

**Fiscal Year 2023
Cornell University
Central Energy Plant (CEP) Fast Facts¹**

CEP PRIMARY ENERGY CONSUMPTION		
<u>Primary Consumption (trillion Btu)</u>	<u>1990⁽²⁾</u>	<u>2023</u>
Electricity (Grid Purchased)	0.60	0.09
Coal	1.33	0.00
Hydro (electric)	0.02	0.02
Natural Gas	0.28	2.80
Oil	0.14	0.00
Total Primary Energy Consumption	2.35	2.90

CENTRAL ENERGY PLANT EFFICIENCY		
<u>Energy Output (trillion Btu)</u>	<u>1990</u>	<u>2023</u>
Total Steam Generation ⁽³⁾	1.35	1.34
Total Turbine Electric Generation	0.07	0.81
Total Energy Output	1.42	2.15

<u>Fuel Sources (trillion Btu)</u>	<u>1990</u>	<u>2023</u>
Coal	1.33	0.00
Natural Gas - Boilers	0.28	0.20
Natural Gas - Turbines	0.00	2.28
Natural Gas - Duct Burners	0.00	0.32
Oil	0.14	0.00
Total Energy Input (trillion Btu)	1.74	2.80
Total Central Plant Efficiency	81%	77%
Total Steam Sales (trillion Btu)	0.99	0.79
Total Distrib and Building Steam Losses (%)	17%	24%
Total Steam Condensed for Electric (trillion Btu)	0.00	0.17

ELECTRICITY		
<u>Cornell Utilities Generated (Mwh)</u>	<u>1990</u>	<u>2023</u>
Cornell Utilities Hydro	5,200	5,000
Cornell Utilities Steam Turbine - Cogen	21,000	28,100
Cornell Utilities Gas Turbine - CCHPP ⁽³⁾	0	210,800
Total Cornell Utilities Generated	26,200	243,900
Electricity Exported to Grid (Mwh)	0	(59,600)
Electricity (Grid Purchased) (Mwh)	174,500	19,900
Total CEP Electricity (Mwh)	200,700	204,200
Total Campus Sales (Mwh)	190,626	194,000
LSC Electricity (Grid Purchased) (Mwh)	0	5,600

<u>Electricity (NY State Grid) Sources</u>	<u>1990</u>	<u>2023</u>
Other Renewables	0%	7%
Coal	19%	0%
Natural Gas	17%	26%
Hydro	21%	33%
Nuclear	17%	33%
Petroleum	25%	0%
Other	1%	<1%
Total	100%	100%

CHILLED WATER		
<u>Energy Output & Input (trillion Btu)</u>	<u>1990</u>	<u>2023</u>
Total Chilled Water Production (trillion Btu)	0.381	0.563
Total Energy Input (trillion Btu) ⁽⁶⁾	0.072	0.026
System Coefficient of Performance	5.3	21.7
Total Campus Sales (trillion Btu)	0.348	0.503
Chilled Water Sources		
Mechanical Chillers	85%	2%
Lake Source Cooling	0%	98%
"Free" Cooling	15%	0%

ENERGY RELATED CARBON DIOXIDE (CO₂) EMISSIONS		
<u>Purchased Electric</u>	<u>1990</u>	<u>2023</u>
Grid CO ₂ Emission Factor (kg/MWh)	870	125
Grid Electric CO ₂ (1,000 metric tons)	152	3
Cornell Central Energy Plant		
Cornell Coal ⁽⁴⁾	125	0
Cornell Natural Gas ⁽⁵⁾	15	148
Cornell Oil	11	0
Total CEP CO ₂ Emissions (1,000 metric tons)	151	149
Total CO₂ Emissions (1,000 metric tons)	303	152

<u>CO₂ Emissions By Primary Energy Type:</u>	<u>1990</u>	<u>2023</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>2023</u>
Electric (provided via CEP)	NA	14,700
Steam (provided via CEP)	NA	13,600
Chilled Water (provided via CEP)	NA	11,900

ENERGY METRICS (KBTU/GSF) PER YEAR		
	<u>1990</u>	<u>2023</u>
Electric (CEP to Campus)	NA	47
Steam (gross Generation less SCB)	NA	86
Chilled Water (gross Production)	NA	47

ENERGY CONSUMPTION BY BUILDING		
<u>Building Type: (trillion Btu)</u>	<u>1990</u>	<u>2023</u>
Research/Teaching	NA	2.09
Campus Life	NA	0.58
Administration (includes CEP)	NA	0.23

POPULATION AND WEATHER		
	<u>1990</u>	<u>2023</u>
Students	18,389	24,278
Staff/Non-Faculty	7,690	10,410
Faculty	1,617	1,543
Ithaca Campus ⁽⁶⁾ (1000 GSF)	11,800	16,613
Campus GSF per Student	642	684
Heating Degree Days (7,220 Normal)	6,919	6,083
Cooling Degree Days (337 Normal)	312	489

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