ASSOCIATION OF METROPOLITAN WATER AGENCIES

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Faisal D'Souza
Technical Coordinator
Networking and Information Technology Research and Development (NITRD)
National Coordination Office (NCO)
National Science Foundation
2415 Eisenhower Avenue
Alexandria, VA, 22314

Re: Request for Information on the Development of an Artificial Intelligence Action Plan

*Submitted electronically*

Dear Mr. D'Souza:

The Association of Metropolitan Water Agencies (AMWA) is pleased to have the opportunity to provide comments to the White House Office of Science and Technology Policy (OSTP) and the National Science Foundation (NSF) NITRD NCO regarding the request for information on the development of an artificial intelligence (AI) action plan. AMWA is an organization of the largest publicly owned drinking water systems in the United States. Member utilities collectively provide clean drinking water to over 160 million people across the nation. As large public water agencies, AMWA utilities support thriving local economies by supplying reliable water services to businesses, industries, and communities. Simultaneously, as stewards of large sums of public funds, water utilities recognize the vast opportunities to leverage AI applications in ways that advance the impact and efficiency of utility operations. The Association believes that advancement of domestic AI applications is essential for our nation's security and economic prosperity and encourages the inclusion of water impacts and opportunities for water efficiency in the AI Action Plan.

AMWA recognizes that the development and proliferation of artificial intelligence will increase water demand and use. At the same time, AI-powered technologies have opportunities to optimize how water utilities operate, including through improved water distribution, leak prediction and detection, enhanced treatment efficiency, improved customer relations, and more. The Association

urges NSF to include an assessment of the impacts of artificial intelligence development and technologies on the nation's water supply in its AI Action Plan.

## I. Impacts of AI and related industries on water supplies.

There are various means through which AI technologies and supporting infrastructure will affect water demand that the NSF and other parties should account for when developing the AI Action Plan. AI datacenters require large amounts of water, and freshwater consumption is a necessary part of generative AI processing. Additionally, the production and maintenance of AI datacenters and technologies also requires increased electricity production, which will drive water use in many instances.

First, AI processing and datacenters, as well as AI-related manufacturing and other technologies, require cooling technologies that are water-intensive. Water-intensive cooling towers and water evaporation-assisted air-cooling processes are commonplace methods of preventing servers in AI facilities from overheating, and these require fresh, potable water to avoid pipe clogs and bacterial growth.[1] Within cooling towers, a portion of water is evaporated to dissipate the heat generated by servers. The remaining water moves in an open loop to further absorb heat, although this recycled water can only be reused three to ten times before mineral and salt buildup makes it unusable. This standard cooling process therefore requires a consistent input of water and has been found to use anywhere from 0.26 to 2.4 gallons of water per kilowatt per hour (kWh)[1], depending on weather conditions. Evaporation-assisted air cooling is a more efficient alternative, although water is still used in notable amounts when conditions are too hot or dry for heat to be sufficiently ejected into the natural environment.

In addition to the water used directly in datacenters, AI production and manufacturing drive additional water demands. AI production require large amounts of electricity, which has the potential to impact water use. Much of the electricity used to provide power to AI datacenters is generated through thermoelectric or hydroelectric methods, which are estimated to use two additional gallons of water per kWh of electricity consumed.[2] Manufacturing of AI-related technologies also has an impact on water use, as AI chip and server manufacturing processes also use large amounts of pure water for wafer fabrication and cooling of semiconductor plants. While deliberate estimates of water consumption from manufacturing is a developing research area, researchers and technology leaders have estimated that it is likely significant. Apple, for example, has previously reported that the manufacturing supply chain accounts for 99% of the company's water footprint.[3] As the nation prepares identifies methods for its companies to accelerate AI

[1] Li, P., Yang, J., Islam, M. A., & Ren, S. (2023). Making ai less" thirsty": Uncovering and addressing the secret water footprint of ai models. *arXiv preprint arXiv:2304.03271*.
[2] Torcellini, P., Long, N., & Judkoff, R. (2003). *Consumptive water use for US power production* (No. NREL/TP-550-33905). National Renewable Energy Lab (NREL), Golden, CO (United States).
[3] Apple, Inc. (2024). Apple Environmental Progres Report. Environmental Progress Report. https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2024.pdf.

technologies and use, it is essential to identify and plan for the impacts of AI on the nation's water supplies.

**II. Recommendations for policy areas of consideration in the AI Action Plan.**

To ensure that the nation's use of AI also promotes the nation's water security, the AI Action Plan should focus on three areas: understanding AI's water impacts, leveraging AI for water conservation, and fostering collaboration between AI developers and water resource managers. The following considerations outline actionable steps to address these opportunities.

First, it is essential that the AI Action Plan include impacts to the nation's water supplies. Conducting a comprehensive water footprint assessment on the water supplies of various regions, particularly those expected to see proliferation of datacenters and other AI technologies. A footprint assessment would include an estimation of the increase in demands to water supplies in various regions across the nation. Such assessments should include direct and indirect impacts to the nation's supplies, with specific attention to different hydrologic regions of the nation.

Where water supplies are constrained, the Action Plan should identify additional measures for datacenters, manufacturers, and other AI-related industries to effectively reduce their water demands. These measures include technologies such as monitoring or predictive tools that optimize cooling efficiency in datacenters, decreasing the needs for water to cool down centers, and research into other alternatives for water-intensive cooling, including air-based cooling or hybrid cooling systems or and waste heat recovery. As the Action Plan outlines opportunities for reducing energy constraints on the electricity gride, the action plan should also consider the use of energy production through low-water alternatives. Finally, the action plan should outline how AI datacenters and manufacturers could use recycled water to support industrial facilities.

While assessing water impacts, the AI Action Plan should also promote solutions for water efficiency. AI and related technologies hold abundant opportunities for advancing the efficiency of water utilities. A policy plan should include an assessment of how AI applications more efficiently provide water to communities, industries, and businesses through technologies like service and treatment optimization, predictive maintenance, leak detection, water supply forecasting, demand planning, and more. Exploring the opportunities that AI applications may have on promoting efficiency in water provision and protection of water supply will advance the nation's water security.

Finally, it is necessary that any action plan recognizes importance of collaboration with local water managers when developing local AI policies and infrastructure plans. Local water utilities, watershed managers, and regional planning authorities have critical insights into water availability in the near- and long-term, challenges, and the potential strain that AI-driven industries, such as data centers and AI-powered manufacturing, may place on existing water supply resources. By identifying where water supply and AI stakeholders should work together, the National Action Plan can ensure that AI growth aligns with regional water management strategies, promotes

responsible water use, and supports the longevity of water-stressed areas. Considering formal partnerships, data-sharing agreements, and other best practices between AI developers and local water authorities may help mitigate water stress while fostering important economic and technological advancement.

**III. Conclusion**

AMWA thanks NSF for the opportunity to provide comment on the development of an AI Action Plan. The Association recognizes the necessity to develop an AI Action Plan to advance the nation's leadership in AI and bolster economic and technologic opportunities nationwide. Acknowledging the significant impacts that proliferation of AI and its associated industries may have on water supplies is also necessary to ensure that regions and communities are able to efficiently take advantage of AI opportunities while also ensuring the long-term viability of water resources. The Association emphasizes that any AI Action Plan must consider the impacts of AI and AI-related industries on the nation's water supplies and appreciates NSF's consideration of these comments. If you have any questions about this letter, please contact Jessica Evans, AMWA's Senior Manager of Government Affairs and Sustainability Policy at evans@amwa.net.

Sincerely,

Thomas Dobbins
Chief Executive Officer
Association of Metropolitan Water Agencies

cc: Suzanne H. Plimpton, Reports Clearance Officer