

**Fiscal Year 2017
Cornell University
Central Energy Plant (CEP) Fast Facts¹**

CEP PRIMARY ENERGY CONSUMPTION		
Primary Consumption (trillion Btu)	<u>1990⁽²⁾</u>	<u>2017</u>
Electricity (Grid Purchased)	0.60	0.07
Coal	1.33	0.00
Hydro (electric)	0.02	0.01
Natural Gas	0.28	2.98
Oil	0.14	0.00
Total Primary Energy Consumption	2.35	3.07

CENTRAL ENERGY PLANT EFFICIENCY		
Energy Output (trillion Btu)	<u>1990</u>	<u>2017</u>
Total Steam Generation ⁽³⁾	1.35	1.31
Total Turbine Electric Generation	0.07	0.88
Total Energy Output	1.42	2.19

Fuel Sources (trillion Btu)	<u>1990</u>	<u>2017</u>
Coal	1.33	0.00
Natural Gas - Boilers	0.28	0.06
Natural Gas - Turbines	0.00	2.69
Natural Gas - Duct Burners	0.00	0.23
Oil	0.14	0.00
Total Energy Input (trillion Btu)	1.74	2.98
Total Central Plant Efficiency	81%	74%
Total Steam Sales (trillion Btu)	0.99	0.81
Total Distrib and Building Steam Losses (%)	17%	22%
Total Steam Condensed for Electric (trillion Btu)	0.00	0.24

ELECTRICITY		
Cornell Utilities Generated (Mwh)	<u>1990</u>	<u>2017</u>
Cornell Utilities Hydro	5,200	4,300
Cornell Utilities Steam Turbine - Cogen	21,000	25,100
Cornell Utilities Gas Turbine - CCHPP ⁽³⁾	0	234,700
Total Cornell Utilities Generated	26,200	264,100
Electricity Exported to Grid (Mwh)	0	(58,600)
Electricity (Grid Purchased) (Mwh)	174,500	15,400
Total CEP Electricity (Mwh)	200,700	220,900
Total Campus Sales (Mwh)	190,626	208,000
LSC Electricity (Grid Purchased) (Mwh)	0	5,200

Electricity (NY Grid) Sources	<u>1990</u>	<u>2017</u>
Other Renewables	0%	5%
Coal	19%	6%
Natural Gas	17%	30%
Hydro	21%	29%
Nuclear	17%	29%
Petroleum	25%	0%
Other	1%	0%
Total	100%	100%

CHILLED WATER		
Energy Output & Input (trillion Btu)	<u>1990</u>	<u>2017</u>
Total Chilled Water Production (trillion Btu)	0.381	0.544
Total Energy Input (trillion Btu) ⁽⁶⁾	0.072	0.022
System Coefficient of Performance	5.3	24.7
Total Campus Sales (trillion Btu)	0.348	0.527
Chilled Water Sources		
Mechanical Chillers	85%	2%
Lake Source Cooling	0%	98%
"Free" Cooling	15%	0%

ENERGY RELATED CARBON DIOXIDE (CO₂) EMISSIONS		
Purchased Electric	<u>1990</u>	<u>2017</u>
Grid CO ₂ Emission Factor (kg/MWh)	870	167
Grid Electric CO ₂ (1,000 metric tons)	152	3
Cornell Central Energy Plant		
Cornell Coal ⁽⁴⁾	125	0
Cornell Natural Gas ⁽⁵⁾	15	159
Cornell Oil	11	0
Total CEP CO ₂ Emissions (1,000 metric tons)	151	159
Total CO₂ Emissions (1,000 metric tons)	303	163

CO ₂ Emissions By Primary Energy Type:	<u>1990</u>	<u>2017</u>
Electricity (Grid Purchased)	50%	2%
On-Site Coal	41%	0%
On-Site Natural Gas	5%	98%
On-Site Oil	4%	0%
On-Site Hydro	0%	0%

CENTRALLY CONNECTED BLDG GSF x 1,000		
	<u>1990</u>	<u>2017</u>
Electric (provided via CEP)	NA	14,100
Steam (provided via CEP)	NA	12,700
Chilled Water (provided via CEP)	NA	9,100

ENERGY METRICS (KBTU/GSF) PER YEAR		
	<u>1990</u>	<u>2017</u>
Electric Sales	NA	53
Steam Sales	NA	103
Chilled Water Sales	NA	60

ENERGY CONSUMPTION BY BUILDING		
Building Type: (trillion Btu)	<u>1990</u>	<u>2017</u>
Research/Teaching	NA	2.21
Campus Life	NA	0.61
Administration	NA	0.25

POPULATION AND WEATHER		
	<u>1990</u>	<u>2017</u>
Students	18,389	21,709
Staff/Non-Faculty	7,690	9,243
Faculty	1,617	1,576
Ithaca Campus ⁽⁶⁾ (1000 GSF)	11,800	15,872
Campus GSF per Student	642	731
Heating Degree Days (7,220 Normal)	6,919	6,525
Cooling Degree Days (337 Normal)	312	613

GLOSSARY & NOTES		
Btu: British thermal unit		
Primary: Central Plant Usage		
MMBtu: Million Btu		
Mwh: mega watt-hour		
(1) Info for CEP only, not all campus facilities part of CEP		
(2) Kyoto Base Year is 1990		
(3) Combined Heat & Power Plant start-up FY 2010		
(4) "Beyond Coal" begins FY 2012		
(5) GHG NOT adjusted for exported electric		
(6) Ithaca Campus GSF includes non-CEP connected facilities		