Technology Assessment Program (TAP)
Lake Erie Algal Bloom

Request for Technologies

Issue Date: November 16, 2020
Due Date: January 15, 2021

TABLE OF CONTENTS

Section Page

1.0 INTRODUCTION

The State of Ohio is soliciting proposals to address algal blooms in Lake Erie with emerging technologies, improved uses of existing technologies, or established technologies currently unused in the Lake Erie basin. This Request for Technologies (RFT) includes the following: a brief overview of the program, its objectives, purpose, and goal; eligibility; submittal requirements; an overview of the selection process; an overview of a third-party evaluation process; and disclaimers.

1.1 BACKGROUND

H2Ohio (http://h2.ohio.gov) is Governor Mike DeWine's comprehensive, data-driven water quality plan to reduce harmful algal blooms (HABs), improve wastewater infrastructure, and prevent lead contamination.

"We have a moral obligation to preserve and protect our natural resources," Governor DeWine said during a speech at the National Museum of the Great Lakes in Toledo. "My H2Ohio plan is a dedicated, holistic water quality strategy with long-lasting solutions to address the causes of Ohio's water problems, not just the symptoms."

Governor DeWine's H2Ohio plan is an investment in targeted solutions to help reduce phosphorus runoff and prevent algal blooms through increased implementation of agricultural best management practices and the restoration of wetlands; improve wastewater infrastructure; replace failing home septic systems; and prevent lead contamination in high-risk daycare centers and schools.

HABs have been a concern in Lake Erie for decades, and the State of Ohio has a long history of developing solutions to address them. In support of these efforts, state agencies are often presented with new approaches for addressing HABs. Since these approaches often involve technologies and products that are typically innovative, proprietary, and span multiple scientific disciplines, state agencies alone are not best positioned to evaluate the efficacy and feasibility of these proposals.

1.2 PROGRAM OBJECTIVES

To guide Ohio in addressing HABs in Lake Erie, H2Ohio initiated a Technology Assessment Program (TAP) to solicit and evaluate technologies that support one or more of the following:

1. Reduction of nutrient loading to rivers, streams, and lakes;
2. Removal of nutrients from rivers, streams, and lakes;
3. Reduction of the intensity or toxicity of algal blooms;
4. Recovery of nutrients from animal waste; and
5. Improvement of nutrient removal in wastewater treatment systems.

In furtherance of this program, the Ohio Lake Erie Commission created a public advisory council called the H2Ohio TAP Team to help solicit and prioritize technology

proposals for further review by a third-party firm. The H2Ohio TAP Team is comprised of representatives from the private sector, public sector, trade associations, and non-profit companies.

1.3 PURPOSE OF RFT

The purpose of this RFT is to allow those with innovative technologies and products to provide information on their proposals, which allows the H2Ohio TAP Team to identify ten promising technologies that can reasonably address the program objectives, as described in Section 4.0. These ten selected applicants will work closely with a third-party firm, that will conduct detailed evaluations of the technologies, prepare summary reports, and provide recommendations to the H2Ohio TAP team. Applicants do not have to construct or install any technologies to be eligible, but the concept must have already been validated by the applicant or others in a relevant environment or laboratory.

1.4 PROJECT GOAL & INCENTIVE FOR PARTICIPATION

After the third-party consultant completes detailed evaluations of the selected technologies, H2Ohio TAP's goal is to facilitate demonstration projects with the proposals determined by the third-party consultant to be viable solutions for Lake Erie (see Section 5.0). H2Ohio TAP will pursue funding for select projects and technologies with appropriate federal, state, and philanthropic funding sources. While specific funding for demonstration projects cannot be guaranteed at this time, the H2Ohio program so far has accomplished the following:

- Nearly $30 million in H2Ohio funding is being spent to build 3,535 wetland acres, filtering the nutrients from over 60,000 acres of land. By late March 2020, the Ohio Department of Natural Resources had executed grant award agreements for nearly $28.9 million in project work and obligated approximately $3.3 million in project monitoring and management expenses.

- H2Ohio's drinking and wastewater infrastructure work is targeting disadvantaged communities, and the $8.675 million in H2Ohio funds that Ohio EPA received for this work leveraged $23 million in additional funds for infrastructure, home sewage, and lead remediation projects. Ohio EPA directed $4.21 million for seven critical water and sewer projects, $1.75 million to seven local health districts for replacement of household home sewage systems, and $750,000 for lead service line replacement.

- H2Ohio developed a new agriculture program to provide H2Ohio funding to farmers to implement Best Management Practices (BMPs) on their farms. H2Ohio targeted the most cost-effective BMPs for farmers in 14 counties in the Maumee River Watershed. The Ohio Department of Agriculture's annual goal for cropland enrollment in the H2Ohio program is 1 million acres with a total funding request for 2021 BMPs of $42 million.

For more information on the H2Ohio program please visit: h2.ohio.gov.

H2Ohio TAP will also provide the following support for selected proposals. The selected technologies will receive a copy of the report prepared by the third-party consultant to supplement grant applications and marketing materials. The final reports for each technology will be made publicly available. Where appropriate, Letters of Support for the selected technologies, consistent with the results of the final reports, will be provided by the Ohio Lake Erie Commission. H2Ohio TAP will share the final reports with applicable state agencies, as well as provide an opportunity for applicants to present their technologies at an H2Ohio TAP seminar/webinar. Furthermore, technologies will receive feedback from leaders in innovation at some of Ohio's largest private companies, nonprofit companies, and state agencies.

After the third-party evaluation, selected technologies that have received a favorable review will be automatically enrolled into the Cleveland Water Alliance's (CWA) water accelerator program for market evaluation and consideration for additional support services. The program focuses on narrowing the time from *development to market* for early stage technologies through test bed applications and entrepreneurial support. No technology is required to participate in the program, nor is auto enrollment a guarantee that the technology will be accepted for further support. The CWA is one of the world's leading freshwater Blue Economy Innovation Clusters and focuses on leveraging technology to drive regional economic development throughout Ohio and the Great Lakes region. The program is supported by the U.S. Economic Development Administration's Build to Scale program, the Cleveland Innovation Project, industry, utilities, academic institutions and philanthropy.

The following benefits are included in CWA's Water Accelerator Program:

1. Access to multiple test beds, built for 'plug and play' of new technology solutions for firms from throughout the world;

2. Access to capital;

3. Workforce assistance for firms within Ohio or considering adding staff in Ohio;

4. Inclusion into CWA's internationally recognized open innovation competitions including Erie Hack 3.0; and

5. Mentoring and networking support for doing business in Ohio, the Great Lakes region, and beyond.

2.0 ELIGIBILITY

H2Ohio TAP has identified the following eligibility requirements to participate in this program.

2.1 APPLICANTS

Eligible applicants are those with innovative technologies or products, improvements to existing technologies or products, or established technologies or products that are new approaches for the Lake Erie basin that address HABs, or nutrient removal or reduction. H2Ohio TAP reserves the right to request that any applicant submitting improvements to an existing technology or product provide an affidavit addressing ownership rights to the existing technology or product.

2.2 TECHNOLOGIES

H2Ohio TAP is specifically interested in evaluating technologies that meet at least one of the following objectives:

- **Reduce nutrient loading to rivers, streams, and lakes:** For example, technologies or products, such as new fertilizers, that reduce nutrient loading by (1) intercepting nutrients on land or in shallow groundwater, (2) improving nutrient application to farmland, or (3) reducing the mobility of nutrients on farmland.

- **Remove nutrients from rivers, streams, and lakes:** For example, technologies used in Lake Erie's tributaries that (1) efficiently remove nutrients from large volumes of water, (2) produce a valuable product rather than a waste stream, or (3) require minimal operational efforts.

- **Reduce the intensity or toxicity of algal blooms:** For example, technologies that remove algae or prevent the growth of algal blooms and (1) can scale to the size of Lake Erie, (2) require minimal operational efforts, or (3) convert HABs into a product.

- **Recover nutrients from animal waste:** For example, technologies that cost effectively convert animal waste into a valuable and transportable fertilizer resource, energy source, or other productive byproduct, focusing on regional or onsite use of the technology.

- **Improve nutrient removal in wastewater treatment systems, specifically with small (e.g. lagoon) and decentralized systems:** For example, technologies that can be added to a treatment system and that (1) produce a valuable product rather than waste stream, or (2) more efficiently remove nutrients than currently used technologies.

2.3 READINESS

Preference will be given to technologies that meet a National Oceanic and Atmospheric Administration (NOAA) Readiness Level of 5 or above, meaning that the technology, system, or concept has been validated in a relevant environment or laboratory (https://www.noaa.gov/organization/administration/nao-216-105b-policy-on-research-and-development-transitions). H2Ohio TAP will give preference to technologies with more advanced levels of readiness. The goal of this process is to help Ohio innovate its HABs response; therefore, technologies already in widespread use in the Lake Erie basin will not qualify.

3.0 SUBMITTAL REQUIREMENTS

H2Ohio TAP has developed the following requirements for technology proposals.

Due Date & Time: January 15, 2021, 4:00 PM (EST).

Technology proposals must not exceed fifteen single-sided pages in length (maximum 15 pages including all appendices and attachments). Proposal narratives should be in Calibri font with minimum 11-point font size and one-inch margins.

Submission Procedure: All proposals must be submitted via email to OhioEPAH2OhioTAP@epa.ohio.gov. Paper copies and faxes will not be accepted. Please attach the proposal and all supporting documentation as one PDF file. The email submissions can contain a maximum of one attachment. Please label the PDF file and the subject of the email with the word "proposal," the proposal name and the company name. For companies submitting multiple technologies, please send a separate email for each proposal. If the attachment will exceed 20 MB, which is Ohio EPA's email capacity, please submit the proposal through Ohio EPA's file sharing website: https://fileshare.epa.ohio.gov. Instructions to self-register and send large files to Ohio EPA can be found at https://epa.ohio.gov/Portals/29/documents/ofa/LiquidFiles%20Instructions.pdf. If you have any questions about how to submit a proposal, please submit those questions to OhioEPAH2OhioTAP@epa.ohio.gov with the word "question" in the subject of the email.

Question and Answer Period: Questions about the RFT and H2Ohio TAP program will be accepted up until December 15, 2020. Please submit these questions to OhioEPAH2OhioTAP@epa.ohio.gov with the word "question" in the subject of the email. These questions and answers to these questions will be publicly posted through a link on the H2Ohio website: h2.ohio.gov.

Public Records: Please note that these **technology proposals will become public records**, so refrain from including proprietary information at this phase of the process. If there is relevant information that applicants desire to remain confidential, applicants should note the potential availability of that information, describing the information to the extent that can be made public at this time. Technologies that advance to the in-depth evaluation phase, will have an opportunity to submit proprietary data and information

directly to the independent third-party firm under the protection of a non-disclosure agreement that will be provided and may submit a separate request to Ohio EPA utilizing the following guidance for trade secret protection under Ohio's public records law: https://www.epa.ohio.gov/Portals/47/facts/TradeSecretProtectionRequests.pdf.

Award date: H2Ohio TAP will notify technologies by March 31, 2021, on its determination of which technologies will advance to the third-party evaluation.

Content of Proposals: Applicants are requested to respond to all eight of the following items as part of the project narrative in their proposal submittal:

1. **Introduction**
    a. What is the name of the technology?

    b. What objective(s) does the technology address (i.e., which bullet under Section 2.2 above)?

    c. How does the technology advance that objective?

2. **Contact Information and Company Profile**

    a. Who is the primary point of contact?

    b. What is the primary contact's mailing address, email address and phone number?

    c. What is the size of the company (e.g., number of staff, number of offices, annual revenue)?

    d. How many years has the company been in business?

    e. (Optional) Does the company qualify for certification under Ohio's Encouraging Diversity, Growth and Equity (EDGE) Program as defined in Ohio Administrative Code 123:2-14? For more information please see: https://das.ohio.gov/Divisions/Equal-Opportunity/Business-Certification/Encouraging-Diversity-Growth-and-Equity-EDGE-Program

3. **Narrative Description of the Technology**

    a. What is the technology, how is it used and who are the main beneficiaries?

    b. What does the technology do, how does it do it and what physical, chemical and biological factors are involved in the process?

    c. How is the technology innovative and what makes this technology different from other technologies on the market?

    d. How is the technology similar to other technologies on the market?

e. What materials does the technology use, convert, treat, or act upon (e.g., animal waste, wastewater, surface water, algae, etc.)?

f. Does the technology reduce/remove nitrogen, phosphorus, or both?

g. Has this technology been successful in similar land uses/soils/water bodies as those that are located within the Lake Erie basin?

h. What are the technology's maintenance and operation requirements?

i. What is the expected lifespan of the technology before major re-charge or maintenance is required?

4. Readiness for Implementation and User Receptiveness

a. What is the technology's NOAA Readiness Level?

b. What are the types of entities that would use/purchase this service/technology?

c. Is the technology applied to land or water and how is it applied?

d. What is the lead time needed for implementation?

e. What anticipated permitting requirements are associated with use of the technology and are there any permitting concerns?

5. Risk/Concerns

a. What, if any, are the environmental, health, and safety risks/concerns associated with the technology?

b. How will those risks/concerns be mitigated?

6. Community Perception and Disproportionate Impact

a. What are the anticipated community impacts or community perceptions?

b. How will any negative impacts be mitigated or negative perceptions be addressed?

c. How does the applicant intend to ensure the use of this technology does not have a disproportionate impact on minority or lower income communities?

d. Please provide a link to your company's current antidiscrimination policy or a copy of your current antidiscrimination statement.

7. Past Validation or Use of the Technology and Available Data

a. Has this technology been previously validated or used in a relevant environment? Where and how?

b. Has this technology been previously validated in a laboratory? Where and how?

c. Has this technology been previously validated in a mesocosm or pilot project study? Where and how?

d. What are the previous uses of this technology in pilot-scale or field applications (narrative project description, location, size, references, results/outcomes, cost)?

e. What types of performance or validation data can be provided upon request?

f. What other information about the technology can be provided upon request?

8. Costs

a. What are the operational, material, capital, maintenance, decommissioning, and other costs?

b. Please provide costs relative to the scale of treatment (e.g., cost per pound removed or number of acres treated).

4.0 TECHNOLOGY SELECTION PROCESS

Of the technologies received, the H2Ohio TAP Team will narrow the list of technology proposals to ten using the following selection process:

1. H2Ohio TAP will perform a completeness review to ensure that proposals are fully responsive.
2. The H2Ohio TAP Executive Committee will distribute each proposal to at least three of its members for review. The decision on which member will review each proposal will be based on the type of the proposal and the reviewers' areas of expertise.
3. The reviewers will score each proposal using the criteria and scoring described below.
4. The independent third-party firm will also provide input on each proposal.
5. The ten highest scoring proposals will advance to the independent third-party evaluation.

4.1 EVALUATION CRITERIA & SCORING

Reviewers will provide scores of 0-5 for each category listed below, which are derived from the information requested in Section 3.0. The ten highest scoring proposals will advance to the in-depth third-party evaluation phase.

1. Company Profile
2. Innovation
3. Maintenance and Operational Requirements
4. Feasibility
5. Scalability and Nutrient Reduction Potential in Lake Erie Basin
6. Readiness and Implementation Lead Time
7. Risk/Concerns
8. User Receptiveness, Community Perception, and Disproportionate Impact
9. Past Validation and Available Data
10. Cost

5.0 THIRD PARTY EVALUATION PROCESS

The top ten applicants selected by the H2Ohio TAP committee will be asked to participate in further evaluation and submit additional information to the independent third-party firm. Technologies wishing to submit proprietary information to the third-party firm will be able to enter into a non-disclosure agreement that will be provided by the third-party firm and may seek protection under Ohio EPA's trade secret process addressed above in Section 3.0.

The independent third-party firm will conduct a comprehensive desktop assessment of each selected technology, which involves a more in-depth evaluation than the initial screening. The third-party firm will use additional information provided by applicants to perform the following evaluations:

1. Proof of concept review
2. Fatal flaw analysis
3. Review of previous implementation of the technology or similar technologies
4. Review of data quality objectives
5. Review of quality assurance/quality control procedures and reports
6. Evaluation of scalability
7. Information gap evaluation
8. Evaluation of cost; both total and by unit, such as nutrient reduced/removed
9. Feasibility review for a proposed demonstration project
10. Feasibility review for full scale implementation
11. Statement of probability of success

The primary objective of this comprehensive evaluation is to assess reliable, quality performance and cost data on these technologies. The procedures used in this analysis are critical, and the third-party firm will stringently apply a QA/QC plan throughout each assessment to ensure consistency and reliability across all evaluations.

5.1 TECHNOLOGY VENDOR EXPECTATIONS

It is anticipated that each applicant who has submitted one of the ten selected technology proposals will support the third-party firm evaluation process by providing additional and more detailed information, responding in a timely manner to inquiries by e-mail and telephone, and participating in periodic conference calls.

5.2 ADDITIONAL INFORMATION FOR EVALUATION PROCESS

Technologies advancing to this assessment will be evaluated on existing data and information provided by each technology applicant and not based upon new studies or data generating activities. It is anticipated that each applicant will support the third-party firm by providing additional information, such as the following as applicable:

- **Reduce nutrient loading to rivers, streams, and lakes:**
    a. Does the technology reduce/remove nitrogen, phosphorus or both?
    b. What land uses does this technology apply to?
    c. What is the relationship between the treatment area of the technology and the drainage area (e.g., a one-acre wetland might treat runoff from 10-acres)?
    d. Has this technology been successful in similar land uses/soils as those that are located within the Lake Erie basin?
    e. Are there limitations to the technology in terms of pounds of nutrients intercepted or removed?
- **Remove nutrients from rivers, streams, and lakes:**
    a. Does the technology reduce/remove nitrogen, phosphorus or both?
    b. What waterbody type is the technology designed for (e.g., small stream, large river, pond, lake)?
    c. Does the technology produce a useful byproduct? If so, what is the byproduct? And what could it be used for?
    d. Does the technology produce a waste stream?
    e. What are the costs, if any, for the transportation of the byproduct to a location where it can be used? Or can the byproduct be used on-site?
    f. How does the cost of technology change, depending on the scale of treatment?
    g. How many pounds of nutrients does the technology remove? Is this dependent on volume of waterbody, surface area, or flow?
- **Reduce the intensity or toxicity of algal blooms:**
    a. What dosage is required for this technology (e.g., XX pounds needed to treat YY acres)?
    b. What process is used to reduce the intensity or toxicity of algal blooms (e.g., chemical, physical, or biological)?

c. Does the technology cause algal cells to lyse (i.e., break apart)? If so, does the technology treatment/remove the algal toxins that are released when cells are lysed? If not, how is the release of toxins mitigated?

d. Does the technology specifically target cyanobacteria and/or are other species of algae (e.g., green, brown, diatoms) impacted by the technology?

e. If the technology converts HABs into a byproduct, how are potential algal toxins that could be present treated, removed, or mitigated?

f. If the effects of the technology are temporary, what is the expected timeline for treatment and re-application?

- **Recover nutrients from animal waste:**

  a. What uses or markets would be suitable for the fertilizer product produced?

  b. What is the potential for nutrient runoff from the product?

  c. How is the technology applied (e.g., is it a separate treatment system or an adaptation to existing animal waste management systems in Ohio)?

  d. What are your experiences with marketing the technology and product? Have there been limitations on farmer acceptance?

  e. Is the technology applicable at individual farm scale or is it more applicable to regional application?

  f. How is the technology typically funded for use on privately-owned farms?

- **Improve nutrient removal in wastewater treatment plants, specifically with small (e.g. lagoon) and decentralized systems:**

  a. What volume of wastewater and nutrient load is this technology designed to treat?

  b. What is the nutrient removal efficiency of this technology? What are the relevant variables that affect efficiency?

  c. Are plant materials used in this process? What is the anticipated use or disposal of the plant material when it has exceeded its useful life.

Upon completion of this comprehensive assessment, the independent third-party firm will prepare assessment reports for each technology and provide recommendations to H2Ohio TAP.

6.0 DISCLAIMERS

For the purposes of this RFT, H2Ohio TAP makes the following statements:

1. Please note that proposals submitted in response to this RFT will become public records, so refrain from including proprietary information at this phase of the process.

2. Note that applicants that are selected for evaluation by the independent third-party firm may seek protection under Ohio EPA's trade secret process addressed above in Section 3.0 and may enter into a non-disclosure agreement with the independent third-party.

3. No funding or compensation will be provided to any applicant for preparation of their proposal or for their participation in this evaluation process.

4. There are no guarantees made to any applicant participating in this evaluation process.

5. Technology proposals are due by on or before 4:00 p.m. on Thursday January 15, 2021.

6. Technology proposals must not exceed fifteen (15) single-sided pages in length, which includes narrative and all appendices/attachments.

7. Proposal narrative should be in Calibri font with minimum 11-point font size and one-inch margins.

8. Proposals will be accepted in electronic file format only, preferably PDF.

9. The H2Ohio TAP Team, Ohio EPA, and the third-party technical consultant will not discriminate, by reason of race, color, religion, sex, military status (past, present, or future), national origin, disability, age, or ancestry in soliciting, scoring, or evaluating technology proposals under this program.

10. Participation in the program does not entitle the selected applicants to any endorsement or approval of proposed technologies from the State of Ohio, Ohio EPA, H2Ohio, or H2Ohio TAP. Further, the State of Ohio, Ohio EPA, H2Ohio, and H2Ohio TAP do not make any warranty of validity or guarantee of the success for the proposed technologies.