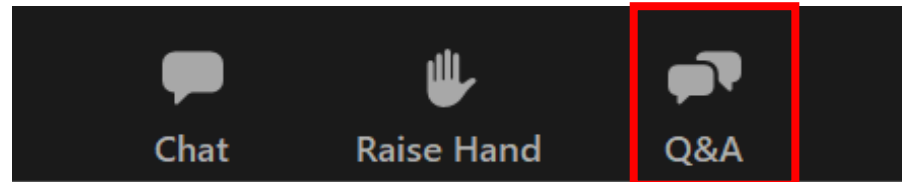




Welcome to the IDEA Sustaining Sponsors Webinar Series

- Webinar will commence at 12:00 pm ET.
- Please submit comments or questions via “Q&A” during the prepared remarks portion of our call. The Q&A icon can be found at bottom right of your screen. Questions will be moderated at conclusion of the presentation.



- If you are having problems with video or audio, please send a note via the Chat and our host, Kristen Hawkins, will assist.
- The call will be recorded and made available to the public via download or streaming. Slides will be made available in pdf format at www.districtenergy.org.



October 6, 2020

COVID-19 and Campus Utility Systems

INTRODUCTION



AGENDA

- ▶ Thanks to IDEA
- ▶ Introduction - COVID-19 and Campus Utility Systems
- ▶ Brian Kirk, New York Presbyterian Hospital
- ▶ James Rosner – University of Denver
- ▶ Ken Martin – Auburn University
- ▶ Gregg Coffin – University of MO – Columbia
- ▶ Q/A



INTRODUCTION

- ▶ Instruction (Chronicles of Higher Ed)
 - 60% In-Person
 - 24% Hybrid Model
 - 9% On-line Only
- ▶ Enrollment
 - Agencies have seen drops from 5 - 20%
 - Staff Reductions
- ▶ Tracking COVID – 130K Cases, 1,300+ Colleges
 - Updated 9/25 – NY Times



COVID-19 AND CAMPUS UTILITY SYSTEMS

- ▶ Increasing / Decreasing Space Utilization – Utility System Load Profiles
 - Space density will decrease which will increase hourly use of space with remote learning
 - Telework options for staff will reduce the need for more office space
 - Increased online learning options will require more evening/weekend hours
 - Leased spaces will be eliminated
 - Smaller class sizes + need for larger spaces due to social distancing requirements
 - Re-imagining space utilization



COVID-19 AND CAMPUS UTILITIES

- ▶ Safety and Resiliency
 - Drop in Demand
 - Customer Confidence
 - Reduced Investment affects Essential Services Safety
 - Increased Security Risks (Cyber and Physical)
- ▶ Operational Challenges
 - Reduced Productivity
 - Supply Chain Disruptions
 - Staggered Shifts



COVID-19 AND CAMPUS UTILITIES

- ▶ Construction Project Challenges
 - Project Delays or Disruptions
 - ▶ Material Shortages - 35%
 - ▶ Shortage of Trade/Craft Workers 23%
 - ▶ Shortage of Inspectors 25%
 - ▶ Infected Individuals 17%

COVID-19 CONSTRUCTION JOB SITE GUIDELINES

As construction activities continue in the City of Fort Lauderdale, please follow all CDC guidelines to limit the spread of COVID-19 including:

-  If you feel sick, stay home. Do not go to work.
-  Wear a face mask at all times while in the workplace.
-  Maintain 6 feet of social distancing as work duties permit.
-  Practice good hygiene. Wash your hands and avoid touching your face.
-  Clean and disinfect all shared areas and equipment routinely.

All construction upon or within uninhabited, unoccupied, or vacated structures prior to final Certificate of Occupancy (CO) is permitted, however, construction inside or within inhabited or occupied structures after final CO has been issued is not permitted, unless such work is specifically for repair or maintenance on or within a residence or is located within an essential business, or alterations are being made to provide accessibility pursuant to Florida Building Code Accessibility requirements.

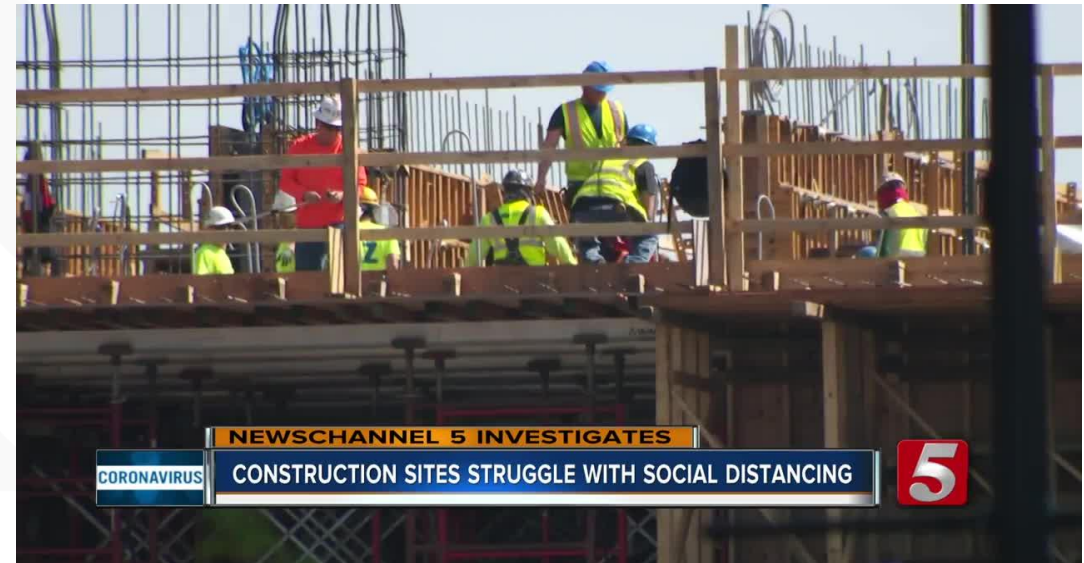
For additional safety tips and to learn more about COVID-19, visit www.fortlauderdale.gov/coronavirus.

 If you would like this publication in an alternate format, please call (954) 828-4755 or email strategiccommunications@fortlauderdale.gov.



COVID-19 AND CAMPUS UTILITIES

- ▶ Financial Challenges
 - Revenue Model Disruption - tuition, government grants, alumni donations, endowment revenue, and even ticket sales and television contracts – All have been affected.
 - Utilities Example – 5% Reduction in load, up to 30% net income loss.
 - Effects to Capital Resources and Liquidity
- ▶ How are these challenges being addressed?



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Brian Kirk – New York Presbyterian

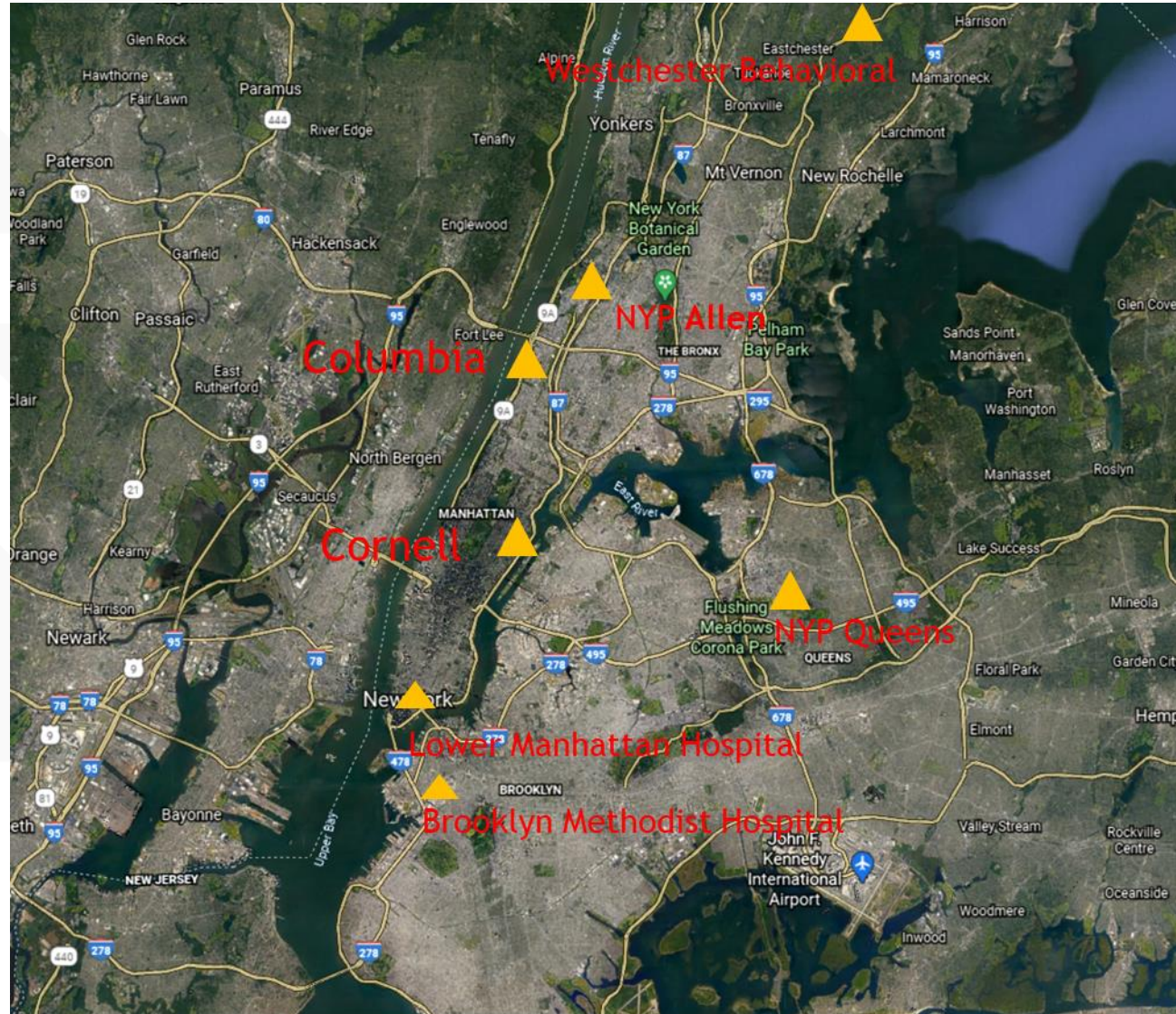


New York-Presbyterian/Columbia University & Weill Cornell Medical College

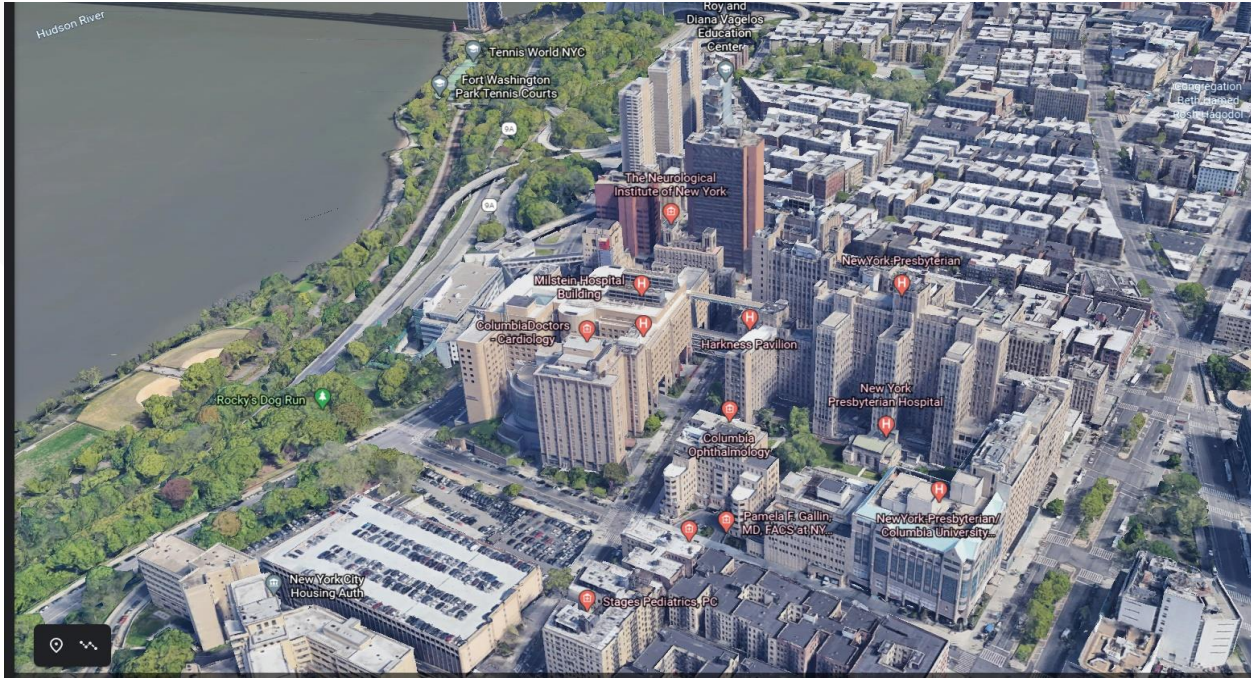


- ▶ NYPresbyterian was at the epicenter of the COVID-19 pandemic, treating the most novel coronavirus patients of any hospital system in the US; primarily during the height of the health emergency
- ▶ Multiple campuses including major urban campuses with district utility systems
 - Columbia University and Weill Cornell Medical College; each ~ 4mmsf healthcare occupancy
 - Additional urban campuses in Manhattan, Queens and Brooklyn boroughs
 - Suburban Behavioral Health campus in Westchester County
- ▶ NYP's Central District Energy systems provided reliable service throughout pandemic
- ▶ NYP MEP utilities supporting healthcare needs (i.e. medical gases and HVAC systems) were in many cases put under severe duress, but performed reliably

Principal New York Presbyterian Campuses



NYP Columbia and Cornell Campuses



- ▶ Each campus houses central cooling and heating plants and related distribution networks
- ▶ Medical gases also supplied from bulk sources through distribution systems

NYP Queens and NYP Allen Hospitals



- ▶ NYPQueens experienced massive high-acuity patient volumes; straining O2 and Med Air distribution systems
- ▶ NYP Allen Hospital hosted the Ryan Larkin Field Hospital on adjacent Baker Field (CU) Athletic Complex

COVID-19 Response

- ▶ Initial engineering/facilities response was primarily concerned with construction/conversion of space into surge “ICU” space
- ▶ Rooms, entire wards, and in some cases offices, lobbies and auditoriums were converted to patient bed space
- ▶ All systems/trades affected, with HVAC distribution mods most prevalent
- ▶ Focus expanded to Medical Gas networks, primarily O2 and Med Air

COVID-19 Central Utility Impacts

- ▶ Central Plant Heating, Cooling and Electrical Utilities performed without incident
 - Shoulder season loads
 - Elective healthcare delivery drastically reduced to focus on virus patients
- ▶ Staffing Impacts
 - Essential labor
 - ▶ Plant and facilities O&M
 - ▶ Critical construction (in-progress and COVID-related)
- ▶ Impacts to Healthcare-Related Central and Distributed Utilities
 - HVAC Conversion
 - Medical Gas

Baker Athletic Complex (Columbia University) Field Hospital



Lessons Learned and What's Next

- ▶ Potential energy impacts of unprecedented deployment of medical equipment
 - Examples of Ventilators and/or O2 Concentrators
- ▶ Building ventilation standards-what can we expect and what will be the effects
- ▶ Social distancing and other measures; impact on building loading and energy intensity
- ▶ COVID-19 and Local Law 97 (in essence, NYC's own "Green New Deal")

James Rosner – University of Denver





- ▶ Reduced setbacks and operations to unoccupied settings
- ▶ “soft” lockdown of buildings during “Stay at Home” order
- ▶ Only Essential Personnel allowed on campus
 - Staggered shifts to 50% manning to reduce risk to staff
 - Controls techs worked from home
- ▶ Successfully achieved savings through reduced operations

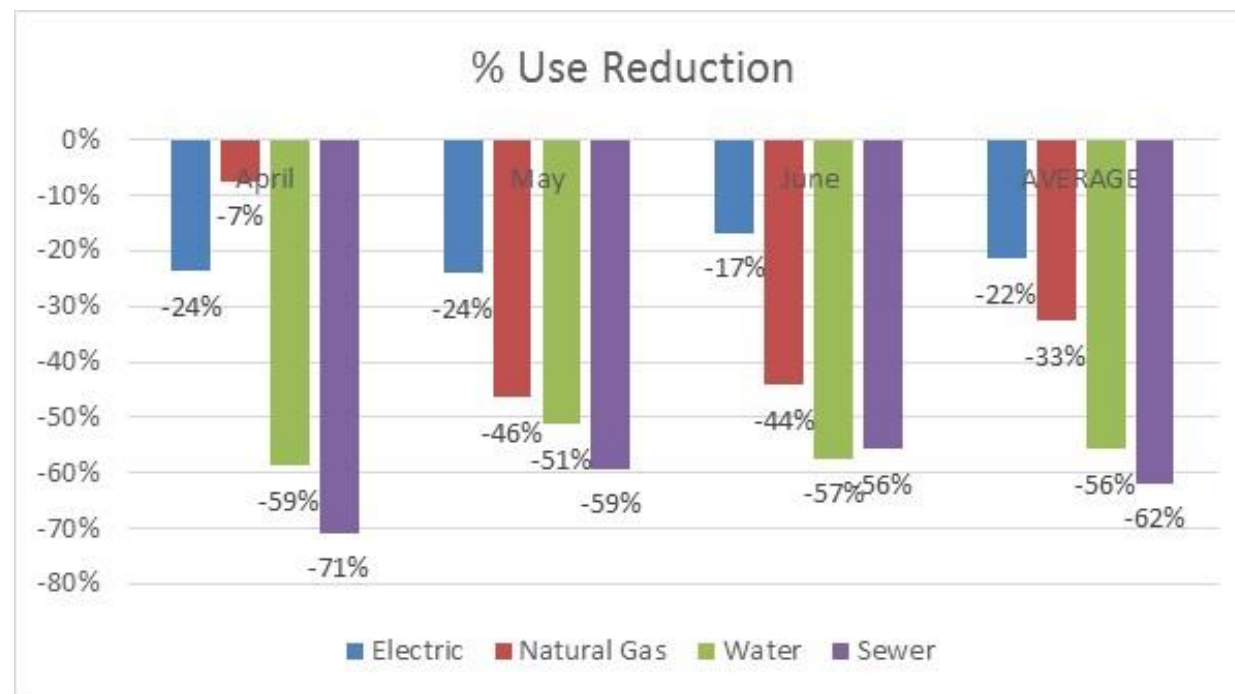
► Cost Comparison April – June (\$6 million annual budget)



Cost Comparison	Cost Saving				% Reduction			
	April	May	June	Total	April	May	June	AVERAGE
Electric	\$ (65,544)	\$ (59,790)	\$ (41,314)	\$ (166,648)	-22%	-19%	-12%	-18%
Natural Gas	\$ (8,211)	\$ (30,268)	\$ (9,619)	\$ (48,098)	-11%	-50%	-22%	-27%
Water	\$ (9,749)	\$ (14,827)	\$ (12,639)	\$ (37,215)	-36%	-42%	-35%	-37%
Sewer	\$ (12,992)	\$ (17,746)	\$ (7,890)	\$ (38,628)	-45%	-54%	-27%	-42%
Total	\$ (96,496)	\$ (122,631)	\$ (71,462)	\$ (290,589)				



► Use comparison



Use Comparison	April	May	June	Total	April	May	June	AVERAGE
Electric	(800,995)	(850,551)	(597,616)	(2,249,162)	-24%	-24%	-17%	-22%
Natural Gas	(11,335)	(63,859)	(5,722)	(80,916)	-7%	-46%	-44%	-33%
Water	(3,800)	(4,333)	(5,699)	(13,833)	-59%	-51%	-57%	-56%
Sewer	(5,063)	(3,897)	(33,393)	(42,353)	-71%	-59%	-56%	-62%



► Carbon Footprint Impacts

GHG	CO2 Reduction (Metric Tons CO2 Emitted)			
	April	May	June	Total
Electric	\$ (561)	\$ (595)	\$ (418)	\$ (1,574)
Natural Gas	\$ (623)	\$ (3,512)	\$ (315)	\$ (4,450)

Electric	Natural Gas	Total	
334	53	387	vehicles driven in 1 year
3,946,024	605,863	4,551,887	miles driven by cars
178,941	27,474	206,415	gallons of gas consumed
184	28	212	# homes energy use in 1 year
26,295	4,037	30,332	trees grown for 10 years
2,077	319	2,396	acres of U.S. forests in 1 year

Ken Martin – Auburn University



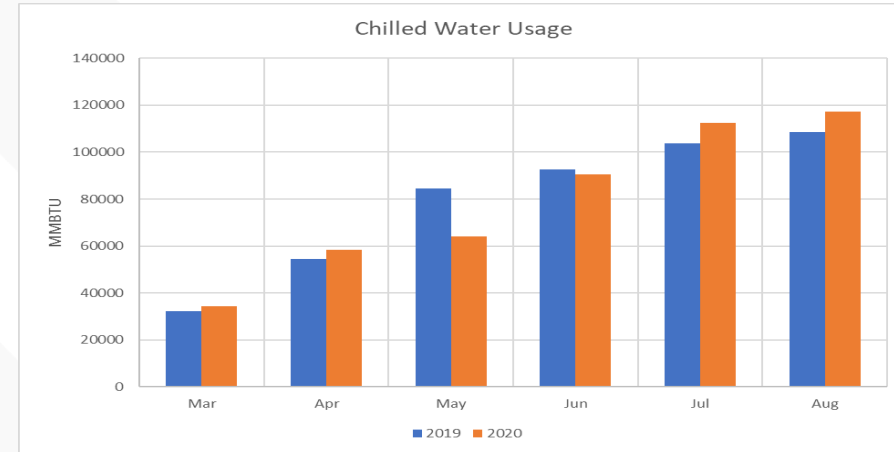
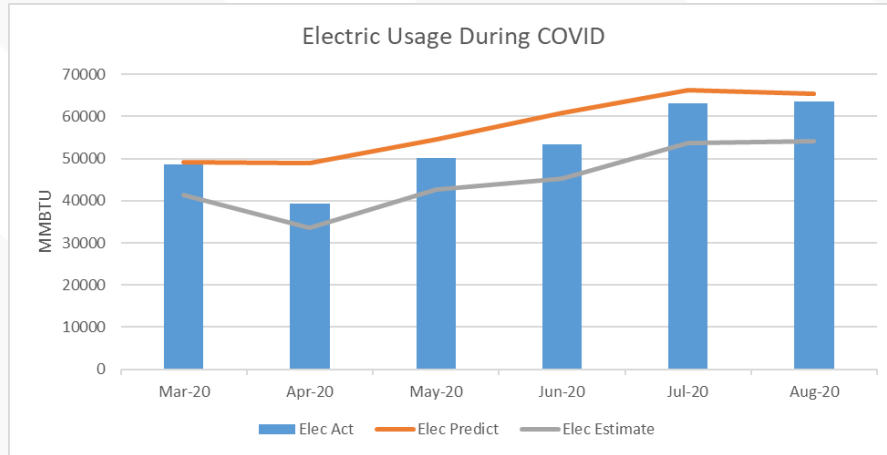
Auburn University: COVID Timeline

- ▶ March 16th: Classes went remote. Only essential personnel on campus.
- ▶ Facilities personnel worked flexible schedules
- ▶ Mid May saw increases in Facilities staff to prepare for some students to return for 2nd mini-semester of summer and to prepare for Fall.
- ▶ Fall semester began August 17th with some in person, online, and hybrid formats.
- ▶ Those that can work remote continue to do so.

COVID Operational Approach

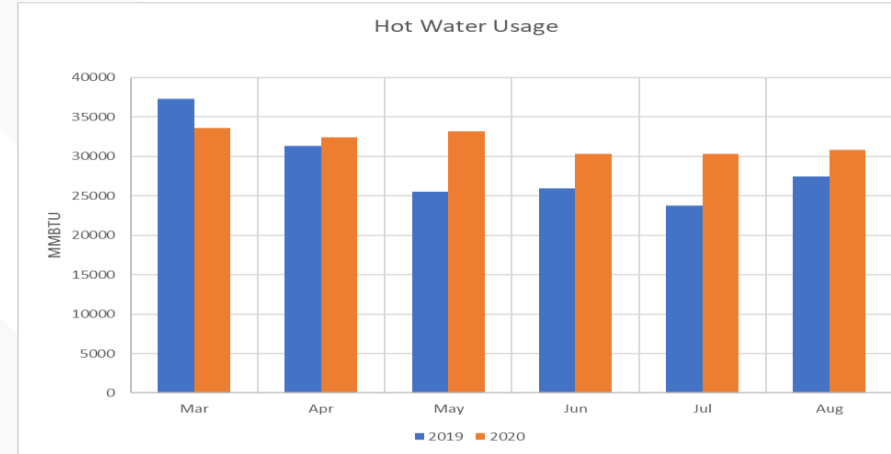
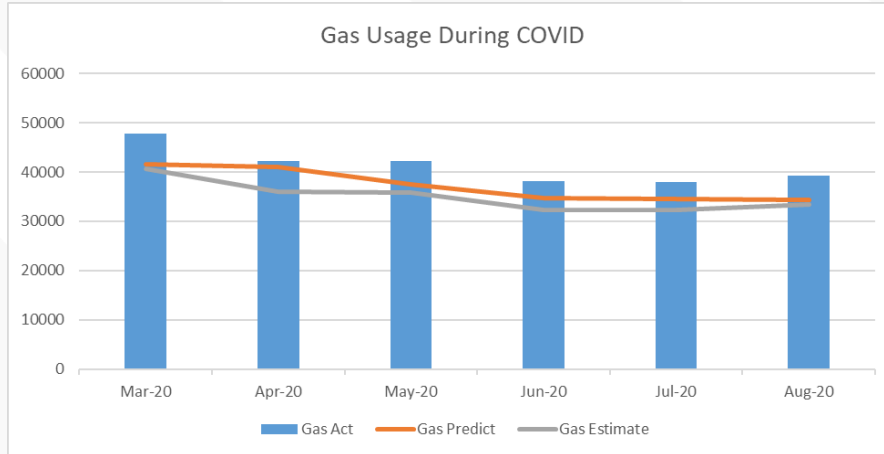
- ▶ The decision was made to not increase unoccupied modes in buildings across campus.
- ▶ AU has taken a cautious approach in quick changes relying on guidance from CDC and ASHRAE.
- ▶ Increasing air filters from MERV 8 to MERV 13 where possible.
- ▶ Increasing outside air in AHU's where possible and running the AHU's 2 hours longer in the mornings (began in August).

Electric & Chilled Water Usage



- ▶ Decreased electrical consumption was systemic across campus.
- ▶ Likely cause of reduced consumption was lighting and plug loads.
- ▶ Consumption decreased approximately 7.4%.
- ▶ Chilled Water did not contribute to the electrical reduction and was essentially flat compared to 2019.
- ▶ Estimating savings of 15% more if unoccupied schedules were expanded.

Gas & Hot Water Usage



- ▶ Gas usage increased 9% due to increase in Hot Water use.
- ▶ Hot Water increase was systemic across the campus buildings.
- ▶ The likely increase was due to building reheat because people and machine loads were less in the buildings.
- ▶ Similar to chilled water, estimating savings of 15% if unoccupied schedules were expanded.
- ▶ This would have ultimately been a 6% gas savings.

Auburn University: State of Affairs

- ▶ Actually set a new enrollment record for Fall 2020
 - 400 students more than previous record
 - Mainly graduate level students as undergraduate numbers are capped.
- ▶ Campus Stats
 - Parking lot occupancy down 44%
 - Transit Ridership down 90%
 - Dining Transactions down 50%
 - Rec Center down 75%
 - Library Traffic down 54%

Gregg Coffin – University of MO - Columbia





District Energy for Mizzou

2017 System of the Year!



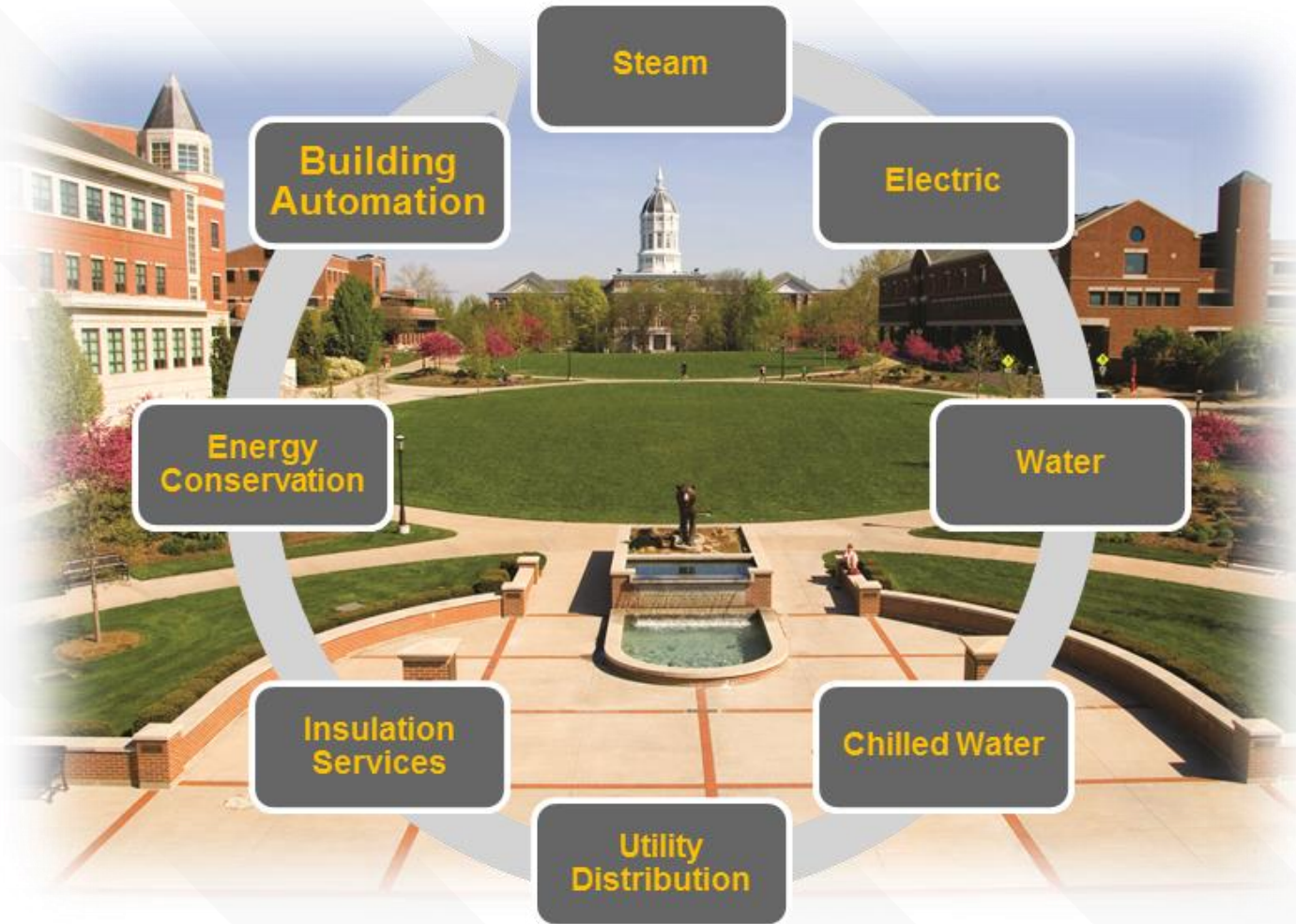
Reliable!

**Cost
Efficient!**

Sustainable!

MU Energy Management

A campus utility enterprise



Comprehensive Campus Micro-grid

- ▶ 66 MW electric generation capacity
- ▶ 40 MW 69KV transmission connection
- ▶ 1,100,000 lb/hr steam capacity
- ▶ 33,400 Tons chilled water capacity
- ▶ 4 Million gal/day drinking water capacity
- ▶ 110 miles of under-ground utilities
- ▶ Fully metered and automated
- ▶ Utility managed campus building automation



MU Campus COVID19 Timeline

- ▶ Classes moved to online March 16th
- ▶ Community lockdown from March 24th to May 3rd
- ▶ Campus buildings closed from March 23rd to late July – Remote working, only essential staff allowed on campus
- ▶ Some research suspended in April
- ▶ Summer academic session online
- ▶ Ventilation changes per ASHRAE guidance - Summer
- ▶ Research activities restored in July/August
- ▶ Faculty and students returned to campus mid August
- ▶ Hybrid classes started August 24th

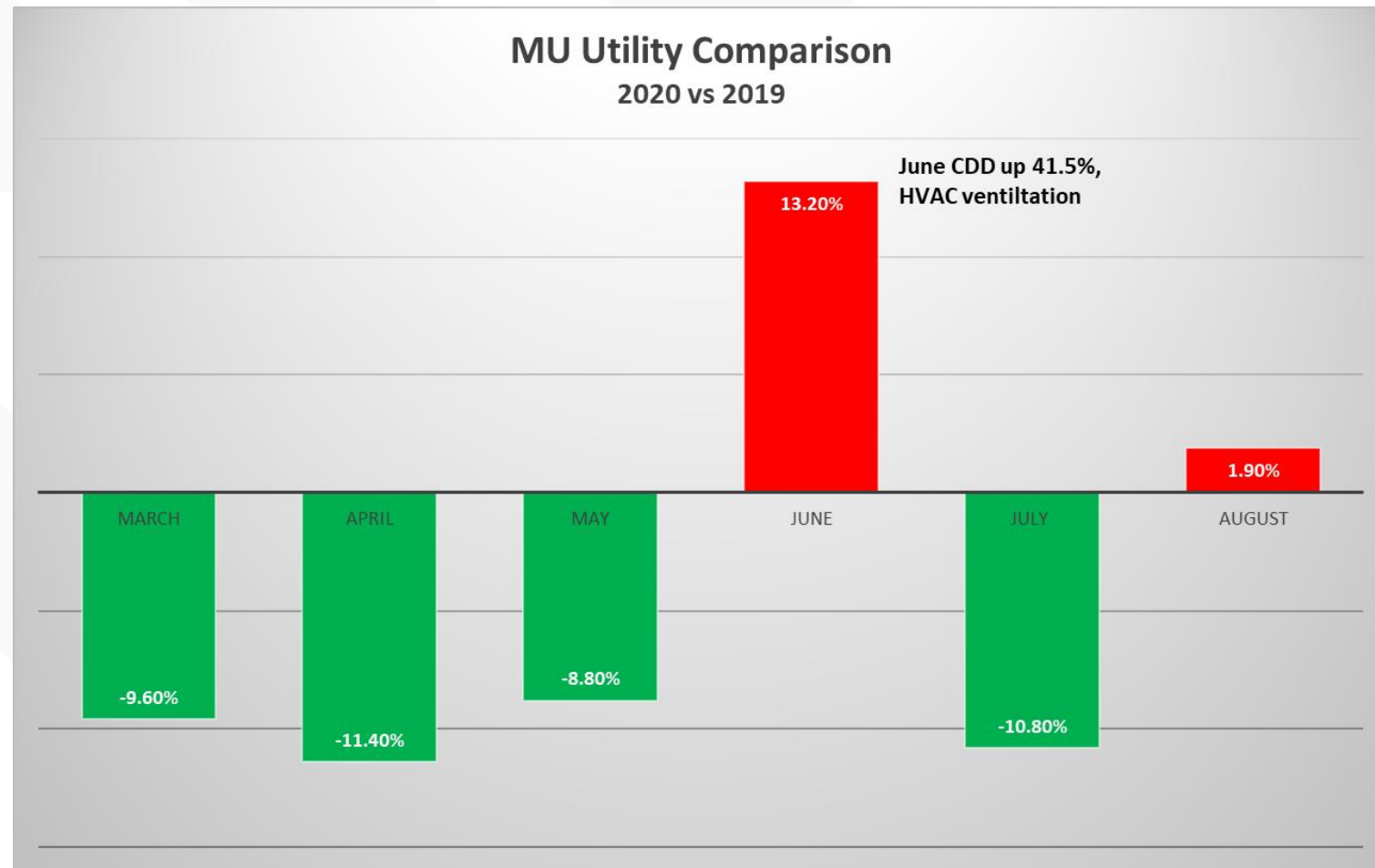
Utility Operation Impact

- ▶ Moved to 12-hr shifts and reduced on-site staff
- ▶ One operator per control room, smaller consistent work groups
- ▶ Simplified CHP operation to gas operation only April and May
- ▶ Engineering and administrative staff worked from home
- ▶ Added our own COVID PPE requirements before campus safety policies developed
- ▶ Challenges in obtaining disinfecting materials, hand sanitizer, masks, etc.
- ▶ Managing utility staff compensation and benefit time (vs FFCRA)

Utility Operation Impact

- ▶ All utility front line staff and supervision returned May 4th, essential staff status
- ▶ Never ending campus COVID-19 policy role out. Staff experience COVID policy fatigue!
- ▶ Experienced some part / material delays, chillers for a plant addition delayed two months
- ▶ Staffing Adjustments– So far, only one employee staff member had COVID, many incidents of staff quarantine

Facility Consumption Impact



Lower consumption and demands from a nearly empty campus!

Utility Financial Impact

- ▶ Lower spot gas prices and market electric prices in MISO helped lower CHP plant expenses
- ▶ Budget cuts implement for end of fiscal 2020
- ▶ Significant budget uncertainty for fiscal 2021, forecasted cuts
- ▶ Hiring freeze, no travel, benefits cut, procurement limited
- ▶ Most all utility system maintenance and repairs projects have been suspended and delayed
- ▶ No layoffs or furlough of utility staff yet

What's next???



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and share your feedback

Tuesday, October 20
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