

**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  |