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SUSTAINABILITY CONSIDERATIONS FOR PROPOSED DATA CENTERS

As the demand for data grows in the age of artificial intelligence (AI), there are associated community and environmental implications, many of which are still emerging.

The checklist provides a framework for community members and local governments to better understand the options available that have the potential to lessen the environmental impact of data centers. This document is shared for informational purposes only.

There are 10 suggested considerations with example metrics that are relevant to data centers under consideration at this time. For interested stakeholders, these criteria are items to consider when evaluating if a data center is appropriate for your community. This is a dynamic document that will be updated as additional information becomes available.

CRITERIA

METRICS

01 ENERGY EFFICIENCY

Power Usage Effectiveness (PUE)

- PUE target $\leq 1.1-1.2$ (modern best practice)
- Continuous PUE monitoring in place
- PUE reported publicly

Hardware Efficiency

- Use of high-efficiency servers (latest generation CPUs/GPUs/TPUs)
- Virtualization/ containerization used to maximize utilization
- Server refresh cycles optimized for carbon, not just performance

Facility Design

- Hot aisle/cold aisle containment
- Optimized airflow and rack layout
- High-efficiency UPS systems (>95%)
- LED lighting with occupancy sensors

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METRICS

02 CLEAN ENERGY & GRID INTERACTION

Energy Sources

- Purchase 100% clean and renewable electricity from the grid
 - Utilize as much on-site renewables (solar/wind) as feasible
 - Long-term renewable power purchase agreements (PPAs)
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Grid Management

- Energy storage used to reduce peak demand and handle outages
 - Workload shifting to periods of high renewable production
 - Smart grid or demand-response participation
 - No resulting increase in electricity utility billing rates
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03 COOLING & THERMAL MANAGEMENT

- Free cooling / outside air cooling available
 - Liquid cooling or immersion cooling deployed
 - Cooling system has variable-speed fans and intelligent controls
 - Hot/cold aisle containment implemented
 - Waste heat recovery / reuse (e.g., district heating, greenhouses)
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04 WATER USE

- Water Usage Effectiveness (WUE) actively monitored
 - Low-WUE or near-zero-water cooling design
 - Use of reclaimed/gray water instead of potable water
 - No evaporative cooling in water-stressed regions
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METRICS

05 CIRCULAR MATERIALS & WASTE

- Servers and equipment refurbished or reused where possible
 - Certified responsible e-waste recycling (R2 or e-Stewards)
 - Packaging minimized and recyclable
 - Building materials include recycled or low-carbon products
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06 GOVERNANCE, CERTIFICATION, & TRANSPARENCY

- Monthly/quarterly carbon reporting (Scope 1, 2, 3)
 - LEED Certification
 - Verified carbon neutrality or net-zero commitment
 - Transparency on energy mix and water usage
 - Published sustainability goals with progress tracking
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07 SITE & ECOSYSTEM CONSIDERATIONS

- Avoids critical habitats or sensitive ecosystems
 - Minimizes land disturbance
 - Native landscaping supports biodiversity
 - Low ecological disturbance during construction
 - Access to local renewable energy generation
 - Not located in drought-sensitive, water-stressed, and/or residential areas - particularly those in locations that draw from a disproportionately carbon-intensive energy mix
 - Community engagement plan in place
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08 OPERATIONS & AUTOMATION

- Energy optimization for cooling and power
 - Predictive maintenance reduces waste and downtime
 - Automated capacity scaling (avoids over-provisioning)
 - Staff trained in sustainability best practices
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METRICS

09 SECURITY & RESILIENCE

- Fire suppression systems with low environmental impact (e.g., clean agents)
- Climate-resilient design (heatwaves, storms, flooding)
- Redundant systems built efficiently, not excessively

10 END OF LIFE & LIFECYCLE PLANNING

- Plan for equipment decommissioning and material recovery
- Embodied carbon tracked for major construction upgrades
- Offsetting only used after real reductions

This document was developed for The Conservation Foundation by volunteer DuPage Advisory Council member Steve Stawarz, Oak Brook resident, with consultation by fellow councilmember, Dan Probst, Roselle resident, using ChatGPT, augmented with Perplexity, and refined by the authors.

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