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Engaging stakeholders to improve innovation in the water industry

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WATER RESOURCES CENTER OHIO WRC

Agenda

1. Why do we want to improve innovation?
   a) Lack of Innovation in Small PWSs
   b) Previous Work in Ohio to Enhance Innovation
   c) Cost of Innovation

2. How are we overcoming barrier to innovation?
   a) Stakeholders Interaction
   b) Overview of the Ohio Water Resources Center (WRC)
   c) Ohio WRC Approach

Technology Innovation Challenging in the Water Industry

Nationwide discussion to improve innovation b/c

Innovation:

- Improves finished water quality → better public heath outcomes
- Reduces cost

Barriers

Barriers to Approval of Drinking Water Technologies for Small Public Water Systems (PWSs)

- Water Innovation Network for Sustainable Small Systems reported results of a survey of 49 state water regulating agencies, with 38 responding (Ringenberg 2017)

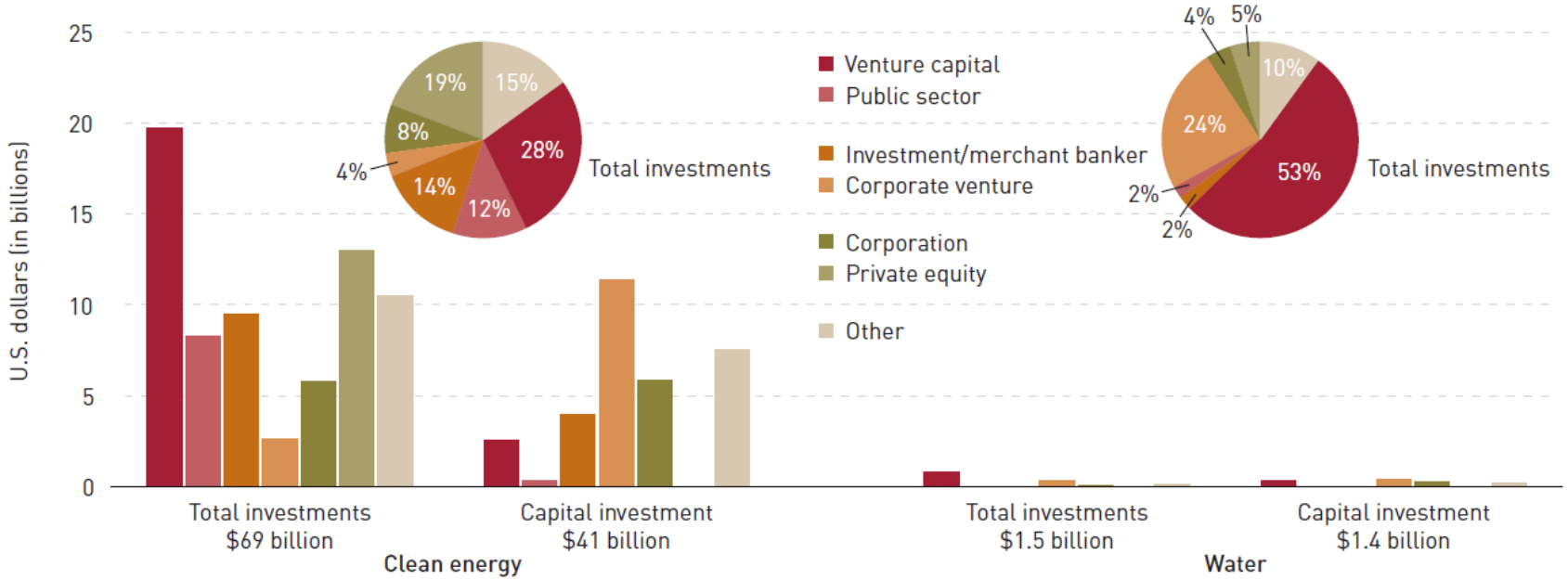
Barriers	Respondents *n* (%)
Staff time for review/approval	29 (76)
Limited staff to run program	23 (61)
Lack of information from vendors (data)	23 (61)
Lack of training of staff for adequate evaluation	22 (58)
Lack of funding for testing/evaluation	21 (55)
Concern over cost to systems	19 (50)
Risk from deceptive vendors	13 (34)
Regulation	9 (24)
Lack of product/technology support	9 (24)
Cost to vendors to meet program requirements	8 (21)
Procedural	8 (21)
Statute	4 (11)

Total number of respondents = 38

Additionally:

- Systems being risk averse
- Lending agencies being averse to funding new technologies
- Long life expectancy and complexity of treatment
- Limited resources of small public water systems
- Complicated regulatory requirements and restrictions

Sources and Level of Investment Dollars for U.S. Innovation in the Clean Energy and Water Sectors, 2000–13



Source: Cleantech Group 2014.
Note: Clean energy = biomass generation + energy efficiency + energy storage + solar + wind + geothermal + nuclear + hydro & marine + smart grid; and water = water + wastewater.

Building new drinking water treatment plant or plant upgrades have to follow:

- WATER QUALITY BASED Regulation and Rules:
  a) US EPA regulation
  b) Individual State rules (+ guidelines in Ohio)

To achieve the regulated water quality, **Ten States Standards (TSS) document was developed in 1953**

- Contains three sections:
  a) Policy statements
  b) Interim standards
  c) Design standards

GLUMRB: Great Lakes Upper Mississippi River Board (of State Public Health and Environmental Managers; water treatment)

"Emerging Technologies" in Ohio are those for which there are no design criteria in TSS

There are 10+ technologies successfully used in drinking water treatment plants that are still considered "emerging technologies"

History of Plan Approval in Ohio

Before Guidelines (1990's)

OEPA could not provide Plan Approval for Emerging Technologies

With Guidelines (2000's)

OEPA can provide Plan Approval **with a demonstration study**

With Supplemental Design Criteria (Our Project)

OEPA can provide Plan Approval **without a demonstration study**

Demonstration studies

Different scales (sizes)

- bench scale
- pilot scale
- full scale

Exact conditions of study described in guidelines, but generally:

- Have to represent production scale
- Appropriate amount of time under most challenging water quality
- Continuous data collection

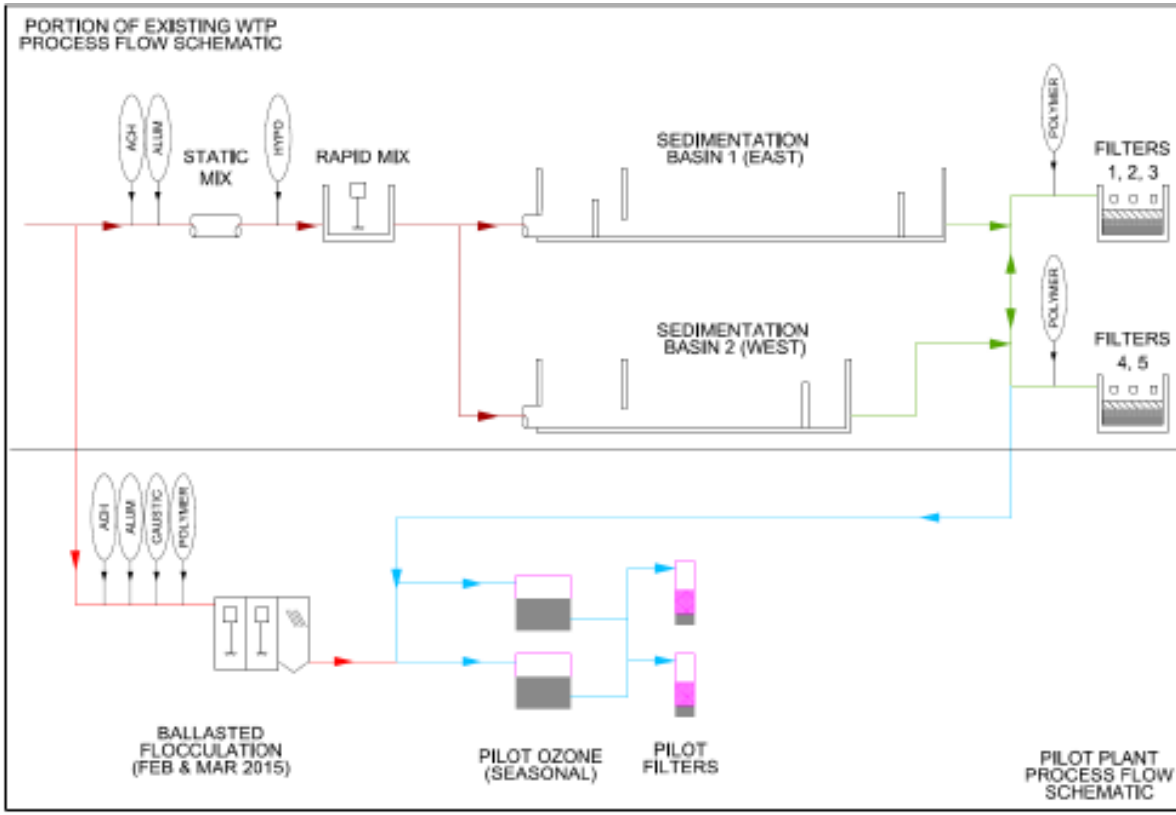
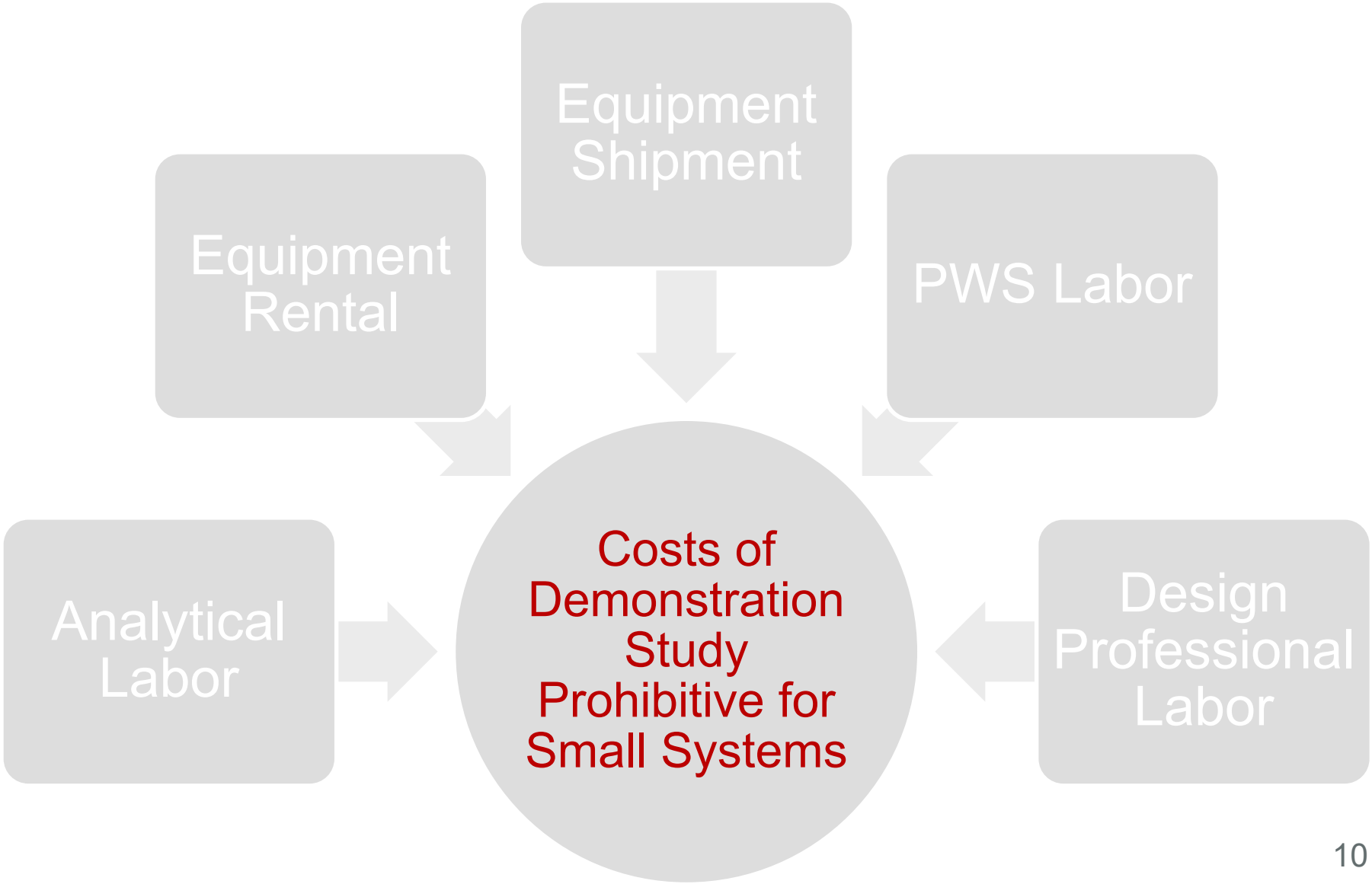
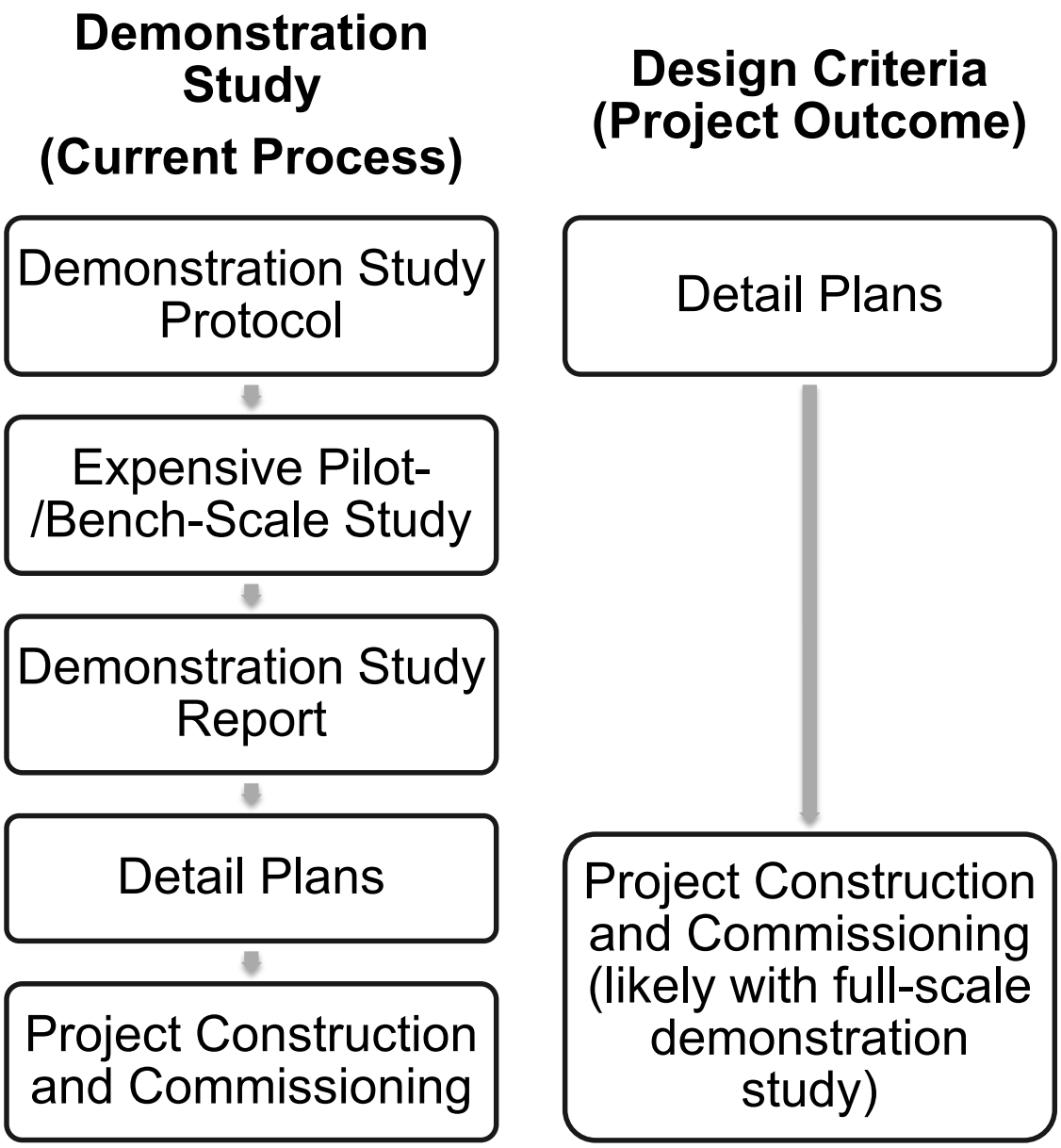


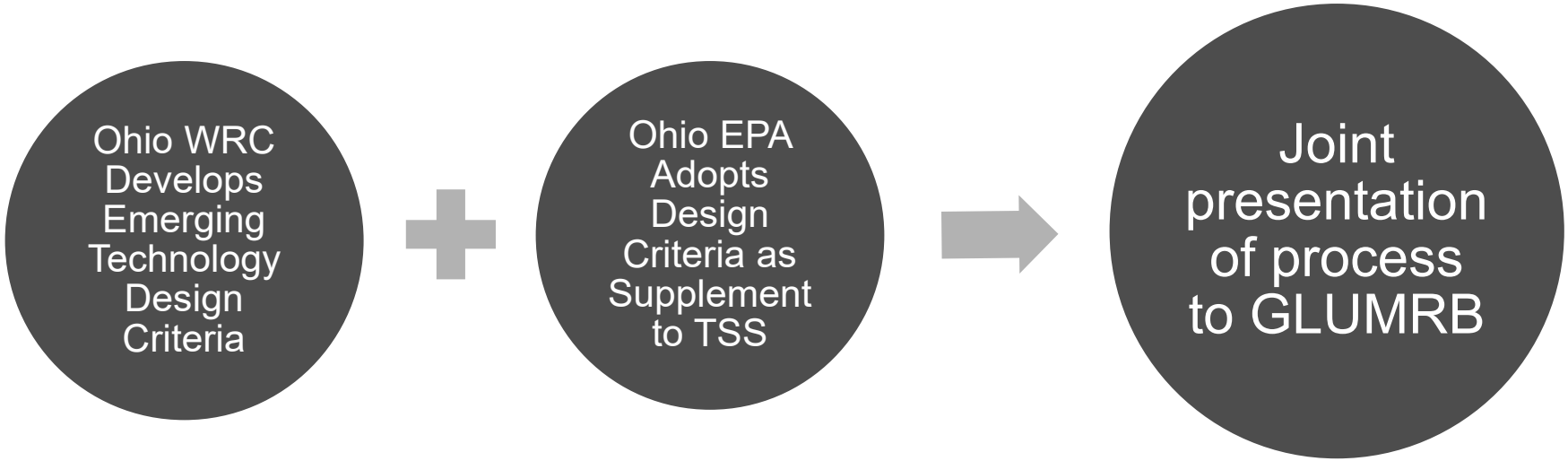
Figure 1-2. Existing WTP and Pilot Plant Process Flow Schematic


Equipment Shipment
Equipment Rental
PWS Labor
Analytical Labor
Costs of Demonstration Study Prohibitive for Small Systems
Design Professional Labor

Project Goal



Potential Impacts Beyond Ohio



Stakeholders

Ohio EPA

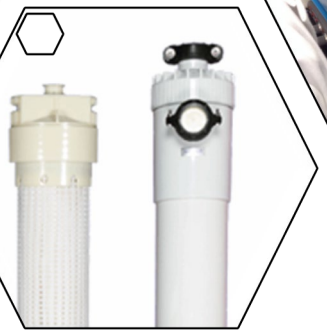
Ohio Environmental Protection Agency

Vendors

Researchers & Experts

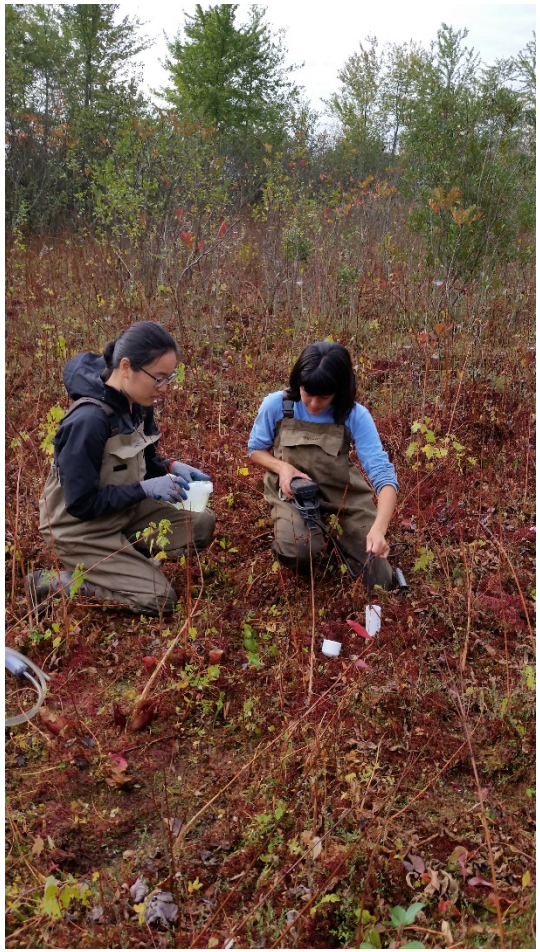
PWSs

Design Engineers



Ohio Water Resources Center

- Enables and conducts water resources research,
- Fosters collaboration among water professionals,
- Trains the next generation of water scientists,
- Educates the public on water resources issues in the State of Ohio.



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Stakeholder interaction:

Ohio EPA
- Review demonstration study protocols submitted by PWSs and unofficially approve technology based on demonstration study data
- Review detailed plans and Officially approve detail plans

PWSs
- Commission design engineers to create demonstration study protocol and most of the times to preform demonstration study
- Commission design engineers to develop detailed plans for installing emerging technology

Design engineer
- Communicates with vendor to determine design criteria to test in demonstration study
- Create and performs demonstration study
- Creates detailed design plans

Vendor
- Runs membrane models to recommend preliminary design criteria
- Recommends design criteria to test in demonstration study

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Ohio WRC Steps to Develop Design Criteria for Emerging Technology

Vendor

- Engage vendors to get recommendation for general design criteria
- Obtain demonstration study data or information about existing installations

PWSs

- Collect data from demonstration studies and full scale operation to validate vendor recommended design criteria
- Determine potential issues with design criteria

Design Engineers/ Experts

- Develop water quality parameters important for design
- Ensure level playing field in bidding process is maintained

Ohio EPA

Negotiate use of specific design criteria

- Good water quality – no demonstration study
- Intermediate water quality – follow-up full scale demonstration required
- Poor – pilot scale demonstration before design

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Acknowledgement

- Core Advisory Committee:

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  Cleveland Division of Water
  Columbus Division of Water
  Greater Cincinnati Water Works
  Newark Water Department
  Ohio EPA
  Westerville Water Department
  USEPA

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- Project Funding:

  Ohio Water Development Authority

OHIO WATER DEVELOPMENT AUTHORITY

Questions?