Sierra Club Maryland Chapter position on data centers:

Sierra Club Maryland Chapter is concerned about the adverse impacts of data center development in Maryland on the environment and communities.

To ensure Maryland's ability to meet its statutory mandates under the Climate Solutions Now Act—which requires a 60% reduction in greenhouse gas emissions by 2031 and net-zero carbon emissions by 2045—the state must proactively take steps to establish strong data center policies.

Policy should be established to minimize the negative impact of data centers on Maryland's clean energy and climate goals, with an ultimate goal of net-zero impact. Furthermore, policy should ensure that the health of our communities is not adversely impacted, overburdened communities are not bearing the brunt of high utility costs,[1] and environmental impacts are mitigated. Specific attention should be paid to differential impacts on overburdened and underserved communities.

The recommendations shared below are based on the best available technology currently available. All of the technologies related to data centers, including IT equipment; energy; water; and HVAC system; are experiencing rapid advances that can lower costs, energy and water use, and GHG impacts. We encourage Maryland to develop a framework that requires data centers to aggressively adopt new technologies so that we can meet our 2031 and 2045 climate goals.

1. BACKUP GENERATION

To ensure the necessary consistent energy supply, data centers require backup generation. This backup generation may include fossil fuel generators, hydrogen fuel cells, battery storage, and/or behind the meter generation.

A. Maryland should put in place strong requirements to significantly limit or prohibit data centers from relying on fossil fuel backup generation, including diesel backup generators.

Often, data centers use diesel generators to supply this backup generation. Diesel generators lack air pollution controls, and emit particulate matter and nitrogen oxides. These pollutants can cause and exacerbate lung conditions and form ozone,[2] which is described by the American

[1] https://vcnva.org/agenda-item/surging-energy-demand-from-data-centers/

[2] *See* Clean Air Northeast, *Diesel 101*, https://cleanairnortheast.epa.gov/diesel101.html#:~:text=Diesel%20engines%20in%20trucks%2C%20buses,millions%20of%20residents%20are%20affected.

Lung Association as "one of the most dangerous and widespread pollutants in the U.S."[3] They also contribute to climate change.

Maryland should require data centers to be equipped with clean backup sources of power, such as battery storage and fuel cells using green hydrogen.

In any scenarios where fossil fuel generators may be needed for backup generation based on currently available technology, backup generators should only be used for emergency generation and during necessary equipment testing and maintenance. Backup generators should not be used to facilitate peak shaving.

B. Maryland should continue to require review of backup generation systems through the Public Service Commission as currently required under the Certificate of Public Convenience and Necessity.

Maryland law requires that electricity generators totaling a certain megawattage apply for a Certificate of Public Convenience and Necessity (CPCN). The application and review process for a CPCN facilitates transparency, public participation, and regulatory oversight. In determining whether to grant a CPCN the PSC is required to consider the impact of the proposed generator on climate change and air quality.

Accordingly, on-site power generation for data centers should not be exempted from the CPCN process.

2. ELECTRIC GRID

Data centers use an immense amount of electricity.[4] In our current regulatory system, utilities are required to serve all customers – including large consumers like data centers – and the cost of upgrading the grid to meet demand is spread across all consumers. Maryland ratepayers may pay in part for significant costs for grid expansion required by data center growth in Virginia.[5]

Maryland should not make the same mistake if it intends to attract data center buildout here. Instead, data centers should be required to pay for the requisite distribution or transmission lines or substations and feeders associated with their peak load.

3. ENERGY GENERATION

The very substantial amount of electricity consumed by data centers could offset most or all of the greenhouse gas savings from our energy efficiency programs, and negate the greenhouse gas reductions stemming from renewable energy development.

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[3] American Lung Association, *Ozone*, https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/ozone.
[4] https://www.energy.gov/eere/buildings/data-centers-and-servers
[5] https://vcnva.org/agenda-item/surging-energy-demand-from-data-centers/

To the extent possible, data centers should meet electricity demand through net-new renewable energy generation.[6] As matters now stand, Maryland should require data centers to implement measures to support net-new renewable energy generation to minimize their impact on overall energy demand. The requirement should extend to all usage, including night hours and peak usage. Behind the meter technologies, including on-site solar like rooftop solar, and PPA agreements such as with Maryland offshore wind projects, should be utilized when feasible.

Further, data centers should be required to develop and submit demand response and clean energy integration strategies with the Public Service Commission to reduce peak demand, yield system benefits, etc.

A time frame is needed by which data centers must reach 24 x 7 Carbon-Free Energy. Google[7] and many others are already working on options[8,9] for this scenario.

4. ENERGY EFFICIENCY

To reduce impacts on the grid and on our climate goals, Maryland should require data centers to meet the highest energy efficiency standards. We recommend requiring them to attain a power usage effectiveness (PUE) score no higher than 1.2.

Power usage effectiveness, or PUE, is defined as the ratio of the total amount of power used by a data center to the power used specifically for computing. The additional power consumed by a data center is used for processes including heating and cooling the equipment.

The National Renewable Energy Laboratory notes that, "studies show a wide range of PUE values for data centers, but the overall average tends to be around 1.8. Data centers focusing on efficiency typically achieve PUE values of 1.2 or less."[10] Energy Star[11] provides clear examples of how data centers can achieve the 1.2 score.[12]

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[6] https://virginiamercury.com/2023/11/21/a-5-point-plan-for-data-centers/
[7] https://www.google.com/about/datacenters/cleanenergy/
[8]https://www.canarymedia.com/articles/clean-energy/google-and-others-have-committed-to-24-7-carbon-free-energy-what-does-that-mean
[9] https://www.volts.wtf/p/247-carbon-free-energy-everything#details
[10] https://www.nrel.gov/computational-science/measuring-efficiency-pue.html
[11] https://www.google.com/about/datacenters/cleanenergy/
[12] Energy Star, 16 More Ways to Cut Energy Waste in the Data Center (accessed February 15, 2024), available at https://www.energystar.gov/products/16_more_ways_cut_energy_waste_data_center As noted in their article: "These energy efficiency measures fall into one of 5 categories:

- Information technology (IT) – reducing the energy consumed IT equipment (e.g., servers, storage)
- Power infrastructure – reducing losses from power distribution units and uninterruptible power supplies
- Air flow management – improving cooling by preventing hot and cold air from mixing
- HVAC – optimizing cooling and humidification systems
- Other."

5. MINIMIZING LOCAL ENVIRONMENTAL IMPACTS

There are many local/regional data center impacts that need to be considered and avoided to the extent possible. Data centers and their supporting systems are a rapidly evolving set of technologies. Timelines for data center construction and the availability of new technologies call for a regulatory approach that sets performance standards that become more stringent over time with respect to environmental performance and human impacts. These standards should adopt a "best available" approach that applies to new data center construction with retrofit to existing data centers in a reasonable time frame. Data centers should adopt a modular approach to systems that are designed for retrofits and upgrades to better performing systems.

These local/regional impacts that need to be considered and avoided to the extent possible include:

- **Water Use** - Currently, most data centers use vast quantities of water which can put severe stress on local water systems. Allowed water usage should be based on available capacity. Data centers must be connected to municipal water/sewer systems so that all water leaving the site is processed for any contaminants in the water after it is used. Gray water usage should be highly encouraged/incentivized. Future technologies that reduce/eliminate water use should become the norm as they become possible. Use of groundwater should be minimized and avoided to the extent possible. There are many practices that data centers can employ to optimize airflow, reduce HVAC demands, and reduce water usage. Many of these practices are referenced at the footnoted links, including the Energy Star for Data Center site[13]. Water Usage Effectiveness (WUE)[14] is a metric used to measure water usage in relation to power usage. The concept is similar to the PUE metric described above. Data Centers should be required to meet a below average WUE with the standard becoming more stringent over time as technology options allow for water usage reductions.

- **Noise** - For those near a data center, noise can be a serious issue. Noise reduction and abatement options that provide for safe noise levels should be required. Allowable noise levels must be based on real-time limits, not averages over some time frame.

- **Land Use** - Land use concerns can be divided into several categories.
    - The first is what types of land are being used. Green space, agricultural reserve, and various conservation areas should not be converted to data center use.
    - The second land use concern relates to infrastructure. Locating data centers in close proximity to needed resources, (water, especially gray water; high voltage power lines; and data fiber), can minimize the impacts and resources needed to access these resources.
    - A third area is construction-related. Dewatering a site during construction needs to be done with care so as not to contaminate nearby waterways. Post

[13] https://www.energystar.gov/products/data_center_equipment/optimize-airflow-hvac
[14] https://www.sunbirddcim.com/glossary/water-usage-effectiveness-wue

construction, the potentially massive amount of new impervious surfaces at a data center can have considerable impact on stormwater management. These impacts need to be addressed from the start at the expense of the data center owners/operators.

6. MONITORING AND TRANSPARENCY

To ensure proper compliance, a system of monitoring should be required for all data centers in Maryland that provides transparency and data access for all citizens. Data center operators should provide funding and the needed access and instrumentation for all of the following: noise levels, water usage, energy usage, air and water quality, and the greenhouse gas intensity of the system. Ideally this system would be operated by a third party company or local government, and the data, including historical data, would be available to everyone.

7. IMPACT ASSESSMENT

Maryland should conduct an analysis of the environmental and economic impacts of data center growth, including an evaluation of the impact on existing state environmental goals and the electric grid (including transmission lines, power stations, and substations).[15]

Elected officials and ratepayers are entitled to a transparent understanding of the true costs borne by the public for data center development. An analysis of the expected cost of infrastructure expansion necessary to service data center demand for energy, water, transmission lines, sewer, new roads, energy substations, and also noise, visual, and ecosystem impact must be conducted as part of the approval process.

Part of the allure of encouraging data centers is the potential for tax revenue and jobs for Maryland. This needs to be tempered with a realistic assessment of the costs that governments will incur with data center growth and the impact of any tax incentives provided to data centers. Also, the jobs assessment needs to consider how many jobs will be local.

[15] https://vcnva.org/agenda-item/mitigating-data-center-developments-impacts/