

**Fiscal Year 2019  
Cornell University  
Central Energy Plant (CEP) Fast Facts<sup>1</sup>**

<b>CEP PRIMARY ENERGY CONSUMPTION</b>		
<b>Primary Consumption (trillion Btu)</b>	<b>1990<sup>(2)</sup></b>	<b>2019</b>
Electricity (Grid Purchased)	0.60	0.06
Coal	1.33	0.00
Hydro (electric)	0.02	0.02
Natural Gas	0.28	3.04
Oil	0.14	0.00
<b>Total Primary Energy Consumption</b>	<b>2.35</b>	<b>3.13</b>

<b>CENTRAL ENERGY PLANT EFFICIENCY</b>		
<b>Energy Output (trillion Btu)</b>	<b>1990</b>	<b>2019</b>
Total Steam Generation <sup>(3)</sup>	1.35	1.36
Total Turbine Electric Generation	0.07	0.88
<b>Total Energy Output</b>	<b>1.42</b>	<b>2.24</b>

<b>Fuel Sources (trillion Btu)</b>	<b>1990</b>	<b>2019</b>
Coal	1.33	0.00
Natural Gas - Boilers	0.28	0.17
Natural Gas - Turbines	0.00	2.65
Natural Gas - Duct Burners	0.00	0.23
Oil	0.14	0.00
<b>Total Energy Input (trillion Btu)</b>	<b>1.74</b>	<b>3.05</b>
<b>Total Central Plant Efficiency</b>	<b>81%</b>	<b>74%</b>
Total Steam Sales (trillion Btu)	0.99	0.88
Total Distrib and Building Steam Losses (%)	17%	22%
Total Steam Condensed for Electric (trillion Btu)	0.00	0.21

<b>ELECTRICITY</b>		
<b>Cornell Utilities Generated (Mwh)</b>	<b>1990</b>	<b>2019</b>
Cornell Utilities Hydro	5,200	7,300
Cornell Utilities Steam Turbine - Cogen	21,000	26,800
Cornell Utilities Gas Turbine - CCHPP <sup>(3)</sup>	0	231,600
<b>Total Cornell Utilities Generated</b>	<b>26,200</b>	<b>265,700</b>
Electricity Exported to Grid (Mwh)	0	(77,200)
Electricity (Grid Purchased) (Mwh)	174,500	12,400
<b>Total CEP Electricity (Mwh)</b>	<b>200,700</b>	<b>200,900</b>
<b>Total Campus Sales (Mwh)</b>	<b>190,626</b>	<b>192,000</b>
LSC Electricity (Grid Purchased) (Mwh)	0	4,900

<b>Electricity (NY Grid) Sources</b>	<b>1990</b>	<b>2019</b>
Other Renewables	0%	7%
Coal	19%	1%
Natural Gas	17%	26%
Hydro	21%	35%
Nuclear	17%	31%
Petroleum	25%	<1%
Other	1%	<1%
Total	100%	100%

<b>CHILLED WATER</b>		
<b>Energy Output &amp; Input (trillion Btu)</b>	<b>1990</b>	<b>2019</b>
Total Chilled Water Production (trillion Btu)	0.381	0.582
Total Energy Input (trillion Btu) <sup>(6)</sup>	0.072	0.024
<b>System Coefficient of Performance</b>	<b>5.3</b>	<b>24.2</b>
Total Campus Sales (trillion Btu)	0.348	0.529
<b>Chilled Water Sources</b>		
Mechanical Chillers	85%	4%
Lake Source Cooling	0%	96%
"Free" Cooling	15%	0%

<b>ENERGY RELATED CARBON DIOXIDE (CO<sub>2</sub>) EMISSIONS</b>		
<b>Purchased Electric</b>	<b>1990</b>	<b>2019</b>
Grid CO <sub>2</sub> Emission Factor (kg/MWh)	870	115
Grid Electric CO <sub>2</sub> (1,000 metric tons)	152	2
<b>Cornell Central Energy Plant</b>		
Cornell Coal <sup>(4)</sup>	125	0
Cornell Natural Gas <sup>(5)</sup>	15	162
Cornell Oil	11	0
Total CEP CO <sub>2</sub> Emissions (1,000 metric tons)	151	163
<b>Total CO<sub>2</sub> Emissions (1,000 metric tons)</b>	<b>303</b>	<b>165</b>

<b>CO<sub>2</sub> Emissions By Primary Energy Type:</b>	<b>1990</b>	<b>2019</b>
Electricity (Grid Purchased)	50%	1%
On-Site Coal	41%	0%
On-Site Natural Gas	5%	99%
On-Site Oil	4%	0%
On-Site Hydro	0%	0%

<b>CENTRALLY CONNECTED BLDG GSF x 1,000</b>		
	<b>1990</b>	<b>2019</b>
Electric (provided via CEP)	NA	13,900
Steam (provided via CEP)	NA	13,100
Chilled Water (provided via CEP)	NA	11,100

<b>ENERGY METRICS (KBTU/GSF) PER YEAR</b>		
	<b>1990</b>	<b>2019</b>
Electric (CEP to Campus)	NA	49
Steam (gross Generation)	NA	104
Chilled Water (gross Production)	NA	52

<b>ENERGY CONSUMPTION BY BUILDING</b>		
<b>Building Type: (trillion Btu)</b>	<b>1990</b>	<b>2019</b>
Research/Teaching	NA	2.39
Campus Life	NA	0.51
Administration (includes CEP)	NA	0.23

<b>POPULATION AND WEATHER</b>		
	<b>1990</b>	<b>2019</b>
Students	18,389	22,824
Staff/Non-Faculty	7,690	9,629
Faculty	1,617	1,531
Ithaca Campus <sup>(6)</sup> (1000 GSF)	11,800	16,025
Campus GSF per Student	642	702
Heating Degree Days (7,220 Normal)	6,919	6,971
Cooling Degree Days (337 Normal)	312	588

<b>GLOSSARY &amp; NOTES</b>	
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