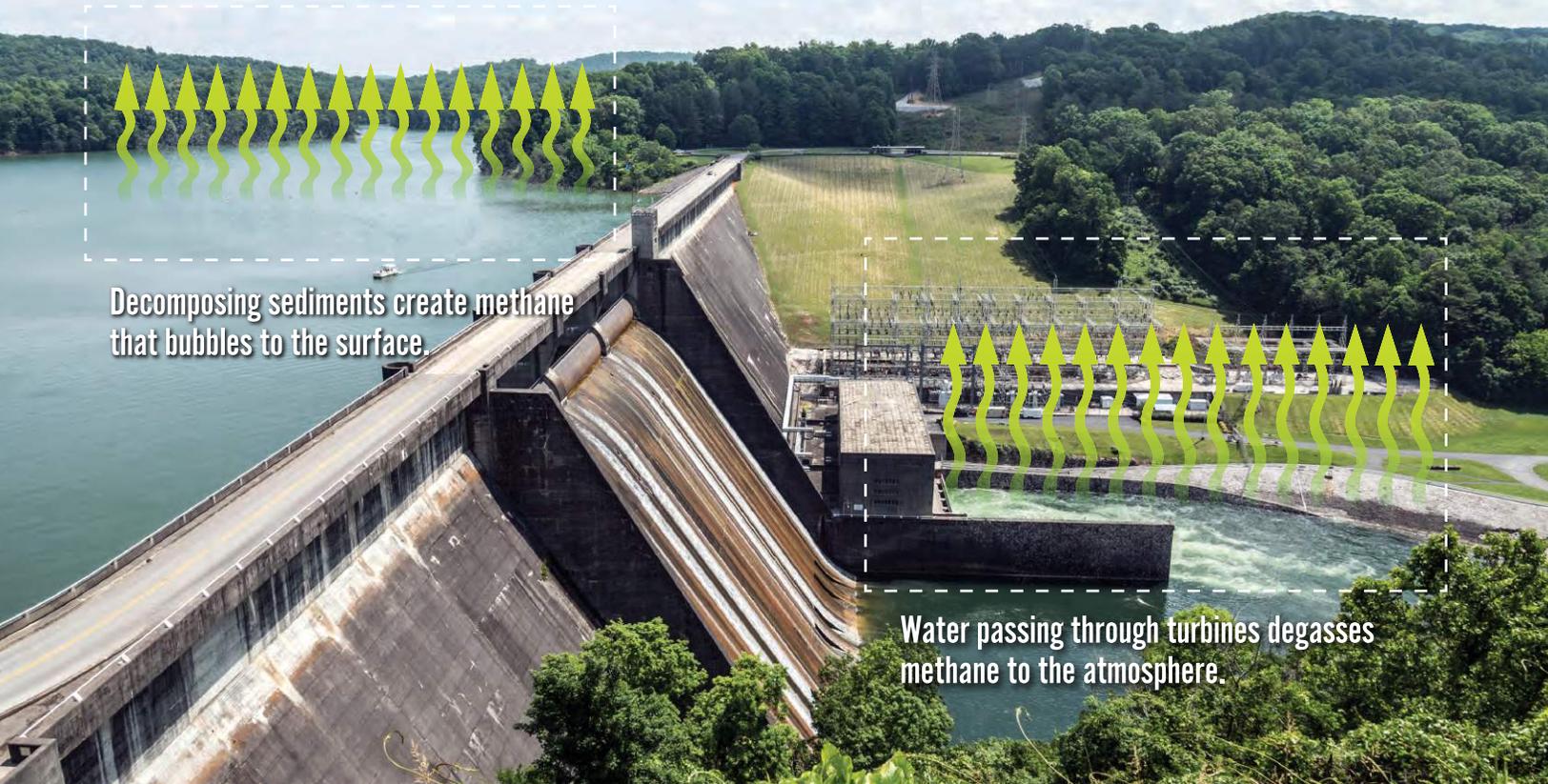


HYDROPOWER DAMS ACROSS THE U.S. ARE LEAKING METHANE



Where do these emissions come from?

- After rivers are dammed and lands flooded to form reservoirs, the inundated biomass decomposes. When this decomposition of organic matter occurs in the low-oxygen environment present in a majority of reservoirs, methane is produced.¹
- Methane and carbon dioxide can escape into the atmosphere from hydropower reservoirs by bubbling up from sediments, degassing when water is passed through a hydropower facilities' turbines or spillways, and diffusing at the air-water surface.²

The Science is Clear

"Hydroelectric power reservoirs produce renewable energy, yet also emit methane at their surfaces, and from turbines and downstream reaches."³

1. John A. Harrison et al., "Reservoir Water-Level Drawdowns Accelerate and Amplify Methane Emission", *Enviro. Sci. & Technol.* 2017, 51, 1267-1277, <https://pubs.acs.org/doi/10.1021/acs.est.6b03185>

2. Kyle B. Delwiche et al., "Estimating Drivers and Pathways for Hydroelectric Reservoir Methane Emissions Using a New Mechanistic Model", *J. Geophysical Rsch.*, Aug. 17, 2022, <https://doi.org/10.1029/2022JG006908>

3. Ibid.



HYDROPOWER HAS A METHANE EMISSIONS PROBLEM.

How bad is all of this?

- Reservoirs are artificial, human-made water bodies. These anthropogenic methane emissions can be created, managed, and even reduced by human activity.³
- Some individual hydropower facilities emit on par with fossil fuel sources like coal and natural gas when considered on an emission-per-unit-of-energy basis.⁴
- We do not know the extent of the greenhouse gas emissions from hydropower reservoirs because there is currently no requirement for owners to monitor, report, or mitigate their emissions.
- Globally, dams and reservoirs (with and without hydropower) accounted for 5.2% of human-derived methane emissions in 2020. Reservoir emissions rivaled the international shipping sector in terms of carbon dioxide equivalence in 2020.⁵

What can we do about this problem?

- Policymakers and regulators must require monitoring, reporting, and mitigation of methane from hydropower dams and reservoirs.
- Mitigation opportunities exist to reduce these emissions: boosting dissolved oxygen levels using aeration devices, adding intakes to draw water from the upper levels of reservoirs, changing operating levels, reducing upstream nutrient run-off, and recovering methane to convert to energy have been posed as strategies to reduce fugitive emissions from hydropower facilities.

Tell lawmakers to require monitoring of methane from hydropower dams and reservoirs.

3. The Environmental Protection Agency has noted, “[s]ince reservoirs are not natural systems, greenhouse gasses emanating from reservoirs are considered to have an anthropogenic, or human-made, origin.” United States EPA, “Research on Emissions from U.S. Reservoirs”, <https://www.epa.gov/air-research/research-emissions-us-reservoirs> (last visited Oct. 20, 2022)

4. For example, the validated G-res Tool modeling results of Weiss dam on the Coosa River in Alabama shows a net carbon footprint of 118,437 metric tons of carbon dioxide equivalent being emitted per year, with

methane composing over 60% of the emissions. Validated G-res modeling results for Weiss dam and reservoir and R.L. Harris dam and reservoir are available at https://alabamarivers.org/reservoir_emissions

5. Cnythia Soued et al, “Reservoir Carbon Dioxide and Methane Emissions and Their Climate Impact Over the Period 1900-2060”, *Nature Geoscience*, (Sept. 2022), Vol 15, 700-705, <https://www.nature.com/articles/s41561-022-01004-2>