining operations

Create an educational program for reducing recycling contamination

Expand campus gardens for research and collaboration

ACTION ITEMS 4

Utilize as a living laboratory for relevant academic programs, incorporate caretaking into curriculum

Recruit volunteers to help with garden operations

Explore implementing vertical farming practices

Explore collaboration opportunities with TASTE Project

Implement construction and demolition waste management practices on campus

ACTION ITEMS 4

Incorporate campus-wide policy for construction waste diversion into Office of Facilities Management standards and specifications

Track construction and demolition waste on all campus construction projects

Create/update contractor’s application for qualification to include agreement to abide by UTA policy for construction waste diversion

Incorporate the practice of salvage and reuse of building materials whenever possible prior to demolition

Economic Development & Innovation

EEP

07

UTA

Initiative

Position the DFW region as a leader in sustainability and innovation

LEAD: **Office of Research & Innovation**
with support from the Office of Sustainability

Definition

The economic development strategy focuses on fostering leadership in the green jobs market through collaboration with local businesses. This involves identifying problems that campus research can help solve, offering hands-on learning experiences and capstone opportunities for the students, and connecting startups with UTA researchers. Sustainability plans often drive investment in clean energy technologies, carbon capture and storage, sustainable agriculture, and other areas. This can stimulate academic research in engineering, materials science, biology, and other fields aimed at developing innovative technologies to address climate change.

Resilience Co-benefits

- Grows Green Jobs & Opportunities
- Builds Community Connections
- Fosters a Culture of Sustainability
- Establishes UTA as a Regional Leader

Research Excellence and Innovation

UTA's position as an R1 research institution, particularly its strengths in life sciences and engineering, creates unique opportunities for driving sustainable innovation. The University has established itself as a leader in several key areas:

Engineering and Technology

- Electrical engineering expertise supporting grid modernization
- Advanced materials research advancing battery storage technology
- Systems integration work supporting legacy infrastructure updates

Life Sciences and Community Health

- Research connecting environmental quality with public health outcomes
- Development of sustainable urban systems
- Integration of health considerations into infrastructure planning

Sustainable Urban Design

Through CAPPA (College of Architecture, Planning, and Public Affairs), UTA provides expertise in sustainable urban development and resilient infrastructure design. This knowledge base proves particularly valuable as the region experiences rapid growth and development.

Texas Energy Leadership

The Dallas-Fort Worth metroplex stands at the forefront of Texas' transition toward a more sustainable economy. As of 2022, Texas supported 936,476 energy sector jobs — representing 11.5% of all U.S. energy employment — with an increasing share in renewable and clean energy technologies.[19] The state ranks second nationally in clean energy jobs across a broad spectrum including renewable technologies, nuclear power generation, microgrids, grid modernization, energy storage, biofuels, electric vehicles, and energy efficiency.[20]

Texas' leadership in renewable energy is particularly noteworthy. In 2023, renewable sources accounted for nearly 30% of total state electricity generation, with Texas holding several national distinctions, including the following:

- The nation's leading producer of wind energy, generating 30% of total U.S. wind power
- Second highest solar energy producer behind California
- Overall contribution of nearly 31% to total U.S. renewable energy production (including solar, geothermal, and wind)[21]

19 2023 US Energy and Employment Report, Texas

20 2023 US Energy and Employment Report, Appendix A

21 2024 US Energy Information Administration, Texas State Profile and Energy Estimates

Campus as Innovation Hub

UTA's campus infrastructure itself represents a valuable asset for advancing sustainable technology. The University's diverse building portfolio, energy systems, and operational needs create natural opportunities for:

- Testing and validating new technologies
- Generating real-world performance data
- Demonstrating integrated sustainable systems
- Supporting utility partner research through advanced metering
- Providing hands-on learning opportunities

UTA as an Economic Engine

The University of Texas at Arlington serves as a major catalyst for regional economic development through multiple channels. As one of the region's largest employers, UTA directly contributes to the local economy through its operational spending, employment, and procurement practices. More significantly, the university's role in workforce development helps supply the skilled professionals needed to support the region's growing sustainable technology sector.

Regional Momentum

The Dallas-Fort Worth region has demonstrated increasing commitment to sustainability leadership, exemplified by DFW International Airport becoming North America's first carbon-neutral airport. This achievement, along with other regional initiatives, positions North Texas as an emerging hub for sustainable development. The region's rapid growth and upcoming major events provide opportunities to showcase sustainable development at scale.

This comprehensive foundation positions UTA to expand its role as both an economic driver and innovation catalyst for sustainable development across North Texas.

RESEARCH INNOVATION

UTA has the potential to establish national leadership in specific sustainability domains by strategically focusing its research investments and faculty recruitment.

FACULTY LEADERSHIP

Targeted faculty recruitment and comprehensive research support infrastructure can strengthen UTA's position as a leader in sustainability.

CAMPUS INNOVATION

UTA students and faculty can test new technologies, generate research data, provide hands-on learning experiences by transforming the campus into a living laboratory.

ECONOMIC DEVELOPMENT

Workforce development programs and technology commercialization initiatives aligned with industry needs can support regional economic growth.

REGIONAL PARTNERSHIPS

Fostering partnerships through professional accreditation programming and local industry can identify opportunities for joint research, demonstration projects, and shared facilities.

Research Innovation

UTA has the potential to establish national leadership in specific sustainability domains by strategically focusing its research investments and faculty recruitment.

Energy Storage and Grid Innovation

By building upon existing electrical engineering strengths, UTA can help to advance battery technology research and develop smart grid solutions. There is opportunity to support pilot programming of new technologies through partnerships with regional utilities.

Urban Resilience Technology

There is potential to leverage CAPPA's expertise in urban planning to help develop climate-adaptive infrastructure solutions, create integrated building management systems, and advance urban heat mitigation strategies.

Smart Systems Integration

Combining Internet of Things (IoT) technology and advanced metering into infrastructure management can help to optimize overall performance by supporting data-driven decision making and create predictive maintenance systems.

Faculty Leadership

Strategic Recruitment

UTA can strengthen its position as a sustainability leader through targeted faculty recruitment focusing on supporting emerging leaders in fields such as renewable energy systems, sustainable infrastructure development, urban climate adaptation, and amplifying the work of researchers who are bridging technology and community health.

Research Support

To attract and retain leading researchers, UTA can create dedicated sustainability research centers, develop specialized laboratory facilities, establish seed funding programs for sustainability research, and build industry partnership programs.

Campus Innovation

Living Laboratory Implementation

UTA's campus offers unique opportunities to test new technologies in real-world conditions, generate performance data for research, demonstrate integrated sustainable systems, and support utility partner research through advanced metering, all while providing hands-on learning experiences for students.

Economic Development

Workforce Development

Supporting regional economic growth can be done by offering continuing education programs for working professionals and offering technical training partnerships with local businesses. Further, providing professional certification programs in sustainable technologies and having industry-aligned curriculum can help students be better prepared to enter the workforce upon graduation.

Technology Commercialization

Opportunities to accelerate innovation include programs for industry partnerships and startup incubation focused on sustainable technologies, living laboratory demonstrations, and supporting enhanced technology transfer.

Regional Partnerships

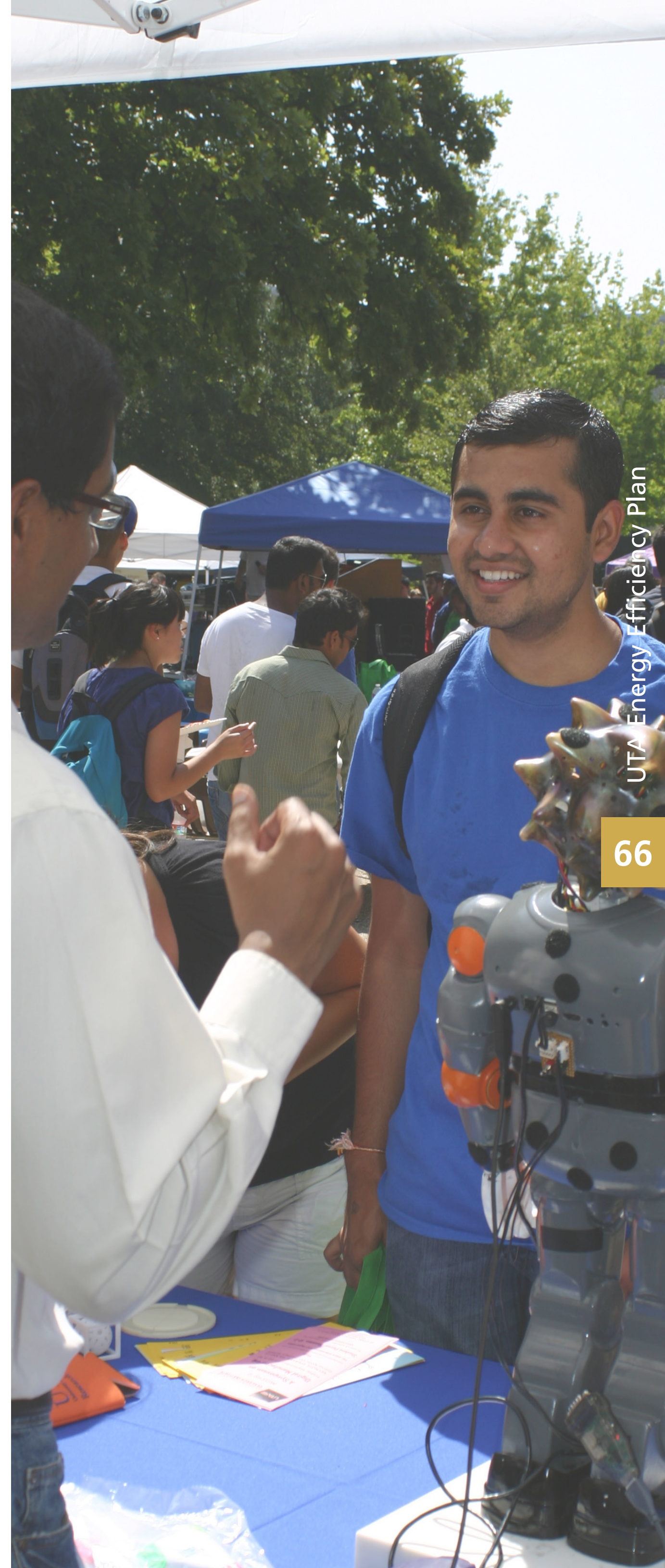
Professional Accreditation

UTA can establish itself as a regional training hub by developing sustainability-focused professional credentials and creating industry-recognized certification programs, as well as offering specialized technical training and partnering with professional organizations.

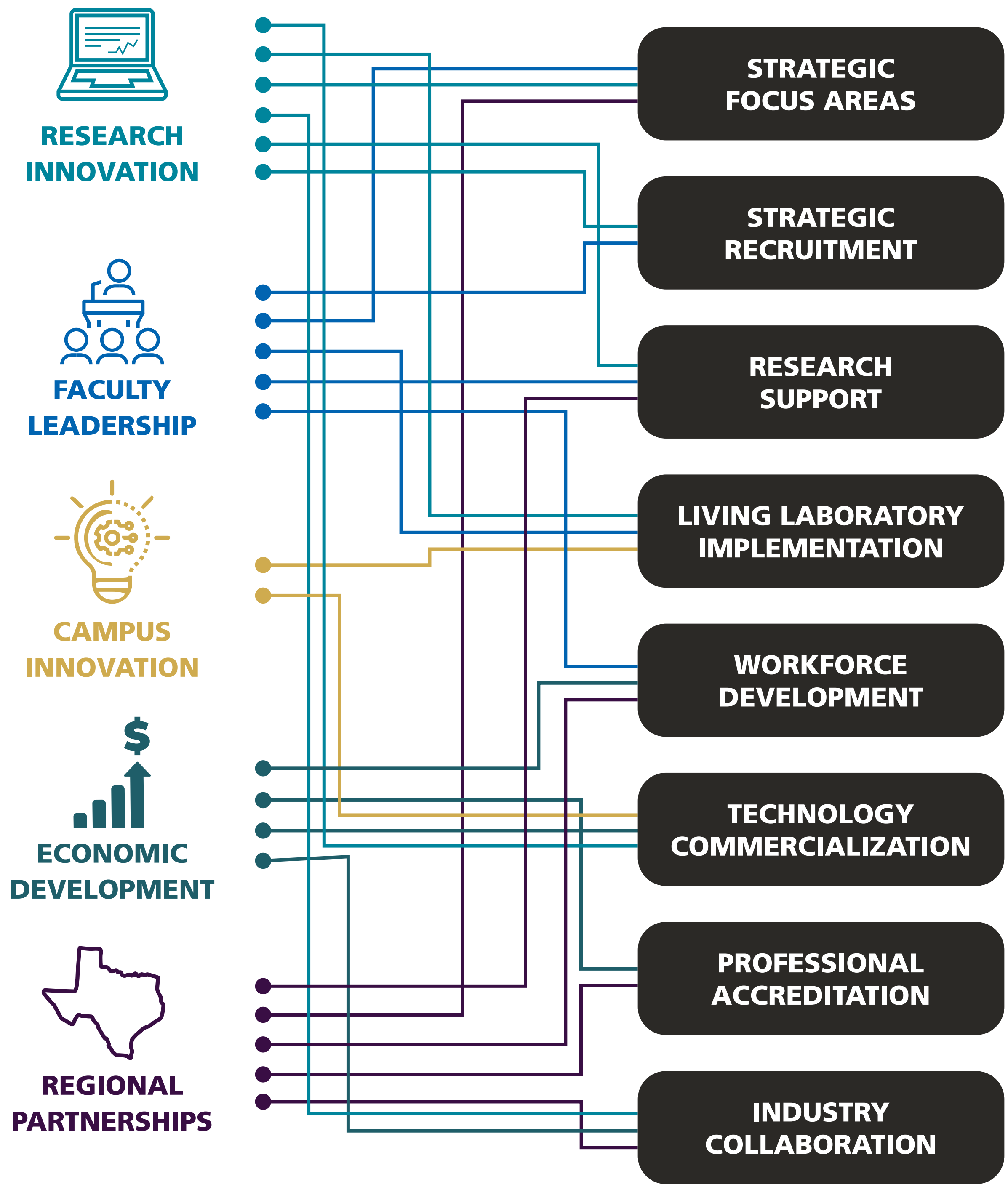
Industry Collaboration

Key partnership opportunities include regional utility providers and technology companies where UTA can support joint research, demonstration projects, and provide shared testing and validation facilities. Strong partnerships can make it easier to pursue collaborative proposals, allowing for a greater chance of securing funding for further research and equipment.

Source: UTA Research Institute



These opportunities represent a holistic approach to achieving UTA's major goals



UTA

PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

Establish Green Tech Network

ACTION ITEMS 2

- Identify faculty to foster research within Green Technology
- Identify collaboration opportunities for green technology transfer and commercialization

Develop partnerships for infrastructure modernization training utilizing UTA courses

ACTION ITEMS 3

- Create a professional learning opportunity/ program for existing professionals to benefit from UTA's sustainable offerings
- Leverage the cluster hire initiative to drive a sector of research that is focused, across disciplines, on forwarding research around sustainability
- Develop administrative capacities to pursue grants in these fields

Encourage leadership in the green jobs market

ACTION ITEMS 5

- Connect with local businesses to identify problems that campus research could help solve
- Identify target areas for sustainability to further grant-funded research
- Collaborate on sustainability-focused workforce training
- Leverage Center for Entrepreneurship and Technology Development for collaboration with local businesses/organizations
- Expand green workforce development funding

Work with regional leaders to further DFW as an innovative EcoDistrict

ACTION ITEMS 1

- Reference and analyze the annual ULI sustainability and climate change report to compare against UTA sustainability metrics

Social & Community Impact

EEP

08

Initiative

Highlight UTA as an exemplar university for research in sustainability

LEAD: **Office of Sustainability**, **CAPPA**, and **Division of Student Affairs**

Definition

To maximize social impact, initiatives aim to highlight existing sustainability research, rethink mindsets around sustainability, and effectively communicate its social implications. This involves establishing a shared vision of sustainability, enhancing communication with younger generations, and offering educational opportunities like walking tours and community engagement events.

Resilience Co-benefits

- Grows Green Jobs & Opportunities
- Supports Community Health
- Enhances Environmental Quality
- Builds Community Connections
- Establishes UTA as a Regional Leader

University Programming and Success

Since the 1990s, the University has been deepening its involvement in the sustainability movement, making progress in GHG emissions, waste management, campus engagement, and sustainability education. As part of these efforts, four sustainability-related programs have emerged, three of which are located within the College of Architecture, Planning, and Public Affairs and one within the College of Engineering:

- MS Sustainable Building Technology (CAPPA)
- Minor Environmental and Sustainability Studies (CAPPA)
- BS Sustainable Urban Design (CAPPA)
- BS Resource and Energy Engineering (College of Engineering)

As a top tier research institution, UTA receives grant dollars from federal, state, and local sources that fund crucial research in science and technology. This funding supports the pursuit of innovative solutions to today's challenges, establishing a foundation for continued leadership in these fields.

Total Research Dollars
by scale, as of 2022
Source: Data USA

71.8M
FEDERAL

20.6M
STATE

534K
LOCAL

Source: UTA Flickr | Brett Shipp at TEDxUTA

Witnessing the best of humanity in the worst of times

Developing UTA's Influence

UTA can use the existing momentum toward becoming an international leader in research and innovation as a catalyst for future-focused change. Focusing funding and doctoral research on clean energy and sustainable development can ensure the university is first seen as a regional resource before extending its national- and subsequently its global-reach.

Increasing UTA's presence at conferences specifically focused on these topics, as well as providing widespread access to existing sustainability research by hosting published articles publicly, can help to attract faculty researchers who are trailblazing in areas of green innovation and graduate students who are hoping to expand upon the work of current faculty.

Broadening and highlighting this network of professionals will undoubtedly begin laying the groundwork for leadership in the green industry, attracting further funding and growth of UTA's student body, its faculty membership, and its influence on the local, state, federal, and ultimately, the international scale.

Embedding Sustainability Across UTA's Core Curricula

Sustainability can most successfully be woven into the fabric of UTA's academic programming by aligning capstone and doctoral research projects with campus operations, allowing students to apply the concepts and principles they are learning in class through living laboratories, partnerships with local governments and businesses, and by becoming involved in the implementation of sustainability initiatives across campus. Combining hands-on learning experiences with capstone projects allows students to apply theoretical knowledge to real-world contexts and develop practical skills relevant to addressing the challenges Texas faces in relation to energy and environment. Further, through these efforts UTA can encourage an interdisciplinary approach to sustainability research and education, utilizing cluster hires in sustainability to facilitate cross-campus dialogue and expand graduate offerings for sustainability curriculum which will foster collaboration between researchers from different disciplines, leading to innovative solutions and new research directions.

MASTER PLAN ALIGNMENT
Outdoor research areas can provide space to implement these practices

What this can look like:

- Onboarding and recruiting efforts for students, faculty, and staff
- Building courses into core curriculum, exposing opportunities for integrating sustainability into different fields of study
- Leaning into understanding how UTA can continue to grow the clean energy industry
- Seeking federal research grants to pursue innovative technologies
- Introducing life cycle assessment to architects and industrial designers
- Ensuring students in marketing and graphic design know how to communicate sustainability information
- Encouraging students in existing sustainability-focused programs to pursue PhD research and to engage in campus-wide education campaigns

Highlight existing sustainability research

ACTION ITEMS 6

- Group recent sustainability stories in a featured section on the UTA website
- Be more explicit in communicating research related to sustainability
- Align recruiting efforts with key hiring districts
- Create a searchable catalog of faculty experts, projects, and sustainability efforts
- Host walking tours with educational signage on trails
- Ensure sustainability vision is integrated into on-boarding and recruiting efforts

Ensure widespread Research Access by hosting published articles on publicly available infrastructure

ACTION ITEMS 2

- Create a Sustainability category on UTA Libraries DAZL and the BrowZine library for easy access to related research
- Ensure common keywords are being used in all published work to ensure UTA research is being cataloged and referenced effectively

Deepen connections for fostering a sustainable campus community

ACTION ITEMS 2

- Expand network of sustainability professionals by connecting with other institutions in the region with programs in sustainability or with environmental-focus (examples include University of Oklahoma, Sam Houston State University, University of Houston, Texas A&M)
- Advocate for social justice and environmental sustainability at local, national, and international levels

Integrate sustainability initiatives into course curriculum

ACTION ITEMS 2

- Enhance capacity to implement action items by aligning class syllabi with relevant projects
- Connect students with local businesses and government departments through coursework

High-Performance Buildings

EEP 09

UTA

Initiative

Retrofit and design high-performance buildings across campus

LEAD: **Office of Facilities Management**
with support from the Office of Sustainability

Definition

High-performance buildings are an essential building block to a low-carbon future for UTA. Building operations are the driver for nearly all scope 1 and 2 emissions at UTA, and improving their efficiencies will have some of the most immediate impact on overall carbon emissions reductions efforts. Additionally, high-performance buildings complement on-site renewable power generation, and taking steps to reduce consumption will allow for more effective use of on-site renewables. It Is also important to integrate the sustainability principles into construction and design documents for consultants and contractors.

Resilience Co-benefits

- Shrinks Carbon Footprint
- Supports Community Health
- Increases Energy Efficiency
- Decreases Utility Costs
- Establishes UTA as a Regional Leader

Current Building Performance Metrics

UTA's Campus Energy Use Intensity (EUI), a metric that tracks building performance on a per square foot basis, has been a key reference point for the Office of Sustainability Dashboard for several years. This number has fluctuated throughout the last five years, but following the notable dip in energy utilization brought on by the COVID-19 Pandemic, the university has been steadily increasing its campus EUI. Since 2023, UTA's campus EUI has outpaced pre-pandemic numbers, both a sign of a growing campus, and a noteworthy reduction in building performance. UTA's current and future building stock will require intervention in order to maximize the potential for sustainable development and operation.

Campus EUI in kBTU/SF

UTA 2019 - 2024

2019	2020	2021	2022	2023	2024
112.9	109.7	106.1	110.5	113.1	114.4

State of Energy Conservation

In 2005, UTA contracted the Siemens Building Technologies team to evaluate energy conservation measures on-site, and identified 18 Energy Cost Reduction Measures, including the development of a chiller plant on the west side of campus, lighting retrofits, occupancy sensors, as well as HVAC system upgrades in order to drive down utility consumption at UTA.[22] These recommendations are the groundwork for this plan's future recommendations, and serve as an early step to adopting energy conservation as a core ethos at UTA.

The implementation of these Energy Cost Reduction Measures has had a significant impact on overall consumption at UTA, seeing a 22% reduction in energy use consumption per square foot between the beginning of their implementation and today.

In order to meet the goals outlined as part of this plan, additional measures need to be taken to continue to drive down campus utility consumption.

22 Sustainability - Energy: UT Arlington

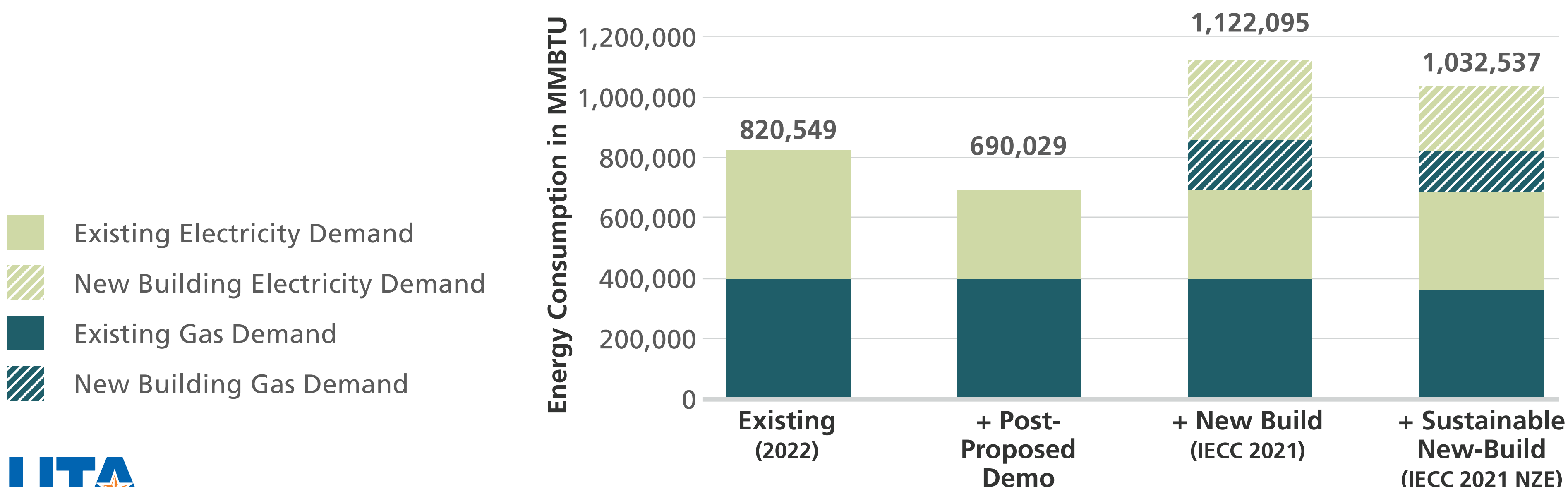
New Building Targets

As of 2023, the City of Arlington and UTA have adopted the 2021 version of the International Energy Conservation Code (IECC) as the building energy code standard. A portion of IECC 2021, titled “Zero Energy Commercial Buildings Provisions” (NZE Buildings Provisions) illustrates potential paths to Net Zero Energy buildings by climate zone. UTA, within the IECC’s Climate Zone 2A, has target EUI of buildings tabulated below. To supplement UTA’s advanced research development, this plan recommends an additional target for lab and research spaces. Although not included in the IECC 2021 NZE Buildings Provisions, these targets are based on current research space operations, as well as high-performance benchmarking from the International Institute for Sustainable Laboratories (I2SL).

A key component of infrastructure modernization is development of high performance targets for each building type on campus.

USE TYPE	TARGET EUI
Admin	30
Athletics	54
Classroom	42
Mixed-Use	73
Lab/Science/Research	165
Office	30
Residential	73

Future Utility Demand Scenarios



Building Level ECMs

Building on what was developed by Siemens in previous iterations of energy efficiency efforts on campus, this plan lays out comprehensive building-level energy conservation measures (ECMs) that will enable existing buildings to operate even more efficiently, while continuing to serve the needs of students, faculty, and staff at UTA. These recommendations are designed as continual efforts to reduce utility consumption year over year, in order to align with a future, low-carbon UTA.

Daylighting
Maximizing natural light with windows and skylights reduces artificial lighting needs and improves occupant well-being.

Direct Digital Control (DDC) Upgrades
DDC advanced monitoring and diagnostics capabilities improve efficiency, reduce maintenance costs, and improve reliability.

Demand Controlled Ventilation (DCV)
Adjusting ventilation based on occupancy and air quality with real-time sensors optimizes energy use while maintaining comfort.

LED Lighting Transition
LEDs use up to 90% less energy than traditional lighting while offering longer lifespans and smart control compatibility.

High-Efficiency Mechanical Equipment
Converting traditional high-temperature equipment to modern solutions like heat pumps significantly improves performance.

Building Thermal Envelope Improvement
Upgrading insulation, windows, and air sealing reduces heat transfer and energy consumption and increases comfort levels.

Mechanical Energy Recovery
Finding opportunities for heat recovery technologies reduces overall demand with the aim of reducing scope 1 emissions.

Plug Load Controls
Advanced plug load controls can optimize energy consumption by adjusting power settings based on occupancy and usage patterns.

Heating Water Circulation Temperature
Decomissioning steam systems in favor of hot water boilers steps down high temperature hot water more gracefully.

Case Study: Impact of Energy Conservation Measures

ENGINEERING RESEARCH BUILDING

Use Type: Lab
Gross Square Footage: 236,528
Certification: LEED Gold Certified
Completion Date: 2011
EUI: 329 kBTU/sf/yr
Estimated Annual Utility Cost: $481,018

This case study serves as an opportunity for application across campus for existing buildings, and will be key to understanding the potential impacts of future campus-wide energy conservation measures, based on existing campus operations.

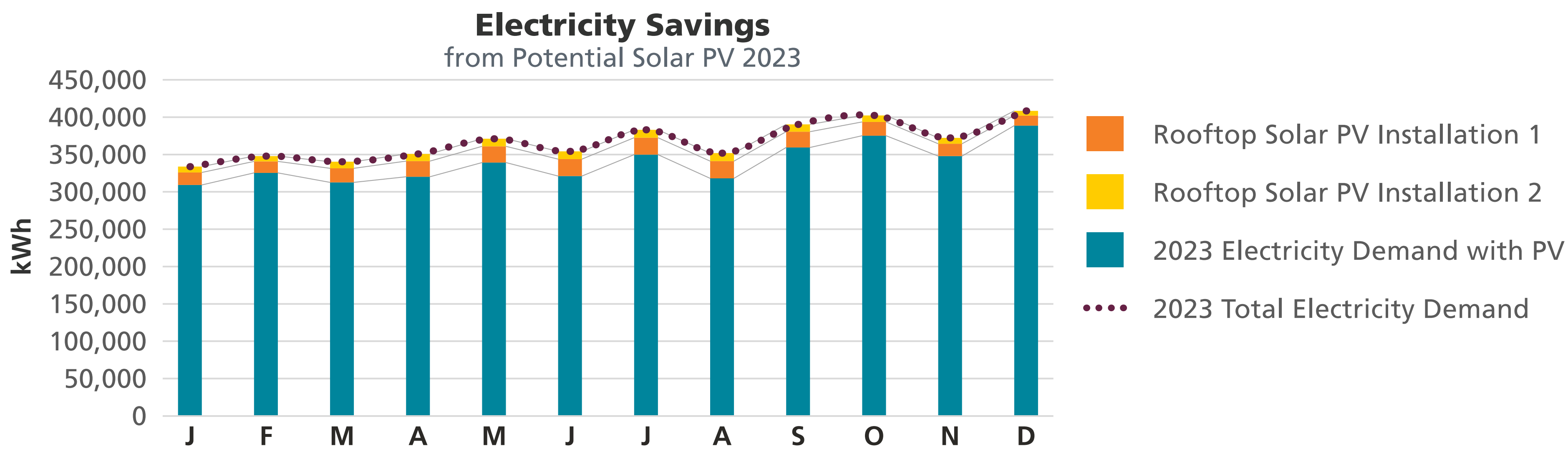
These comprehensive energy conservation measures account for building architectural, mechanical, and electrical system upgrades to drive efficiency as much as possible, in order to support future electrification.

This case study reveals a potential annual utility savings of $132K for building-level ECMs at the ERB.

Image created by SmithGroup and AI

Energy Conservation Potential

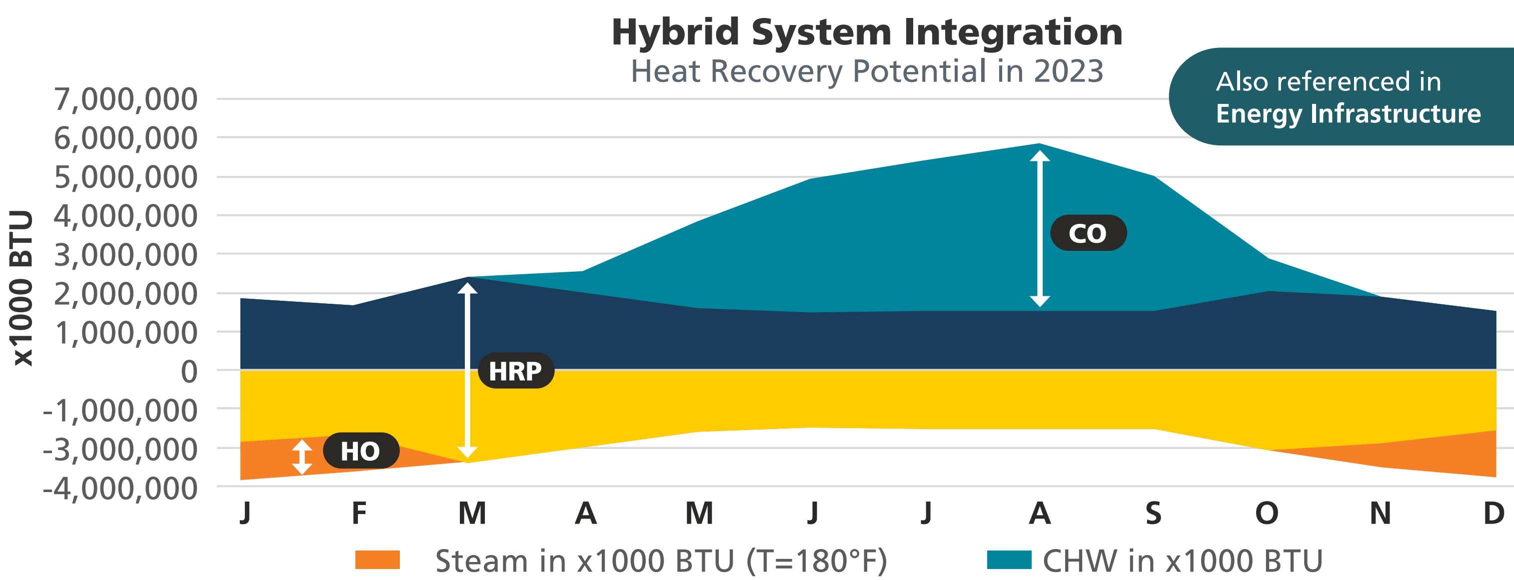
SmithGroup and Ameresco both found that without energy conservation efforts, solar generation covers only 7.7% of annual consumption. Based on June 2024 Plant Reports, current steam boilers are operating at 75.7% efficiency, not including additional distribution losses through campus steam system. Proposed new condensing boiler units at the building level are assumed to operate at 92% efficiency, with rated conditions as high as 99% efficiency. Campus heating systems reveal significant opportunity for heat recovery, particularly transitional seasons where simultaneous heating and cooling demand occurs.



HO **Heating Only**
Effectively served through decentralized, condensing boilers

HRP **Heat Recovery Potential**
Effectively served through heat pumps

CO **Cooling Only**
Effectively served through centralized chiller loops



Also referenced in **Energy Infrastructure**

Viable Building ECMs at the ERB

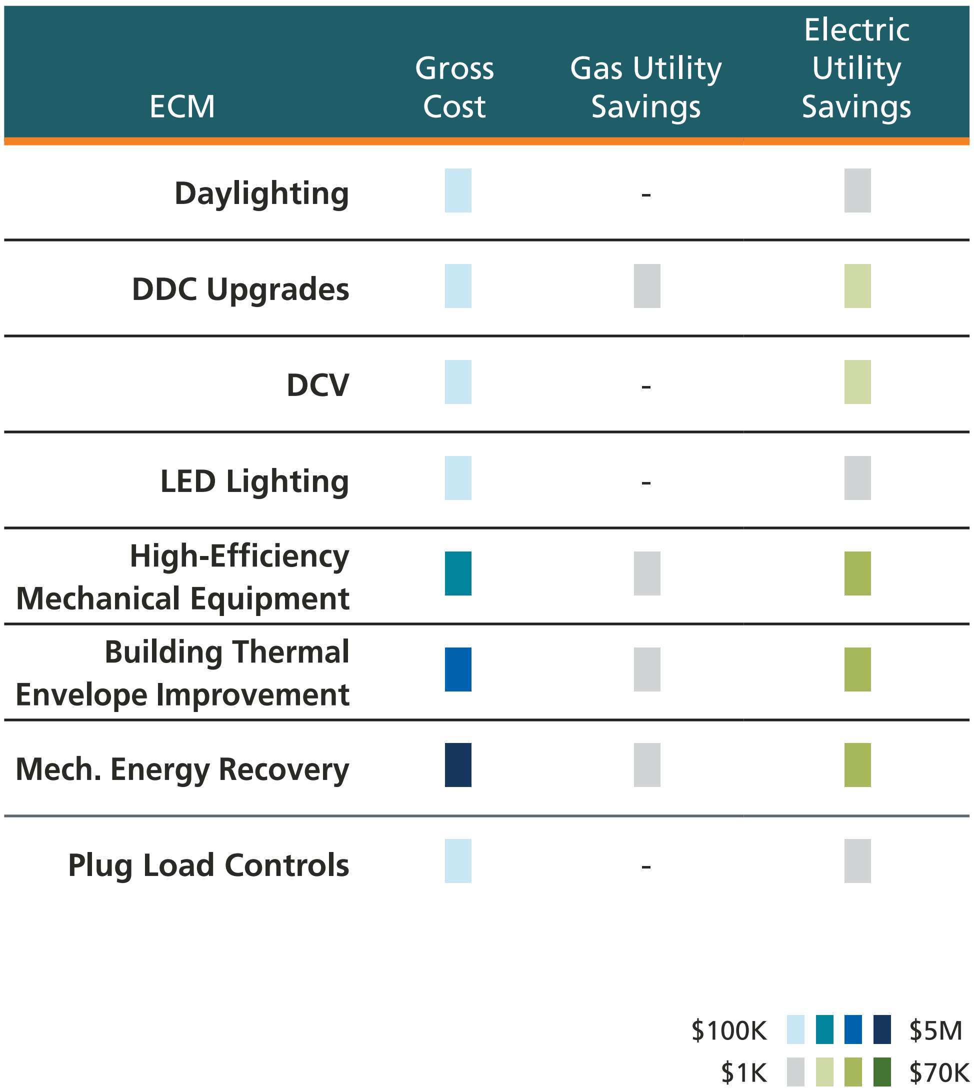
Estimated savings based on previous energy conservation experience

Building-level ECM	Electric Savings	CHW Savings	Heating/Steam Savings	Total Energy Savings kBTU	Gas Emissions Reduction mTCO2e	Electric Emissions Reduction mTCO2e
Daylighting	2.0%	-	-	300,470	-	36.64
DDC Upgrades	3.8%	-	4.0%	1,882,989	71.903	69.62
DCV	2.5%	-	-	375,588	-	45.80
LED Lighting	2.0%	-	-	300,470	-	36.64
High-Efficiency Mechanical Equipment	-	3.8%	4.0%	2,907,503	71.903	194.56
Building Thermal Envelope Improvement	-	3.5%	4.0%	2,781,550	71.903	179.20
Mechanical Energy Recovery	-	5.0%	5.0%	3,739,340	89.879	256.00
Plug Load Controls	1.0%	-	-	150,235	-	18.32

* Based on current energy conservation efforts undertaken by the university, LED transition is likely currently underway for the ERB.

UTA

Viable Building ECMs at the ERB
Total Costs and Savings



ECM Applications for the ERB

Direct Digital Control (DDC) Upgrades

- Upgrade existing systems to ASHRAE Guidelines 36 DDC Control Schemes

High-Efficiency Mechanical Equipment

- Adapt existing steam heating systems on campus
- Expand heating coils within building systems
- High efficiency thermal distribution systems: passive and active chilled beams, radiant heating, etc.

Mechanical Energy Recovery

- Focus on research and lab facilities which provide excellent opportunities for heat recovery
- Build on existing building performance analysis completed as part of Energy Efficiency Plan

Heating Water Circulation Temperature

- Conduct building stress tests to determine minimum circulating temperature requirements on peak heating day
- Transition from current 180°F to suitable temperatures for heat pump operations
- Develop a phased decommission plan for the campus steam system
- Install high-efficiency condensing boilers at each building

STRATEGIES

PRIORITIZATION KEY
NEAR ▪ ▪ ▪ LONG

UTA sustainable design guidelines	Lower building water intensity	Lower building level Energy Use Intensity	Target LEED/WELL Certification on all new construction
ACTION ITEMS 2	ACTION ITEMS 1	ACTION ITEMS 1	ACTION ITEMS 2
Develop sustainable design guidelines for UTA	Use high-efficiency fixtures where possible	Pursue high-performance energy targets for new buildings	Update the 2011 Green Building Policy
Share sustainable design guidelines to all contractors on UTA projects			Enforce the Green Building Policy for all new construction to require LEED Certified rating

Reduce existing building energy consumption

ACTION ITEMS 2

Reduce building energy consumption on existing buildings through targeted retrofitting

Pursue energy conservation measures at each building

Reduce campus embodied carbon

ACTION ITEMS 1

Consider low carbon materials in order to reduce embodied carbon in new construction

Best utilize roof space for sustainability measures

ACTION ITEMS 3

Prioritize roof space for high-efficiency HVAC equipment

Develop new buildings as rooftop solar ready

Identify future candidates for green roof projects as available

Pursue building electrification for heating and cooling systems where possible

ACTION ITEMS 1

Align systems electrification with expanded electrical capacity as a long-term priority

Campus Mobility

EEP 10

UTA

Initiative

Shift to sustainable mobility patterns that support emissions reduction goals

LEAD: Parking & Transportation Services
with support from the Office of Sustainability

Definition

Promoting safe, shaded, and accessible mobility infrastructure options like walking, cycling, public transit, and electric shuttles across the campus will reduce emissions while improving campus health and happiness. This section identifies how efficient land use, shading, and access to sustainable mobility options will support the University's commitment to reducing its environmental impact.

Resilience Co-benefits

- Supports Community Health
- Enhances Environmental Quality
- Shrinks Carbon Footprint
- Establishes UTA as a Regional Leader

UTA's approach to campus mobility must address both transportation needs and environmental impact in an increasingly challenging climate. With summer temperatures regularly exceeding 95°F and the urban heat island effect intensifying in highly paved areas, the quality of the pedestrian experience significantly impacts how the campus community chooses to move throughout the university grounds. The campus is also connected with the City's Entertainment District – Cowboy's Stadium, Ranger's Stadium, Texas Live, Six Flags over Texas, and many more attractions. The surrounding area alone hosts upwards of tens of millions of visitors to Arlington per year.[23] With events like the 2026 FIFA World Cup being hosted at Arlington, this presents a great opportunity for the campus to champion accessible and sustainable mobility despite difficult climatic conditions through parts of the year. Better campus connectivity also increases foot traffic through the campus and encourages attendance at campus-hosted events as well as further improving partnerships with nearby businesses.

Source: The Shorthorn

23 Entertainment District preps for influx of major events, visitors

Current Transportation Patterns

The campus community primarily relies on the following transportation modes to and from the campus:

- Personal vehicles (majority of commuters)
- MavMover campus shuttle system
- Pedestrian, cycling, and newly instated Veo e-bikes and scooters
- Regional connections via Trinity Metro

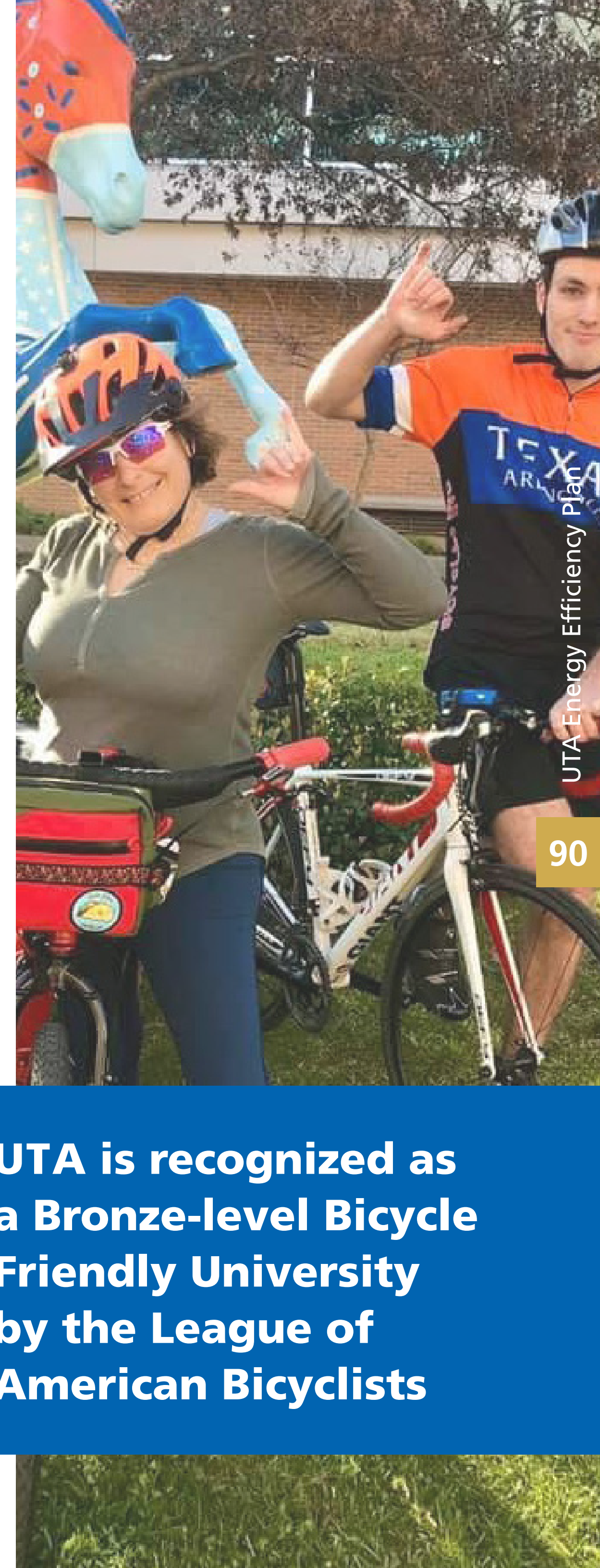
Due to the car-centric nature of mobility around Arlington, high-traffic volume parking lots and expansive paved surfaces contribute to localized heating, with surface temperatures frequently exceeding air temperatures by 50-90°F during summer months. The campus encourages the use of bikes and has set up bike racks and repair stations. However, the UHI-induced heat and high average temperatures during the summer create significant barriers to walking and cycling, particularly during peak class transition times.

Emissions Impact

UTA has eliminated the use of diesel in its campus fleet and has achieved a nearly 27% reduction in emissions from gas-operated fleet operations from 2018 to 2023.[24] Initiatives such as a year-round anti-idling policy for vehicles over 14,000 lbs have also contributed to the success of this effort.

Transportation-related activities that contribute indirectly to UTA's emissions inventory include:

- Daily commuting by students, faculty, and staff
- Goods purchasing, movement, and delivery services
- Business travel
- Waste removal transportation



UTA is recognized as a Bronze-level Bicycle Friendly University by the League of American Bicyclists

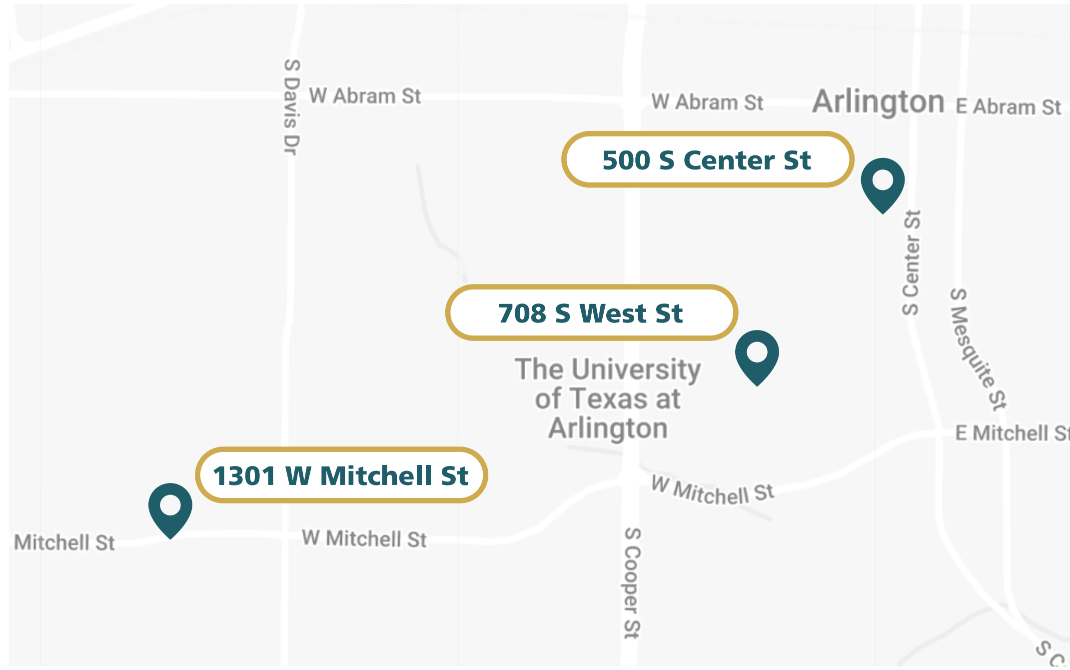
Source: UTA Cycling

24 UTA FY2023 Greenhouse Gas Emissions Report

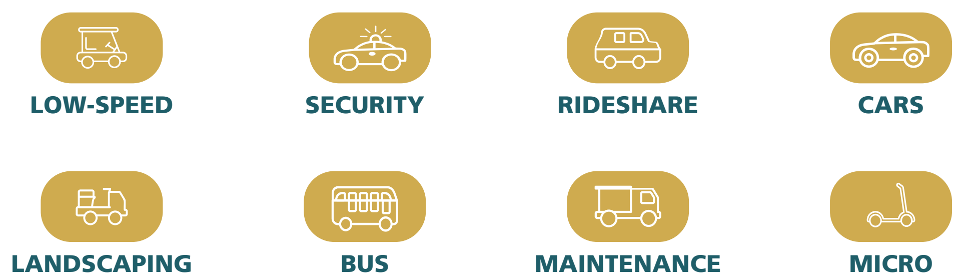
Fleet Electrification

The University owns, leases, and rents motor vehicles, including golf carts, mules, and other low-speed vehicles;[25] electrification of this campus fleet will eliminate all transport-related scope 1 emissions. The replacement of fuel-run vehicles with electric vehicles (EVs) is driven by the commitment to aggressively reduce energy consumption and emissions intensity of the campus. While EVs produce zero tailpipe emissions, they do require electricity for charging. With the wider Texas grid expected to increase its percentage share of energy generated by renewables over the next decade, the energy consumed to operate EVs will have low environmental impacts. While UTA already has three EV charging stations for public use, EV conversion of the current fleet will require additional charging stations, electrical load coordination with utility operator and Facilities Departments, and the implementation of fleet management systems.

EV Charging Stations on Campus
As of 2024



Electrifying these fleet vehicles can significantly reduce UTA's impact



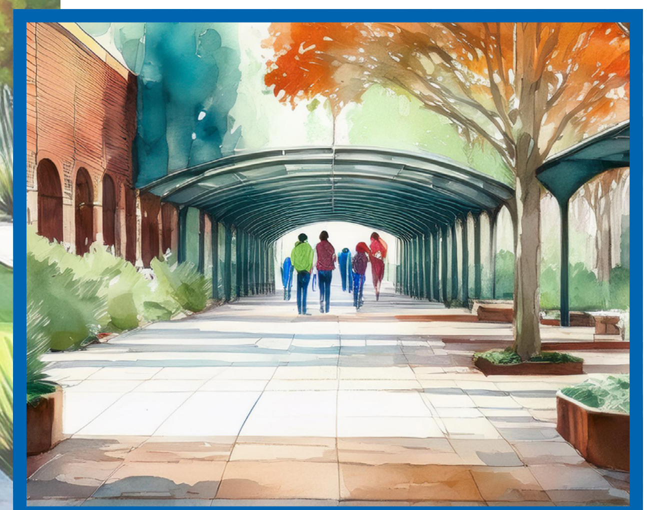
25 Driving UTA Vehicles: UT Arlington

MASTER PLAN ALIGNMENT
Incorporate shaded areas along the proposed pedestrian promenades

Images created by SmithGroup and AI

Creating a More Walkable Core

The University can enhance pedestrian comfort and safety and improve the health of the UTA community by developing a walkable core across campus that prioritizes student and visitor access. The campus can achieve this by developing walkways, green spaces, and shaded stretches to reduce thermal stress during summer months.



Improving Physical Spaces

Creating stress-less pathways for students to move throughout campus becomes increasingly important as conditions during the school year change and periods of extreme heat begin earlier in the spring and extend later into the fall. Since 2003, Arlington has experienced an average of 24 days over 100°F;[26] as full exposure to the sun can increase heat index values by up to 15°F,[27] spending time outdoors can be unsafe especially in the summer and early fall. Providing places of respite from the heat can make it safer to be outside and encourage students to walk or bike to class. Some ways to improve the outdoor experience include providing shade structures along sidewalks and trails, covering seating areas, planting trees with large canopies, and installing additional drinking fountains and misting systems along walking paths and in gathering spaces. Further, using construction materials with high albedo can help to keep spaces cool by reflecting heat away from surfaces.

26 DFW - 100° Day Data

27 Heat Forecast Tools

EV Station Education

- Signage encourages vehicle electrification by demystifying the charging process, highlighting priority parking, and sharing environmental impact metrics
- Retractable cord management ensures charging stations are safe and accessible
- Sufficiently lit areas discourage vandalism and theft while also increasing user safety and comfort when charging at night

Behavioral Change

- Encouraging early adopters of modal shifts and leveraging their experiences, positive or negative, will result in more uptake, discussion of ways to improve, and a general pursuit of transportation culture change
- Engaging and marketing new alternate modes with the help of grass-roots organizations like Walkable Arlington and BikeDFW will help the campus community connect with the new offerings.
- Capturing “a day in the student life” walk-throughs of the campus before and after improvements will also help increase awareness of the need for both physical infrastructure and behavioral changes

PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

Deploy EV charging infrastructure on campus to support a greener campus

ACTION ITEMS 2

- Study portions of campus with highest parking density to evaluate pilot EV program
- Partner with local EV charging installers and campus facilities teams to build a robust and resilient EV charging network

Transition to an electrified fleet for University operations

ACTION ITEMS 2

- As MavMover buses need to be replaced, consider purchasing electric shuttle buses for campus transportation
- Seek funding through federally available grants to upgrade to an electric fleet

Promote active mobility like walkable connection to downtown, bike paths, etc.

ACTION ITEMS 3

- Continue to pedestrianize major interior arteries of campus
- Monitor for City of Arlington major roadway improvements; advocate for the installation of protected bike lanes on major campus commuting routes when timing is appropriate
- Seek guidance from Vision Zero traffic safety guidelines with major transportation projects to protect pedestrian safety

Transition to a campus owned fleet for university transportation

ACTION ITEMS 1

- Decrease reliance on single-occupant car transportation options and on-demand travel in favor of expanding on-campus transportation network

Energy Infrastructure

EEP

11

UTA

Initiative

Shift to resilient, low-carbon energy infrastructure

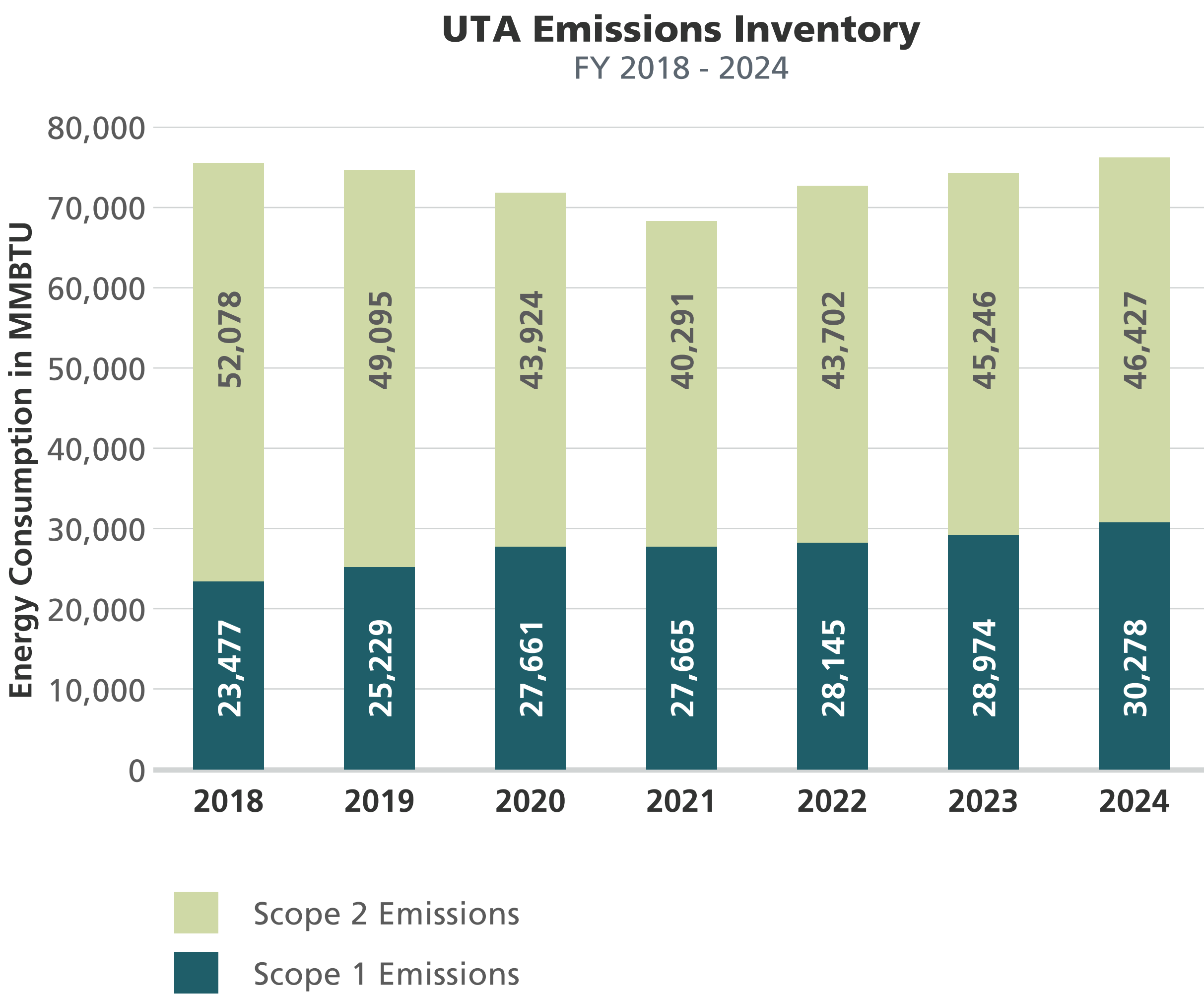
LEAD: **Office of Facilities Management**
with support from the Office of Sustainability

Definition

The key element of UTA's future is charting a path toward low-carbon operations. This section is an integration of much of what has been discussed before: high-performance buildings, improving resiliency on campus, understanding the constraints around the Texas grid, and tying them together to create a cohesive narrative around transitioning the university away from fossil fuels. This plan proposes a hybrid solution, leaving some legacy infrastructure in place to accommodate unforeseen peaks and extreme scenarios, but focuses primarily on the development of low-carbon options to guide UTA's future development.

Resilience Co-benefits

- Shrinks Carbon Footprint
- Grows Green Jobs & Opportunities
- Supports Community Health
- Enhances Environmental Quality
- Increases Energy Efficiency
- Establishes UTA as a Regional Leader



UTA's Energy & Emissions Journey

While UTA has continued to improve its overall building efficiency, and drive down utility consumption, the fact of the matter is: UTA is a growing campus, changing to meet the needs of the future. In that growth, it has continued to increase carbon emissions on a year-to-year basis since 2018, as outlined in the adjoining chart. With additional growth on the horizon, it is crucial to understand how UTA can both grow and change, while adopting practices that allow for a reduction in total emissions. This will require a focus on efficiency, as well as a migration away from fossil-fuel based resources as much as possible.

Existing Conditions

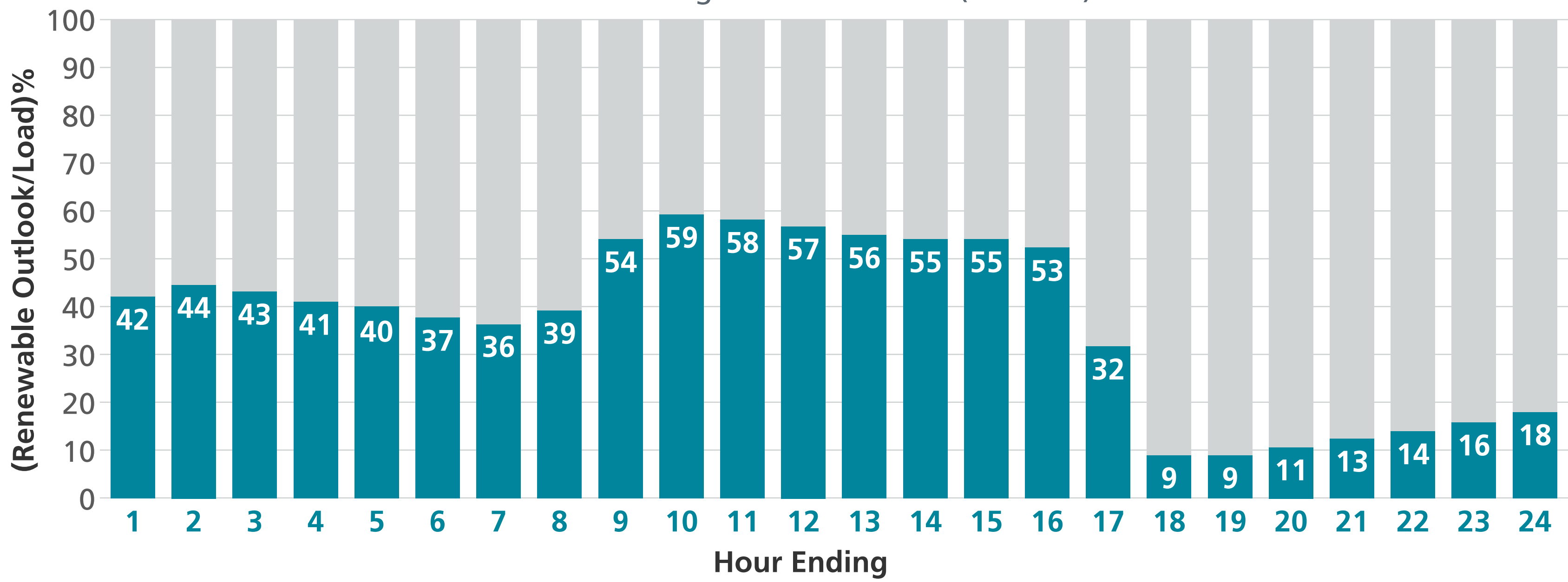
The Texas Grid & Energy Distribution

The state of Texas operates a deregulated energy market, making suppliers and distributors of energy separate entities. Local utilities are responsible for distribution and maintenance of utility assets, and retail suppliers handle generation and coordination with the local utility.

As a result of this, universities and municipal entities in Texas have formed a consortia of power generation purchasing which negotiates rates for the members. This is one of the largest power purchasing contracts in the state, working directly with utility generators.

The Texas grid currently has a significant deployment of renewables, largely utility-scale wind energy and photovoltaic (solar) energy projects. Annually, the highest concentration of renewables in the grid is in the shoulder seasons - fall and spring, with as high as 59% of loads being met in the shoulder seasons by renewable energy. Opportunities for solar development on campus have been evaluated, but do not meet the magnitude of the challenge, as it relates to migrating to a campus as large as UTA off of fossil fuels.

Actual Renewable Output
As a Percentage of ERCOT Load (11/20/24)



Future Grid State & Projected Emissions

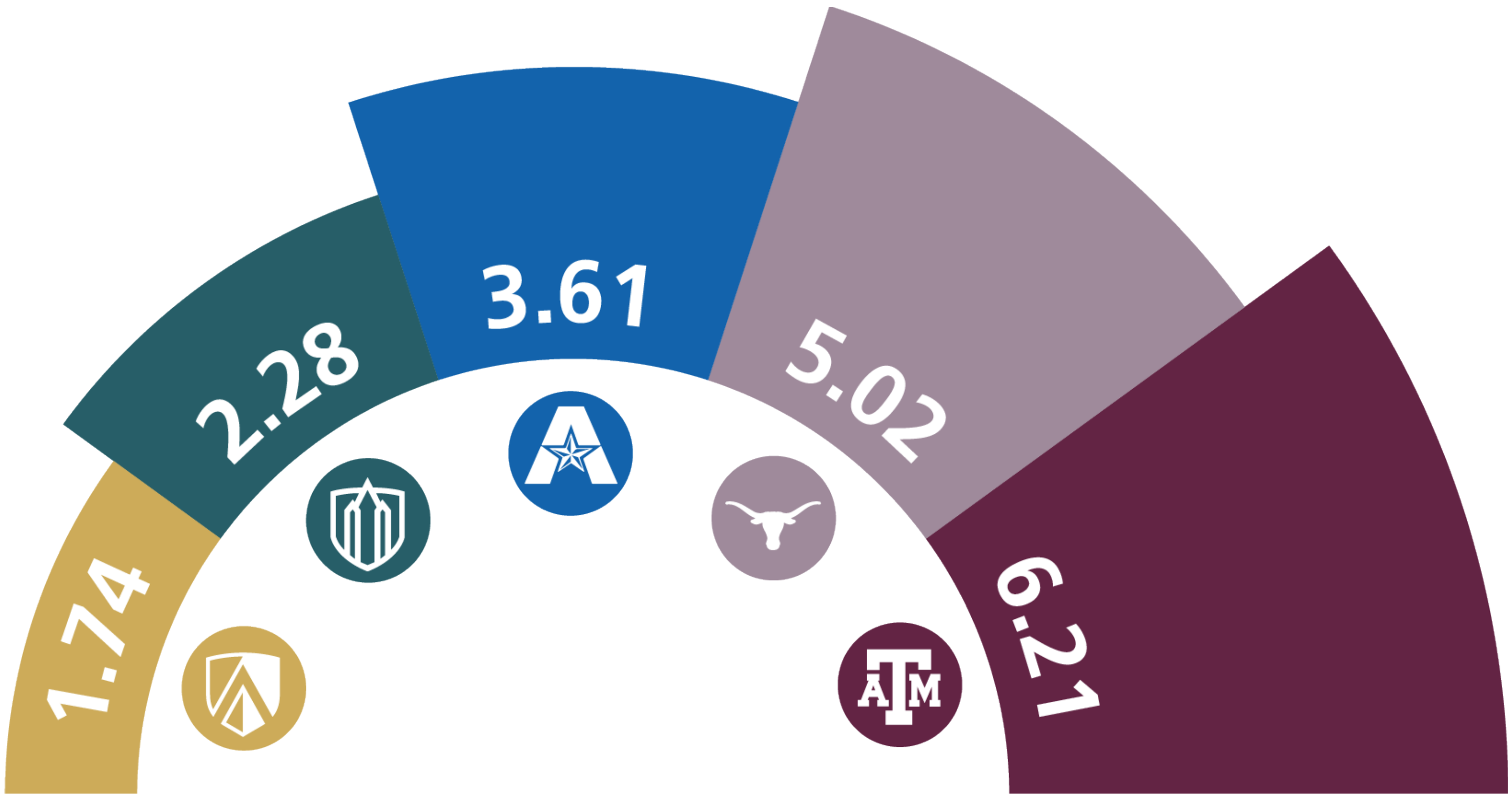
When evaluating future conditions, there are several factors that have outsized impacts on possible futures, including the development of utility-scale renewable energy. Projections for the Texas grid are promising, with some estimates showing a passive reduction in carbon emissions of nearly 84% through coal plant retiring and replacement with utility scale renewable energy. This passive reduction is highly dependent on the continued expansion of utility scale renewable energy at the rate that has been seen over the last ten years, as well as the continued economics of renewables improving as it has over the same time period. Renewable energy, by kilowatt-hour, is currently the cheapest energy resource to develop in the state of Texas, and similarly making it the largest growing portion of the Texas grid, by a wide margin. This bodes well for UTA, as the ability to receive passive benefits of the grid transitioning to renewable sources directly impacts the university's largest source of emissions. Partnership with the grid, as an investment in the grid's long-term transition to renewables, is a key strategy for infrastructure modernization, outlined in later sections.

Campus Utility Constraints

As UTA continues to grow to meet an expanding student population, as well as increased utility needs for research and development, the existing campus infrastructure systems need upgrades. As part of the campus master plan, developed in parallel with this effort, existing campus infrastructure is being improved and expanded to serve these future needs. This growth presents great opportunities to improve efficiency, drive down utility consumption, and develop infrastructure systems that are both resilient, and able to operate sustainably into the future.

Peer Benchmarking

As part of UTA's reporting for AASHE STARS program, metrics are available from which the University can measure itself against its peers, and set aspirational targets based on those around them. As outlined in the diagram below, UTA currently has additional opportunities to establish itself as a leader within large Texas universities as it relates to carbon emissions.



Scope 1 & 2 Emissions Per Weighted Campus User
In Metric tons CO_2e

Campus Infrastructure Growth & Demand Reduction

Electricity Consumption

Future electricity demand on campus is a major focus point for adequately serving the campus needs. As technology continues to integrate with our lives and work, electrical service to power that technology becomes more and more essential. When evaluating UTA's future state, it is crucial to consider how the deployment of electric vehicles, high-intensity computational resources, increased plug loads from personal phones and computers, as well as the electrification of building operations will impact our future electrical demand.

Future electrical consumption will require an aggressive expansion of current electrical service, as outlined in the physical master plan. Dedicated high voltage feeders from the utility provider, as well as a robust expansion of UTA's electrical transformer capacity are proposed to meet these needs.

In tandem with growing needs, it is important to understand where the University can better serve current needs. As discussed in the High-Performance Buildings chapter, building energy conservation measures will be essential to avoiding the overload of existing and future campus circuits. These energy conservation measures free up much needed capacity from current resources.

Comprehensive building utility metering at UTA presents a great opportunity to make informed, focused decisions about the implementation of energy efficiency measures. These systems allow for a better insight into current building performance, as well as opportunities for high-efficiency system integration, without having to overspend on oversized, expensive equipment. With a dedicated energy manager at UTA, this existing and future campus energy data will be essential to the successful implementation and tracking of the Energy Efficiency Plan's energy strategies.

Steam To Hot Water Conversion

Based on current plant health reports, steam boilers are well maintained but aging, and currently operating at approximately 75% efficiency. Current condensing boilers see nominal efficiencies of over 90%, some reaching as high as 95%. Replacement with high efficiency boiler technologies at the building level alone will have significant utility savings, even before building conservation measures are taken.

FROM THE CAMPUS MASTER PLAN

With the Campus' desire to eventually eliminate centralized natural gas fired steam boilers and associated steam/condensate piping distribution throughout campus, the proposed concept is to develop de-centralized heat sources in each new building. Existing buildings would be retrofitted with localized natural gas heating water boilers as maintenance funding is available.

Shifting Toward Electrification

Electrification, sourced from renewables, is the most effective pathway to a low-carbon future for UTA. Electrification, the process of replacing fossil fuel-based systems with electric systems, must be paired with renewables or low-carbon power purchasing in order to result in lower overall emissions, but eliminates the fixed carbon cost of operating fossil-fuel based infrastructure on site.

The following pages explore systems for consideration, including various heat pumps, a hybrid system, and rooftop solar generation and energy storage.

Heat Pump Systems

The benefits of electrification come from the ability to develop higher-efficiency systems than traditional fossil fuel-based systems. That being said: all electric systems are not equally efficient. Electric resistance heating puts an incredible strain on the existing electrical infrastructure, and while it is able to be sourced from renewable energy, it should not be considered a viable whole-building heating strategy, even with inexpensive electric rates. Higher efficiency systems, such as heat pump-based systems, should be the standard for future electrification strategies.

Air to Water

Extracts heat from the outdoor air and transfers it to water, which is then used to serve building hot water systems. Air-to-water heat pumps are highly energy-efficient, often producing three to four times more energy than they consume, making them a cost-effective and suitable alternative to traditional, fossil-fuel based heating methods.

Sewage Waste Energy Exchange

Harnesses thermal energy from wastewater for heating and cooling purposes. This process extracts heat from sewage water using a heat exchanger and transfers it to a clean water system via a heat pump. Extracted heat can be used to warm buildings, while the cooled wastewater is returned to the sewer system. These systems can lower operational costs and reduce the carbon footprint of buildings.

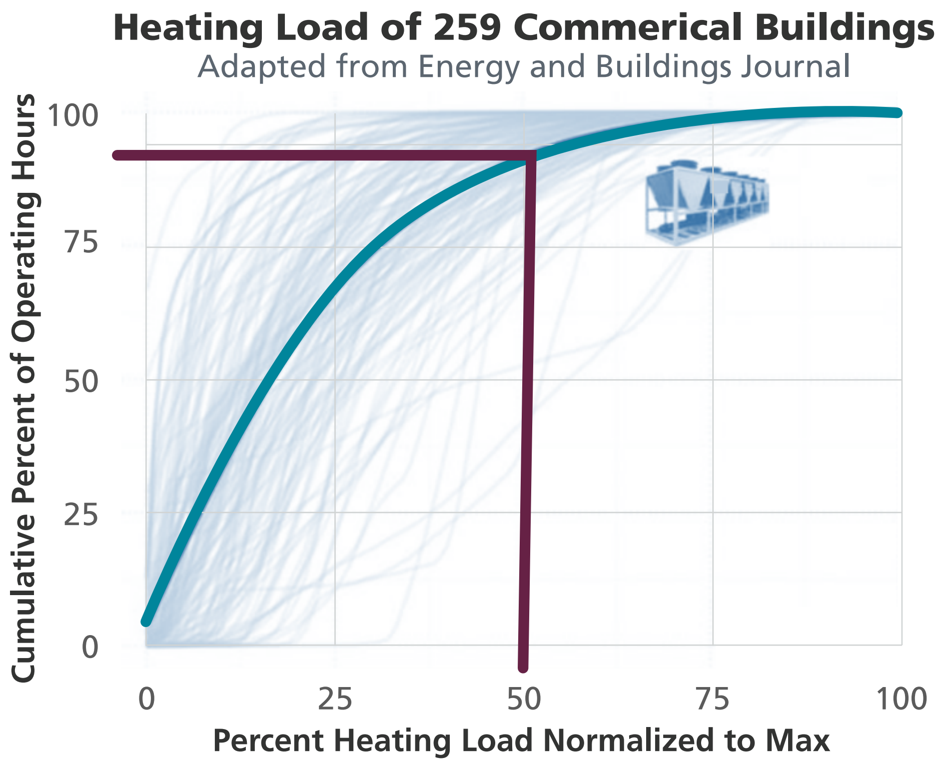
Ground Source Heat Pump

Utilizes stable underground temperatures to provide heating and cooling for buildings. These systems circulate fluid through underground pipes which absorb heat in the winter and release it back into the ground in the summer. Energy is transferred to and from buildings via water-source heat pumps. These systems produce three to six units of heat for every unit of electricity consumed. Although installation costs can be higher than traditional systems, there are long-term savings on energy bills and reduced greenhouse gas emissions.

Hybrid Systems

A note on heat pump temperature performance – there is a limit at which point, particularly air-source heat pumps, are no longer usable, and require supplemental heating and cooling to meet the full building heating and cooling load. This is an opportunity to utilize the legacy heating and cooling infrastructure, with the opportunity for full electrification beyond those system's usable life. These systems' efficiencies, within their temperature ranges down to -5°F, far exceed the efficiencies of natural gas fired hydronic or electric resistance heating.

An analysis of a commercial buildings survey, published in "Energy and Buildings" Journal in October 2024[28] found that out of nearly 260 buildings surveyed, 90% of the operating hours were served at 50% of the load or below. This illustrates an opportunity for a fundamental shift in how building electrification can be deployed. Existing hot water boilers can be held onto for peak load management, shifted towards meeting those remaining 10% of operating hours, while meeting 90% of operating hours with high-efficiency, heat pump solutions.



28 Insights from hydronic heating systems in 259 commercial buildings | Energy and Buildings

Solar Power Generation & Storage

Solar power, in the form of rooftop photovoltaic systems from both an economic and energy perspective, is not a technology that is best suited for immediate deployment on campus. Evaluations of current consumption at the Engineering Research Building suggest that full deployment of rooftop solar would cover only 7% of the annual utility consumption at the building. Following comprehensive energy conservation efforts on campus, in tandem with the successful implementation of electrified building systems, photovoltaic systems become ideal candidates for remaining roof area, as it can serve to directly offset campus utility consumption.

Within the context of an electrified system, photovoltaics pair ideally with battery storage to help to reduce peaks on heating and cooling systems, and can provide additional cost savings and points of electrical resilience on campus.

Case Study: District Systems Improvements

ENGINEERING RESEARCH BUILDING

See supporting chart in
High Performance Buildings

Following the study on energy conservation measures at the Engineering Research Building, similar studies were developed to understand the cost and carbon savings of the successful implementation of both the steam to hot water conversion, as well as hybrid electrification.

Steam to Hot Water Conversion

Savings of 5620 MCF of Natural Gas annually just through serving the same need with high-efficiency equipment.

Heat Pump Option

Sizing heat pump for 50% of the building heating load, in order to properly simulate a hybrid system integration accounting for 90% of operating hours.

Heat pump solutions can eliminate up to 50% of total remaining natural gas consumption, while also eliminating an additional 12% of electricity consumption.

Site / Plant Level ECMs

	Electrical Savings kWh	Chiller Plant Electric Savings kWh	Gas Savings kBTU	Total Energy Savings kBTU	Gas Emissions Reduction mT CO2e	Electric Emissions Reduction mT CO2e
Steam to Hot Water Conversion	-	-	5,811,729.9	5,811,729.90	318.48	-
Heat Pump	-	-	10,464,679.29	11,745,737.17	573.46	533.04
Total Emissions Reduction					1,424.99	

Infrastructure Modernization Pathway

Phase 0 - Laying the Groundwork

Goals: Enact immediate-term strategies to understand current performance and opportunities for efficiency

Power

- Install individual electrical building metering, capture annual consumption and maximum demand information broken out by end-use, to be managed by UTA Energy Manager for future development projects
- Understand, with Oncor, feasibility of dedicated UTA electrical feeders

Thermal

Existing Buildings

- Perform stress tests for hot water temperature to understand lowest feasible operating temperature for each building
- Perform ASHRAE Level 2 Audits, and develop "Make Ready" Packages for modernization
- Install BTU Meters at each building to understand current thermal consumption for right-sizing
- Utilize Freely available Scope of Work for Individual Buildings by the DOE Better Buildings Initiative[29]
- Develop internal knowledge base with facilities and operations teams on installation and operation of heat pump-based solutions utilizing ASHRAE Building Thermal Systems Guidelines[30]

29 GHG Emissions Reduction Audit Scope of Work Template | Better Buildings Initiative

30 Decarbonizing Building Thermal Systems: A How-to Guide for Heat Pump Systems and Beyond

Phase 1 - Supporting Sustainable Systems Expansion

Goals: Prepare infrastructure for modernization, and develop new buildings to high performance targets

Power

- Work with Oncor to develop additional feeder capacity to meet additional building load, as well as future electrified building load
- Key Moment: At the end of 2027, help to develop "Green Power for Texas" via Texas university power consortia members
- Negotiate 100% renewables purchasing option
- For emergency/disaster preparedness, continue the UTA policy of 100% building backup through generators for selected shelter areas

Thermal

Existing Buildings

- Steam to Hot Water Conversion: Begin to move existing steam heat to decentralized, high efficiency hot water boilers at each building, serving at lowest suitable temperature based on stress testing

New Buildings

- Target IECC 2021 Zero Energy Commercial Building Provision Targets by Building Program
- Target 130°F (or lower) hot water for new buildings
- Build out Phase 1 of cooling loop for new buildings

Phase 2 - Bridging Electrification

Goals: Develop new buildings to high performance targets, focus on existing building efficiency improvements, and continue to prepare infrastructure for modernization

Power

- Continue circuit health upgrades, additional feeder and distribution capacity for future electrified loads
- For emergency/disaster preparedness, continue the UTA policy of 100% building backup through generators for selected shelter areas

Thermal

Existing Buildings

- Steam to Hot Water Conversion: Continue to move existing steam heat to decentralized, high efficiency hot water boilers at each building, serving at lowest suitable temperature based on stress testing
- Focus on Comprehensive Energy Conservation Measures
- Target Circulating Temperatures of 130°F (or lower), increasing coil sizes as needed
- Replacement of existing electric resistance heating with hot water heating where suitable

New Buildings

- Target IECC 2021 Zero Energy Commercial Building Provision Targets by Building Program
- Target 130°F (or lower) for hot water for new buildings
- Build out Phase 2 of cooling loop for new buildings

Phase 3 - Resiliently Electrify UTA

Goals: Swap remaining fossil fuel sources for electrified sources, increase on-site utility resilience

Power

- Evaluate on-site PV and Battery Storage for resilience/demand response opportunities for additional cost savings and peak reduction
- For emergency/disaster preparedness, continue the UTA policy of 100% building backup through generators for selected shelter areas

Thermal

Existing Buildings (and Phase 1 & 2 Buildings)

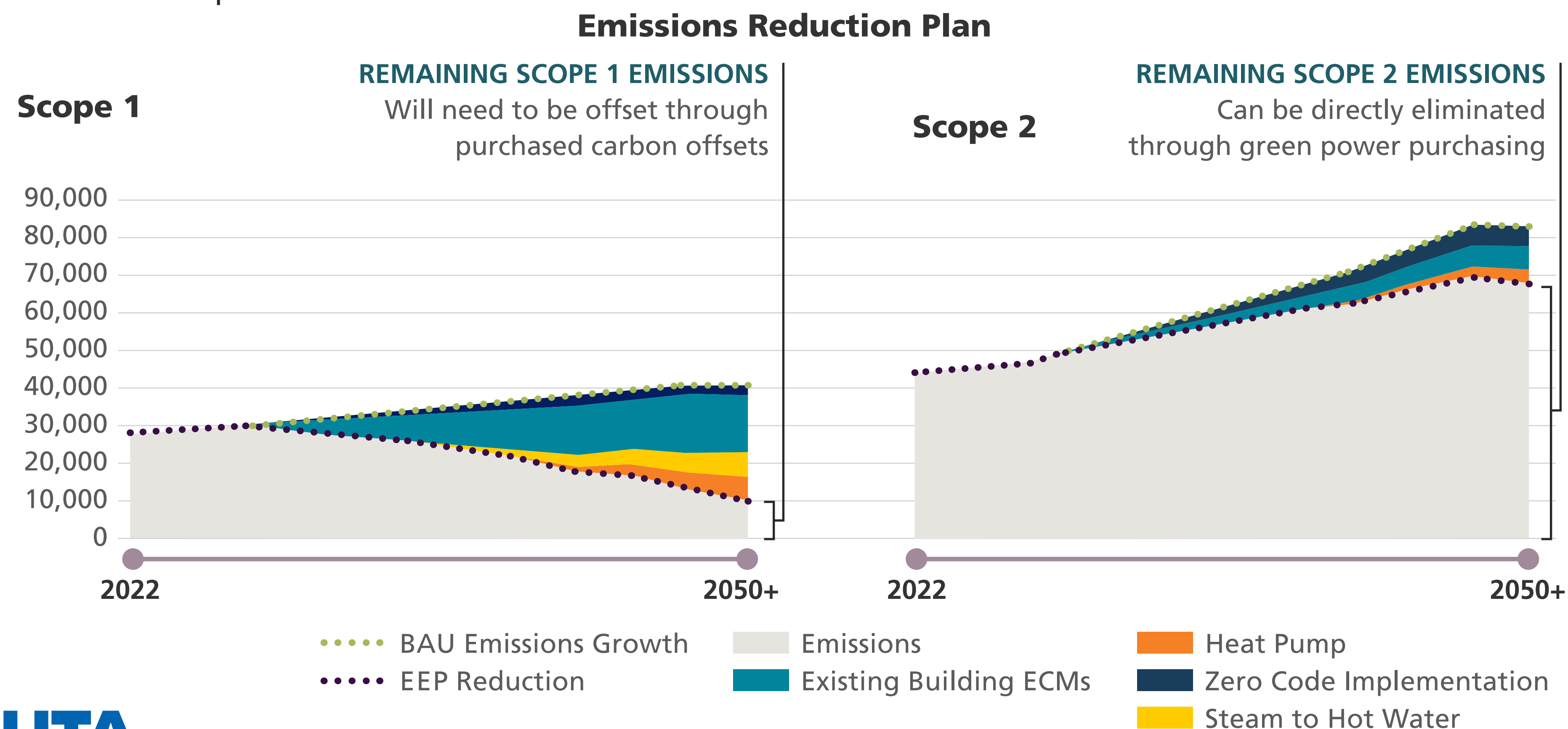
- Supplement fossil fuel dependent systems with high efficiency heat-pump, electrified systems
- Air-to-Water Heat Pump, SWEE system, based on building-by-building conditions – target incentivized clean energy, heat pump systems

New Buildings

- Target IECC 2021 Zero Energy Commercial Building Provision Targets by Building Program
- Target 130°F (or lower) hot water or lower for new buildings
- Highest efficiency Heating and Cooling systems
- Air-to-Water Heat Pump, SWEE system, based on building-by-building conditions – target incentivized clean energy, heat pump systems
- Build out Phase 3 of cooling loop for new buildings
- Explore Micro-districts to share heating and cooling loads

Understanding the Impact of the Infrastructure Plan

Reducing carbon emissions is as much about load shifting as it is about load reduction. While efforts should be made to reduce energy and resources as much as possible, it is not feasible to completely eliminate them from a building. Because of this, focusing on where resources come from becomes incredibly important. At first glance, it may appear as though switching from natural gas to electricity produces higher emissions, however the key difference is that electricity can be sourced through renewable resources. Green purchasing means that the emissions can be avoided entirely, as though they were never emitted because clean energy was used instead of fossil fuels. It must be stated: all natural gas, no matter the source, emits carbon, and the elimination of scope 1 emissions cannot be achieved without the elimination of natural gas. Given the current grid's reliance on coal, this transition first requires a shift in power purchasing at the University level, in order to prevent a net increase of emissions over current operations.



Lower building-level Energy Use Intensity

ACTION ITEMS 2

Use the EnergyStar Portfolio Manager to benchmark and calculate energy project savings for all campus buildings

Match all purchased electricity generated by fossil sources with Green-e certified RECs

Deepen the granularity of energy data across the campus through building metering

ACTION ITEMS 3

Establish overarching goals and specific, measurable targets related to energy and water at UTA (reducing GHG emissions, water reduction and conservation, etc.)

Move toward hourly energy analysis by metering individual buildings

Assess space utilization across all campus buildings

Transition energy infrastructure on campus

ACTION ITEMS 3

Transition thermal networks to low-temperature hot water at the building

Electrify building operations once power purchasing has been secured

Align major energy projects with campus master plan development

Source 100% low-carbon energy

ACTION ITEMS 3

Utilize university power purchase contract to purchase green energy

Ensure all purchased energy is sourced from verified clean and renewable sources

Deploy solar power generation where possible - Install solar panels across campus including on both roofs/parking and coordinate opportunities for solar to provide shading

Operations & Finance

EEP

12

UTA

Initiative

Utilize environmental impact in operational and financial decision-making

LEAD: **Corporate & Foundation Relations** and **Office of the Chief Financial Officer**
with support from the Office of Sustainability

Definition

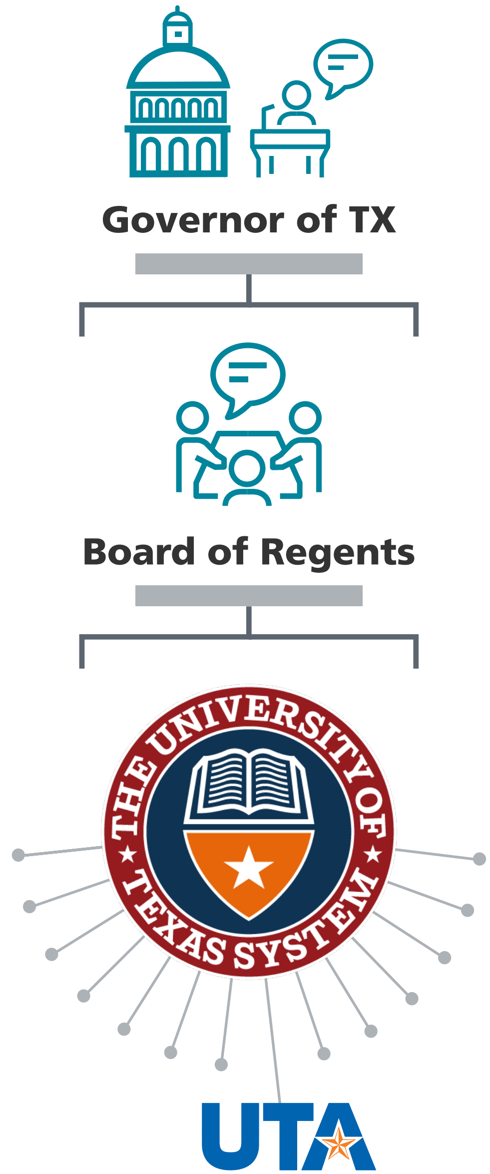
In operations and finance, strategies are directed towards minimizing the ecological impact of new construction, adopting green financial practices, and developing a zero net carbon plan for the campus. This involves exploring renewable energy options, improving water efficiency, and establishing a hub for interdisciplinary sustainability research.

Resilience Co-benefits

- Shrinks Carbon Footprint
- Grows Green Jobs & Opportunities
- Decreases Utility Costs
- Enhances Environmental Quality
- Increases Energy Efficiency
- Establishes UTA as a Regional Leader

System Context and Implementation Framework

The University of Texas at Arlington operates within the UT System's network of institutions, governed by a Board of Regents appointed by the Governor of Texas. This governance structure creates multiple layers of oversight and accountability, with the Board answering to the Texas Legislature while providing strategic direction for system institutions. Individual UT institutions have historically demonstrated remarkable capacity for innovation when backed by sound financial and operational planning — as evidenced by UT Austin's achievement in operating its own power generation since 1929 and reinvesting over $150 million in energy savings into system improvements.



The Infrastructure Investment Challenge

The path toward infrastructure modernization at UTA intersects with decades of institutional approaches to related investment and operational budgeting. Most of UTA's core energy infrastructure dates to the original campus construction, with improvements typically handled through facilities maintenance budgets rather than treated as major capital investments. This historical approach has created a specific challenge: transformative energy projects must compete with routine operational needs under traditional budget cycles that may not fully capture their long-term value.

Current Decision-Making Framework

Capital projects at UTA currently follow standard higher education financial evaluation processes, primarily focusing on initial costs and direct operational savings. This traditional framework often struggles to capture several important factors:

- Long-term resilience benefits that extend beyond typical budget cycles
- Future energy cost volatility and risk mitigation value
- Operational efficiency improvements and maintenance cost reductions
- Enhanced research capabilities and competitive advantages
- Student and faculty recruitment benefits
- Environmental impact and regulatory compliance considerations

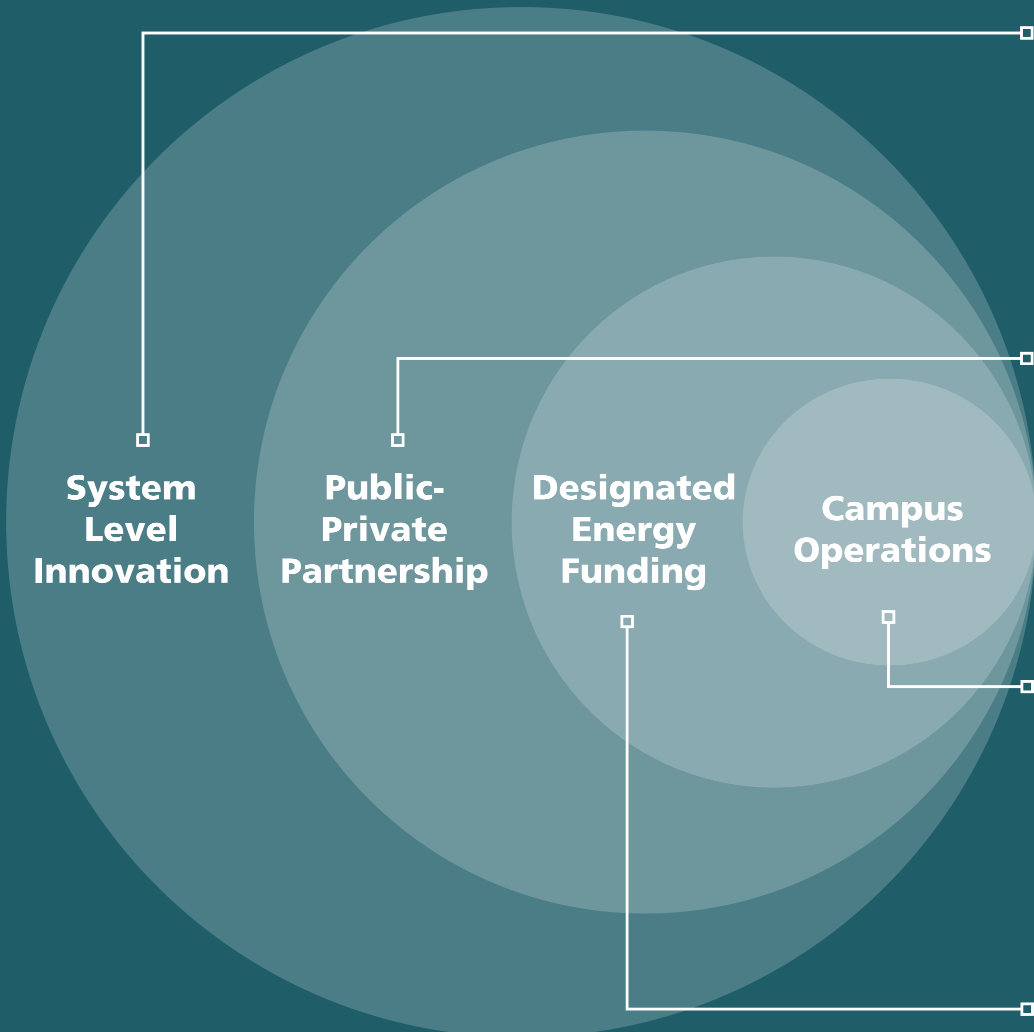
Reconceptualizing Infrastructure Investment

The primary opportunity lies in reconceptualizing infrastructure modernization projects as investments rather than operational expenses.

Strategic Implementation in a Layered System

The path forward requires navigation of multiple institutional layers, each offering distinct opportunities:

- Campus-Level Operations
- Designated Energy Funding
- Public-Private Partnership
- System Level Innovation



- Integration with UT System sustainability initiatives
- Development of cross-institution learning networks
- Creation of shared resource pools

- Exploration of innovative project funding structures
- Development of shared-savings agreements
- Creation of technology demonstration partnerships

- Implementation of Life Cycle Cost Analysis for renovation and retrofit decisions
- Development of building-level efficiency metrics
- Creation of operational improvement tracking systems

- Establishment of energy-specific investment pools
- Development of reinvestment mechanisms for captured savings
- Creation of performance-based funding criteria

Energy-Specific Investment Strategies

UTA can create dedicated funding pathways for energy improvements through several mechanisms. Power Purchase Agreements (PPAs) offer a particularly promising approach, allowing the University to secure renewable energy while minimizing upfront costs. These agreements typically span 15-25 years, providing long-term price stability and simplified budgeting. The University can leverage PPAs not only for renewable energy procurement but also for on-site generation and storage systems.

Utility partnerships represent another significant opportunity. The Texas utilities market offers substantial rebates and incentives for energy efficiency improvements and peak demand reduction. These programs can offset initial project costs while providing ongoing operational savings. For example, demand response programs could generate revenue while supporting grid stability—a win-win that aligns with both financial and resilience goals.

Federal funding presents an expanding opportunity, particularly for transformative technologies like heat pump systems and grid modernization. Recent federal infrastructure legislation has created numerous grant programs specifically targeting higher education institutions. UTA can position itself to capture these opportunities by developing a robust project pipeline and maintaining detailed energy consumption data to support grant applications.

Creating a Centralized Energy Fund

Separating Energy Investment from General Operations

A fundamental shift in UTA's approach involves creating a distinct framework for energy investments, separate from routine operations and maintenance budgets. This separation allows for:

- More accurate tracking of energy-related costs and savings
- Longer investment horizons aligned with infrastructure lifecycles
- Reinvestment of documented savings into future improvements
- Better positioning grant funding opportunities
- Enhanced ability to demonstrate project success

The creation of an Energy Investment Fund, distinct from general O&M allocations, would provide dedicated resources for efficiency improvements while protecting routine maintenance budgets. This fund could be initially seeded through a combination of utility savings, rebates, and strategic allocations, then sustained through documented cost reductions from completed projects.

Improving Data for Continued Cost-Benefit Analysis

Resource Management Systems

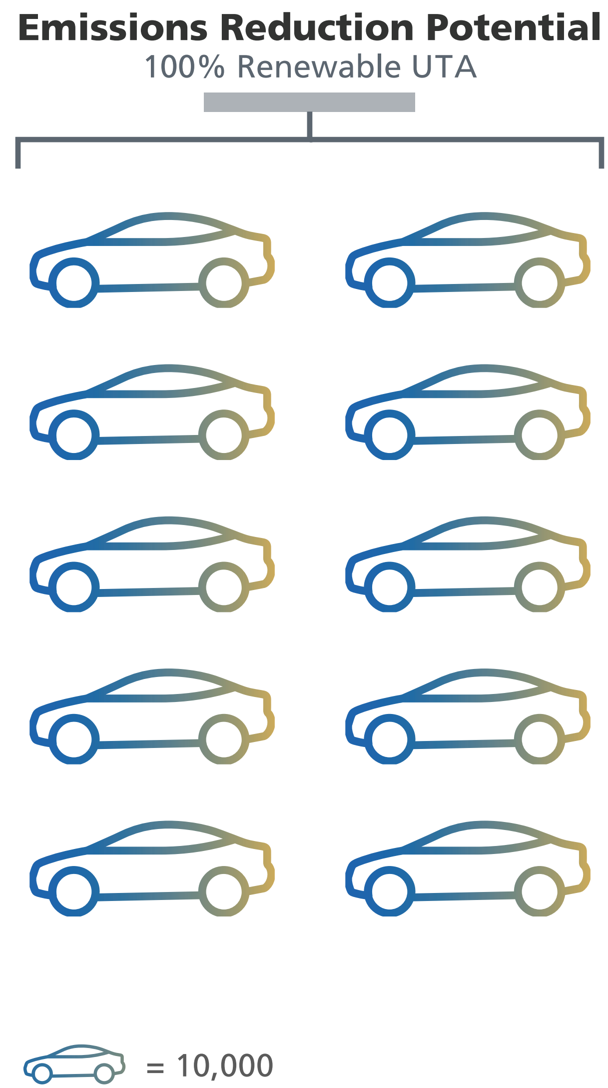
Effective infrastructure modernization requires robust systems for tracking and managing resources. The University can implement:

- Real-time energy monitoring and verification systems
- Standardized inventory management protocols
- Digital tracking systems for maintenance and repairs
- Automated building systems optimization
- Comprehensive waste reduction programs

These systems should incorporate visual management principles, making resource use and conservation opportunities immediately apparent to staff and building occupants. Simple visual cues can help maintain organized storage areas, reduce unnecessary purchases, and highlight opportunities for efficiency improvements.

Sustainable Power Purchasing Across the UT System

The adoption of green power purchasing represents a crucial opportunity for emissions reduction at Texas universities. Analysis of current state-wide grid emissions rates reveals that electrical purchasing accounts for more than 60% of UTA's emissions profile, excluding scope 3 emissions. A transition to 100% renewable power procurement would yield substantial environmental benefits, with an estimated reduction of 48,052 metric tons of CO2 – equivalent to removing over 10,000 vehicles from the road. While renewable energy currently carries a price premium, making demand reduction strategies essential, the Texas energy market shows promising trends.



Renewable energy sources represent the fastest-growing segment of utility generation in the state, with projections indicating they will constitute a significant majority of the grid by 2040. This opportunity becomes even more compelling when considering the University of Texas System's centralized power purchasing agreements. By leveraging the collective purchasing power of all UT institutions, the system can negotiate more favorable renewable energy rates through economies of scale. This system-wide approach not only enhances cost efficiency but also amplifies the environmental impact – as each additional participating institution increases both the negotiating power for better rates and the cumulative positive environmental effect across Texas.

Including a Price on Resilience

The University of Texas at Arlington's 2025 Sustainability Report introduces a transformative internal carbon pricing initiative designed to revolutionize campus sustainability funding.

Through a comprehensive departmental energy and resilience fee structure, academic and administrative units will contribute 3-5% of their energy costs to a dedicated funding pool, with charges calculated based on specific energy consumption patterns and space utilization metrics. This self-sustaining financial mechanism will exclusively support critical climate resilience and sustainability projects, including renewable energy installations, energy-efficient HVAC upgrades, building envelope improvements, and smart energy management systems. Under the supervision of UTA's Facilities Management department and guided by a diverse sustainability committee, the program ensures transparent fund allocation and strategic project selection while fostering energy consciousness across campus. The initiative demonstrates UTA's commitment to addressing climate challenges through innovative solutions, establishing a foundation for long-term sustainability while creating immediate positive impacts on campus operations and the broader community. Initial assessments and department-specific energy audits will commence in Summer 2025, with the first fee collections scheduled for the 2025-2026 academic year, marking the beginning of a new era in university sustainability financing.

Public-Private Partnerships for Major Improvements

A public-private partnership (P3) or energy service agreement (ESA) could revolutionize UTA's central plant and distribution infrastructure by enabling comprehensive system modernization without upfront capital costs. Under this model, a private energy service company would finance and implement upgrades to the university's aging central plants, including new high-efficiency chillers, boilers, and advanced control systems. The scope would extend to modernizing the campus's underground piping distribution network, replacing deteriorating pipes with better-insulated systems that reduce energy losses and maintenance costs. The private partner would make these substantial investments – often reaching into tens of millions of dollars for central plant projects – and recover costs through guaranteed energy savings over a 15-20 year period. UTA would continue paying its current utility costs, with the efficiency gains from the new equipment covering the investment costs and the ESCO's return. This arrangement is particularly attractive for central plant upgrades because these systems offer significant efficiency improvement potential but often require large capital investments that are difficult to fund through traditional university budgets. The private partner would also maintain the new equipment throughout the contract period, ensuring optimal performance and relieving the university's facilities team of this burden. This approach allows UTA to modernize its core energy infrastructure, reduce its carbon footprint, and improve system reliability while maintaining financial flexibility and leveraging private sector expertise in large-scale energy system optimization.

Financing the Infrastructure Modernization

As described in the Energy Infrastructure chapter, the EEP will happen in three phases across a period of 15 years. The following describes the financing strategy for each of these phases, starting with initial steps for building an energy fund and capturing savings, through the stabilization of the fund and a focus on growth, to the university ultimately benefiting from a healthy green fund.

$32 MILLION

Borrow capital to establish the fund

Capture savings where possible

Invest savings for return on investment

FINANCING STRATEGY | PHASE 1

2025-2030

- Capital formation of energy fund
- Targeted efficiency projects in existing campus
- Identify ITC and grant opportunities
- Infrastructure studies for thermal expansion
- Establish PPA with UT Systems
- Establish energy & resilience overhead costs
- Establish targeted philanthropy

$282 MILLION

Concretize investment flows, build credibility

Seek philanthropy & green bonds

Match investments and grow internally

FINANCING STRATEGY | PHASE 2

2030-2040

- Phased construction
- Grid expansion
- System commissioning
- Operations commence on expanded loops
- Permitting and environmental studies

$96 MILLION

Self-finance green projects

UTA as its own green bank

Take on medium risk for high reward

FINANCING STRATEGY | PHASE 3

2040 - Forward

- Full portfolio operation
- Revenue generation
- Asset optimization/enhancement of aged technologies

Implementation Strategies

Immediate Actions

Timeline: 0-2 Years

- Establish separate energy investment tracking systems
- Implement comprehensive building-level metering
- Develop staff training programs for new systems
- Create standard LCCA templates and procedures
- Begin pursuit of available utility rebates and incentives

Near-Term Development

Timeline: 2-5 Years

- Create dedicated Energy Investment Fund
- Implement comprehensive resource management systems
- Develop public-private partnership frameworks
- Expand grant pursuit capabilities
- Establish energy savings reinvestment protocols

Long-Term Integration

Timeline: 5+ Years

- Fully separate energy investment from O&M budgets
- Implement comprehensive energy management system
- Develop innovative funding mechanisms
- Create cross-institution learning networks
- Establish UTA as a regional leader in sustainable operations

This comprehensive approach ensures that both financial and operational systems evolve to support UTA's infrastructure modernization goals while maintaining effective day-to-day operations. The framework provides flexibility to adapt to changing technologies and opportunities while maintaining focus on the University's long-term sustainability objectives.

PRIORITIZATION KEY
NEAR ■ ■ ■ LONG

Identify opportunities to improve water conservation and efficiency

ACTION ITEMS 3

- Research small-scale water treatment options
- Establish rainwater catchment systems for irrigation
- Minimize environmental impact of Landscape Management by focusing on xeriscaping

Utilize a shadow cost of carbon in accounting practices and energy pricing

ACTION ITEMS 3

- Start tracking and reporting construction and demolition waste to establish a baseline
- Develop best practices guidelines
- Refer to LEED O+M scorecard for building operations and maintenance improvement

Reinforce a culture of social and environmental responsibility through UTA's financial investments

ACTION ITEMS 2

- Form a sub-committee of the Executive Budget Committee focused on investor responsibility, addressing the topics of sustainability and social responsibilities as it relates to university investments
- Include students, faculty, and non-academic staff as members of the Committee on Investor Responsibility to ensure proper representation of each group

Utilize green financial practices as a bridge to achieve stronger campus sustainability

ACTION ITEMS 3

- Evaluate carbon emissions trading programs
- Establish an Energy Revolving Fund
- Utilize LCCA to implement on-campus sustainability measures

APPENDIX A: REFERENCES

1 Water - Administration and Campus Operations | UT Arlington

2 Dallas/Fort Worth Climate Narrative

3 NOWData | NOAA - NWS

4 About | ERCOT

5 Weather-related Power Outages Rising | Climate Central

6 Texas winter storm deaths: 246 total, 22 in Dallas County | wfaa.com

7 Oncor: May storm most damaging in Dallas County's history | wfaa.com

8 UTA FY2023 Greenhouse Gas Emissions Report

9 Storm Recovery | City of Arlington

10 Texas saw a record number of heat-related deaths in 2023 | The Texas Tribune

11 DFW - Consecutive Days Without Precipitation | NOAA - NWS

12 Office of Sustainability - Composting | UTA

13 US EPA Food Recovery Challenge National Award Winners

14 Waste Management - The University of Texas at Arlington

15 UTA Office of Sustainability, 2024

16 UTA 2022 Sustainability Report

17 Effects of bin proximity and informational prompts on recycling and contamination | Sonny Rosenthal, Noah Linder

18 NRF | Back to School

19 2023 US Energy and Employment Report, Texas

20 2023 US Energy and Employment Report, Appendix A

21 2024 US Energy Information Administration, Texas State Profile and Energy Estimates

22 Sustainability - Energy: UT Arlington

23 Entertainment District preps for influx of major events, visitors

24 UTA FY2023 Greenhouse Gas Emissions Report

25 Driving UTA Vehicles: UT Arlington

26 DFW - 100° Day Data

27 Heat Forecast Tools

28 Insights from hydronic heating systems in 259 commercial buildings | Energy and Buildings

29 GHG Emissions Reduction Audit Scope of Work Template | Better Buildings Initiative

30 Decarbonizing Building Thermal Systems: A How-to Guide for Heat Pump Systems and Beyond

APPENDIX B: STRATEGY SUMMARY

Culture & Communication

Goal 1: Increase cross-university communications on sustainable stories

Priority: Near

1.1 Coordinate sustainability messaging to be part of campus on-boarding

1.2 Track all departments to understand how activities positively impact UTA through channels like e-newsletters and social media

1.3 Involve Communications students in developing awareness campaigns and social media presence as part of curriculum

1.4 Create a comprehensive playbook defining protocols for sustainability communications

Goal 2: Further the “story” of sustainability across UTA

Priority: Near

2.1 Increase signage and visual indicators across campus with small notes about what has already been done to combat climate change

2.2 Distribute the UTA Sustainability story across key sustainability contributors in the region

2.3 Increase dynamism of sustainability communications and change how UTA communicates by embracing short form, highly visual content

2.4 Engage alumni network in sustainability success at UTA

Goal 3: Continue to expand community service opportunities on campus

Priority: Mid

3.1 Organize formal community events such as charity runs/walks/bike rides which involve volunteer efforts, fundraising opportunities, and outreach activities

3.2 Provide honors pathways at graduation that involve volunteer hours completed

3.3 Clearly define the social impacts of sustainability and how it relates to campus life

3.4 Seek partnerships with local organizations, K-12 programs, and businesses to influence sustainability initiatives across Arlington

Goal 4: Expand office "Green Teams" program

Priority: Long

4.1 Assign at least one sustainability champion per department to be included in all departmental decisions

4.2 Facilitate peer-to-peer support for 100% of UTA staff through sustainability-focused events, opportunities, and training sessions

4.3 Coordinate participation of green teams in social media to celebrate their efforts

Food & Waste

Goal 1: Increase awareness and participation in on-campus community garden program

Priority: Near

1.1 Add garden location to wayfinding signage

1.2 Create a student-led awareness campaign and events to learn about urban agriculture and composting

1.3 Explore ways to increase garden bed capacity to respond to increase in demand for space

1.4 Have Landscape Architecture students design garden spaces for multi-purpose community areas

1.5 Add community garden to online Campus Map

Goal 2: Provide education on responsible food consumption

Priority: Near

2.1 Emphasize the importance of minimizing food waste

2.2 Provide clear signage about where to get and how to use to-go containers

2.3 Have varied and balanced vegan meal options available at every meal

Goal 3: Enhance visibility, accessibility, and knowledge about recycling, composting, and landfill waste

Priority: Near

3.1 Standardize and color code bins and locate them in prominent, high traffic locations

3.2 Increase quantity of recycling bins across campus, include at least one bin per building level

3.3 Provide simple, large signage with educational graphics that explain what goes in each bin

3.4 Increase visibility/improve accessibility of waste and recycling assets using Tactile WasteFinder floor mats

3.5 Expand donations and composting in catering services

Goal 4: Seek local sourcing for campus dining

Priority: Mid

4.1 Partner with local farmers through The Common Market - Texas to establish a preferred supplier program for UTA dining services (prioritize fresh produce, dairy, and proteins)

4.2 Create a farm-to-table dining services practice through the expansion of UTA's growing capacity. This may include the establishment of a campus greenhouse and UTA-owned garden plots

4.3 Partner with local restaurants and campus dining

Goal 5: Promote a culture of repair and reuse

Priority: Mid

5.1 Start a Repair Café, which specializes in teaching consumers the skills necessary to repair their own goods, rather than replacing them

5.2 Expand upon the existing collection of discarded items by creating a campus surplus/reuse store where used items be donated and found by students. Hold monthly in-person events that offer items for free to students, faculty, and staff

Goal 6: Develop an Integrated Waste Management Plan to increase waste diversion

Priority: Mid

6.1 Create a centralized recycling center on campus

6.2 Research and improve methods and logistics for campus composting and recycling operations

6.3 Streamline waste management process by partnering with a service for evaluation and customized programming

6.4 Reduce single use plastics in dining halls and eliminate all remaining Styrofoam from dining operations

6.5 Create an educational program for reducing recycling contamination

Goal 7: Expand campus gardens for research and collaboration

Priority: Long

7.1 Utilize as a living laboratory for relevant academic programs, incorporate caretaking into curriculum

7.2 Recruit volunteers to help with garden operations

7.3 Explore implementing vertical farming practices

7.4 Explore collaboration opportunities with TASTE Project

Goal 8: Implement construction and demolition waste management practices on campus

Priority: Long

8.1 Incorporate campus-wide policy for construction waste diversion into Office of Facilities Management standards and specifications

8.2 Track construction and demolition waste on all campus construction projects

8.3 Create/update contractor's application for qualification to include agreement to abide by UTA policy for construction waste diversion

8.4 Incorporate the practice of salvage and reuse of building materials whenever possible prior to demolition

Economic Development & Innovation

Goal 1: Establish Green Tech Network

Priority: Near

1.1 Identify faculty to foster research within Green Technology

1.2 Identify collaboration opportunities for green technology transfer and commercialization

Goal 2: Develop partnerships for infrastructure modernization training utilizing UTA courses

Priority: Mid

2.1 Create a professional learning opportunity/program for existing professionals to benefit from UTA's sustainable offerings

2.2 Leverage the cluster hire initiative to drive a sector of research that is focused, across disciplines, on forwarding research around sustainability

2.3 Develop administrative capacities to pursue grants in these fields

Goal 3: Encourage leadership in the green jobs market

Priority: Long

3.1 Connect with local businesses to identify problems that campus research could help solve

3.2 Identify target areas for sustainability to further grant-funded research

3.3 Collaborate on sustainability-focused workforce training

3.4 Leverage Center for Entrepreneurship and Technology Development for collaboration with local businesses/organizations

3.5 Expand green workforce development funding

Goal 4: Work with regional leaders to further DFW as an innovative EcoDistrict

Priority: Long

4.1 Reference and analyze the annual ULI sustainability and climate change report to compare against UTA sustainability metrics

Social & Community Impact

Goal 1: Highlight existing sustainability research

Priority: Near

1.1 Group recent sustainability stories in a featured section on the UTA website

1.2 Be more explicit in communicating research related to sustainability

1.3 Align recruiting efforts with key hiring districts

1.4 Create a searchable catalog of faculty experts, projects, and sustainability efforts

1.5 Host walking tours with educational signage on trails

1.6 Ensure sustainability vision is integrated into on-boarding and recruiting efforts

Goal 2: Ensure widespread Research Access by hosting published articles on publicly available infrastructure

Priority: Near

2.1 Create a Sustainability category on UTA Libraries DAZL and the BrowZine library for easy access to related research

2.2 Ensure common keywords are being used in all published work to ensure UTA research is being cataloged and referenced effectively

Goal 3: Deepen connections for fostering a sustainable campus community

Priority: Mid

3.1 Expand network of sustainability professionals by connecting with other institutions in the region with programs in sustainability or with environmental-focus (examples include University of Oklahoma, Sam Houston State University, University of Houston, Texas A&M)

3.2 Advocate social justice and environmental sustainability at local, national, and international levels

Goal 4: Integrate sustainability initiatives into course curriculum

Priority: Mid

4.1 Enhance capacity to implement action items by aligning class syllabi with relevant projects

4.2 Connect students with local businesses and government departments through coursework

High-Performance Buildings

Goal 1: UTA sustainable design guidelines

Priority: Near

1.1 Develop sustainable design guidelines for UTA

1.2 Share sustainable design guidelines to all contractors on UTA projects

Goal 2: Lower building water intensity

Priority: Near

2.1 Use high-efficiency fixtures where possible

Goal 3: Lower building level Energy Use Intensity

Priority: Near

3.1 Pursue high-performance energy targets for new buildings

Goal 4: Target LEED/WELL Certification on all new construction

Priority: Mid

4.1 Update the 2011 Green Building Policy

4.2 Enforce the Green Building Policy for all new construction to require LEED Certified rating

Goal 5: Reduce existing building energy consumption

Priority: Mid

5.1 Reduce building energy consumption on existing buildings through targeted retrofitting

5.2 Pursue energy conservation measures at each building

Goal 6: Reduce campus embodied carbon

Priority: Mid

6.1 Consider low carbon materials in order to reduce embodied carbon in new construction

Goal 7: Best utilize roof space for sustainability measures

Priority: Long

7.1 Prioritize roof space for high-efficiency HVAC equipment

7.2 Develop new buildings as rooftop solar ready

7.3 Identify future candidates for green roof projects as available

Goal 8: Pursue building electrification for heating and cooling systems where possible

Priority: Long

8.1 Align systems electrification with expanded electrical capacity as a long-term priority

Campus Mobility

Goal 1: Deploy EV charging infrastructure on campus to support a greener campus

Priority: Mid

1.1 Study portions of campus with highest parking density to evaluate pilot EV program

1.2 Partner with local EV charging installers and campus facilities teams to build a robust and resilient EV charging network

Goal 2: Transition to an electrified fleet for University operations

Priority: Mid

2.1 As MavMover buses need to be replaced, consider purchasing electric shuttle buses for campus transportation

2.2 Seek funding through federally available grants to upgrade to an electric fleet

Goal 3: Promote active mobility like walkable connection to downtown, bike paths, etc.

Priority: Long

3.1 Continue to pedestrianize major interior arteries of campus

3.2 Monitor for City of Arlington major roadway improvements; advocate for the installation of protected bike lanes on major campus commuting routes when timing is appropriate

3.3 Seek guidance from Vision Zero traffic safety guidelines with major transportation projects to protect pedestrian safety

Goal 4: Transition to a campus owned fleet for university transportation

Priority: Long

4.1 Decrease reliance on single-occupant car transportation options and on-demand travel in favor of expanding on-campus transportation network

Energy Infrastructure

Goal 1: Lower building-level Energy Use Intensity

Priority: Near

1.1 Use the EnergyStar Portfolio Manager to benchmark and calculate energy project savings for all campus buildings

1.2 Match all purchased electricity generated by fossil sources with Green-e certified RECs

Goal 2: Deepen the granularity of energy data across the campus through building metering

Priority: Mid

2.1 Establish overarching goals and specific, measurable targets related to energy and water at UTA (reducing GHG emissions, water reduction and conservation, etc.)

2.2 Move toward hourly energy analysis by metering individual buildings

2.3 Assess space utilization across all campus buildings

Goal 3: Transition energy infrastructure on campus

Priority: Mid

3.1 Transition thermal networks to low-temperature hot water at the building

3.2 Electrify building operations once power purchasing has been secured

3.3 Align major energy projects with campus master plan development

Goal 4: Source 100% low-carbon energy

Priority: Long

4.1 Utilize university power purchase contract to purchase green energy

4.2 Ensure all purchased energy is sourced from verified clean and renewable sources

4.3 Deploy solar power generation where possible - Install solar panels across campus including on both roofs/parking and coordinate opportunities for solar to provide shading

Operations & Finance

Goal 1: Identify opportunities to improve water conservation and efficiency

Priority: Near

1.1 Research small-scale water treatment options

1.2 Establish rainwater catchment systems for irrigation

1.3 Minimize environmental impact of Landscape Management by focusing on xeriscaping

Goal 2: Utilize a shadow cost of carbon in accounting practices and energy pricing

Priority: Mid

2.1 Start tracking and reporting construction and demolition waste to establish a baseline

2.2 Develop best practices guidelines

2.3 Refer to LEED O+M scorecard for building operations and maintenance improvement

Goal 3: Reinforce a culture of social and environmental responsibility through UTA's financial investments

Priority: Mid

3.1 Form a sub-committee of the Executive Budget Committee focused on investor responsibility, addressing the topics of sustainability and social responsibilities as it relates to university investments

3.2 Include students, faculty, and non-academic staff as members of the Committee on Investor Responsibility to ensure proper representation of each group

Goal 4: Utilize green financial practices as a bridge to achieve stronger campus sustainability

Priority: Mid

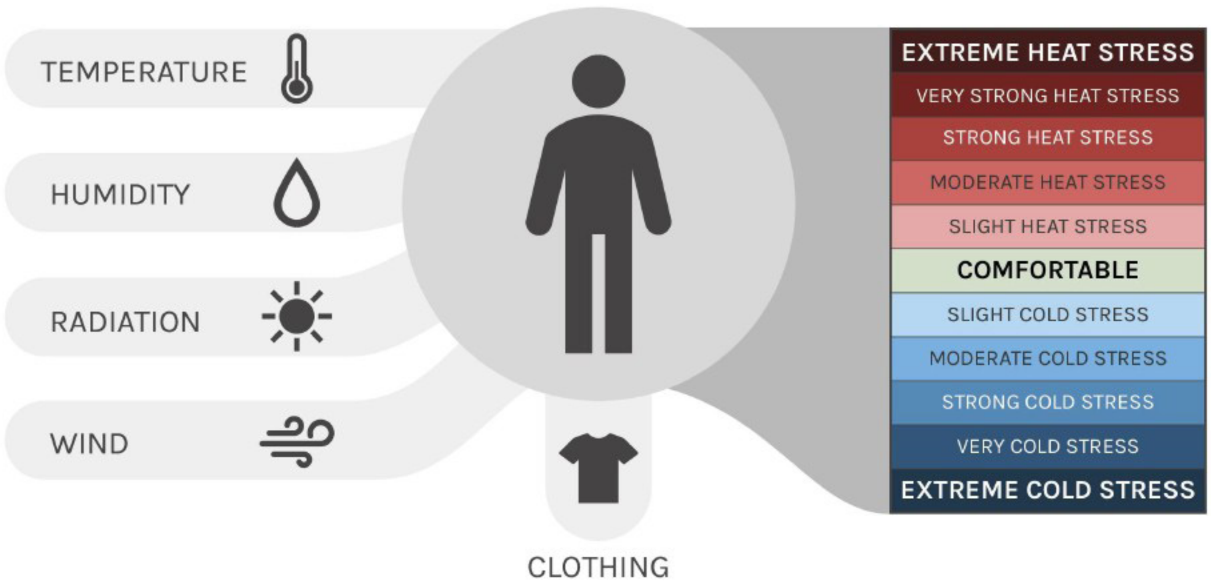
4.1 Evaluate carbon emissions trading programs

4.2 Establish an Energy Revolving Fund

4.3 Utilize LCCA to implement on-campus sustainability measures

APPENDIX C: UTCI STUDY

UNIVERSAL THERMAL CLIMATE INDEX (UTCI)

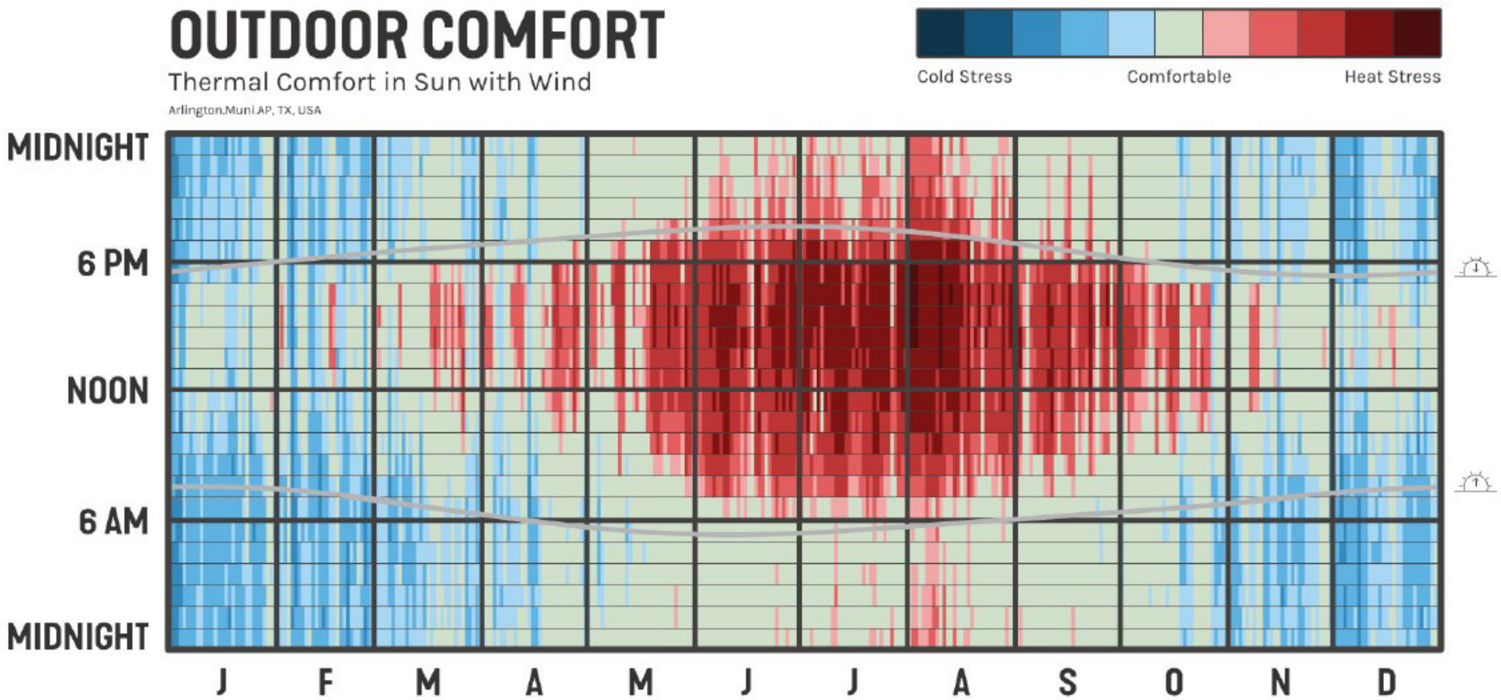


The UTCI is an indicator that estimates the thermal stress the human body undergoes when exposed to outdoor conditions. It is an international standard developed by the European Cooperation in Science and Technology (COST) Action 730. It is defined as the air temperature of a reference outdoor environment that would elicit in the human body the same physiological response (sweat production, shivering, skin wettedness, skin blood flow and rectal, mean skin and face temperatures) as the actual environment. *https://www.utci.org/

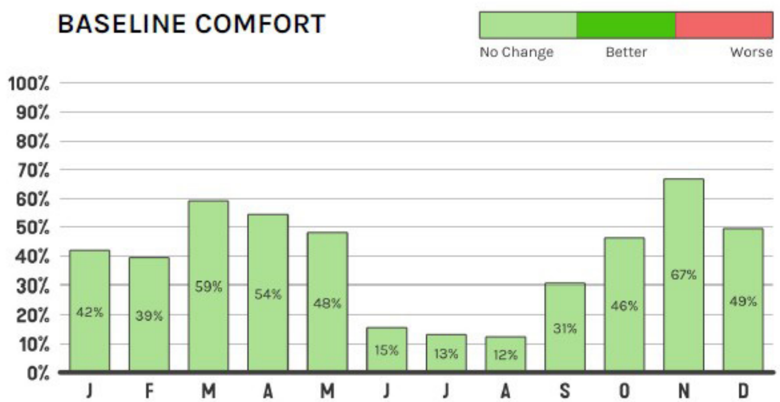
OUTDOOR COMFORT

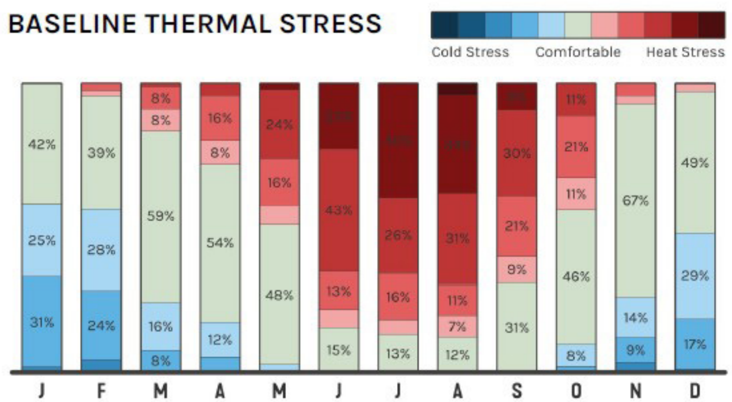
Thermal Comfort in Sun with Wind

Arlington.Muni.AP, TX, USA



OUTDOOR THERMAL COMFORT – BASELINE



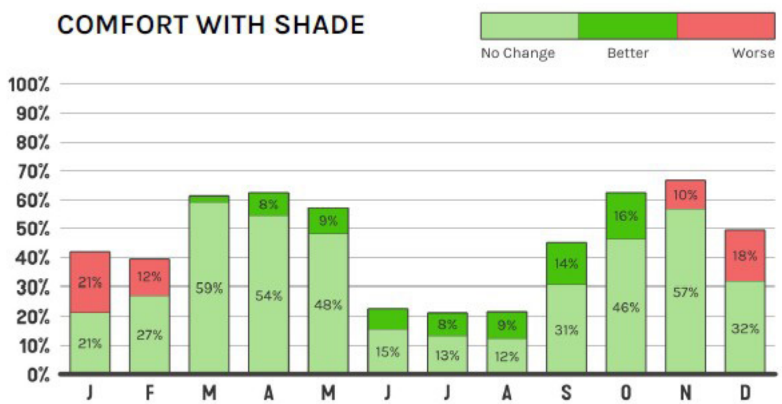


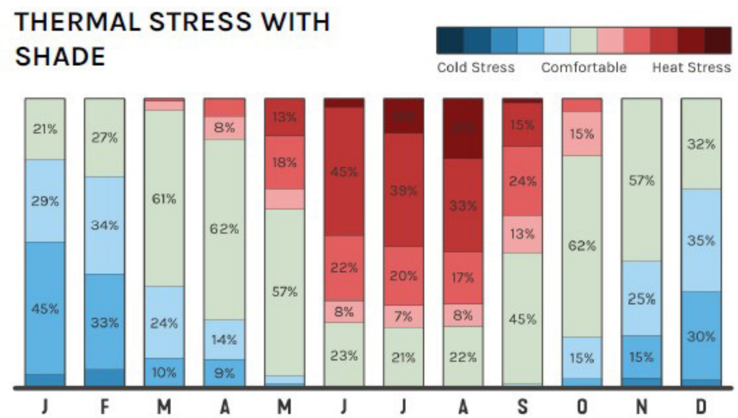
COMFORT
Overall cold climate with freezing temperatures
No heat stress except for a few months of June, July, August and September

SMITHGROUP

UTA

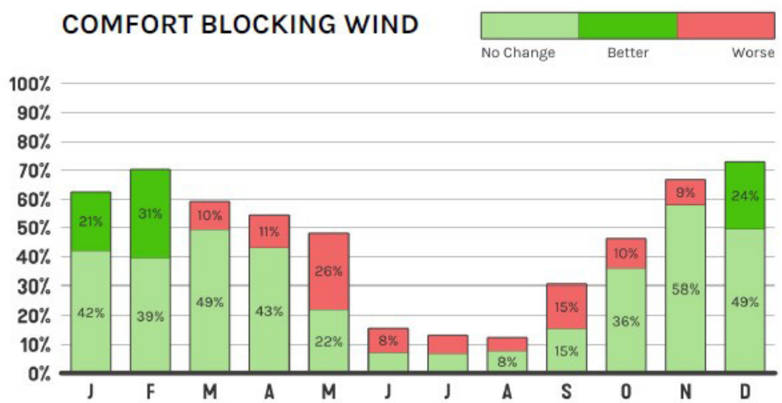
WHEN SHOULD WE BLOCK THE SUN?

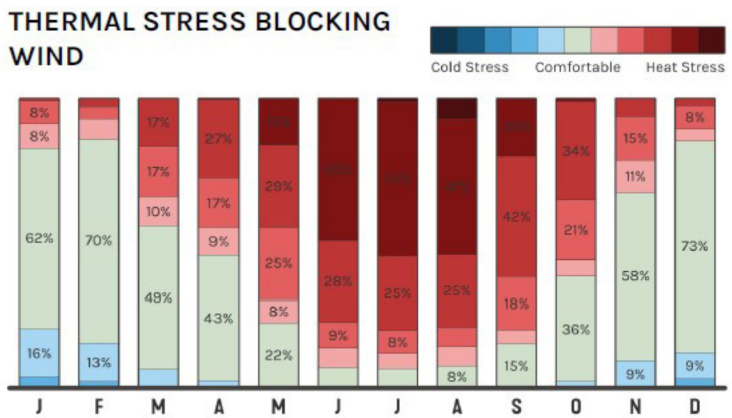




SHADE
Slight increase in comfort during summer
Higher negative impact on comfort during cooler months

WHEN SHOULD WE BLOCK THE WIND?





BLOCKING WIND
Decreases comfort during a couple of summer months
Significantly increases comfort during cooler months

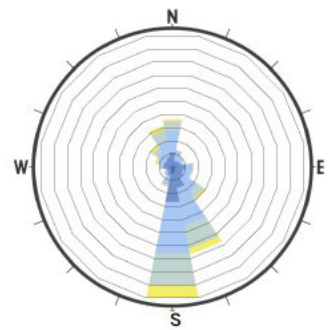
UTA

WIND ANALYSIS

ANNUAL WIND

92% of all hours are >1 mph

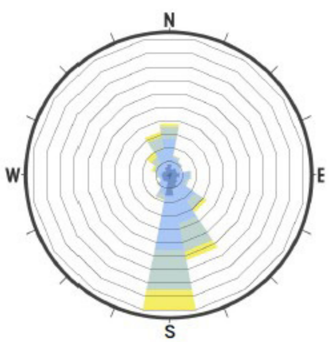
MPH 1 8 19 32 46 63



DAY WIND

95% of daytime hours are >1 mph

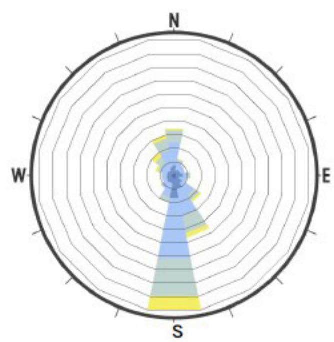
MPH 1 8 19 32 46 63



MORNING WIND

95% of 7am-1pm hours are >1 mph

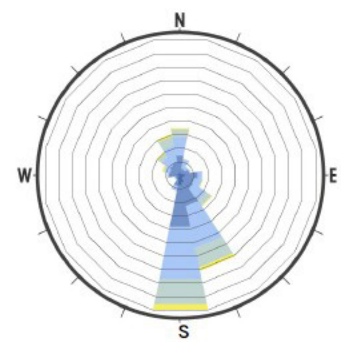
MPH 1 8 19 32 46 63



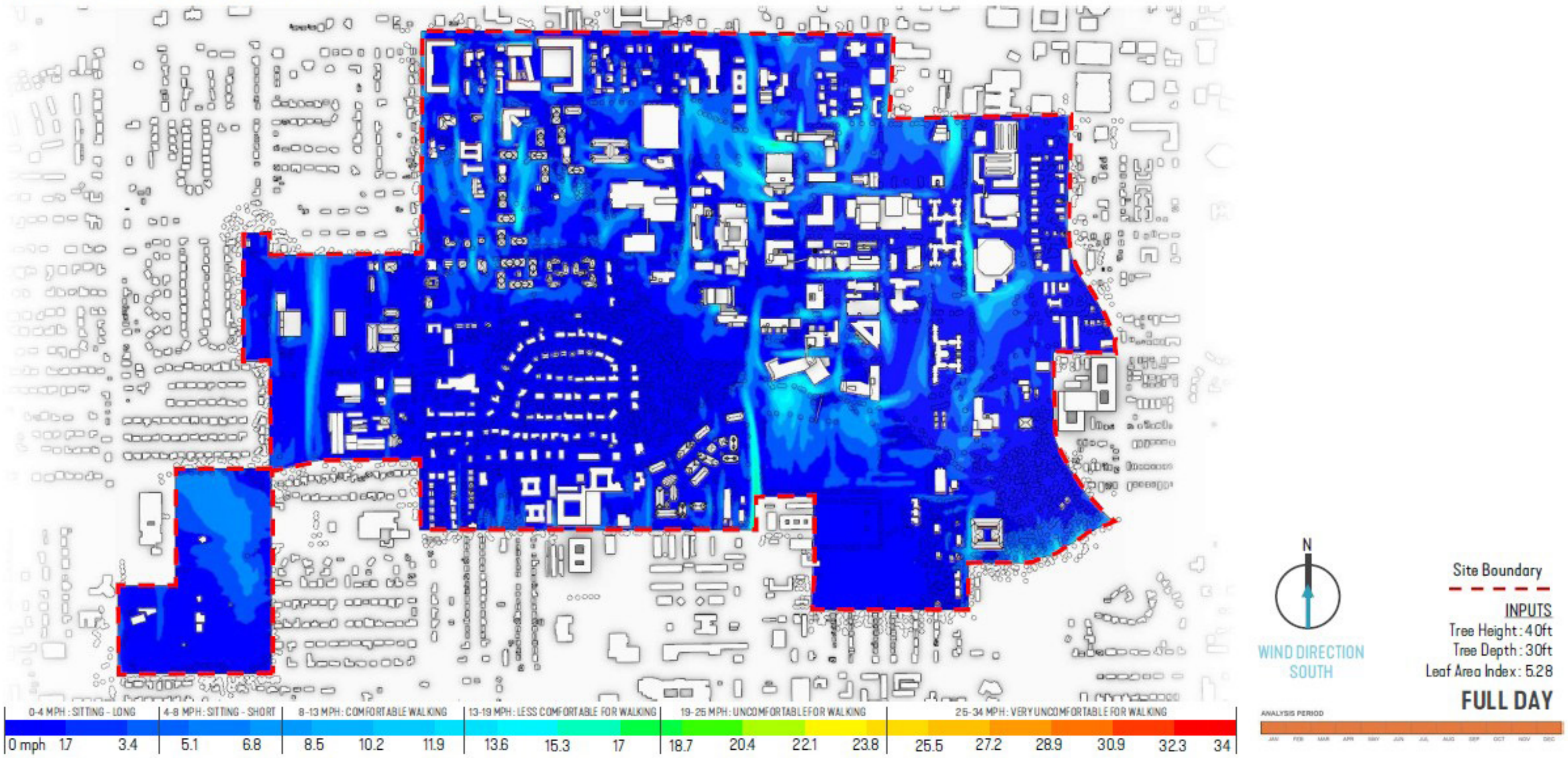
NIGHT WIND

88% of nighttime hours are >1 mph

MPH 1 8 19 32 46 63



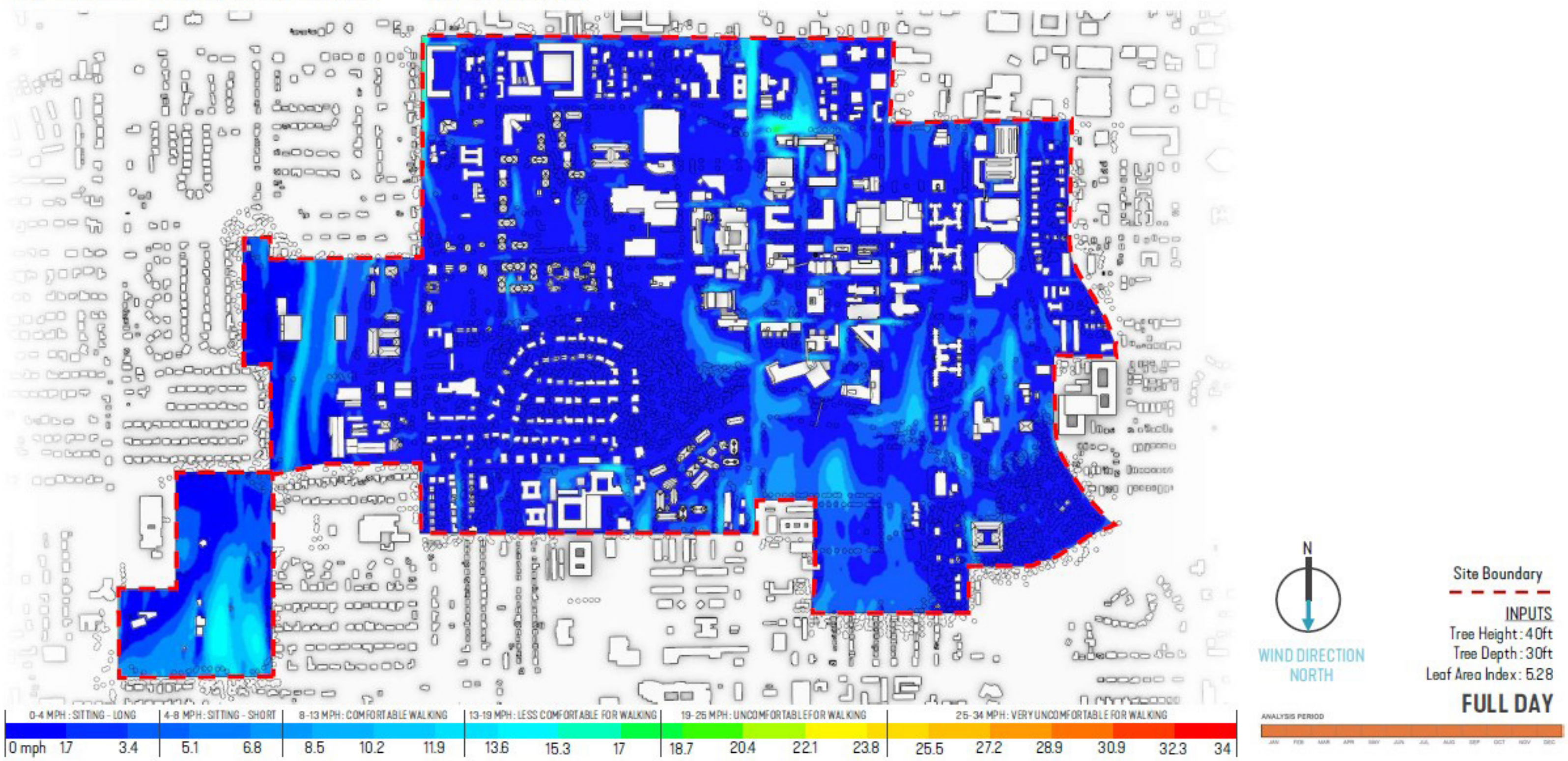
WIND ANALYSIS - SOUTH



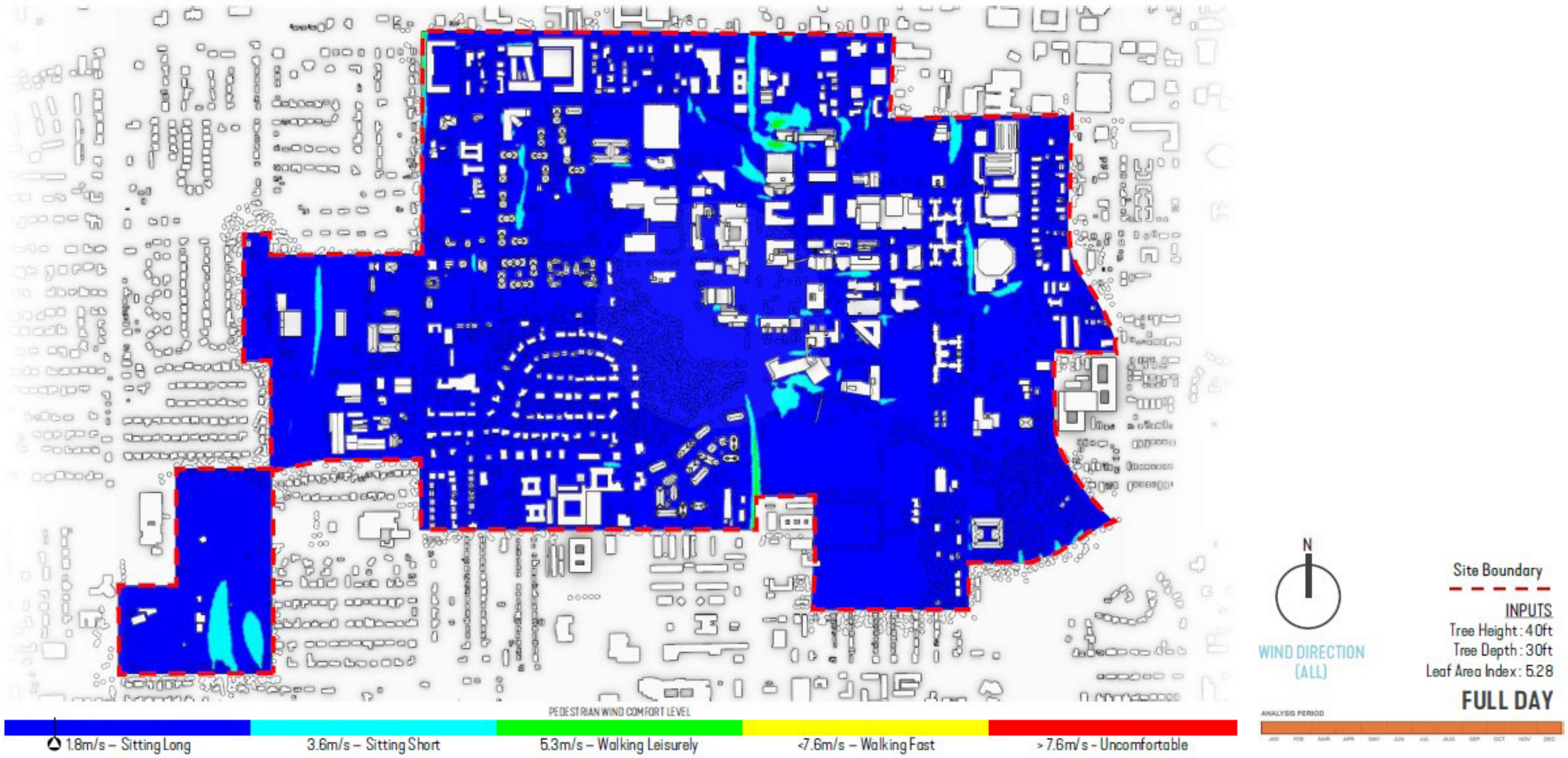
SMITHGROUP

UTA

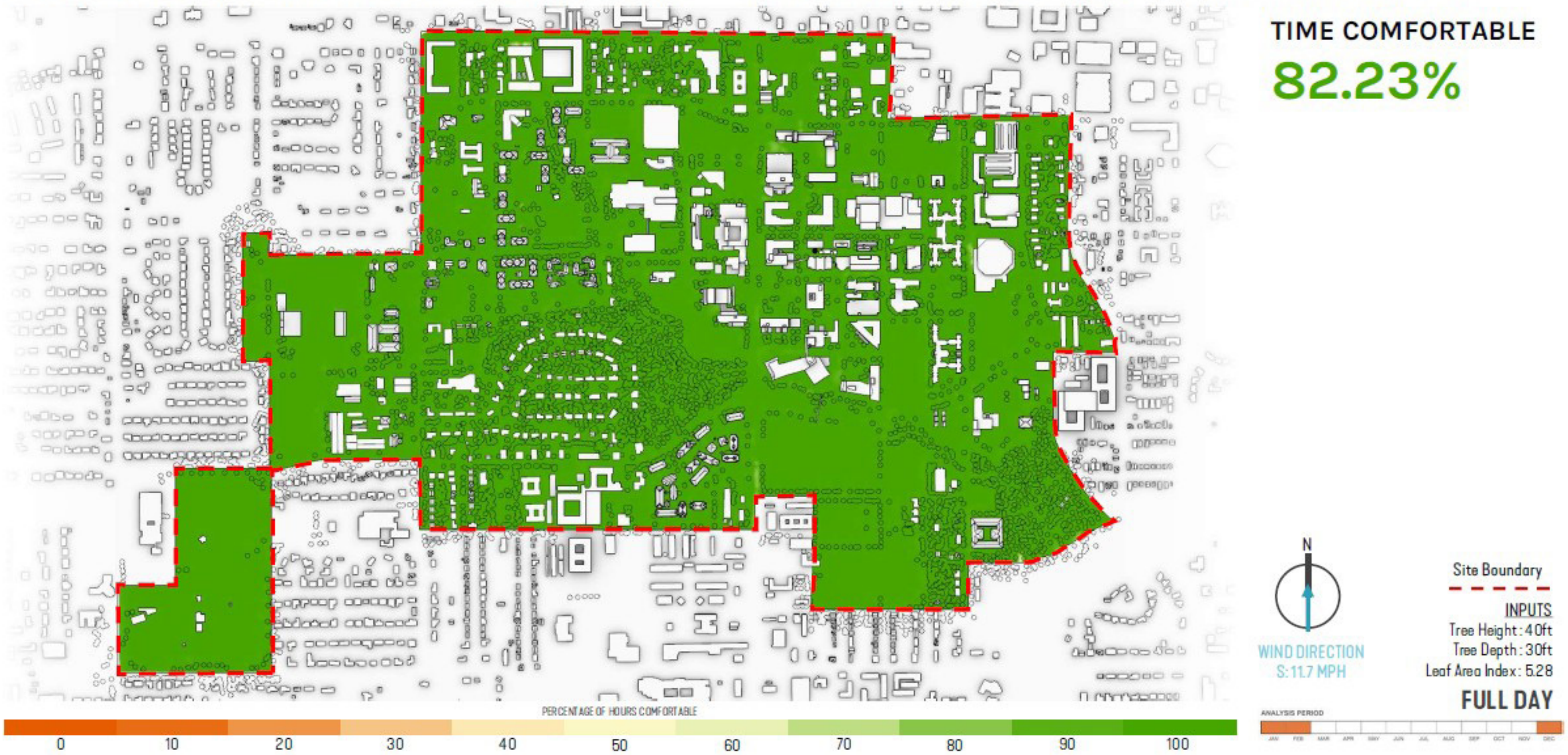
WIND ANALYSIS - NORTH



PEDESTRIAN WIND COMFORT



OUTDOOR THERMAL COMFORT – PERCENT HOURS COMFORTABLE



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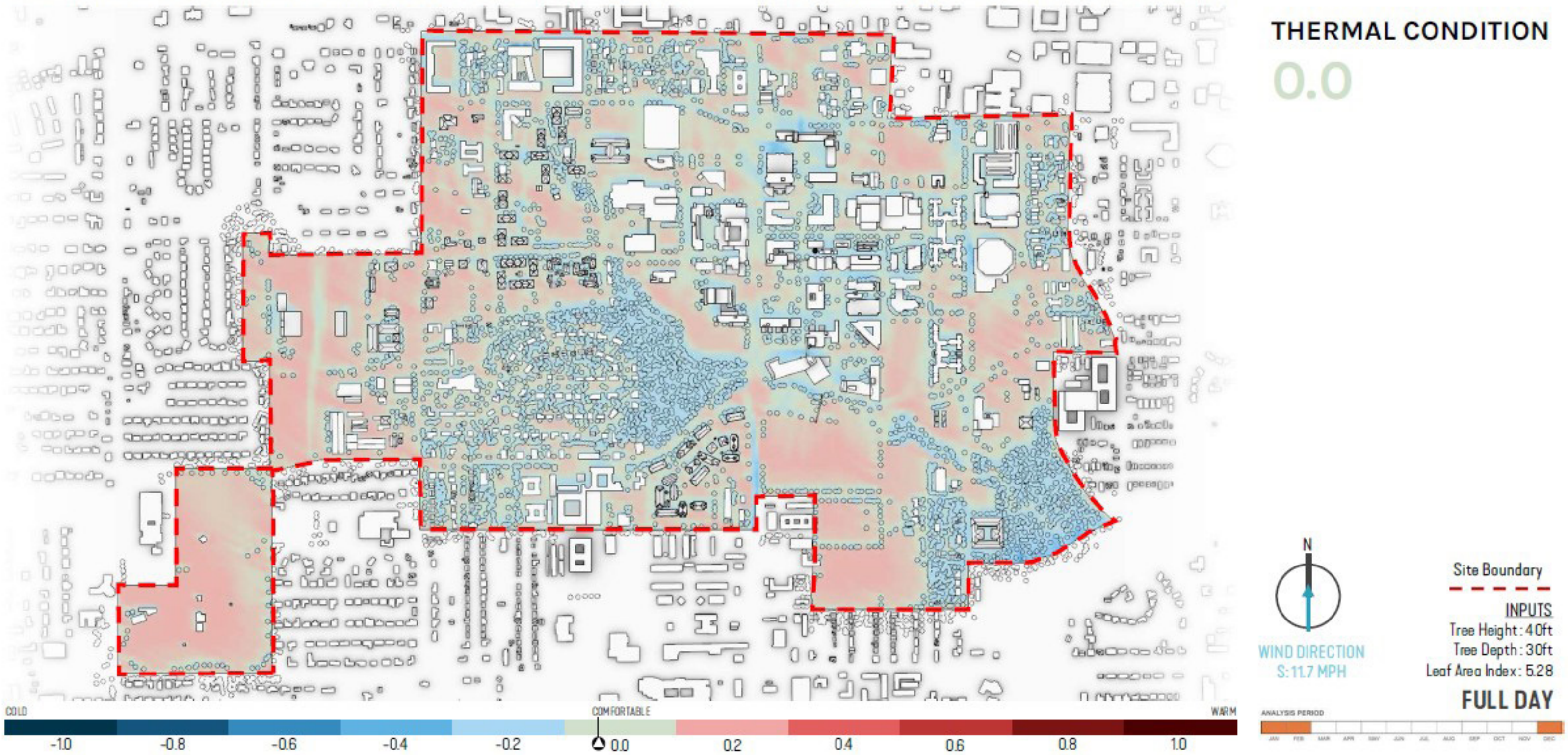
OUTDOOR THERMAL COMFORT – THERMAL CONDITION



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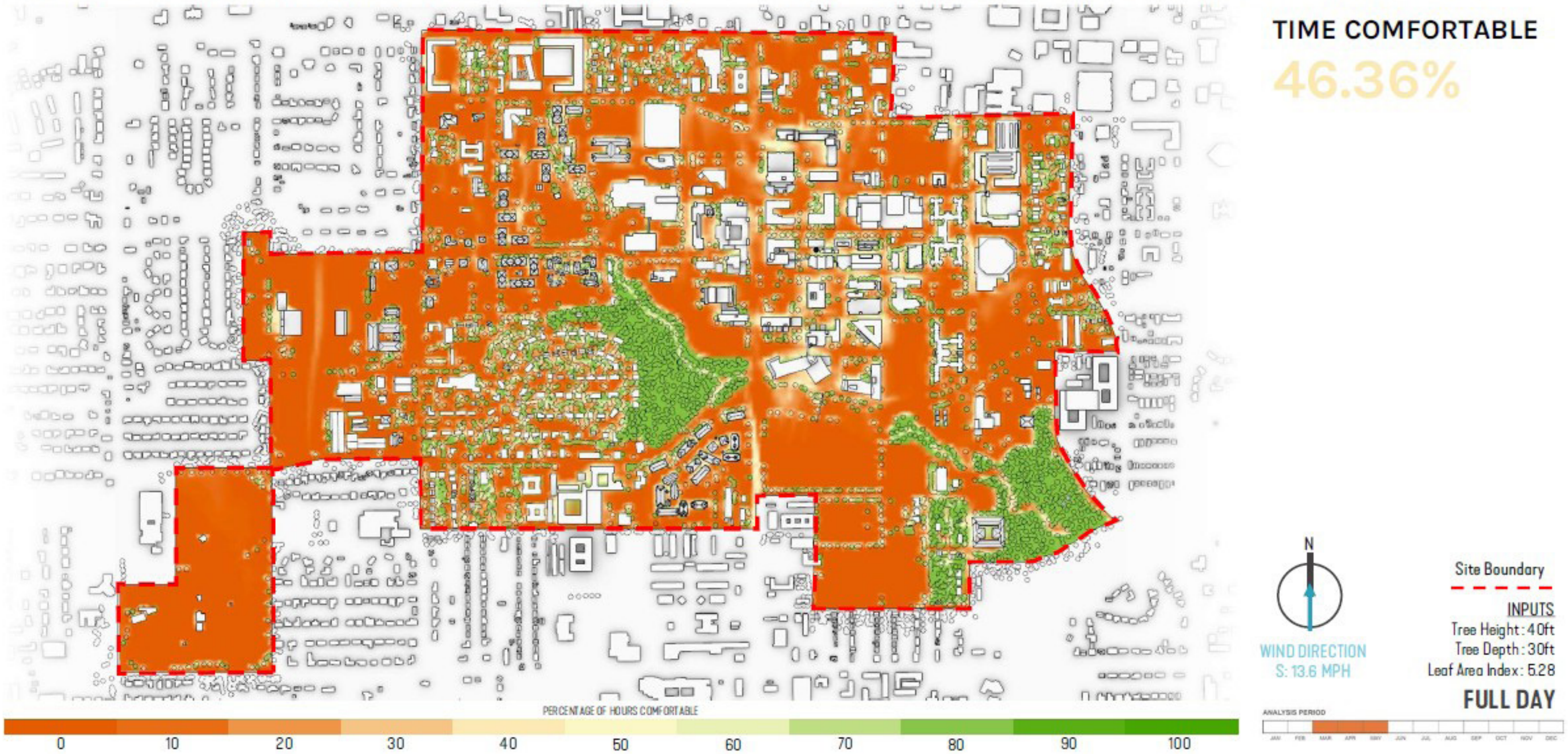
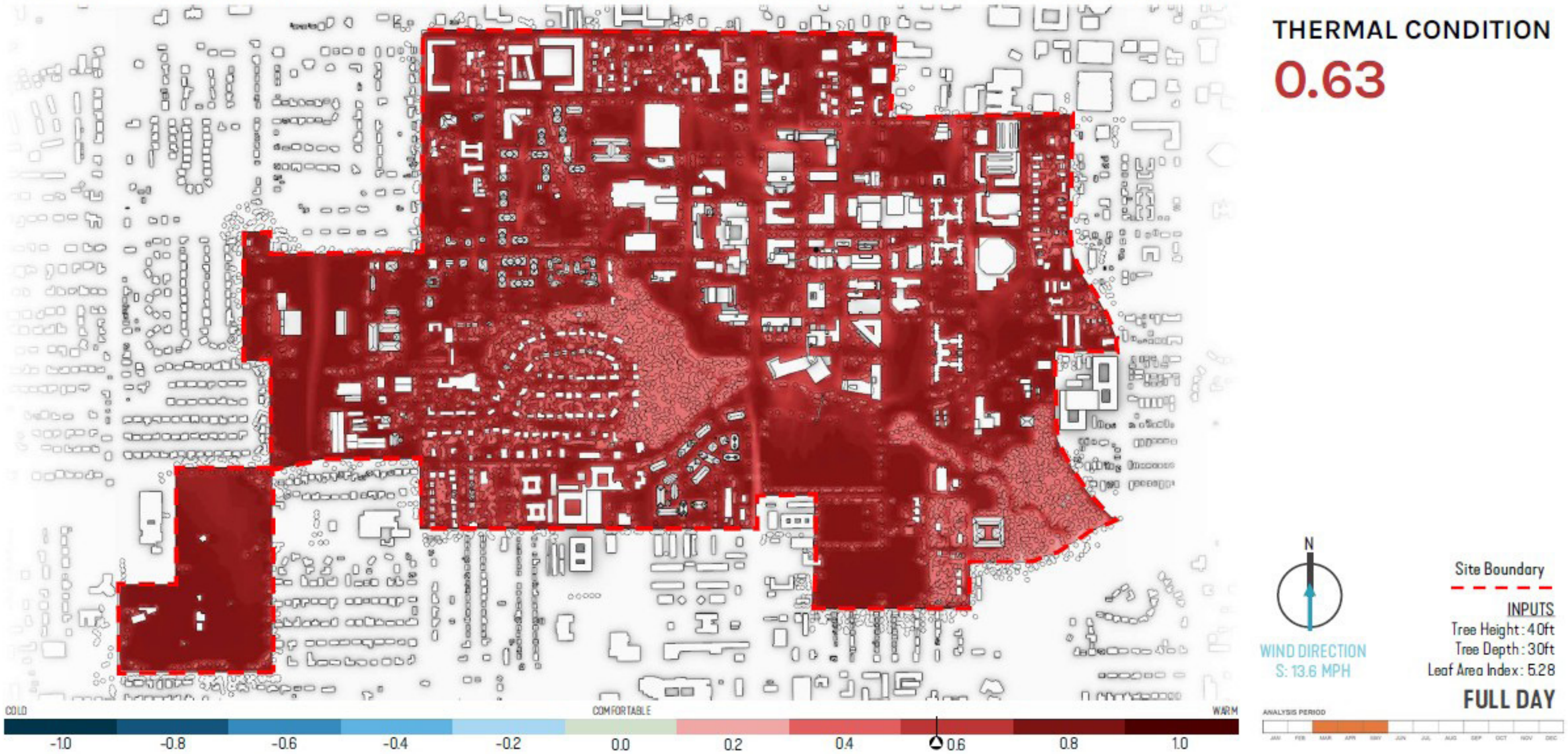
SMITHGROUP

UTA

OUTDOOR THERMAL COMFORT – PERCENT HOURS COMFORTABLE



OUTDOOR THERMAL COMFORT – THERMAL CONDITION



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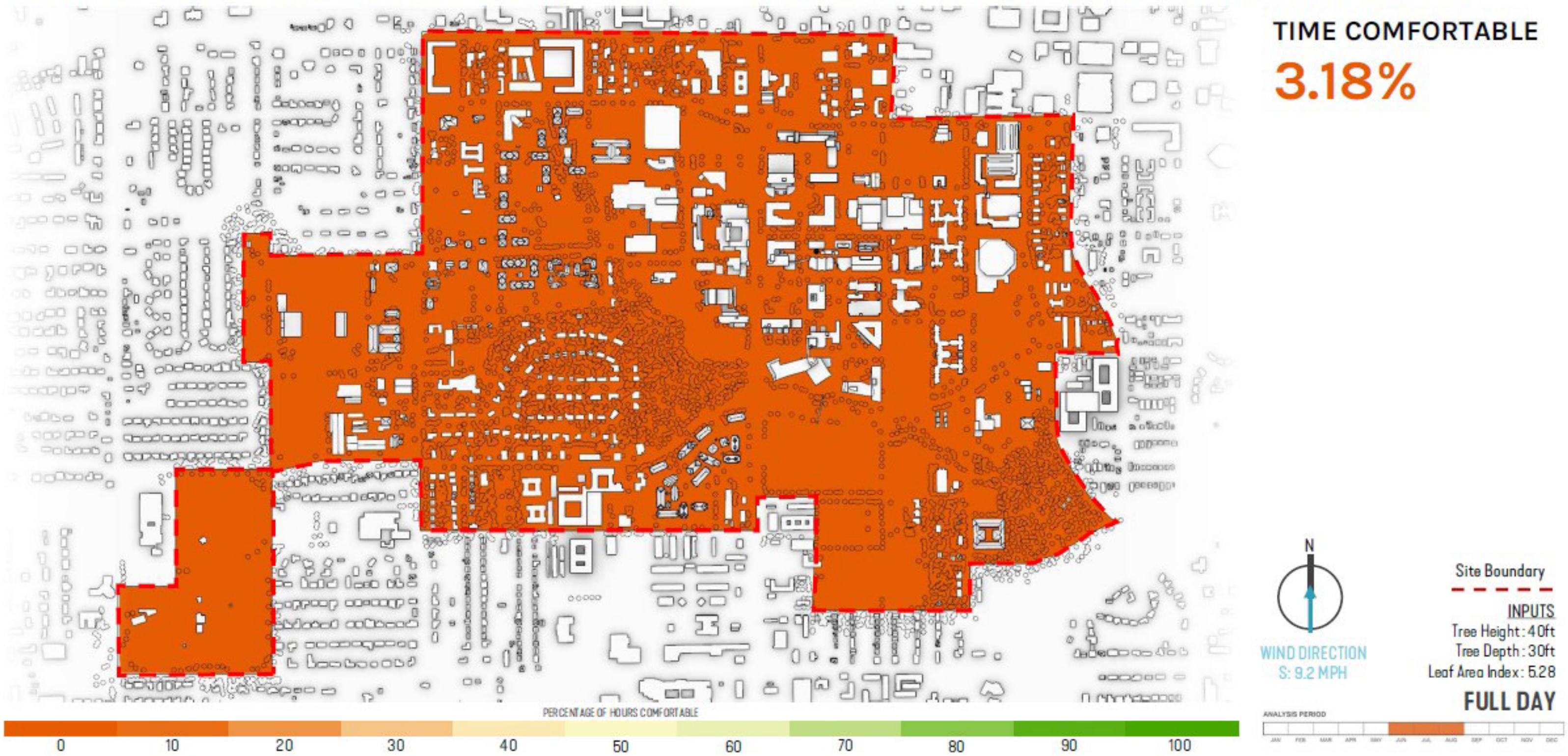
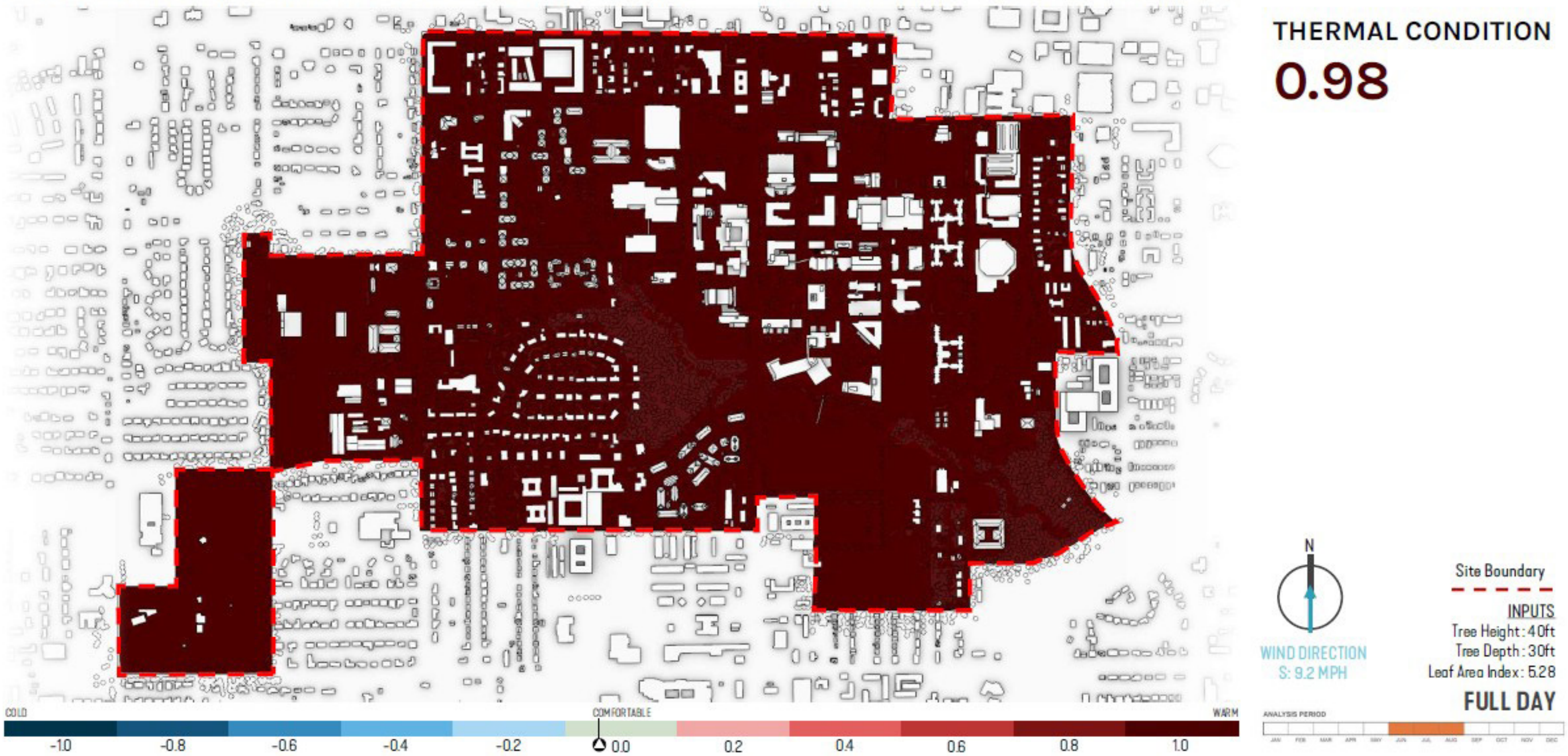
OUTDOOR THERMAL COMFORT – PERCENT HOURS COMFORTABLE



OUTDOOR THERMAL COMFORT – THERMAL CONDITION



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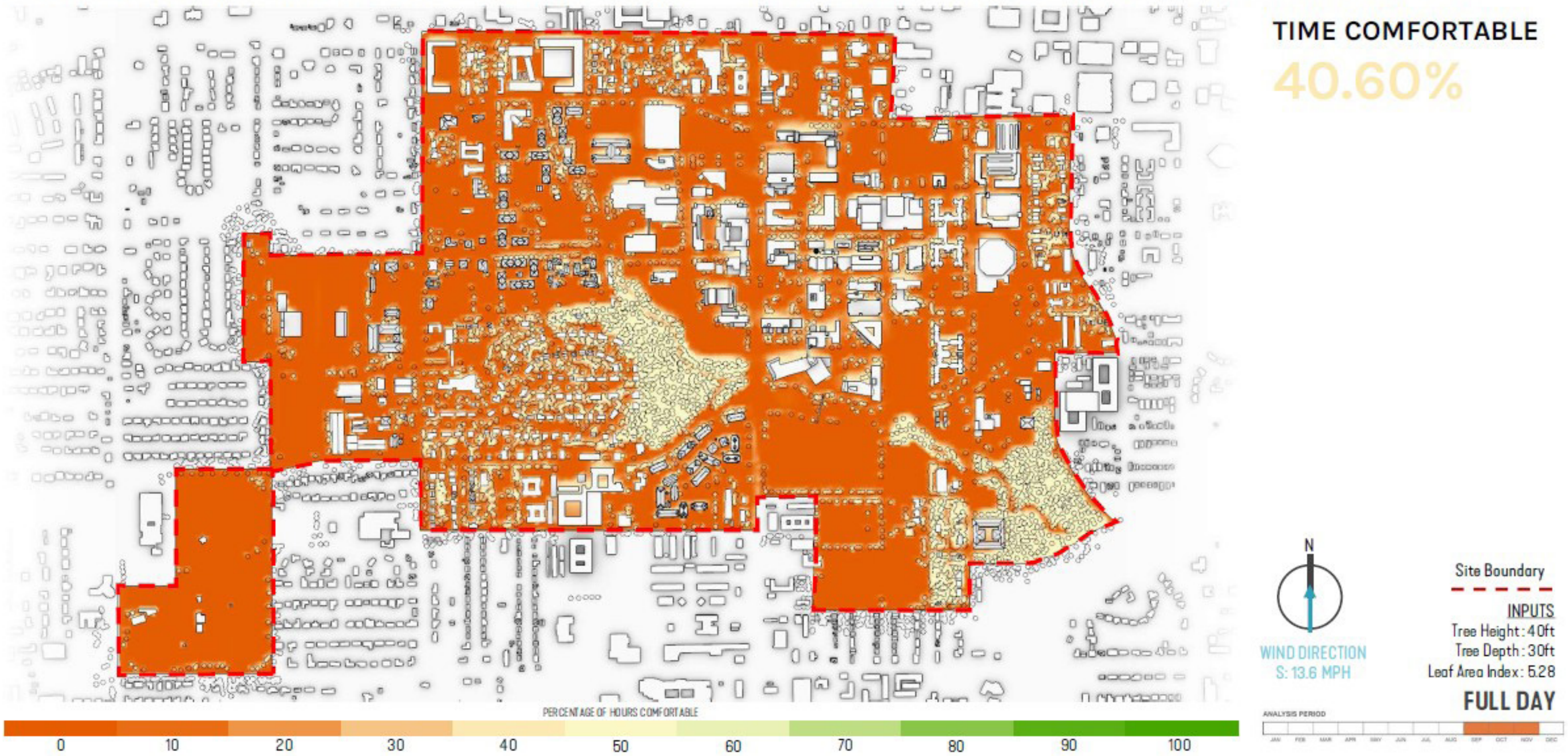
OUTDOOR THERMAL COMFORT – PERCENT HOURS COMFORTABLE



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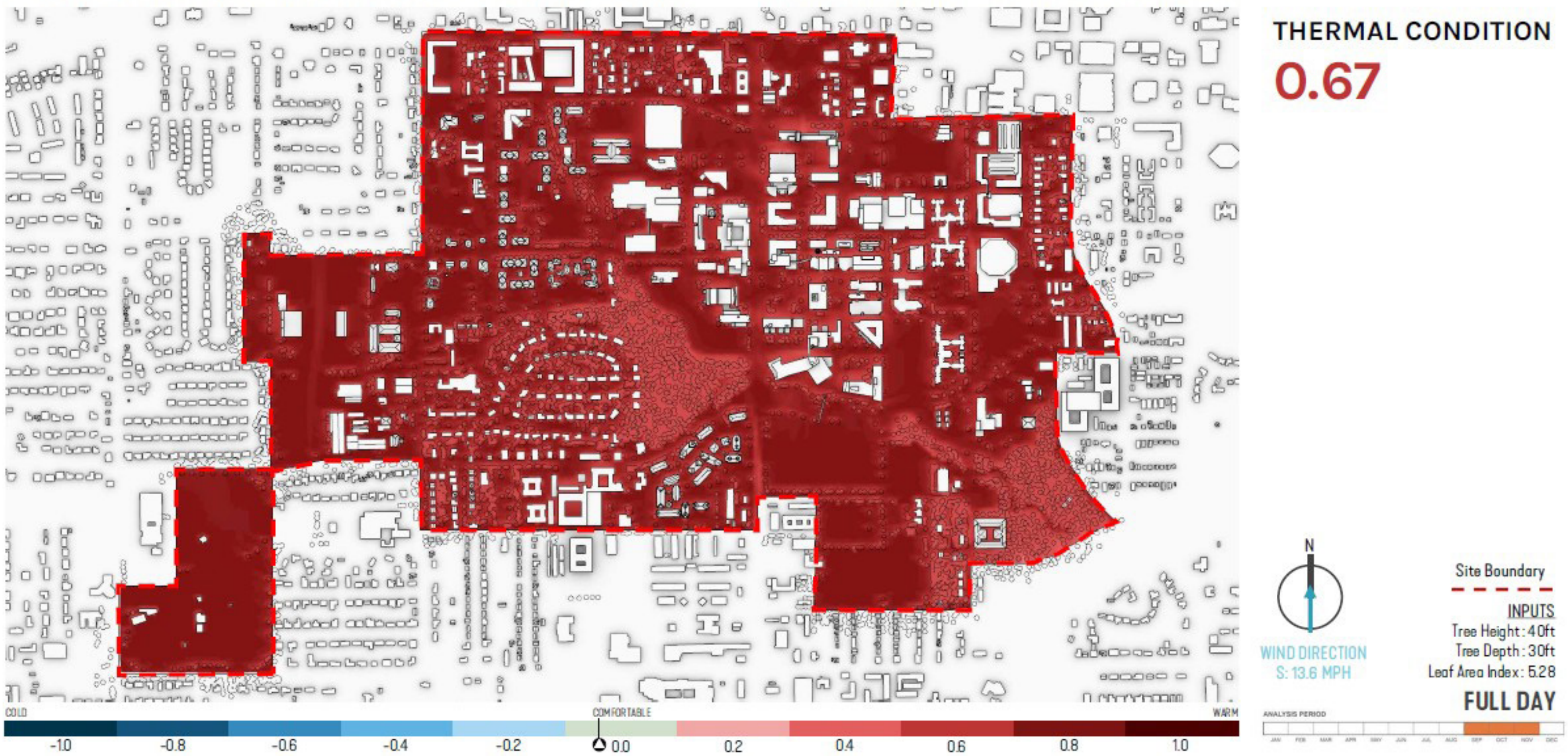
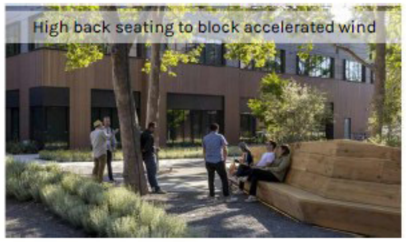
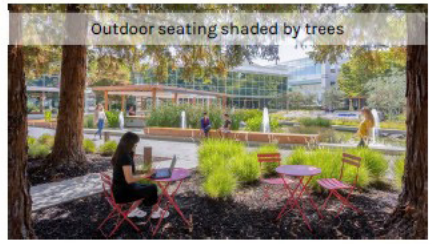
OUTDOOR THERMAL COMFORT – THERMAL CONDITION

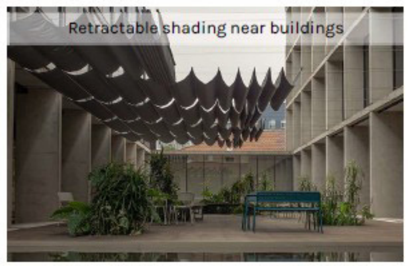


LANDSCAPE DESIGN STRATEGIES

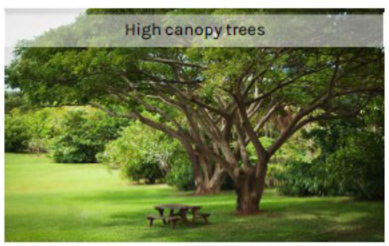

High back seating to block accelerated wind

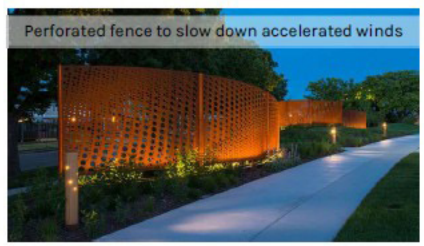

Outdoor seating shaded by trees

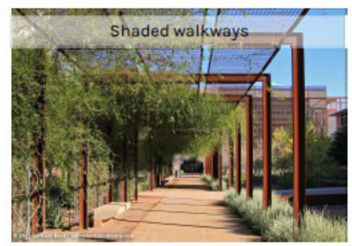

Tensile canopy for shading in large open spaces


Retractable shading near buildings


Shading systems for simple outdoor shading

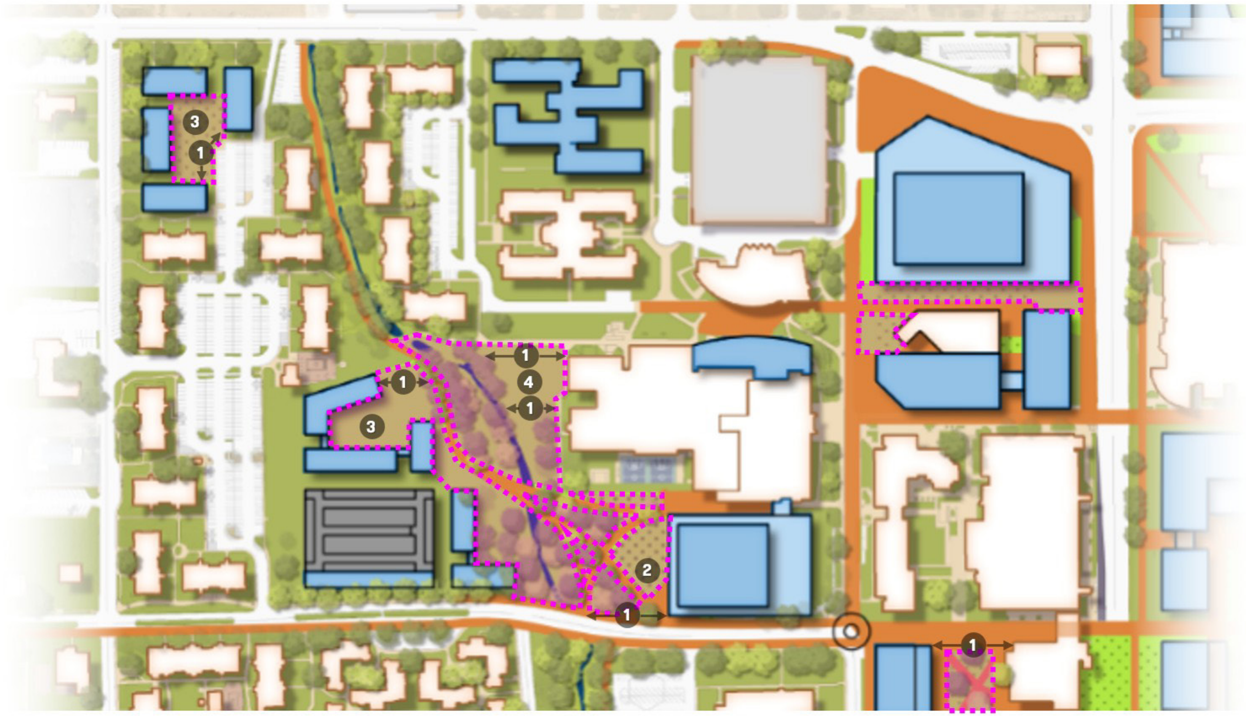

High canopy trees


Perforated fence to slow down accelerated winds


Shaded walkways

LANDSCAPE PLAN

LANDSCAPE PLAN – ZONE 1 - SOUTH



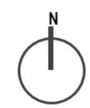
1 Perimeter Trees - High Canopy

2 Outdoor Sitting – Shaded by Trees

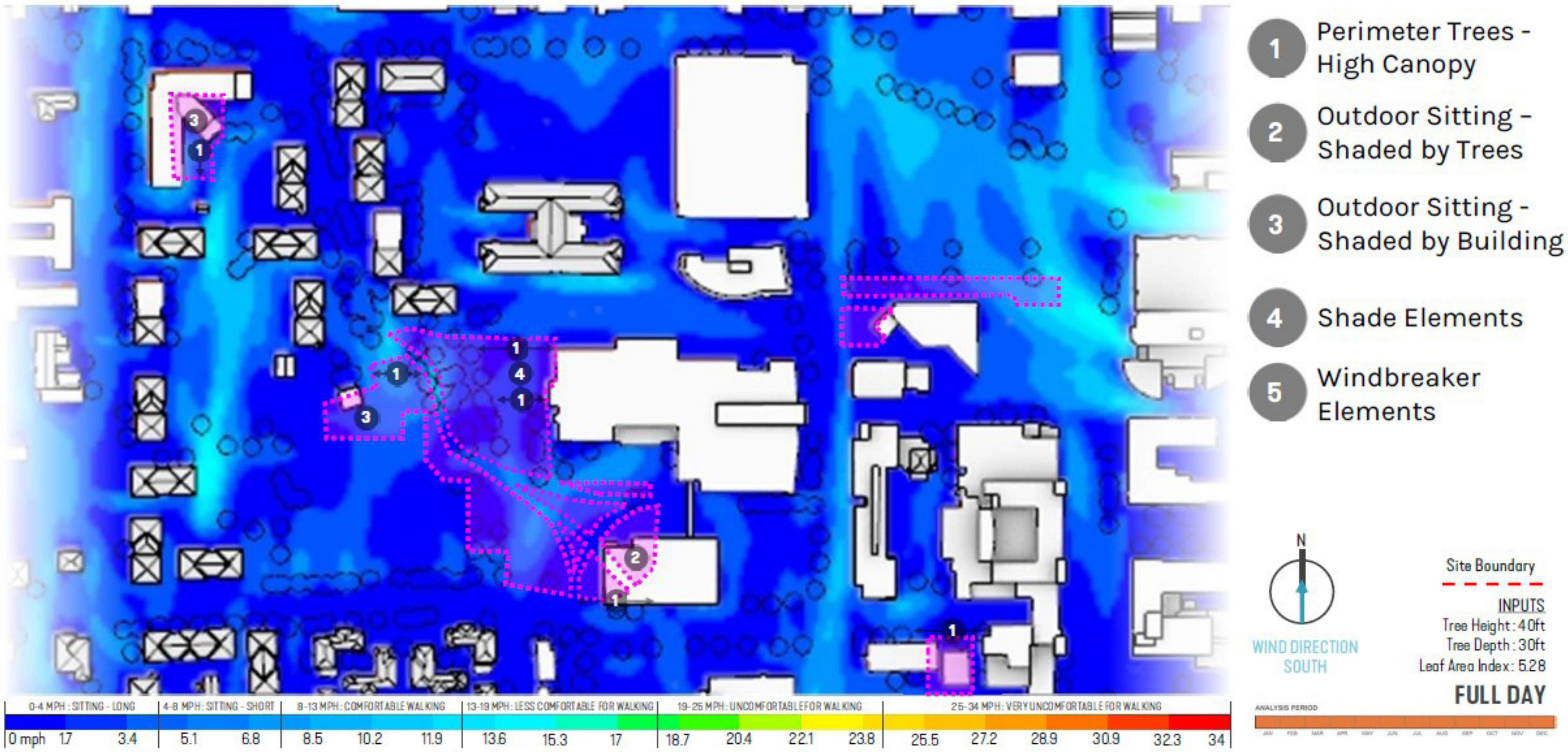
3 Outdoor Sitting - Shaded by Building

4 Shade Elements

5 Windbreaker Elements



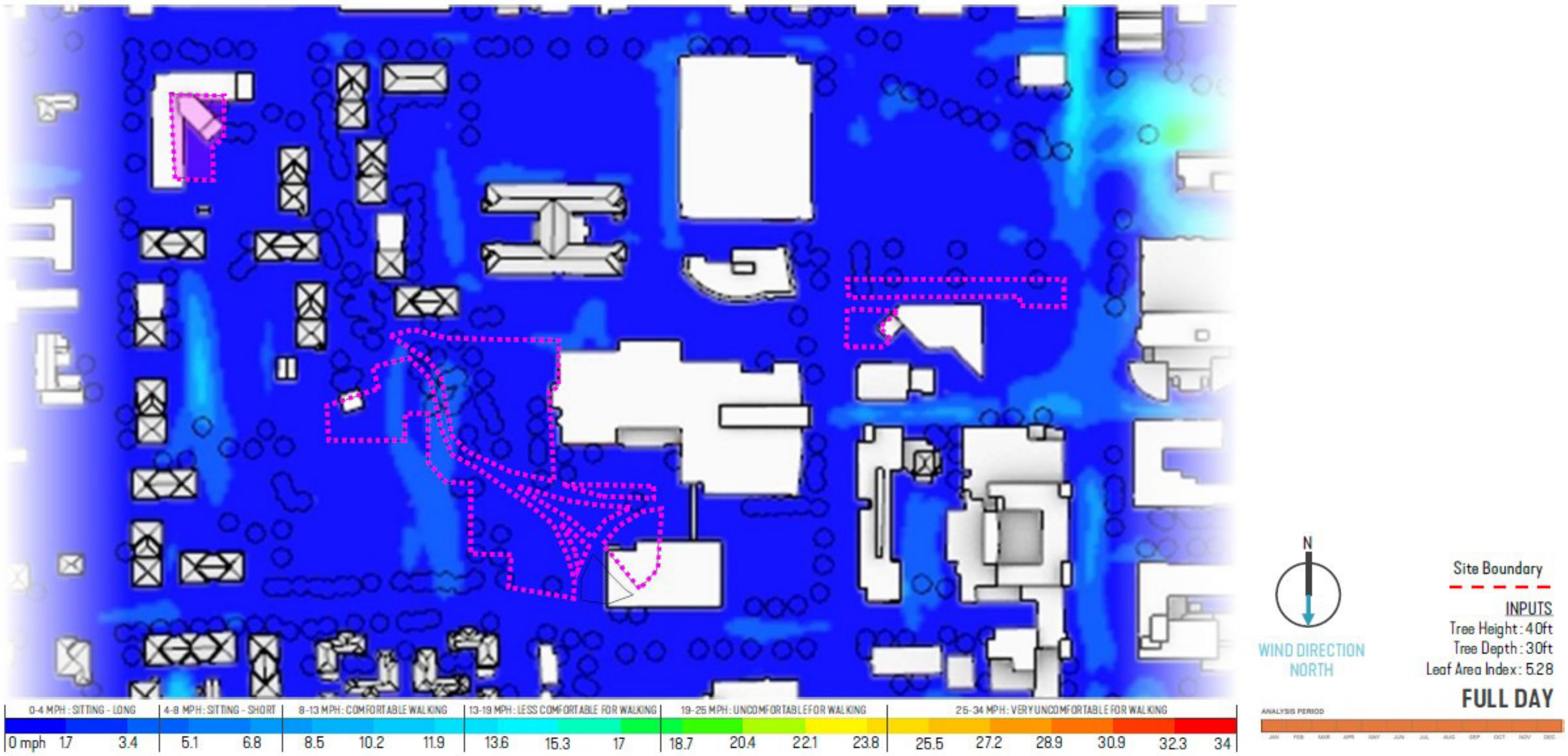
WIND ANALYSIS – ZONE 1 - SOUTH



SMITHGROUP

UTA

WIND ANALYSIS – ZONE 1 - NORTH



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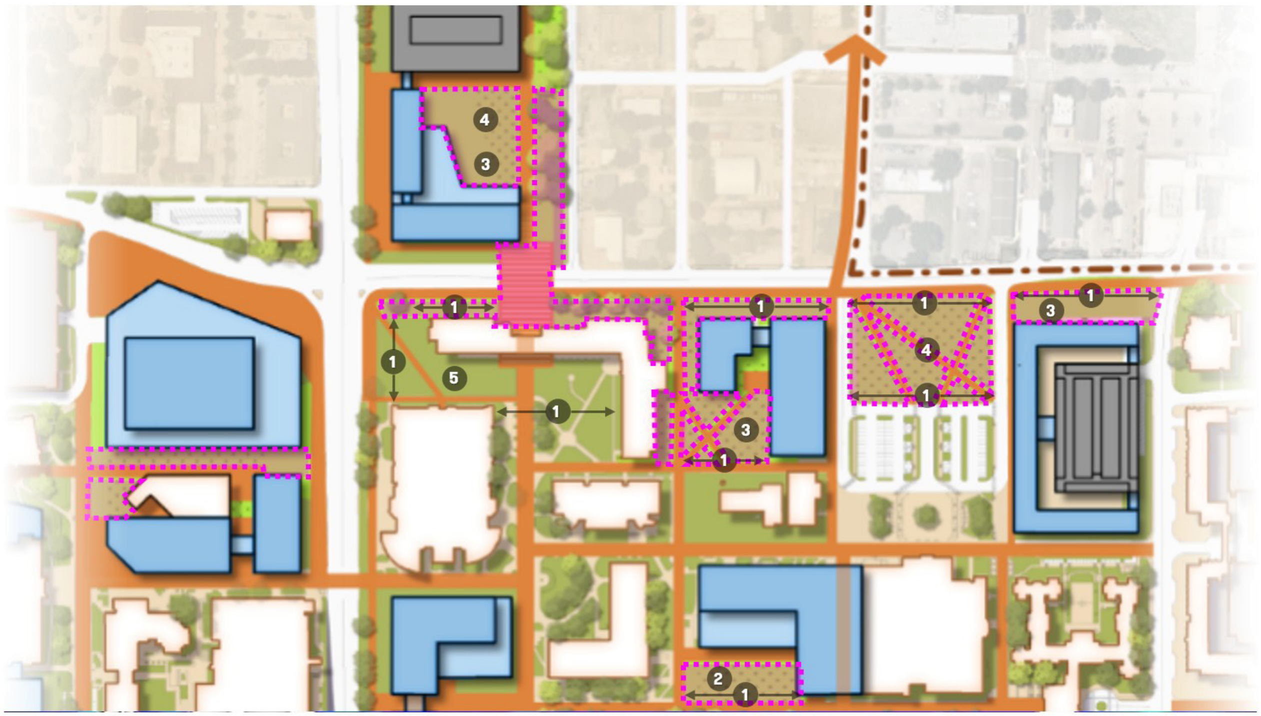
LANDSCAPE PLAN– ZONE 2 - SOUTH



1. Perimeter Trees - High Canopy
2. Outdoor Sitting – Shaded by Trees
3. Outdoor Sitting - Shaded by Building
4. Shade Elements
5. Windbreaker Elements

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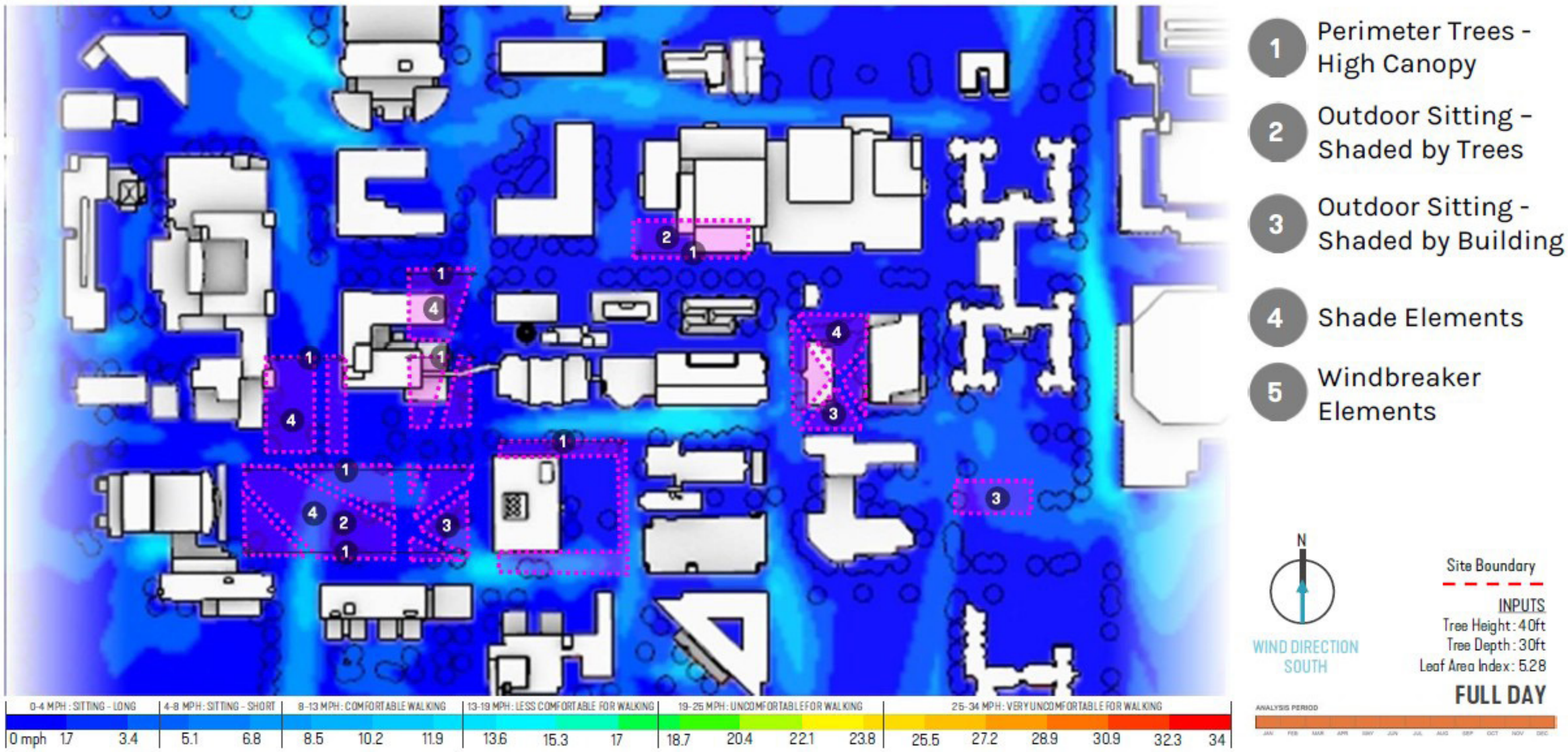
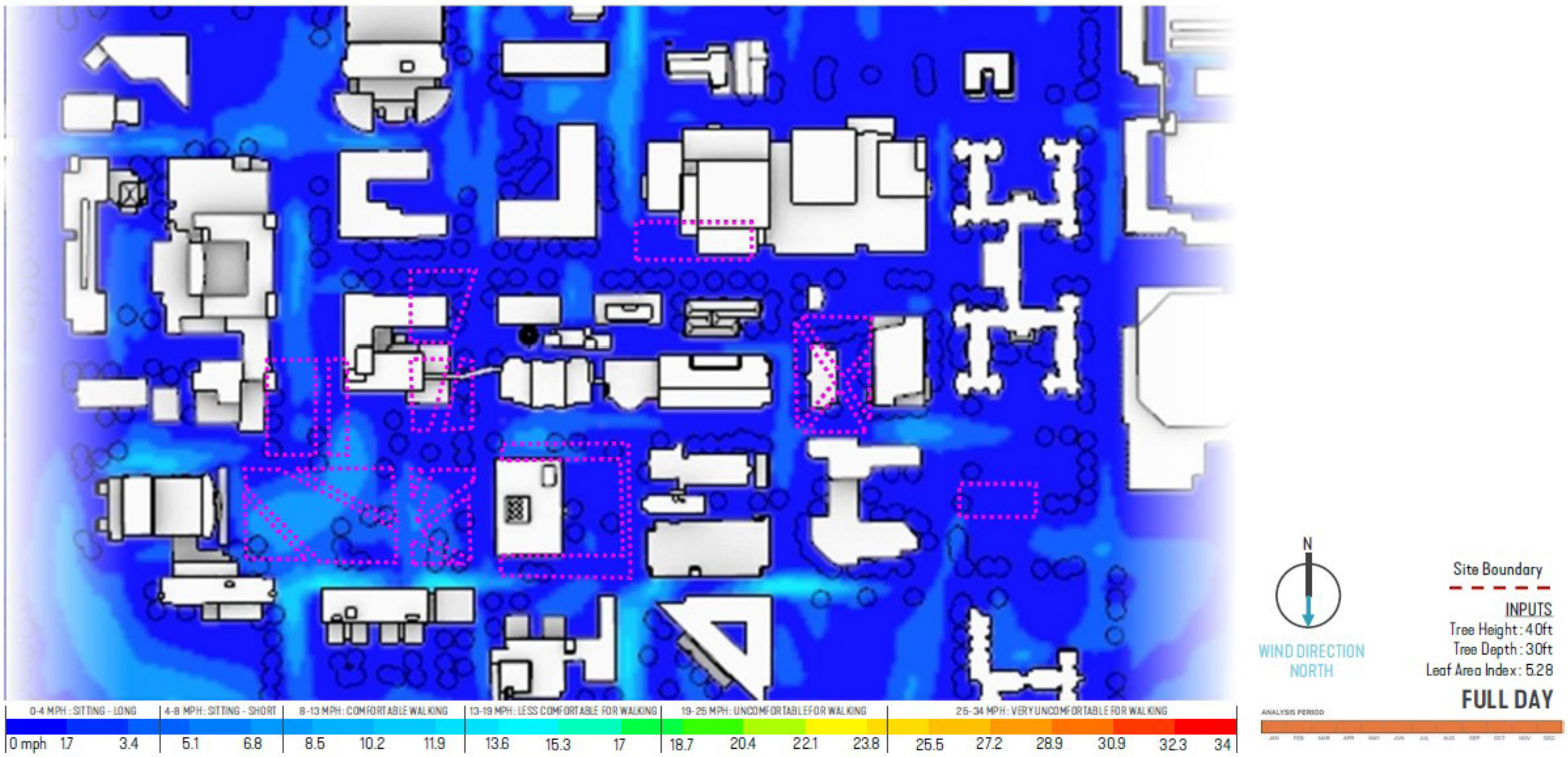
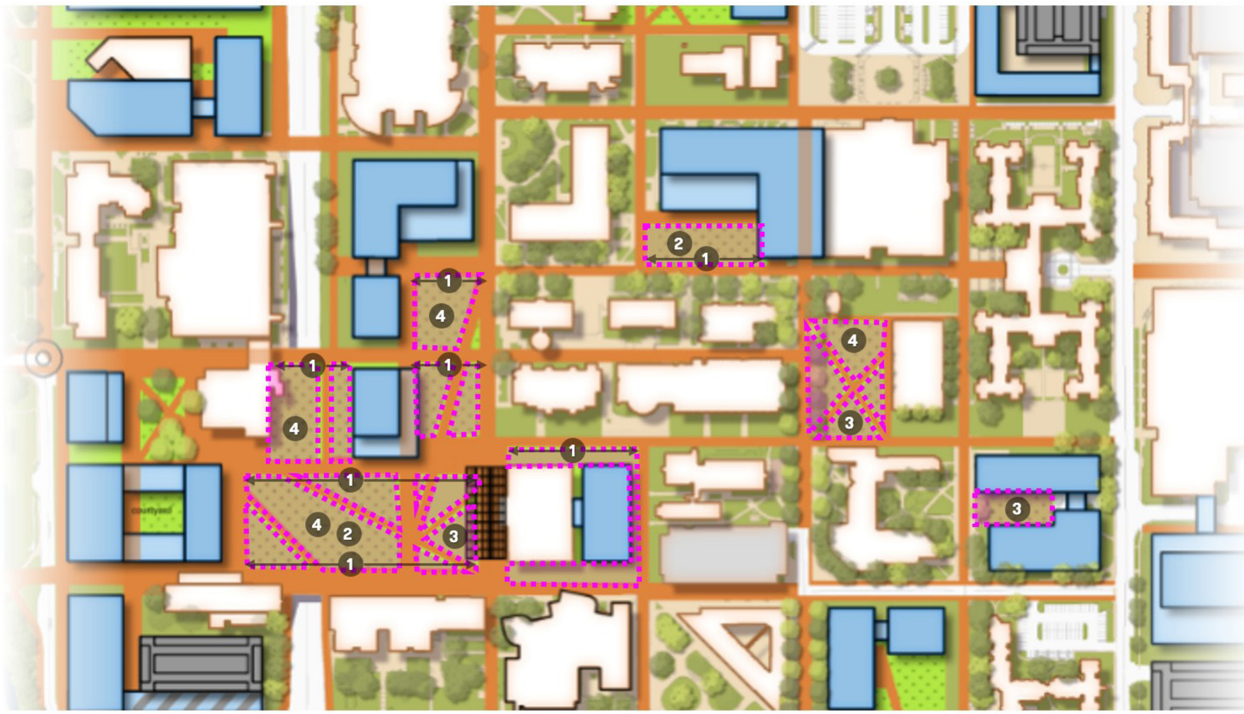
WIND ANALYSIS – ZONE 2 - SOUTH



WIND ANALYSIS – ZONE 2 - NORTH

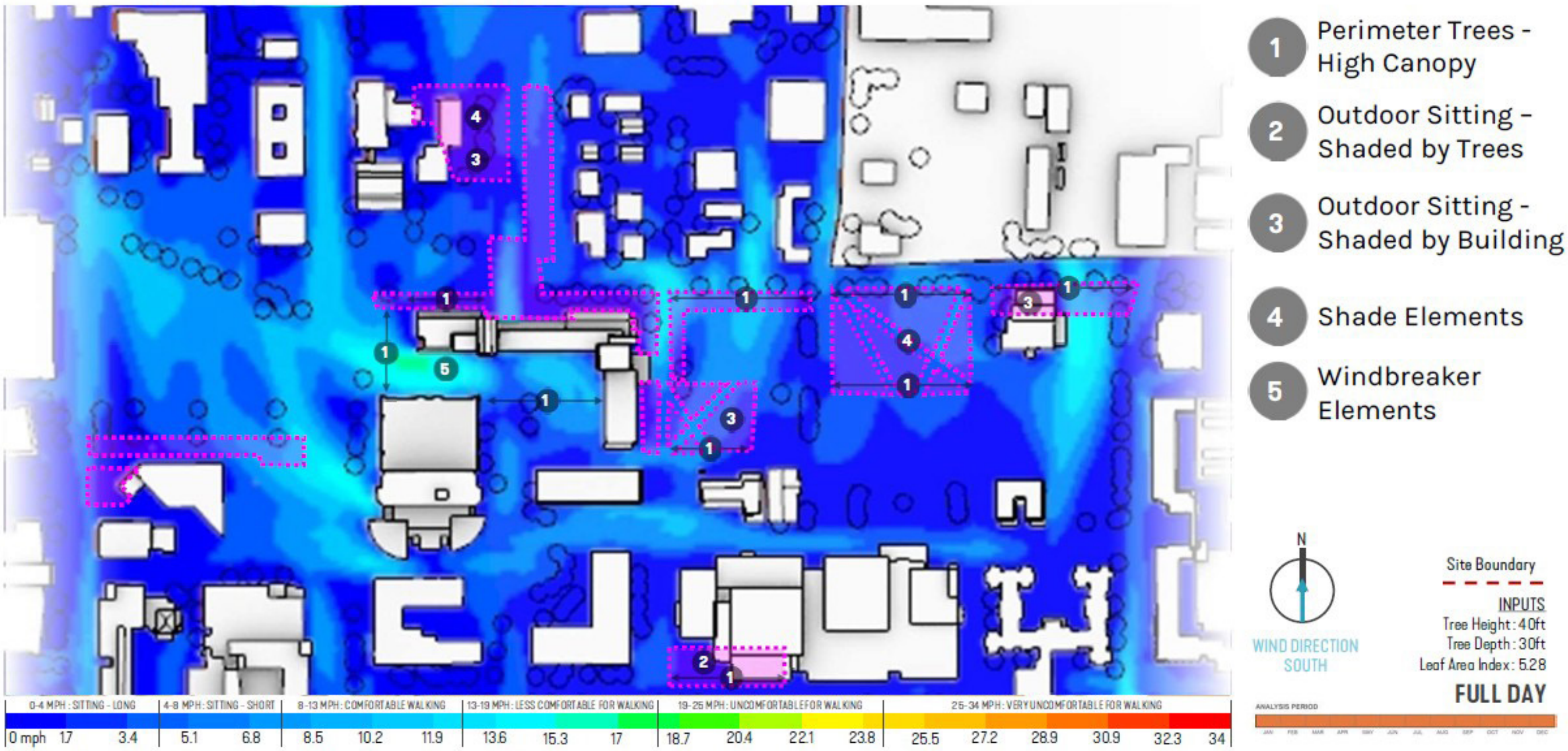


LANDSCAPE PLAN – ZONE 3 - SOUTH

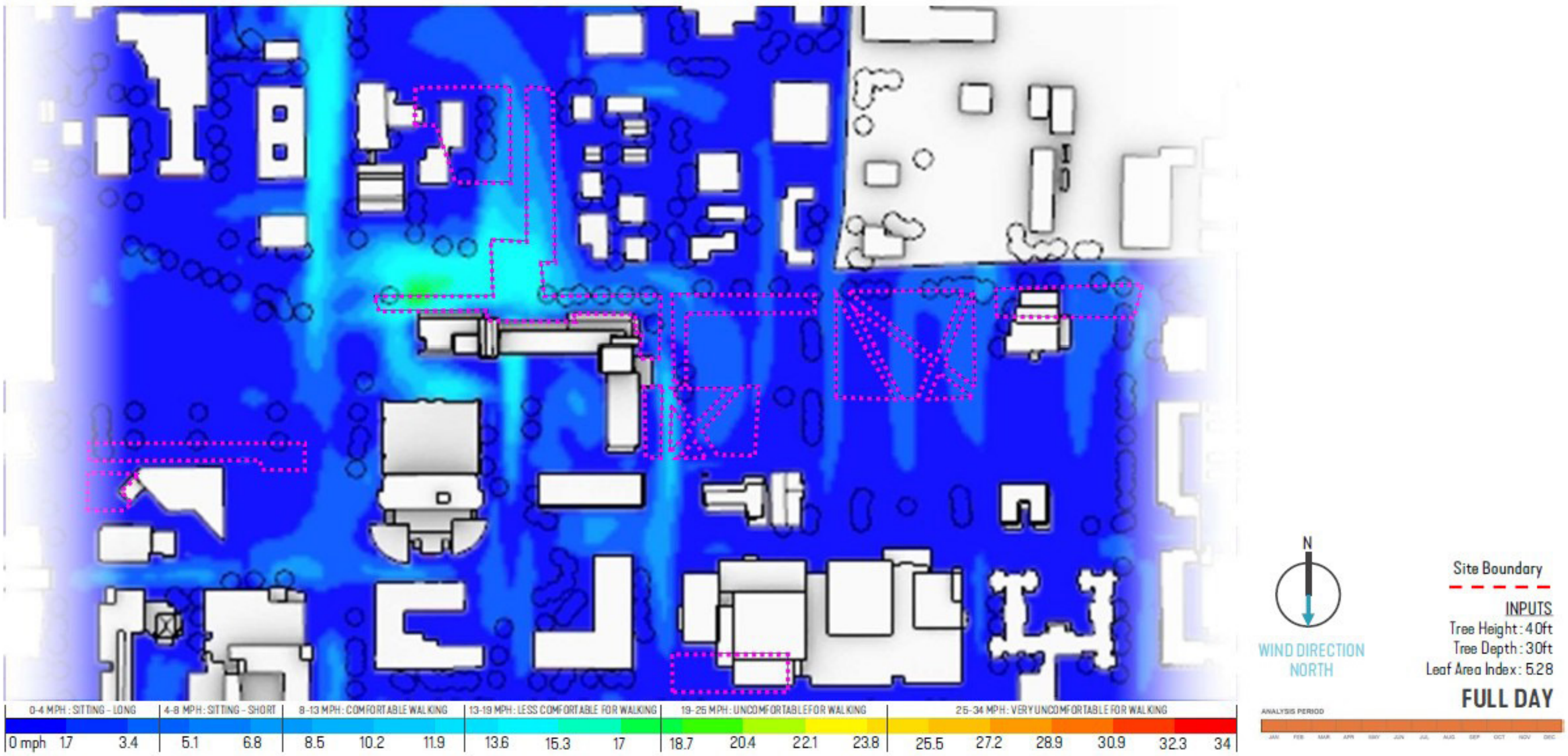


1. Perimeter Trees - High Canopy
2. Outdoor Sitting – Shaded by Trees
3. Outdoor Sitting - Shaded by Building
4. Shade Elements
5. Windbreaker Elements

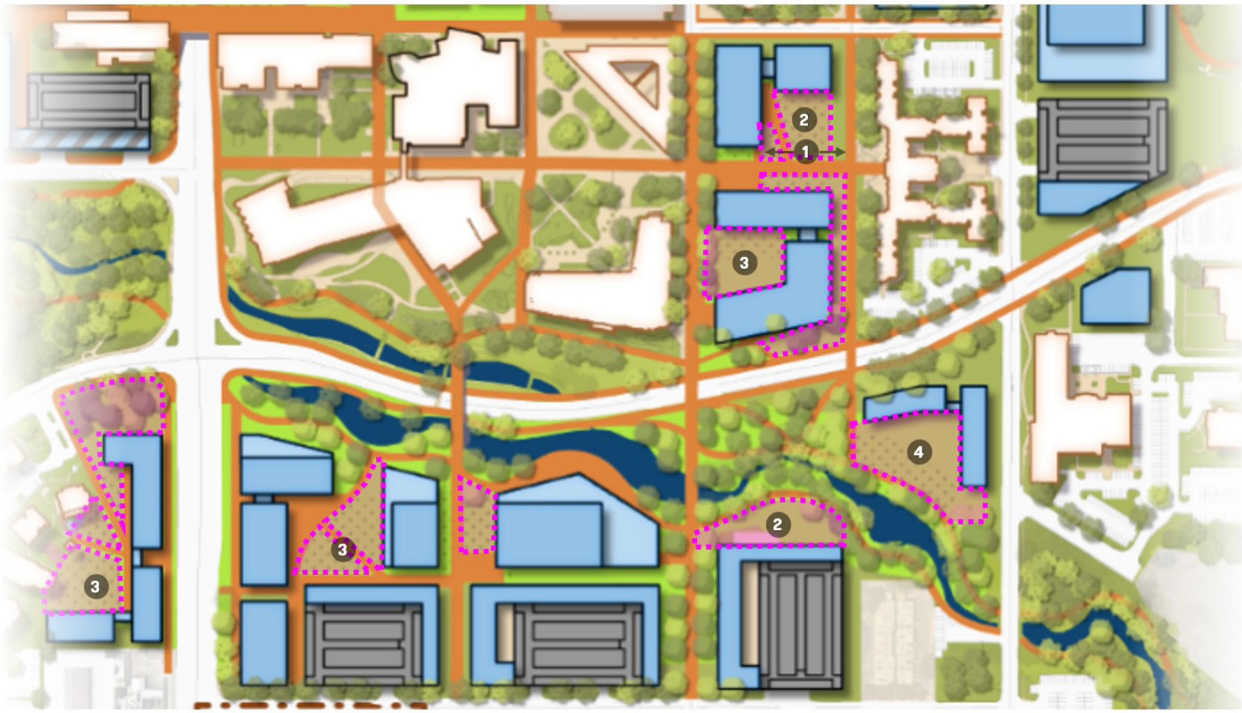
WIND ANALYSIS – ZONE 3 - SOUTH



WIND ANALYSIS – ZONE 3 - NORTH



LANDSCAPE PLAN – ZONE 4 - SOUTH



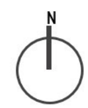
1 Perimeter Trees - High Canopy

2 Outdoor Sitting – Shaded by Trees

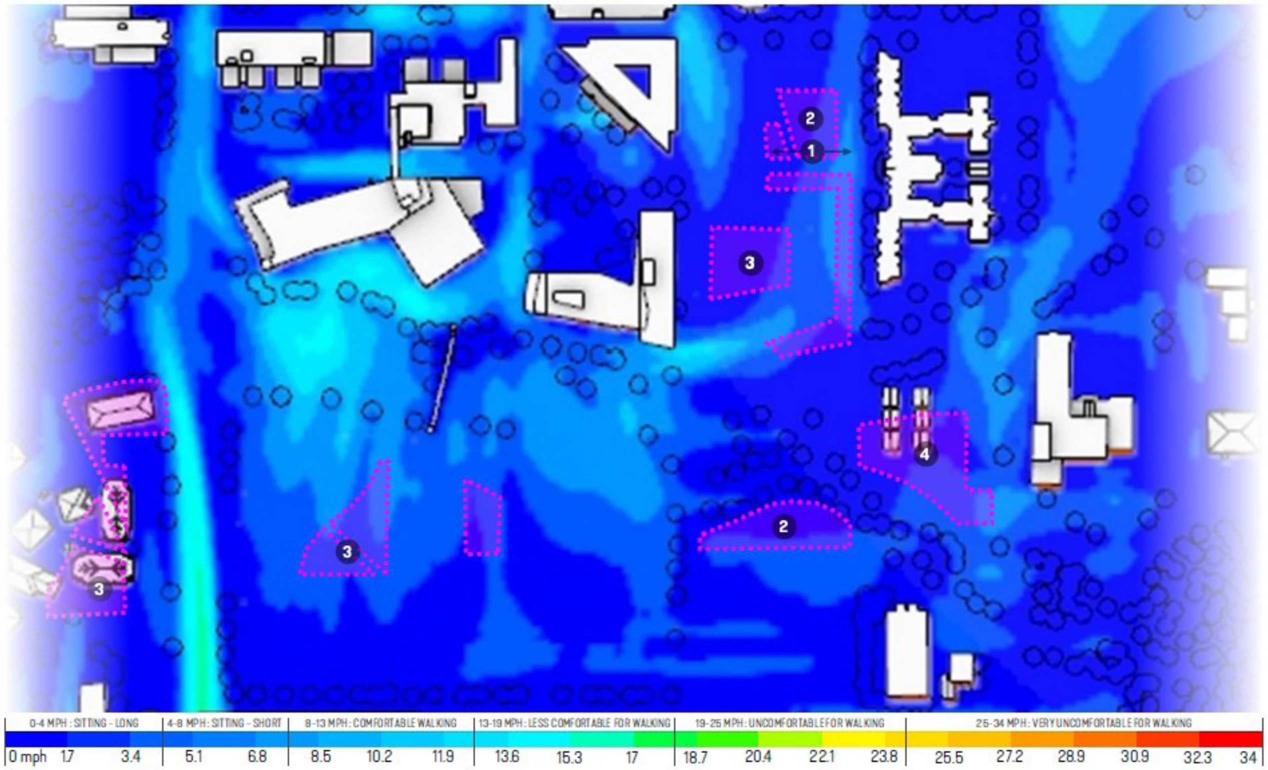
3 Outdoor Sitting - Shaded by Building

4 Shade Elements

5 Windbreaker Elements



WIND ANALYSIS – ZONE 4 - SOUTH



1. Perimeter Trees - High Canopy
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3. Outdoor Sitting - Shaded by Building
4. Shade Elements
5. Windbreaker Elements

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WIND DIRECTION SOUTH

Site Boundary

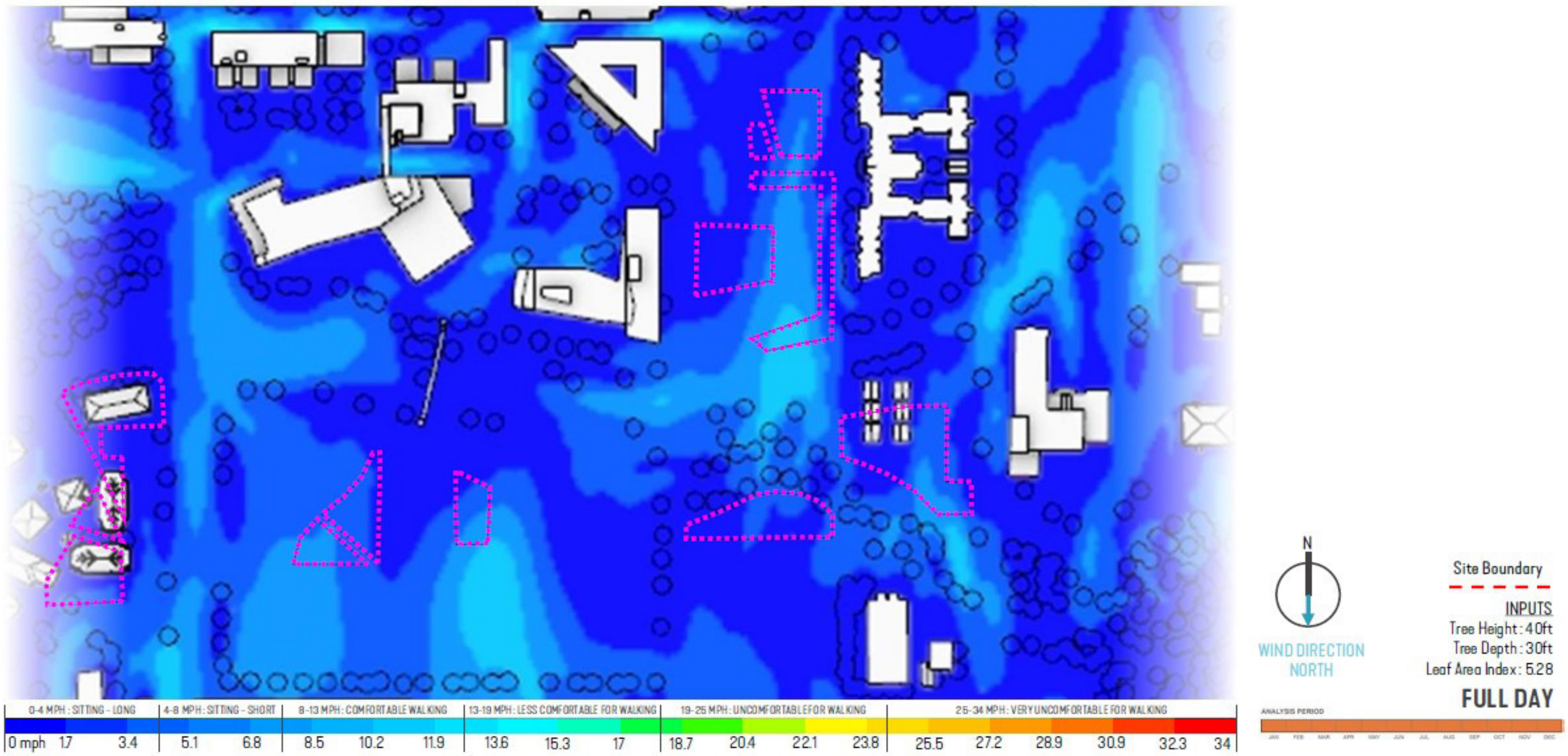
INPUTS
Tree Height: 40ft
Tree Depth: 30ft
Leaf Area Index: 5.28

FULL DAY

ANALYSIS PERIOD

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

WIND ANALYSIS – ZONE 4 - NORTH



SMITHGROUP