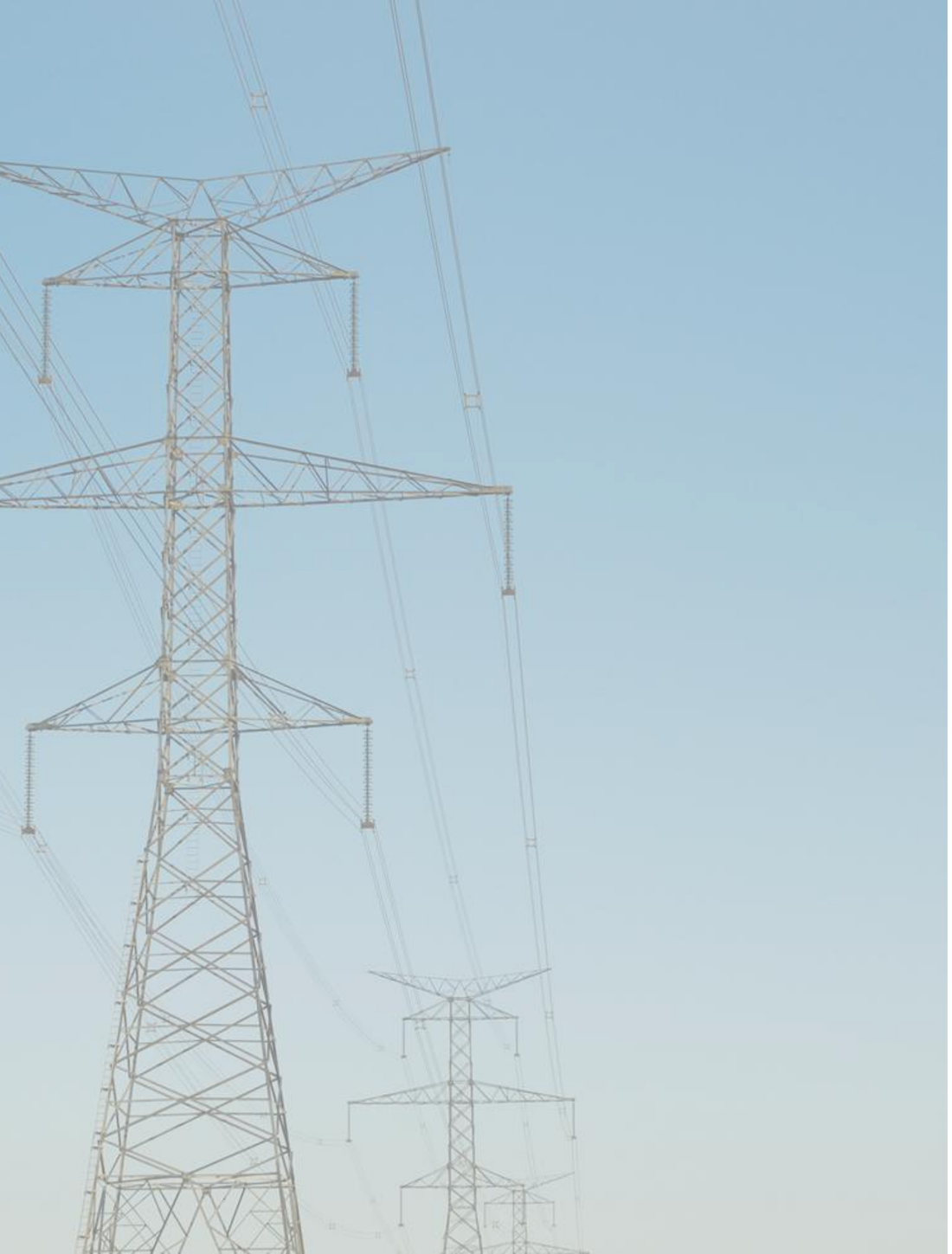
Attachment A



UTILITIES OVERVIEW

UTILITIES & ENGINEERING SERVICES

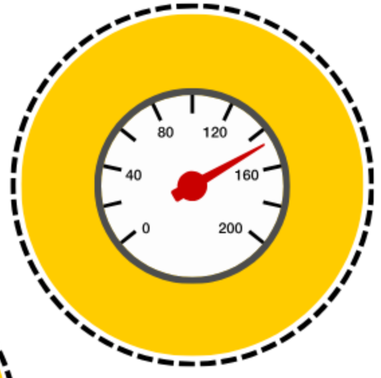
Utilities Overview

Largest Florida university with a 1,415 Acre (2.2 square mile) main campus

Daily operation and maintenance of 6 utility plants and ~ 76 combined miles of underground distribution infrastructure for seven different utility systems, not including stormwater management

Top 15 in FL for Natural Gas consumed, burning over 4.2 million therms annually, feeding 40+ buildings and Cogen Plant

Purchased utilities from 13 different utility providers, 160 accounts, 9 branch locations, encompassing ~$38M purchased utilities and a ~$48M UES budget



Primary metered utility services for electric, natural gas, reclaim water, and bulk sewer.

Main campus electric costs ~$13M annually, using over 110,000 MWh and a peak demand of ~17 MW excluding the additional 5 MW produced by the Cogen Plant

DUKE ENERGY®

TECO ENERGY AN EMERA COMPANY

ORANGE COUNTY GOVERNMENT FLORIDA

SEMINOLE COUNTY FLORIDA'S NATURAL CHOICE

OUC The Reliable One®

FPL.

Utilities Engineering team

Team of seasoned professionals

4 PROFESSIONAL ENGINEERS (PE)

5 CERTIFIED ENERGY MANAGERS (CEM)

4 MECHANICAL/ 1 CIVIL/ 1 ELECTRICAL ENGINEERS

2 CERTIFIED COMMISSIONING AGENTS (Cx)

1 DOCTORAL DEGREE ENVIRONMENTAL ENGINEER (PhD)

3 ELECTRICIANS

1 FIRE/CODE/SAFETY PROFESSIONAL.

3 PMP CERTIFIED PROJECT MANAGERS

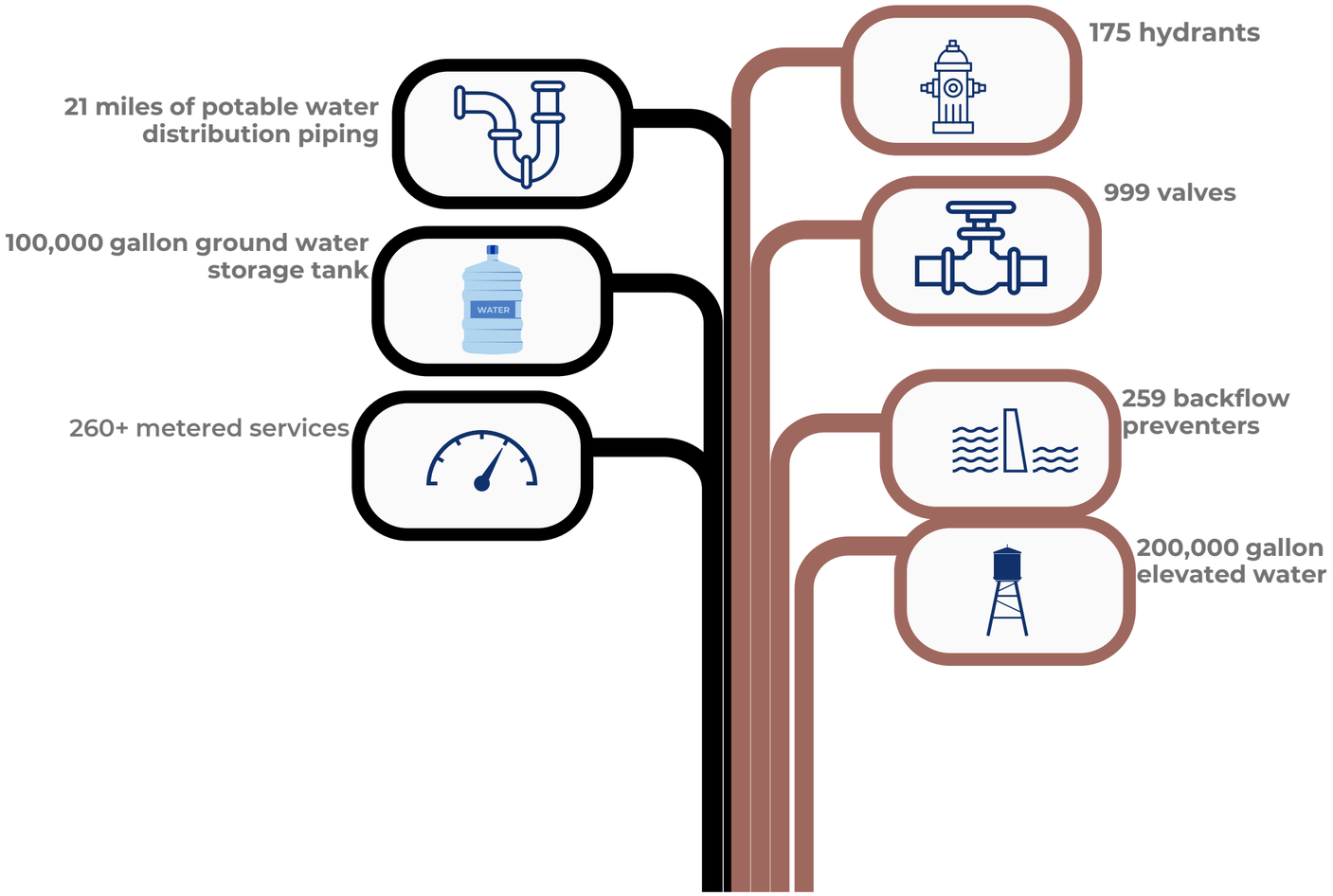
2 LICENSED GENERAL CONTRACTORS (GC)

1 LICENSED ELECTRICAL CONTRACTOR (EC)

Utility Infrastructure & Operations

Water Treatment Plant + 4 Potable Wells

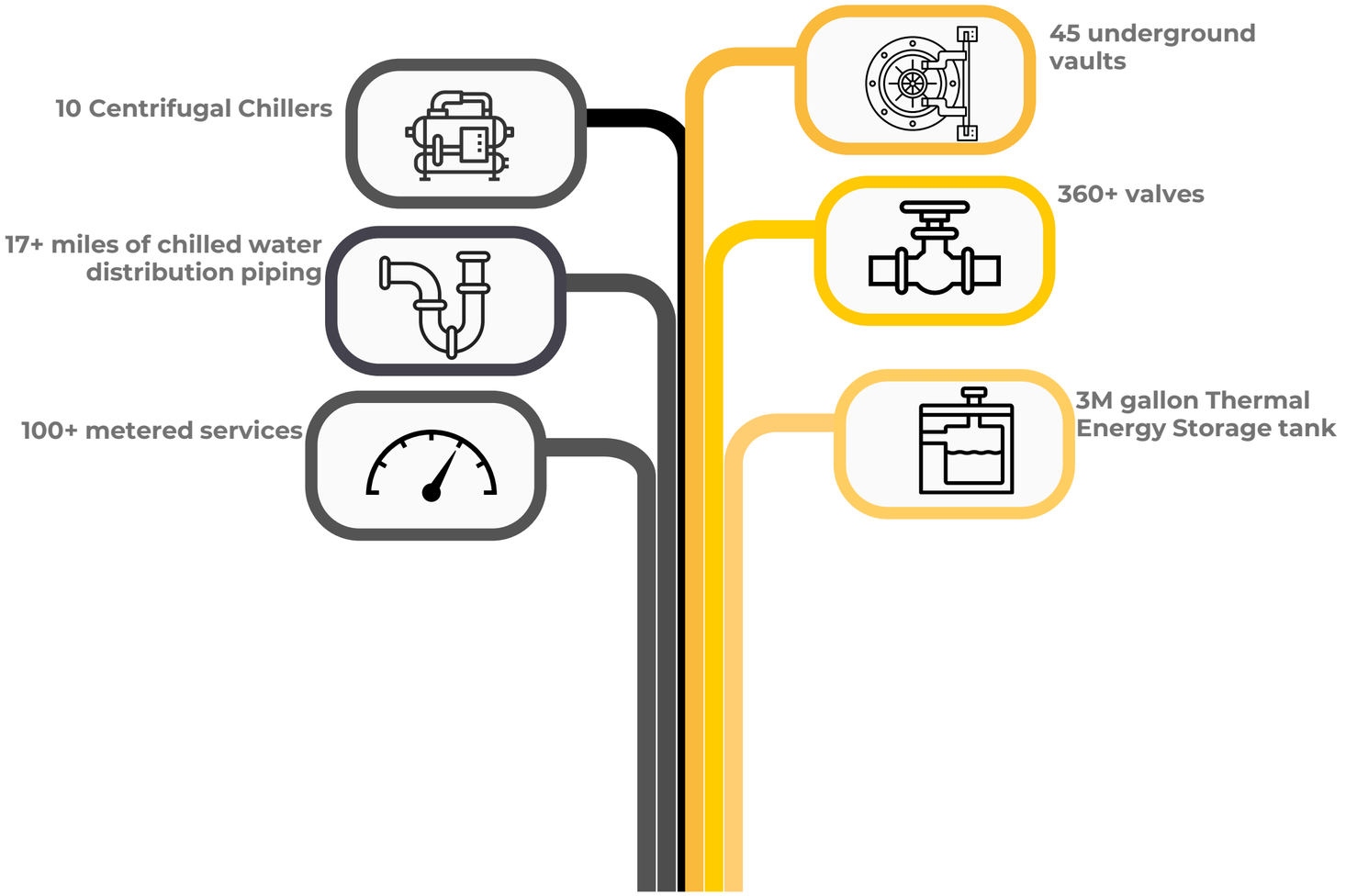
- Current usage of ~2.1M gallons annually
- Consumptive Use Permit (CUP) capacity of 385M gallons annually, and 3.2M gallons per day
- Serves Central Florida Research Park as a backup interconnection for emergency needs, Siemens as primary
- Similar in size and scale to Polk County's new WTP
- Interconnected with Orange County Utilities, serving as a backup to UCF during plant downtime for maintenance



Utility Infrastructure & Operations

4 District Energy Chiller Plants

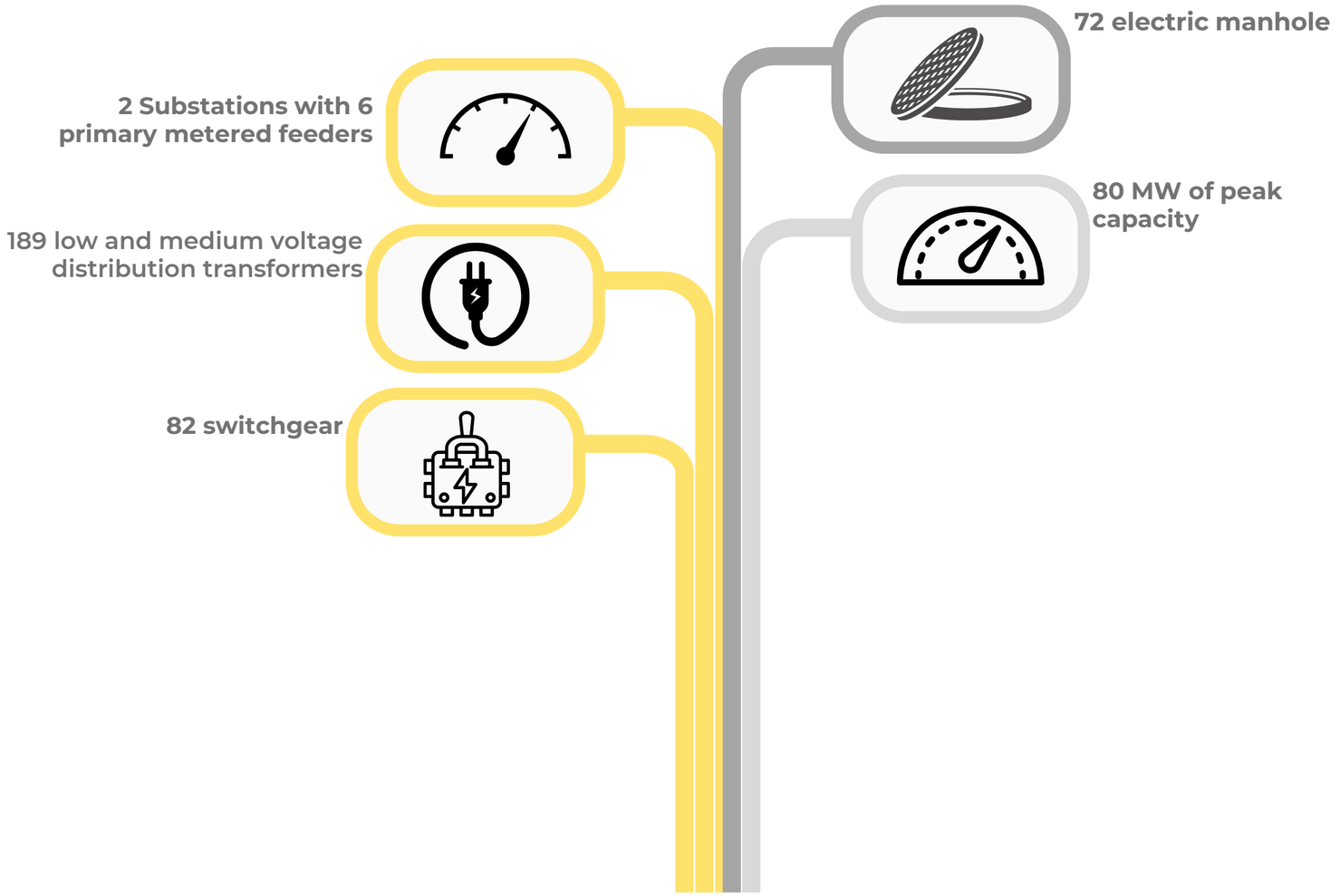
- 21,150 tons of district chilled water cooling capacity
- 2,816 MBH of district hot water (full design for 5,632 MBH)
- Currently delivers over 43M ton-hours of cooling annually, supporting over 73% of campus square footage
- Plants consume 25% of main campus electric and 50% of main campus water for cooling.
- Largest district energy system in Central Florida with a 0.73 kW/ton efficiency



Utility Infrastructure & Operations

Electric Utility Distribution System

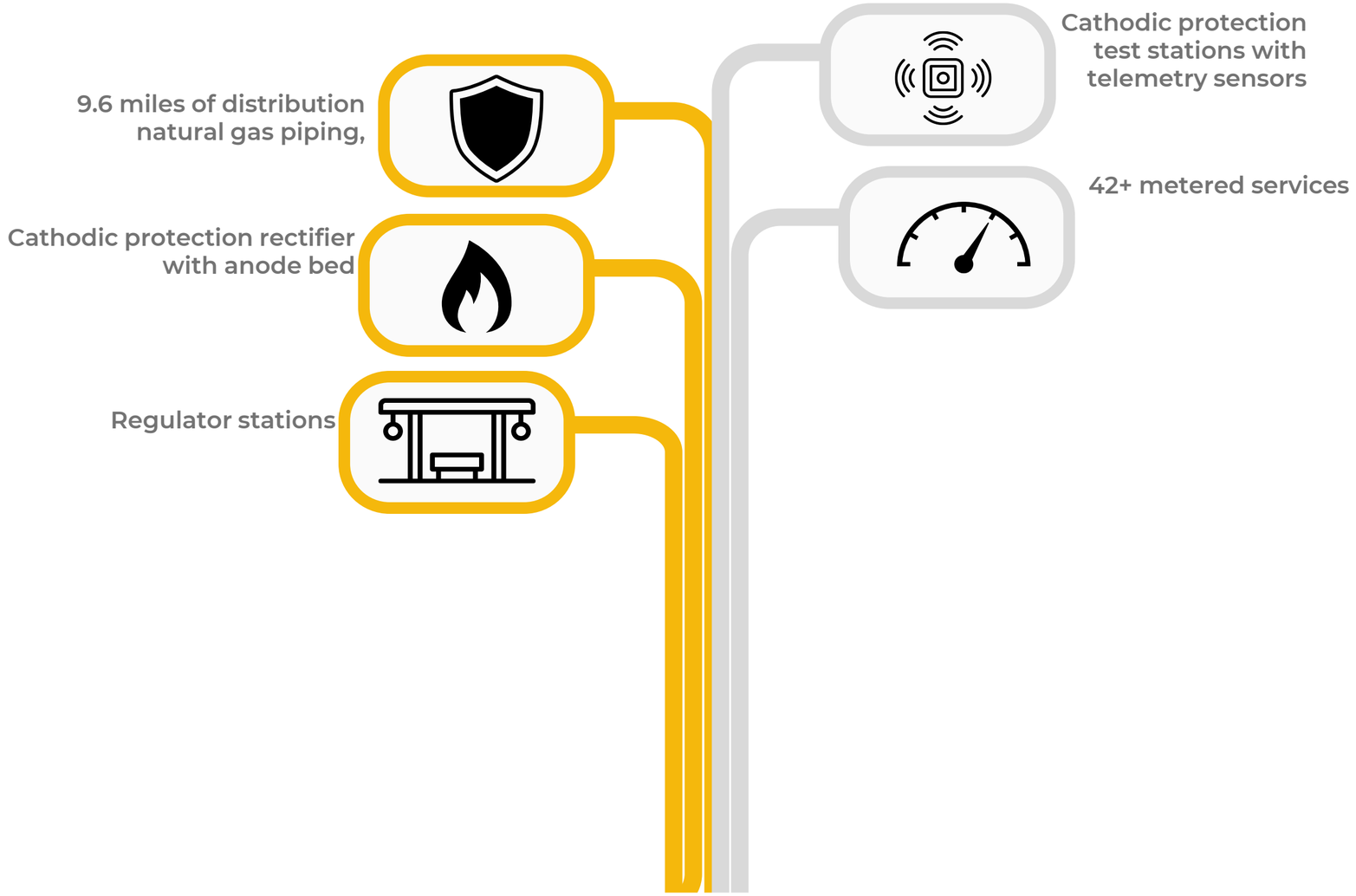
- Primary metered purchased power service from Duke Energy Florida
- Calculated peak load of ~22MW (including ~5MW Cogen production)
- University leases distribution equipment and charges around $50k monthly on the utility bill
- 120kW of PV solar installed on campus (Garage B and Charging Station, EOL)



Utility Infrastructure & Operations

Natural Gas Distribution System

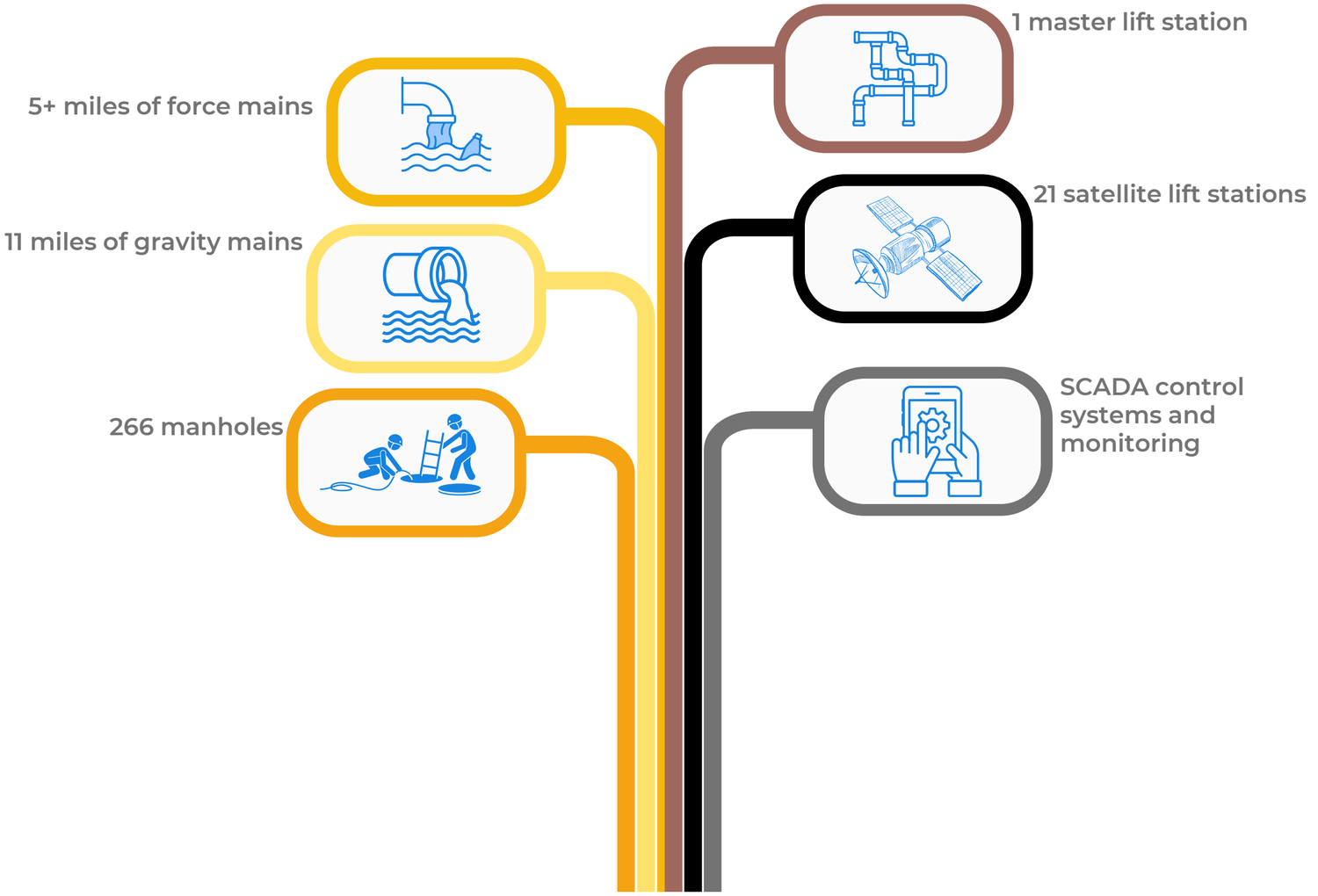
- Designated "Master Meter" private gas system per 49 CFR 191.3, supplied by two TECO primary pipelines*
- UES maintains annual compliance testing and monitoring requirements for gas leaks, cathodic protection, above ground visual inspection and atmospheric corrosion monitoring
- Combined Heat & Power plant consumes ~85% of all natural gas purchased on the main campus



Utility Infrastructure & Operations

Sanitary Sewer/Wastewater

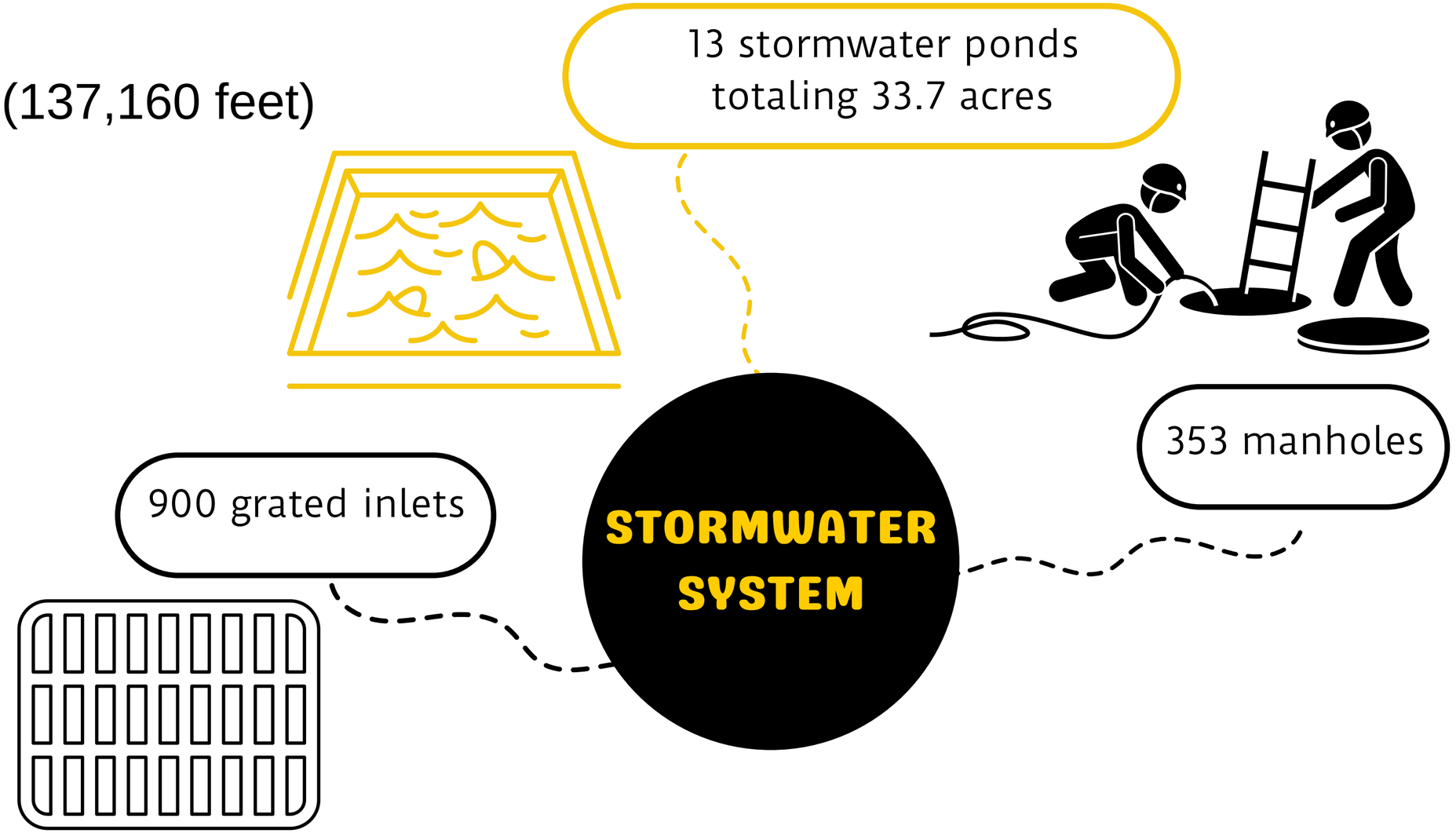
- Transports over 225M gallons of Wastewater to Iron Bridge facility for treatment annually
- System handles outflow from Research Park (over 50 buildings) and Siemens Quad I Energy Facility
- Serves Central Florida Research Park for 50+ buildings as a primary interconnection for sewer
- Serves Siemens Quad 1 Energy Facility as a primary interconnection for sewer



Utility Infrastructure & Operations

Stormwater

- 26 miles of pipe (137,160 feet)



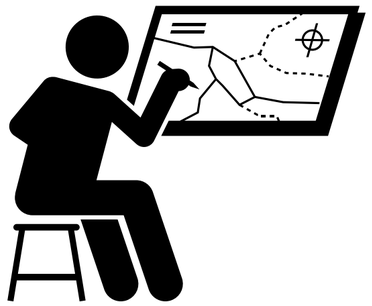
Geographic Information Systems (GIS)

Asset visualization and data collection

Sunshine 811 Member, Self-Perform Utility Locates

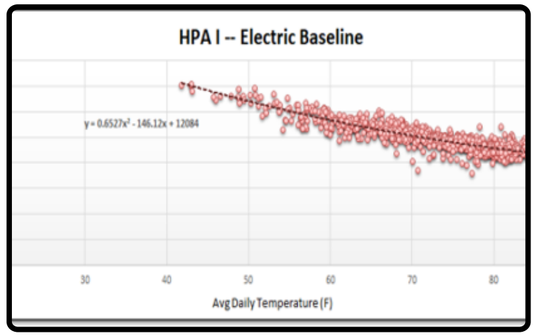
Field Engineering, Soft Digs

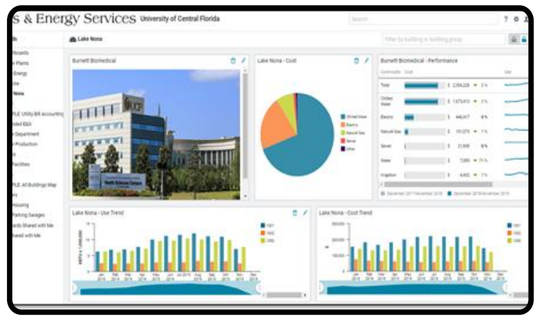
Mapping of all utility infrastructure



Aerial mapping updates utilizing drone technology

Utilities Smart Infrastructure

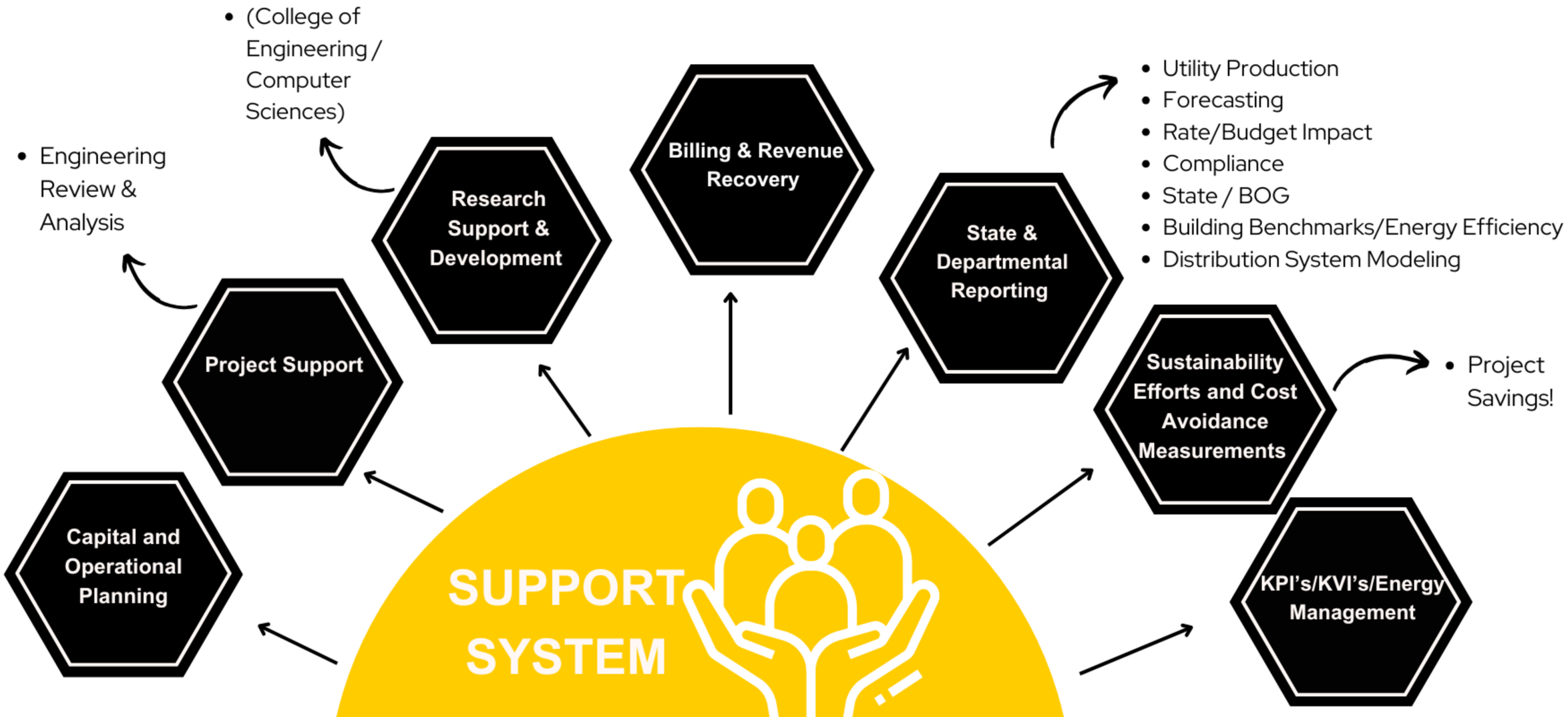




- Operation and maintenance of 280+ electric , 260 Water , 42 Gas , 110+ Chilled Water, 70+ Reclaim, 17 Sewer meters.
- AMI SaaS Network Operations & Data Management
- EnergyCAP Enterprise Energy Management & Smart Analytics:
  - Complex bill creation
  - Automatic bill capture service retrieves, imports, and audits utility bills monthly
  - Smart Audits and visualization for revenue assurance
  - Automated EnergyStar Reporting
  - Automated meter reading and interval data imports used to create complex bills
  - Utilized for cost avoidance calculations using industry standard IPMVP methods
  - Workflow management for export and integration of billing to Workday
- Investments in system infrastructure supports commodity optimization and future AI integrations.
- Integrations – Workday, Itron, EnergyCAP, GIS (future)

Why is all this data so important?

Support for all university divisions and stakeholders



Why is all this data so important?

Support for all university divisions and stakeholders

ANNUAL CHILLED WATER PRODUCTION REPORT
Fiscal Year 2022-2023

COMPLETED FY22/23 - KC - 7/21/2023

Total Campus Electric	Plant % of Campus Total Electric	Total Potable Prod + Purch	Plant % of Campus Total Water
111,635,720	27.9%	249,489,973	36%

		Utility Bldg I	Utility Bldg II	Utility Bldg III	DEPIV	CHP	TES	TOTAL
USE/PROD	Electric (kwh)	9,269,700	3,367,200	8,743,200	9,704,000	-	52,440	31,136,540
	Chilled Water (ton-hr)	12,251,650	4,439,270	11,017,560	15,264,470	232,860	530	42,973,480
	Makeup - Reclaim (gal)	-	8,908,604	0	10,519,100	-	-	19,427,704
	Makeup - Potable (gal)	30,360,100	4,489,137	27,732,852	28,292,200	12,258,000	-	90,874,289
	Blowdown (gal)	8,940,788	4,989,472	8,965,000	17,043,900	3,967,000	-	39,939,160
ANALYSIS	EER	15.9	15.8	15.1	18.9	-	-	16.6
	KW/TON	0.76	0.76	0.79	0.64	-	-	0.72
	% (TonHr / Makeup)	40%	33%	40%	39%	2%	-	47%
	% (Blowdown / Makeup)	29%	37%	32%	44%	32%	-	44%
	% (Reclaim Makeup / Total Makeup)	-	66%	0%	27%	-	-	18%
COST	Electric	$1,333,914.07	$509,019.63	$1,268,841.87	$1,408,934.04	-	$ 8,125.68	$4,528,835
	Reclaim	-	$51,464.64	$240.00	$61,129.12	-	-	$112,834
	Makeup Water	$127,752.42	$19,094.38	$116,838.00	$118,947.24	$51,723.60	-	$434,356
	Blowdown Water	$65,768.47	$36,405.02	$66,221.90	$125,644.56	$29,395.70	-	$323,436
	Labor							$632,066

SAMPLE Bill

Water Treatment Plant

The University owns and operates a water treatment plant that can process up to 3.2 million GPD

Serves

Serves UCF Main Campus, Celeste Hotel, Siemens Energy Quad 1, and backup to Central Florida Research Park

Generates

Today generates $93k revenue from Externals

Future Plans

New Water Treatment Plant plan submitted for Board action item

Combined Heat and Power Plant (CHP)

Cost Savings

Output 5MW after parasitic losses and cost avoids **~$4M year**.

Cost Savings

Board action item for approval of 9-year maintenance contract, savings **$50k / year, or $450k over life of contract.**

Cost Savings

Absorption chiller providing 900 tons of refrigeration, will save on average **~$1M / Year.**

Cost Savings

Adjusted Duke SS-1 (Firm Standby Service) to match parasitic load **~$19k annually**

Cost Savings

Installing new smart metering to run generator based on plant output, reducing parasitic load on standby charge further

Chilled Water Production

Why use Chilled Water instead of Electric Cooling?

Chilled water initially costs 45% more per ton installed, however operating cost over longer 30-yr equipment life yields overall 50% lower cost per ton with reduced maintenance.

- Expanding campus infrastructure to support 650 tons RWC and future 1500 tons Housing*

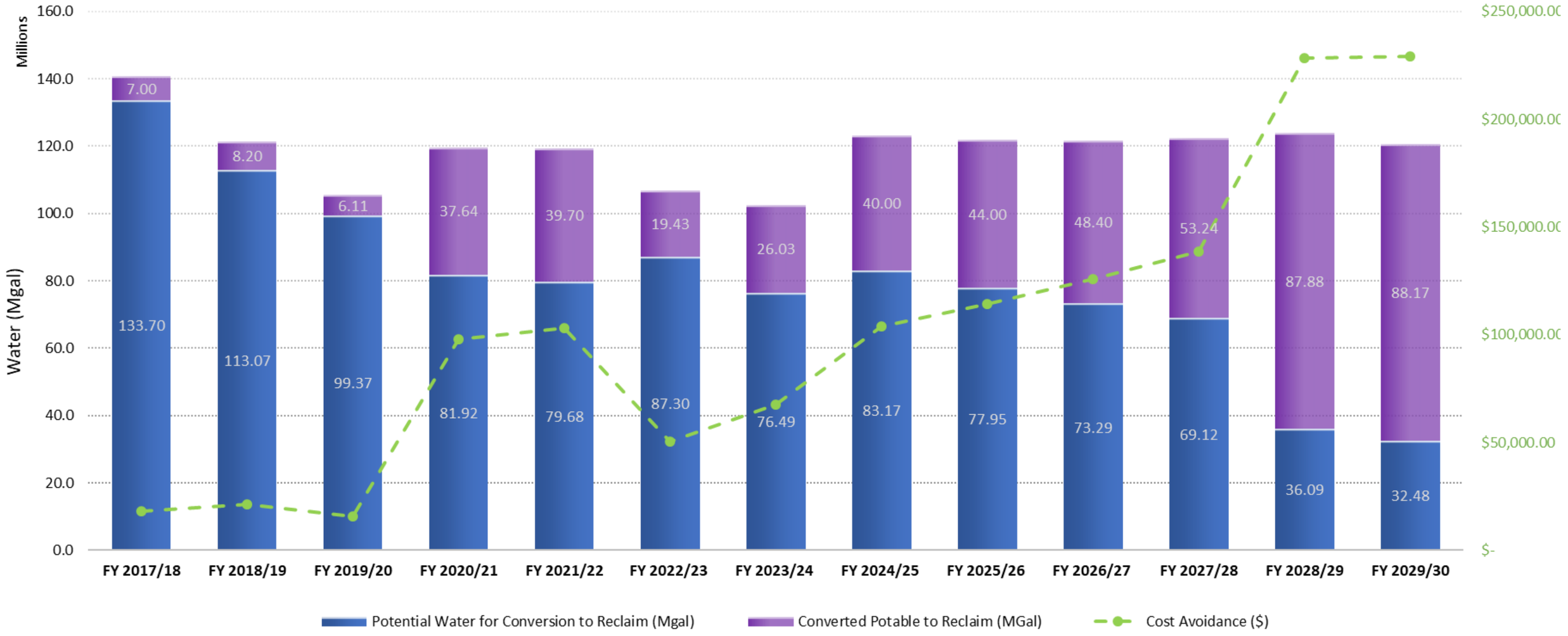
- Optimizing chilled water controls operation
  - Minimizing plant pump energy to meet demands of the campus
  - Improving efficiency of building chilled water consumption

- Continuing to expand use of reclaimed water for cooling towers at plants, cost avoid $50K of water. New WTP will allow DEPI to go to reclaim and **avoid $100K.**

- Heat recovery chiller
  - Providing primary heating to Research 1 and future Research 2 using waste heat from chilled water production

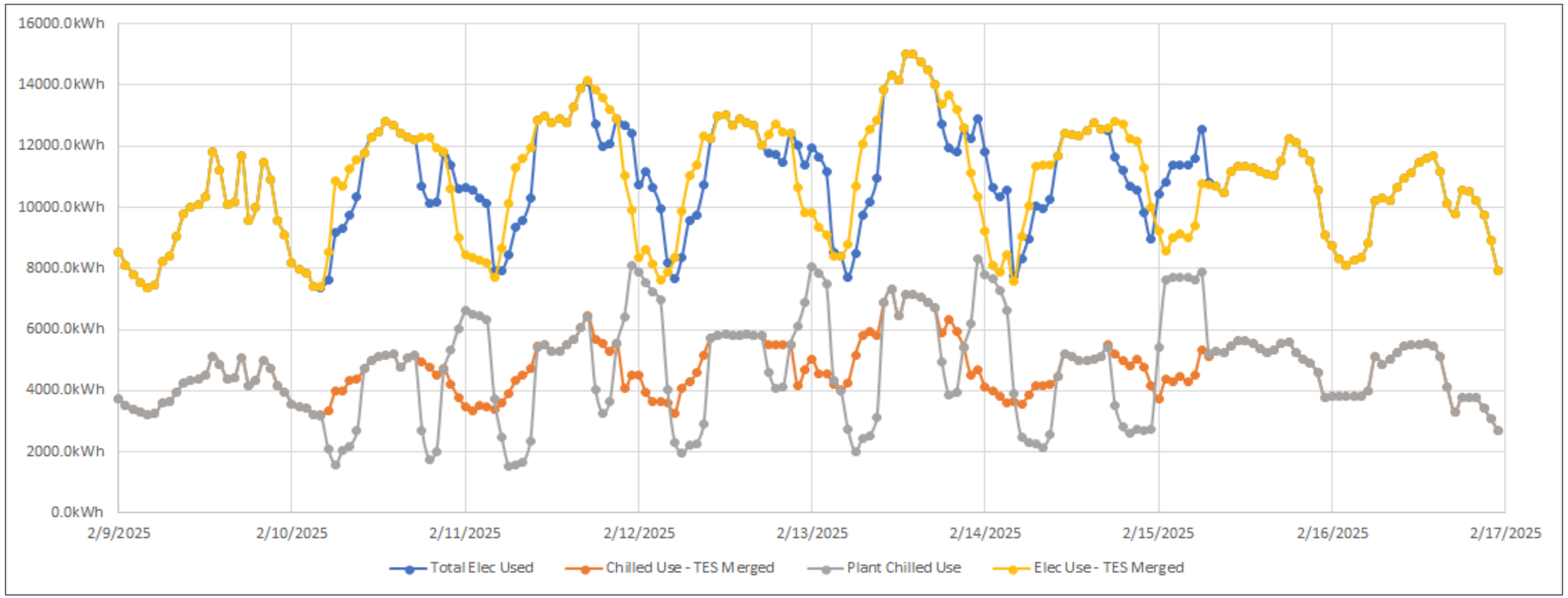
Potable Water Conversion to Reclaim

UES Chilled Water Plant Operations



Thermal Energy Storage

- 3-million-gallon storage of chilled water, operational since 2010
- Optimizes chiller operations during cooler nighttime conditions, taking advantage of lower electric time-of-use rates
- 2023 Duke Energy regulated changed electric tariff
- **As of 2024, saving ~$190k/year**



Retro-Commissioning & Energy Conservation

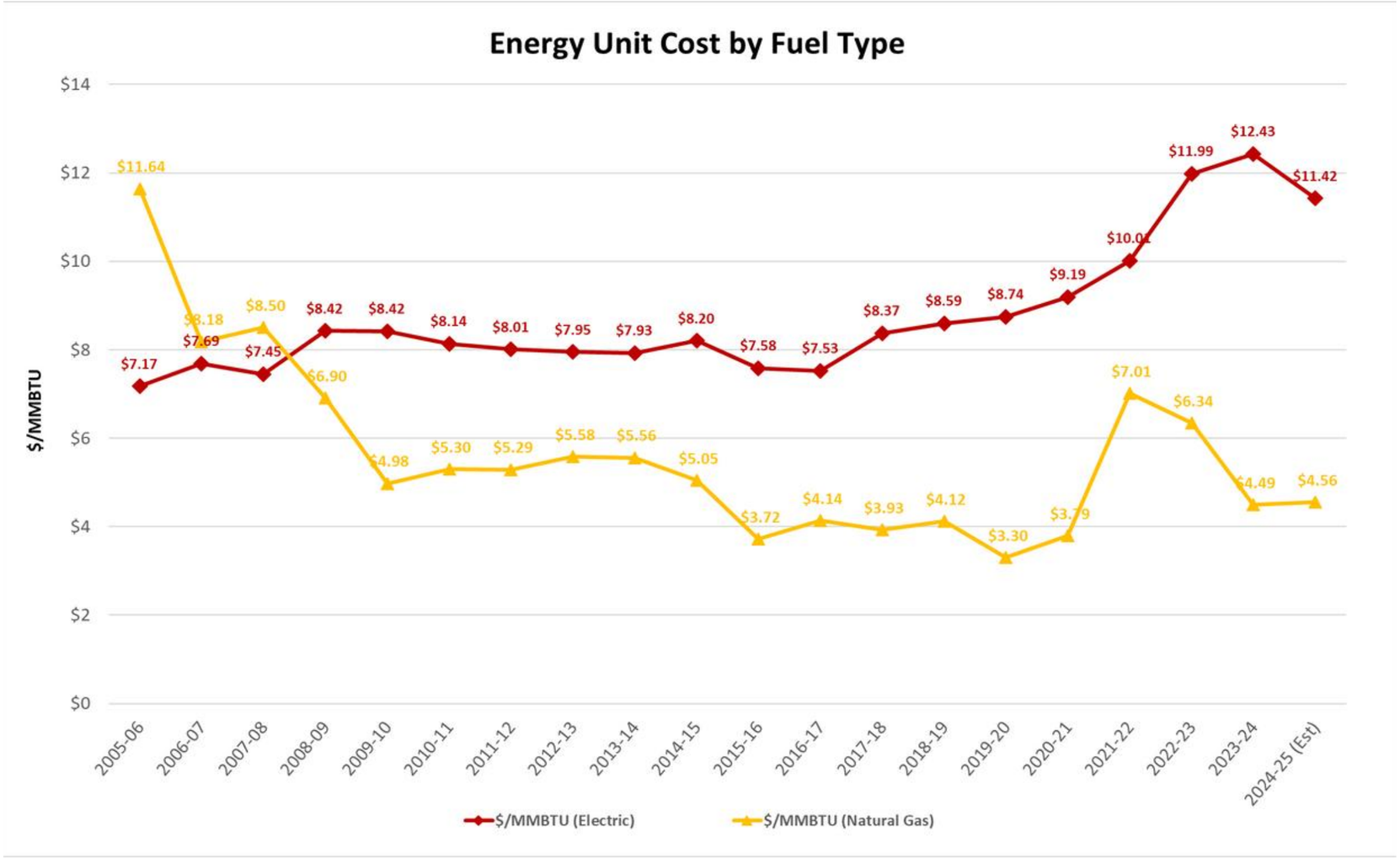
- Installed 141 auto sash closers to reduce supply and exhaust air requirements, sa**ving the university a projected ~ $300k - $500k per year in utility costs.**
- Completed 4 ASHRAE Level II energy audits
- Provide improved indoor air quality, work environment lower maintenance and utility costs
- In-house commissioning retro commissioning oversight. Recent programming controls **avoided $50K***
- Controls retrofits at:
  - CREOL
  - Arena
  - MAE
- Updated controls provide energy savings by reducing chilled water consumption and enhanced temperature and humidity control of buildings by applying enhanced control sequences

Retro-Commissioning & Energy Conservation

UES Engineering Project examples

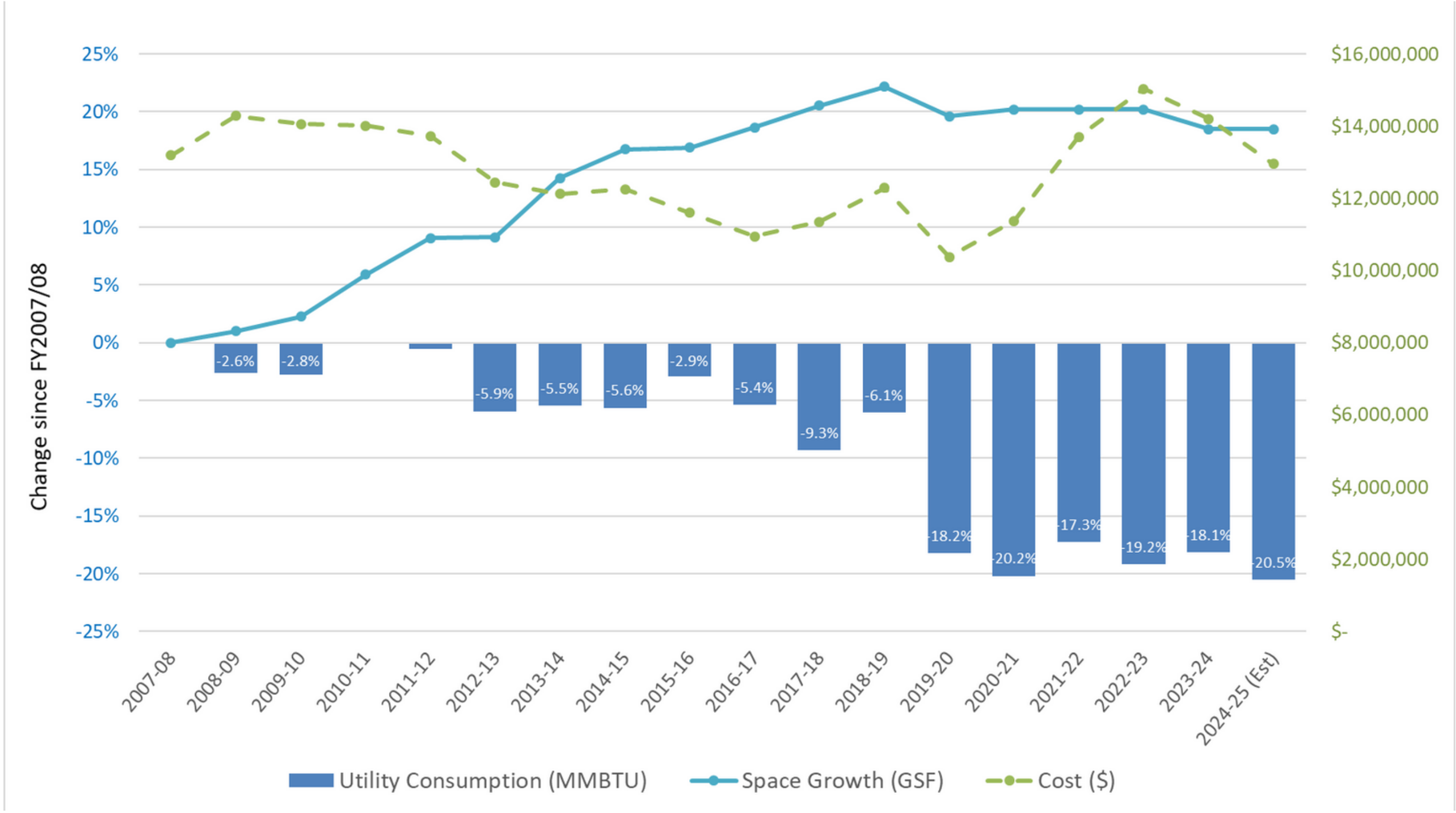
- Tower I thru IV chilled water reduction project and comfort enhancement
- Physical Science lab exhaust fan sequence optimization and reliability enhancements
- Anatomy lab ventilation and comfort improvements
- Submitted 7 new projects for LEED consideration in 2025.
- Provide FO and PDC close coupled Engineering support.
- Building Code Office support.

Energy Unit Cost Breakout



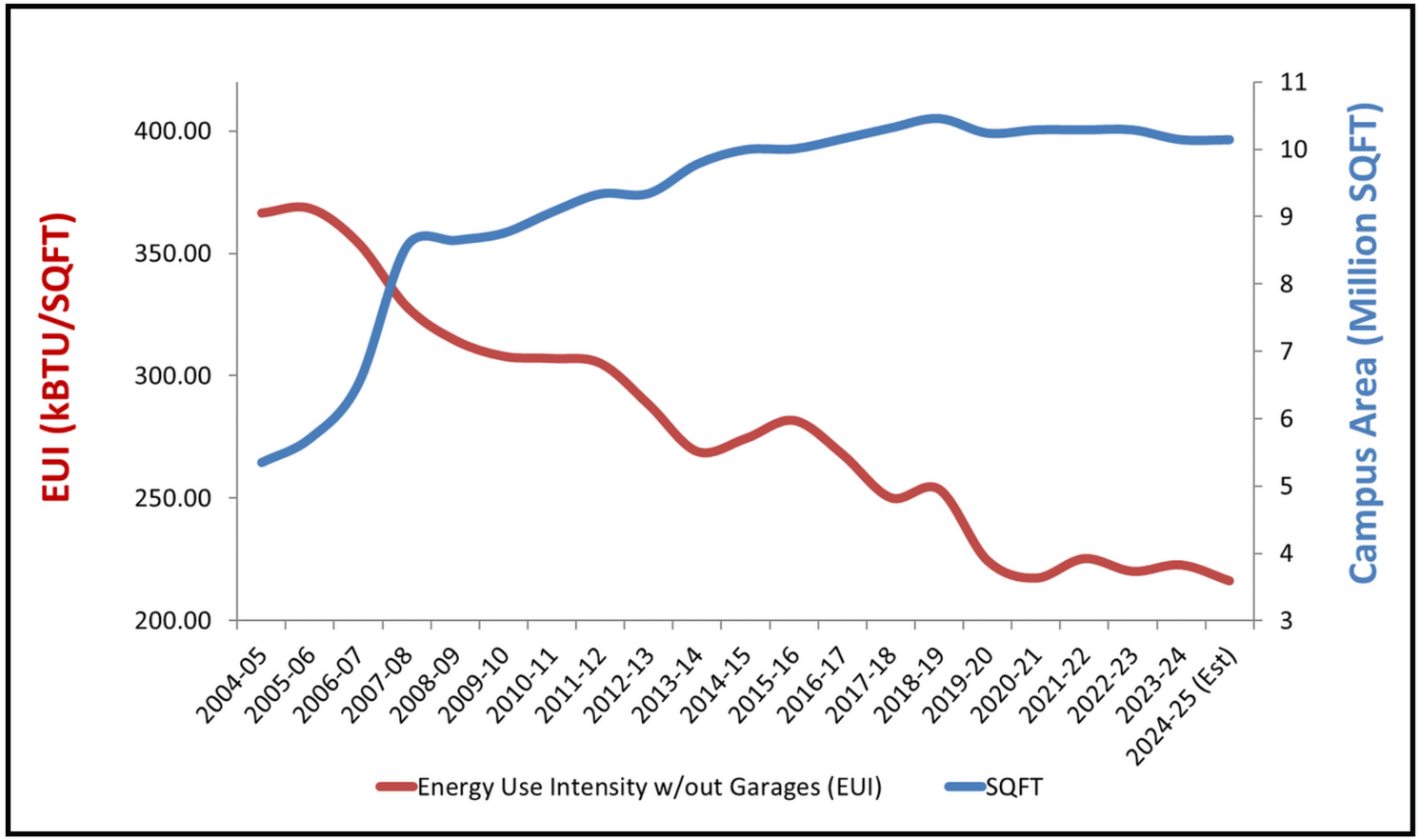
UCF Energy Consumption Trend

Main Campus Electric and Natural Gas*



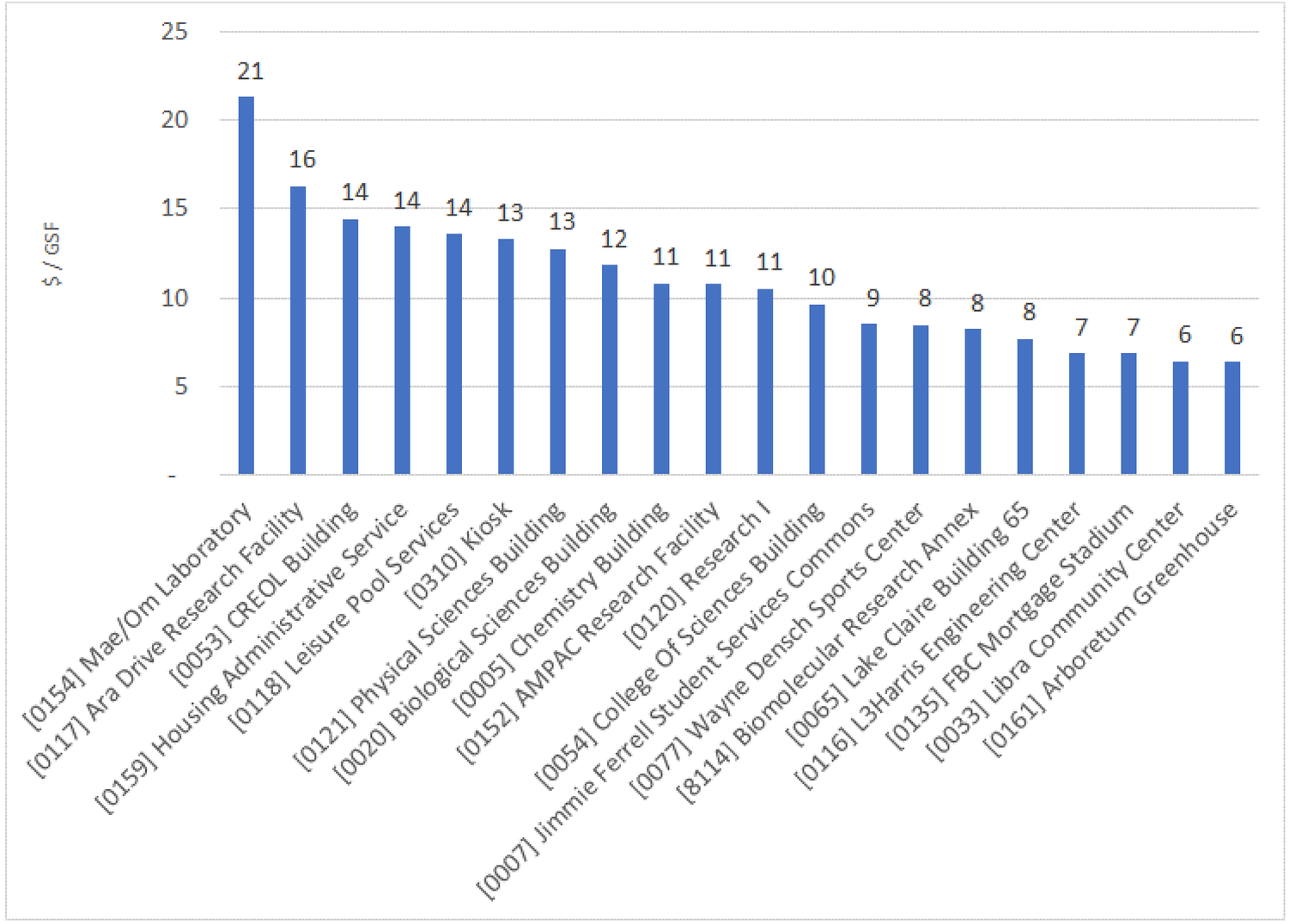
Energy Use Intensity (EUI)

- Constant monitoring and evaluation of high-profile target facilities for savings opportunities is critical to lowering university cost and carbon footprint
- Such efforts demonstrate continuous annual decreases in energy use per square foot despite campus growth over time, avoiding the "Business As Usual" scenario



Energy Cost per GSF (ECI)

- Largest users for energy on campus are research facilities. Efforts using ASHRAE 62.1 guidelines are effective in lowering consumption.

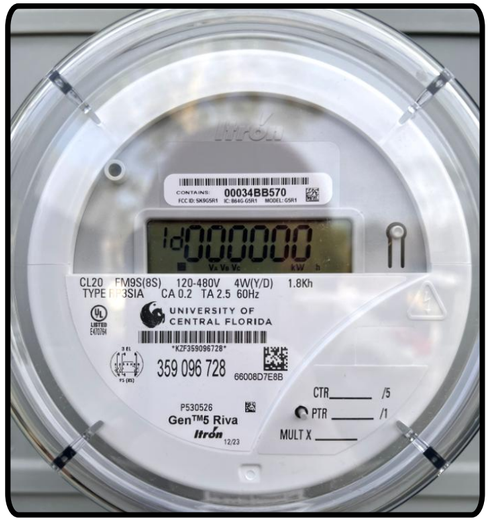


Monthly Key Performance Indicators (KPI)

UES KPI METRICS

Perspective		Strategic Objective		Measure	Owner	Update	Sep-24	Oct-24	Nov-24	Dec-24	Target Range		
											Low	Mid	High
	U1	Demonstrate good stewardship of energy and cost resources	U1.1	**Energy Cost per GSF - All Campuses Combined** *(Rolling 12-month data)*	Janice Martinez	2/10/2025	$ 2.97	$ 2.96	$ 2.95	$ 2.95	<= $2.65	> $2.65 < $3.00	>= $3.00
	U1	Demonstrate good stewardship of energy and cost resources	U1.2	**Energy Cost per GSF - Main Campus** *(Rolling 12-month data)*	Janice Martinez	2/10/2025	$ 2.83	$ 2.82	$ 2.82	$ 2.82	<= $2.55	> $2.55 < $2.90	>= $2.90
	U1	Demonstrate good stewardship of energy and cost resources	U1.3	**Energy Use Intensity - All Campuses Combined** *(Rolling 12-month data, kBTU/GSF)*	Janice Martinez	2/10/2025	154.2	153.5	152.0	152.1	<=150	> 150 < 180	>=180
	U1	Demonstrate good stewardship of energy and cost resources	U1.4	**Energy Use Intensity - Main Campus** *(Rolling 12-month data, kBTU/GSF)*	Janice Martinez	2/10/2025	136	135.5	133.8	133.8	<=140	> 140 < 150	>=150
	U1	Demonstrate good stewardship of energy and cost resources	U1.5	**Chilled Water Plant Efficiency (kW/Ton/Plant)** *(Monthly kW/Ton Efficiency)*	Janice Martinez	2/10/2025	0.76	0.74	0.72	0.70	<= 0.70	> 0.70 < 0.85	>=0.90
	U1	Demonstrate good stewardship of energy and cost resources	U1.6	**Combined Heat & Power Plant Runtime Efficiency** *(Rolling 12-month data)*	Janice Martinez	2/10/2025	81%	79%	79%	78%	<70%	>= 70% <= 80%	> 80%
	U2	Champion Environmental Stewardship & Cost Savings	U2.1	**Water Use per GSF - All Campuses** *(Rolling 12-month data, Gal/GSF)*	Janice Martinez	2/10/2025	14.31	14.21	14.26	14.20	<= 13	>13.00 < 14.00	>=14
	U2	Champion Environmental Stewardship & Cost Savings	U2.2	**Water Use per GSF - Main Campus** *(Rolling 12-month data, Gal/GSF)*	Janice Martinez	2/10/2025	14.10	14.00	14.10	14.10	<= 13	>13.00 < 14.00	>=14
	U2	Champion Environmental Stewardship & Cost Savings	U2.3	**Reclaim vs Potable Savings - MC Plant Cooling Towers** *(Rolling 12-month data)*	Janice Martinez	2/10/2025	36.0%	38.1%	38.2%	40.8%	<= 15.0	>15.0 < 17.0	>=17.0
	U2	Champion Environmental Stewardship & Cost Savings	U2.4	**Rosen College Potable Water Savings kGal - H2FLO Valve** *(Monthly Data)*	Janice Martinez	2/10/2025	-41.9%	20.2%	36.4%	32.2%	<= 10	>10 < 25	>=25
	U3		U3.1	**Building Controls System Faults - Alarms per Month** *(Rolling 12-month trend)*	Tracey Kelley						<= 200	>200.00 < 300.00	>=300.00
	U4		U4.1	**Hot/Cold Calls - Work Orders Created per Month** *(Rolling 12-month trend)*	Tracey Kelley	2/10/2025	113	85	81	63	<= 70	>70.00 < 90.00	>=90.00

Smart Metering & Grid Intelligence



- Recently installed high-speed smart grid mesh network
- Provides real-time critical data within seconds
  - Immediate Outage notifications
  - Voltage/Current monitoring help to identify anomolies (Burnett House)
  - Tamper Alerts and Hot Socket Notifications for safety
  - Self-healing network ensures reliability
  - Building level leak detection (average $15-30k/year saved)
- Future phases targeting grid edge applications at meter level
- **Remote programming and firmware updates, saving ~$15k/y**
- Near Real-Time interval data utilized for analytics, controls, demand response
  - 5-min data profiles used to identify peak loads, equipment operation,
  - Real-time data used to control generator loads for active demand response
- Provides insight for load impact, planning, and predictive analytics
  - Data integration with Willow to assist in driving active demand response at the building level

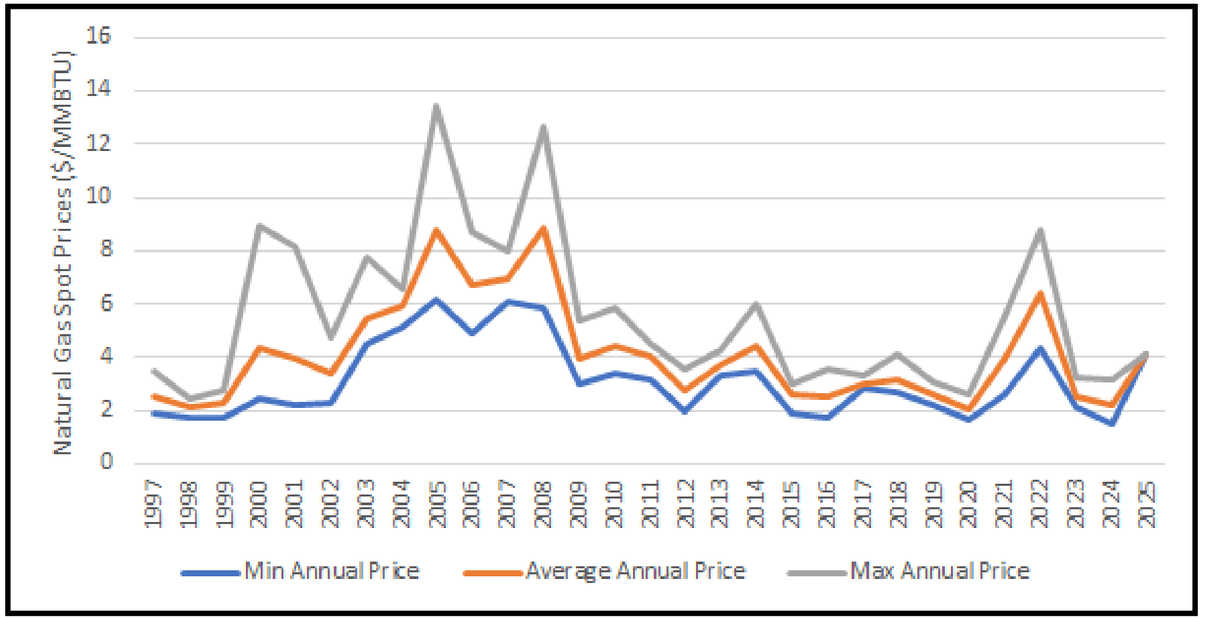
Main Campus - Duke Energy Tariff Change

- Currently on GSDT-1 (General Service Demand Time-of-Use)
- Evaluating CST-3 (Curtailable Service Time-of-Use Tariff)
- UCF has the electrical generation infrastructure to support curtailment
- 19 hours of curtailment in past 30 years, none in the past 10 years
- **Opting in to curtailment would reduce the annual electric bill by ~$2M**
- Curtailment would requirement reducing grid demand by at least 2MW, supportable by emergency generators

DUKE ENERGY

OUC SunChoice Solar Program

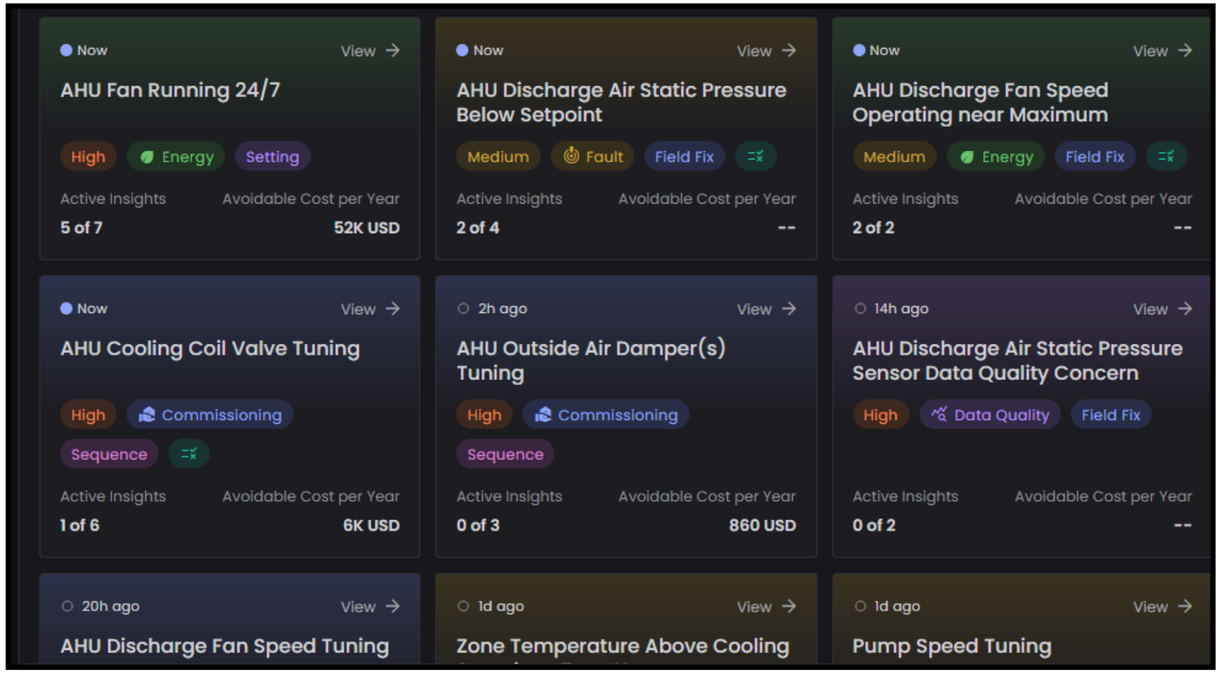
- Orlando Utilities Commission (OUC) offering solar subscriptions
- OUCs SunChoice program replaces a portion of the fuel for a solar charge - no upfront costs
- Fuel costs account for 35-60% of electric costs
- Based on tiers and current fuel prices, 70% solar subscription would reduce electric bills by **10% or $280K annually**
- Savings will increase as gas prices increase
  - Prices last year were historically low



OUC The Reliable One®

Willow Digital Twin

- A digital twin is a virtual replica of a physical object, system, or process, designed to simulate, monitor, and analyze real-world performance in real time.
- Generate predictive work orders, work Smarter
- Working with Microsoft partner Willow to select 3 buildings to pilot
- Integrating building automation, space, energy, and work management systems



WILLOW Relationship Designs

- Willow builds building level relationships between systems similar to Facebook and Instagram