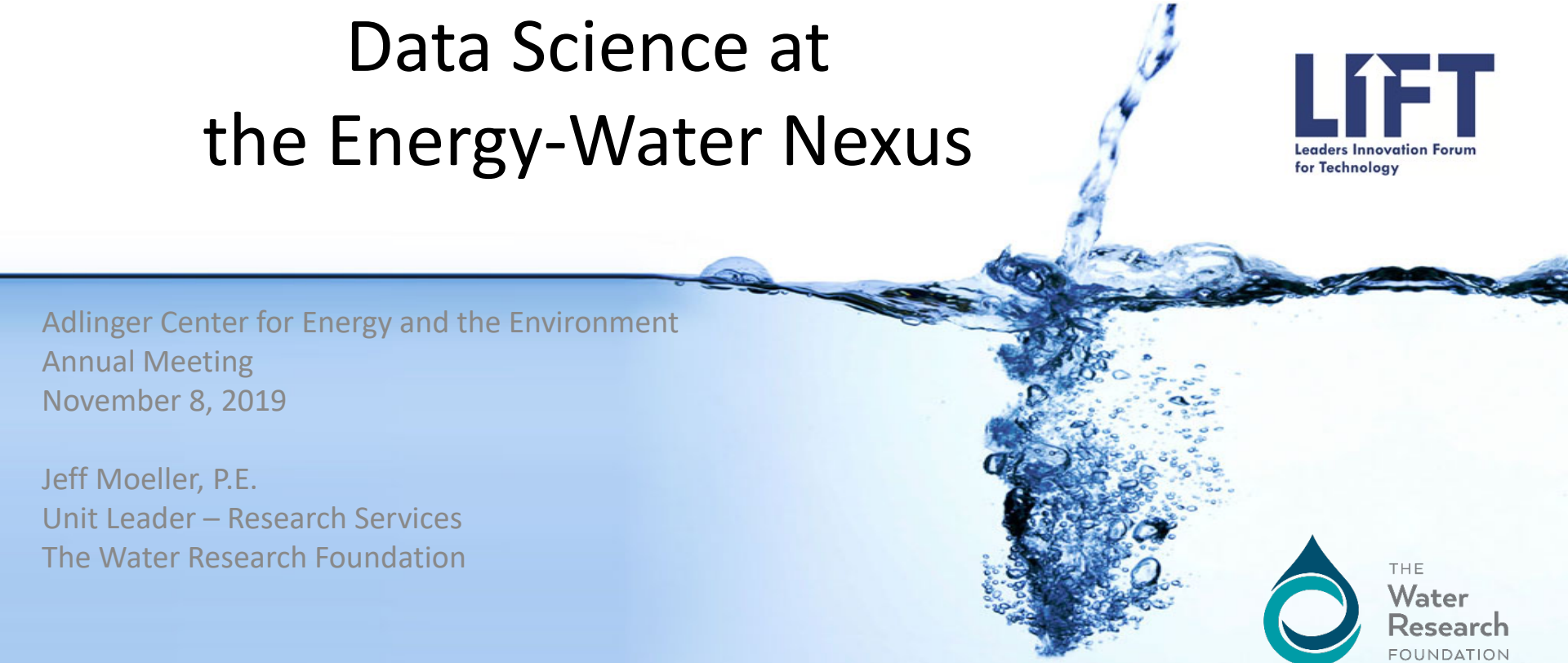
Panel Discussion: Data Science at the Energy-Water Nexus



LIFT
Leaders Innovation Forum for Technology

Adlinger Center for Energy and the Environment
Annual Meeting
November 8, 2019

Jeff Moeller, P.E.
Unit Leader – Research Services
The Water Research Foundation

THE Water Research FOUNDATION

THE
Water
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Leading not-for-profit research cooperative that advances the science of water to protect public health and the environment.

Learn more at www.waterrf.org

$700 Million in Research

2,300 Projects

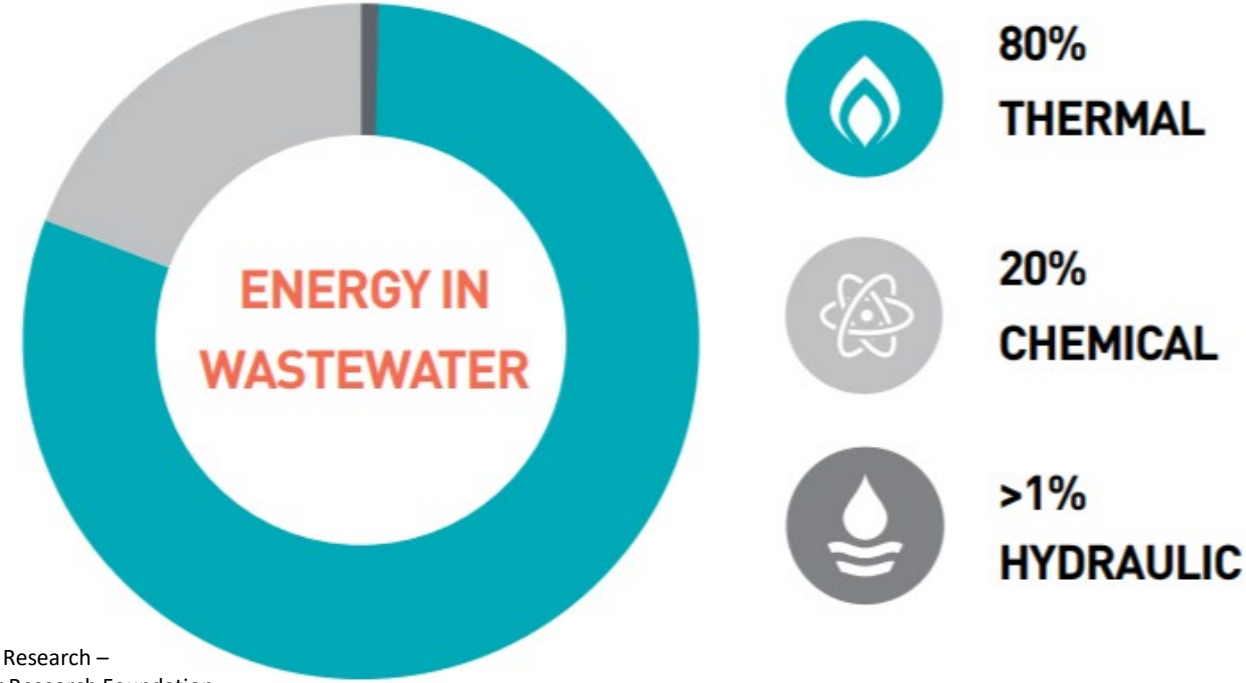
1,200 Subscribers

WRF Priority Research Areas

1. Compounds of Emerging Concern (CECs)
2. Cyanobacterial Blooms and Cyanotoxins
3. Disinfection By-products
4. Energy Production & Efficiency
5. Intelligent Water Systems
6. Lead & Copper
7. Watersheds/Receiving Water Quality
8. PFAS
9. Nutrients
10. Water Reuse
11. Co-Digestion
12. Stormwater and Flood Management
13. Waterborne Pathogens

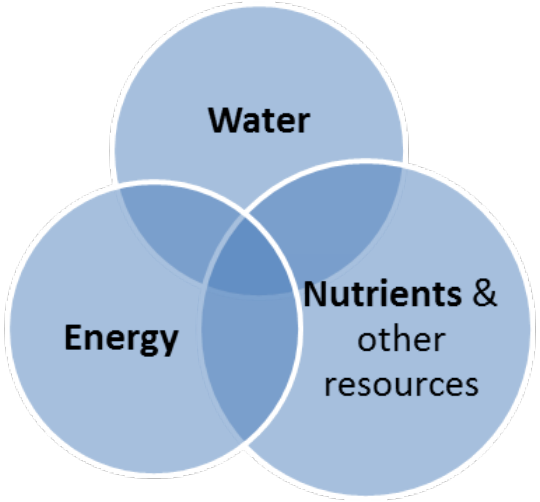
Energy in Wastewater

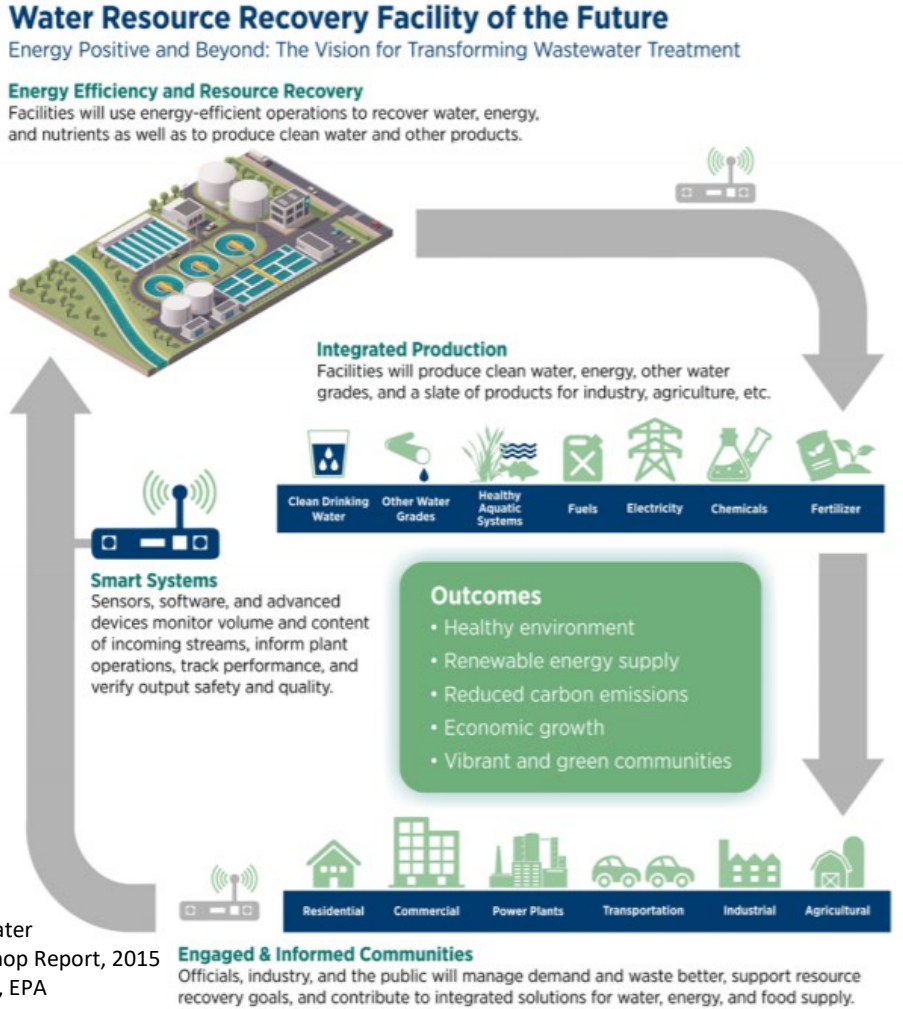
Wastewater contains 5-10 times the amount of energy needed for the wastewater treatment.



Source: Fact Sheet: Energy Production and Efficiency Research – The Roadmap to Net-Zero Energy (ENER1), The Water Research Foundation

Paradigm Shift: Wastewater as a Re-NEW-able Resource





Source: Energy-Positive Water Resource Recovery Workshop Report, 2015
Co-sponsored by NSF, DOE, EPA

Big Data in Energy Management

Example Ongoing and Completed WRF Research Projects

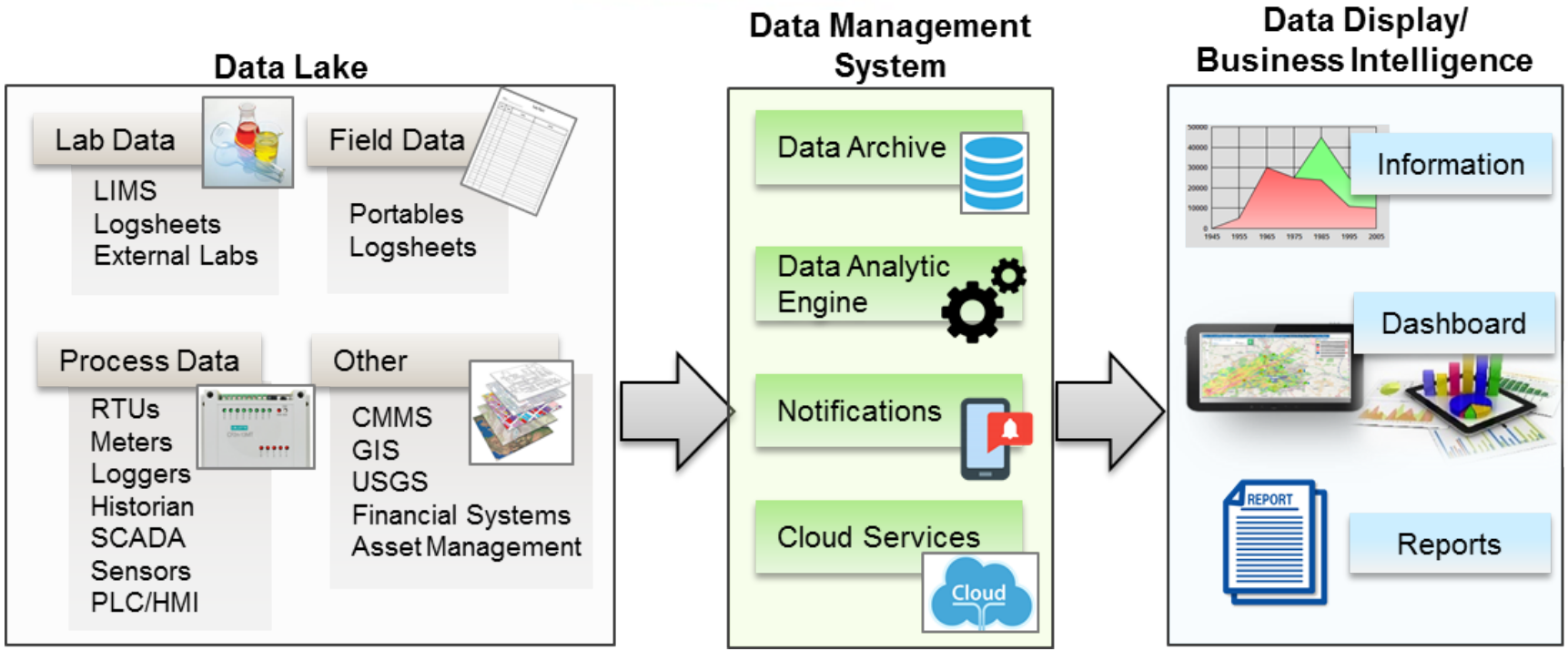
Managing Water and Wastewater Utility Data to Reduce Energy Consumption and Cost (4668, in publication)

Provides guidance on effective strategies, approaches, and practices for energy data management at water and wastewater utilities, by focusing on the identification of:

- Data sets of value to reduce energy consumption and cost of pumping operations and treatment processes;
- Data acquisition, transmission, communication, and storage requirements from various information technologies and energy management systems;
- Data analytics, platforms, and display methods that will support energy management decisions and provide business intelligence insights.

Also explores the associated benefits and challenges of data management by highlighting successful energy data management utility case studies.

Conceptual Schematic of a Holistic Data Management Solution



Example WRF Research Projects (cont.)

- Application of Big Data for Energy Management at Water Utilities (#4978, new project will be published in Dec. 2020)

- Definition of Smart Utility - How to be a Digital Utility and the Framework for an Intelligent Water System (#5039, proposal selection)

LIFT

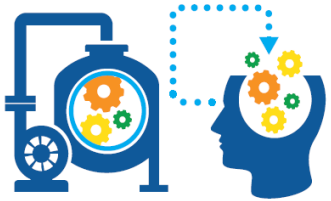
WRF/WEF initiative to accelerate innovation and help move new water technologies into practice

Example LIFT Innovation Program Activities

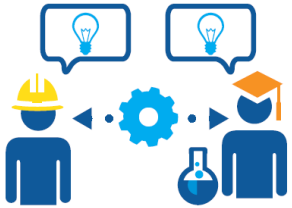
Utility Peer Network

Technology Scans

LIFT Link



SEE IT



University-Utility Partnership

FAST Water Test Bed Network

Collaborative Demonstrations and Challenges

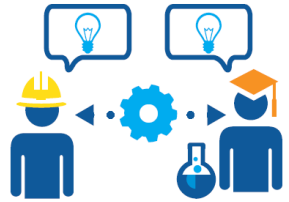
Program to Better Connect Universities and Utilities

Potential University Benefits:

- Real-world training for students, and increased employment potential
- Synergies with practitioners in developing new technologies and processes
- Additional patent and publication opportunities
- Improved understanding of end user R&D needs
- Better outcomes and higher likelihood of solutions being adopted by industry

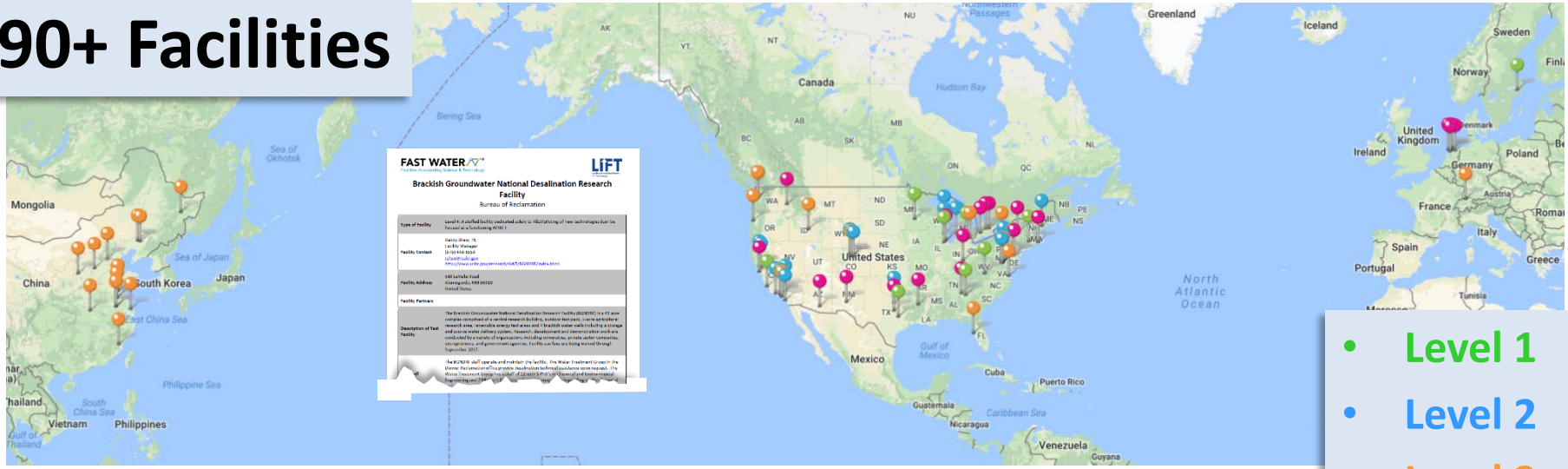
Potential Utility Benefits:

- New solutions and insight into utility problems
- Low-cost technical problem solving
- Identification of new talent for staffing and/or contracting
- Proactive and progressive approach to problem solving
- Minimized risk for innovative technologies (e.g., through research and piloting)



FAST Water Test Bed Directory

90+ Facilities



FAST WATER

LIFT

Brackish Groundwater National Desalination Research Facility

Bureau of Reclamation

- Level 1
- Level 2
- Level 3
- Level 4

https://www.waterrf.org/fast-water-network

NSF

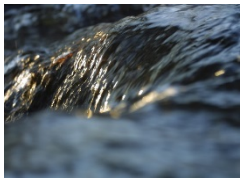
DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

UNITED STATES · ENVIRONMENTAL PROTECTION AGENCY

THE Water Research FOUNDATION

Intelligent Water Systems Challenge

- Focus on leveraging data using the best available tools to help utilities better understand the dynamics of complex systems for making better decisions.
- Give students, professionals and technology aficionados the opportunity to showcase their talents and innovation.



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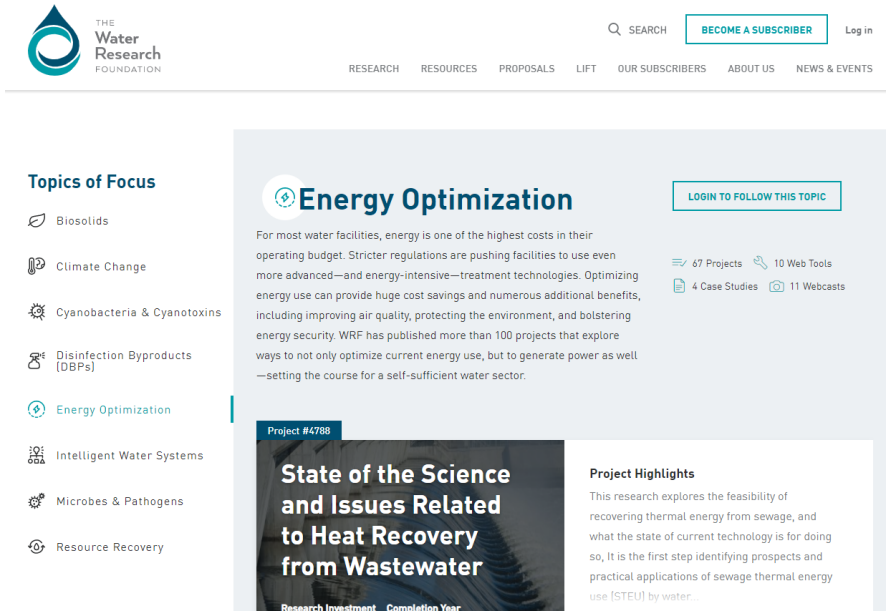
Contact Information



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