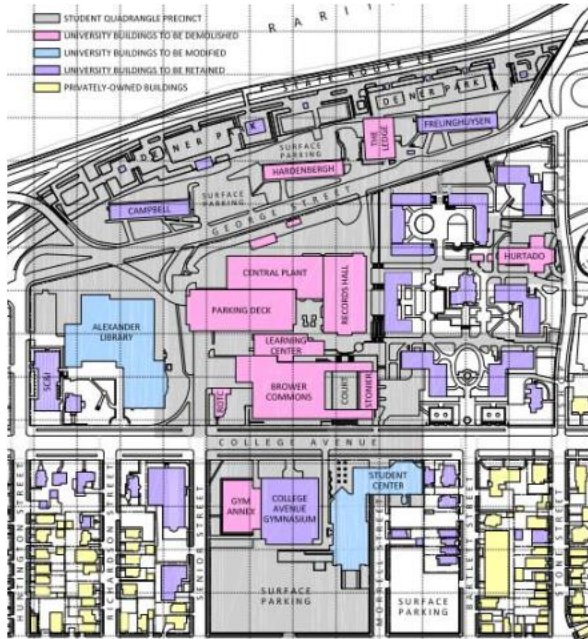




Advanced Energy NY – Q2 Stakeholder Breakfast Buildings & Grid Modernization

May 24th, 2018

Master Plan Concept

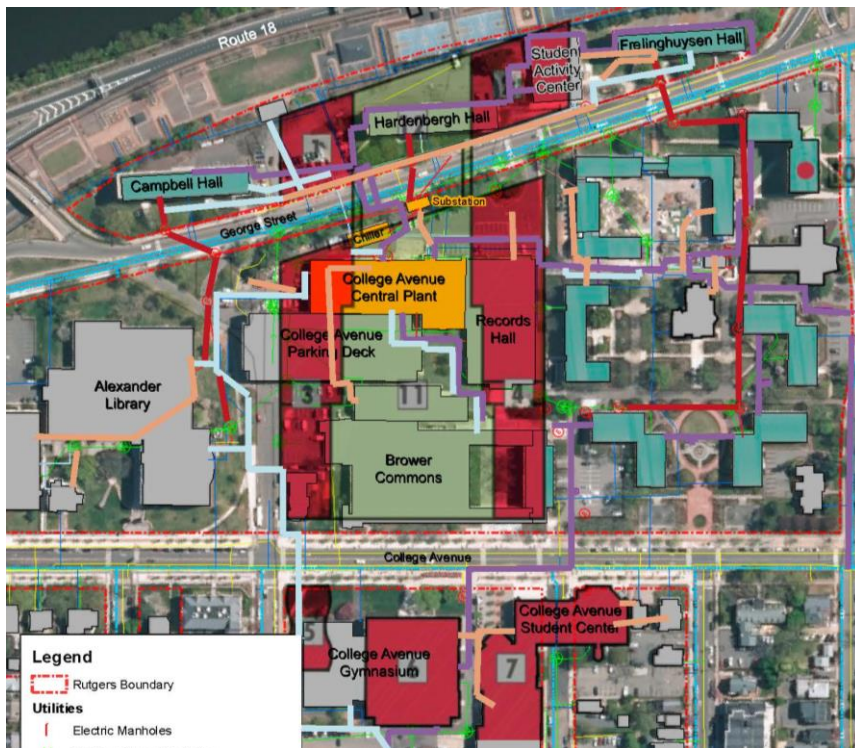


Existing Campus Layout



Proposed New Campus Layout

Utility Distribution



Legend

Rutgers Boundary

Utilities

Electric Manholes

Sanitary Sewer Manholes

Electric Line Underground Primary

Electric Line Above-Ground Secondary

Sanitary Sewer Line

Chilled Water Line









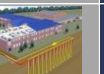

















High Temp Hot Water Line

New Brunswick Water Line

Rutgers Water Line

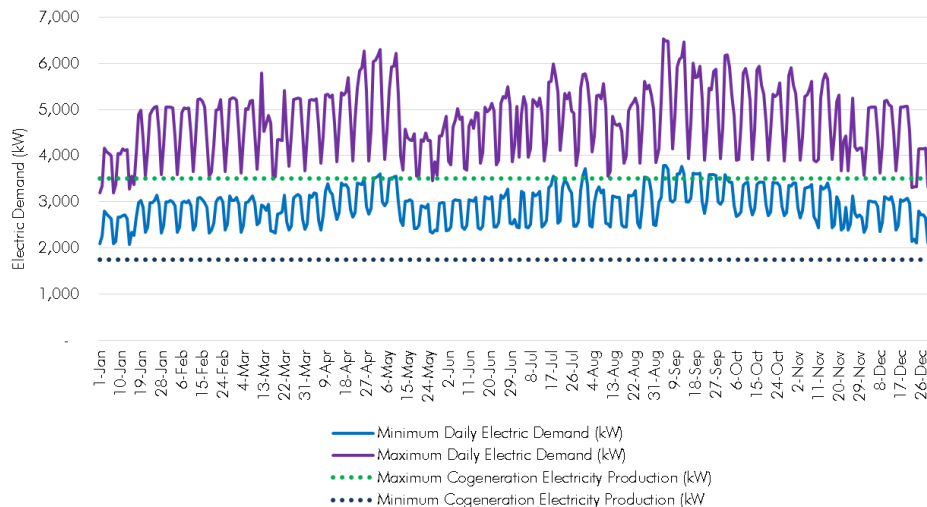
Gas Line

Original Alternative Options

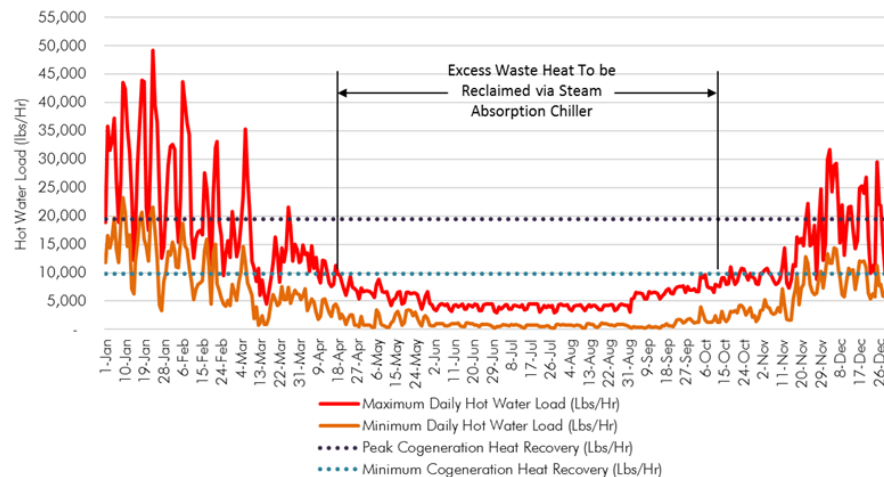
HEATING & COOLING - SOURCE OPTIONS													POWER OPTIONS	
SOURCE OPTIONS	OPTION H1	OPTION H1a	OPTION H2a	OPTION H2b	OPTION H3a	OPTION H3b	OPTION H4	OPTION H5	OPTION H6	OPTION H7	OPTION H8	OPTION E1	OPTION E2	
	Central Plant - Conventional Replacement	Central Plant - Conventional Expansion (to South Campus)	Central Plant - With CoGen (Engine)	Central Plant - With CoGen (Turbine)	Central Plant - With CoGen and Absorption Chillers	Central Plant - With CoGen and Steam Turbine Chillers	Central Plant and River Water Cooling	Partial Central Plant (hybrid, some buildings on plant, some individual buildings)	Decentralized Geothermal (for some buildings)	Decentralized Plants (at each building)	Thermal / Ice Storage	Battery Storage / Micro Grid	Renewable Energy / PV	
														
SCHEMATIC														
Construction Logistics Efficiency Operations Community Impact Other	First Cost	Expansmion Study Pending further discussion	Engine Generators not capable of producing the High Grade Heat needed for central Heating distribution											
	Logistics / Implementation													
	Phasing													
	Operating Costs													
	Energy Performance													
	Maintenance													
	Staffing													
	Aesthetics													
	Space Requirements													
	Noise													
	Environmental Impact													
	Peer Examples													
Comments														
Recommendation														
Green=Best in category														

Green=Best in category

Annual Load Profiles















Anticipated / Estimated Electric Demand (kW)



Anticipated / Estimated Heating (lbs./Hr)

Chosen Priority Options

		PRIMARY HEATING & COOLING - SOURCE OPTIONS				ADDITIONAL OPTIONS	
	SOURCE OPTIONS	OPTION 1	OPTION 2	OPTION 3	OPTION 4	ALT 1	ALT 2
		Central Plant - Conventional Replacement	Central Plant - With CoGen (3.5 MW Turbine)	Partial Central Plant (hybrid, central cooling plant, no central heating plant)	Decentralized Plants (no stand alone plant building)	Thermal / Ice Storage	Additional Capacity for South End College Ave Plants
							
	SCHEMATIC						
Construction Costs / Logistics	First Cost	Captial Cost to implement this Option					
	Impact on Existing Infrastructure	Ability to re-use or need to abandon existing infrastructure					
	Phasing / Logistics	Ease of implementing / phasing this Option relative to the others					
Efficiency	Utility Costs	Annual energy (gas and electric) costs to operate this Option					
	Carbon (MTCO2)	Green House Gas emissions (Carbon equivalent: MTCO2E)					
Operations	Maintenance	Quantity of equipment to maintain					
	Staffing Costs	Cost of additional facilities staff needed					
Community Impact	Resiliency	Emergency Power availability, and emergency preparedness					
	Location / Aesthetics	Location of plant / infrastructure and aesthetic impact on campus					
	Space Requirements	Total building area requirements to implement this Option					
	Noise	Noise concerns					
Summary	Environmental Impact	Environmental assesment impact					
	Peer Examples						
	Pros						
	Cons						

Thoughts? / Discussion

