Wisconsin Data Center Power Needs Analysis and Comparison

Introduction and assumptions:

Publicly-available information suggest that phase one of the Microsoft data center in Mt. Pleasant and full development of the Vantage data center Port Washington will require approximately 3.9 gigawatts (GW) of power to operate. Power is a measure of the rate at which electricity is being consumed. Household energy consumption is measured in kilowatt-hours (kWh). Energy is the total amount of electricity used over time (i.e., multiplying power by time).

To facilitate this analysis and directly compare power vs. energy numbers, we had to make a few assumptions. First, we assumed a 100% load factor at the data centers. That is, the data centers are operating 24 hours a day, 365 days a year with a constant power demand (3.9 GW). Actual utilization may be lower than this. Second, we applied average monthly household electricity consumption in Wisconsin across all 12 months, assuming a continuous power draw.

Analysis Calculations:

According to the most recent data available, Wisconsin household average monthly electricity consumption in 2023 was 658 kWh, lower than the national average of 852 kWh.[1]

Extrapolating monthly across an entire year, this works out to 7,896 kWh of electricity consumption per year:

$$658\ kWh\ \times 12 = 7{,}896\ kWh$$

Assuming a continuous power draw, this is equivalent to a power demand of 0.9 kW per home:

$$7{,}896\ kWh \div 8{,}760\ hours\ per\ year = 0.901\ kW$$

Converting kilowatt power demand to gigawatt power demand:

[1] https://www.eia.gov/electricity/sales_revenue_price/pdf/table_5A.pdf

$$0.901\ kW\ \times \frac{1\ GW}{1{,}000{,}000\ kW} = 0.000000901\ GW$$

Calculating the number of homes to meet the same power demand as the two data centers:

$$\frac{3.9\ GW}{0.000000901\ GW\ per\ home} = 4{,}326{,}748\ homes$$

Using the analysis above, the comparison can be simplified further:

1GW of data center demand equals the power demand of about **1,109,423 Wisconsin homes**.