Canadian Water Network

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Guidance for Canadian Water Utilities to Develop a Net Zero Water Roadmap

March 2025

This project is funded in part by the Government of Canada under the Implementation Readiness Fund. This grant will support CWN's project "Charting the Course to Net Zero Water: Mobilizing Canada's Municipal Water Network for Greenhouse Gas Mitigation" andwill focus on developing networks and sharing knowledge. The project is actiive until March 2027.

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Introduction

The Government of Canada's 2030 Emissions Reduction Plan to reach net zero by 2050 is outlined in the Canadian Net-Zero Emissions Accountability Act. A Net Zero Water roadmap is a document that outlines the strategy and action plan to achieve net zero greenhouse gas (GHG) emissions by a specific time frame.

CWN is working with the project's National and Technical Advisory Committees, which includes municipal and private sector partners who are leading GHG mitigation innovation and implementation, to develop guidance for Canadian municipal water utilities for their GHG mitigation journey.

Figure 1 identifies three distinct phases:

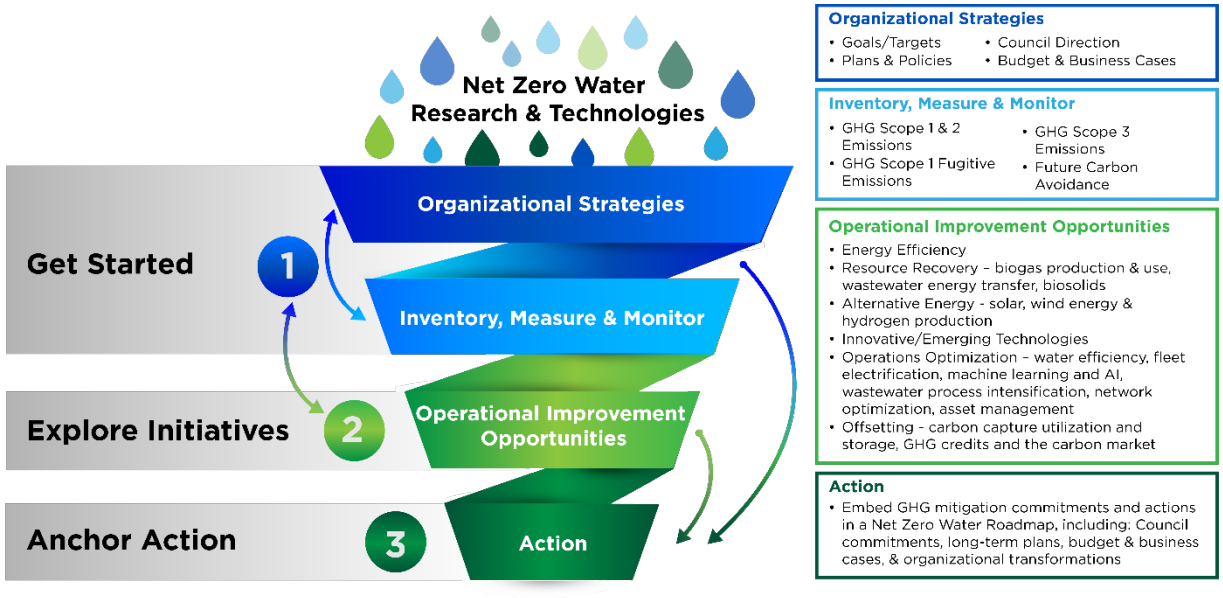

Figure 1: Phases to inform Net Zero Water Roadmap development

How to Use the Net Zero Water Roadmap Guidance

In each section, you will find:

- A **description of the phase or net zero initiative** to consider.
- **Links to resources**, including tools, quantification methods, research, case studies and publicly available training or guidance developed by international organizations.
- **Knowledge products** developed by CWN and our project partners to showcase Canadian examples of net zero water projects, initiatives and roadmaps.

Need more technical information? Download CWN's Canada Net Zero Water Roadmap Background Research.

Phase 1: Get Started

Project partners acknowledge that each municipality will have unique targets and a Net Zero Water roadmap for their water, wastewater and stormwater utilities, given the various municipal-specific drivers and provincial regulatory context. Across Canada, there is a desire to get started — and focus on progress over perfection. The first step is to understand your organizational context by assessing net zero related strategies and operational data available to support a GHG inventory baseline.

Organizational Strategies

In infrastructure-based sectors like water and wastewater utilities, plans and strategies are crucial in guiding actions toward sustained GHG mitigation and emissions reduction.

Plans and strategies provide the overarching framework to guide organizational efforts and ensure alignment with internal corporate goals, as well as national climate goals. These documents translate the organizational vision into actions, setting specific targets and timelines for reducing emissions.

See the table below for examples of municipal and private sector net zero-related plans and strategies.

NAC Member	Plans and Strategies	Commitments
Durham Region	Greening Regional Operations Corporate Climate Change Action Plan	• 20% GHG emissions reduction by 2025, below 2019 levels • 40% GHG emissions reduction by 2030, below 2019 levels • 100% GHG emissions reduction by 2045, below 2019 levels
EPCOR	Climate Mitigation: our pathway to net zero Community Energy Transition Strategy Carbon Budget 2023-2026 (December 2022)	• 50% reduction in net GHG emissions company-wide by 2025 • 85% reduction by 2035 • Net zero emissions by 2050
Halton Region	Climate Change and the Environment	• Net zero corporate GHG emissions by 2045
City of Hamilton Hamilton Water	Community Energy & Emissions Plan - Engage Hamilton Hamilton's Climate Action Strategy	• Achieve net zero GHG emissions by 2050
Metro Vancouver	Climate 2050 Roadmap: Energy. A pathway to clean, renewable and resilient energy in Metro Vancouver	• Carbon neutral region by 2050

NAC Member	Plans and Strategies	Commitments
City of Ottawa	Energy Evolution	• Reduce GHG emissions to zero by 2040 within the corporation, and by 2050
Peel Region	Climate Change Master Plan	• Reduce GHG emissions to 45% below 2010 levels by 2030
City of Saskatoon	The City of Saskatoon's Climate Action Commitment 2024-25 Climate Budget	• Reducing emissions to net zero by 2050
City of Toronto	TransformTO Net Zero Strategy	• 50% of community-wide energy comes from renewable or low-carbon sources • 25% of commercial and industrial floor area is connected to low carbon thermal energy sources • Corporate GHG emissions are reduced by 65 percent over 2008 base year
Region of Waterloo	Our Climate and Energy Transition	• Reduce GHG emissions by 50% by 2030 below 2010 levels
York Region	Climate Change Action Plan	• Reduce GHG emissions towards net-zero by 2050
GHD	2024 Sustainability Report	• Accelerate the transition to a low-carbon future, including reduced fossil fuel reliance, in line with pathways to a 1.5°C climate goal
Xylem	Climate Action Plan	• 1.5°C reduction by 2030 (Scope 1, 2 and 3) and Net Zero emissions (Scope 1, 2 and 3) before 2050
Jacobs	Climate Action Plan Press Release	• Achieving net zero GHG emissions across the value chain by 2040, and maintaining carbon neutrality status

Inventory, Measuring and Monitoring Methods

GHG inventories quantify the emissions from processes and activities within water utilities and can act as a climate change balance sheet. Inventories provide an understanding of the sources and amounts of GHG emissions that water utilities are emitting and what they need to prioritize in GHG mitigation.

A GHG inventory is a necessary step in developing climate action plans and targeted reductions of GHG emissions in water utilities.

Completing a GHG inventory helps to:

- Establish a **baseline**, providing a clear picture of current emissions levels, essential for setting realistic and achievable reduction targets.
- Identify **major sources of emissions**, allowing for prioritization of actions that will have the most substantial impact.

- Enable **ongoing monitoring and reporting**, ensuring the roadmap stays on track and adjustments can be made to reflect water sector specific GHG emissions.
- Aid in **regulatory compliance**, as many regions require detailed emissions reporting.
- Provide **transparency and build trust** with stakeholders, including customers, investors, and regulatory bodies.

Scope 1 emissions in GHG inventories should include methane and nitrous oxide measurements from wastewater treatment and effluent, fossil fuel combustion, biogas consumption, flaring and incineration. Non-biogenic CO_2 from wastewater and sludge treatment processes contribute to the Scope 1 emissions and include organic compounds of soap, detergent or other fossil-fueled chemicals like methanol.

Scope 1 fugitive emissions in water and wastewater treatment and collection include nitrous oxide and methane. Nitrous oxide emissions, which are influenced by operations and processes from wastewater treatment, are estimated to be 3-7% of global nitrous oxide emissions due to biological treatment processes, such as sewage treatment. However, it has since been discovered that nitrous oxide emissions from water resource recovery facilities (WRRFs) can account for up to 86% of total direct Scope 1 emissions. Accurate accounting of nitrous oxide emissions will assist the development of effective and practical mitigation strategies and define target baselines for water utilities.

Scope 2 emissions include electricity consumption and thermal energy. Different methods and calculators for estimating Scope 1 emissions are not standardized nationwide.

One aspect of the roadmap is to work with project partners to compare these different methods and calculators for Scope 1 emissions (e.g. OWWA/WEAO calculator) and identify recommendations for best practices.

Most water utilities use major Scope 1 and 2 emissions to set baselines and targets, as these emissions are within their control

Scope 3 emissions are starting to be included in the target-setting portion of GHG inventories. The role of Scope 3 emissions cannot be overemphasized as this includes embodied carbon, sources of GHGs in supply chains, off-site biosolids management and the use of chemicals, among many others. Addressing Scope 3 emissions is an opportunity for collaboration with others outside water utilities to widen their scope in mitigating GHG emissions. A municipality may not be able to change the global warming potential (GWP) of a product or service, but by integrating GHG emissions into procurement, they can influence supply chains by demanding products that will reduce their emissions. Quantifying Scope 3 emissions also allows the Federal Government and the Provincial and Territorial governments to support the efforts of Canadian water utilities in reducing their GHG emissions.

Future carbon avoidance refers to the choices that an organization can make to eliminate or reduce GHG emissions by adopting greener and more sustainable practices or low-carbon technologies. The approach of quantifying future carbon avoidance is a relatively new concept. Still, it provides an opportunity for Canadian water utilities to make better forward-facing choices on infrastructure development, acquiring

new equipment, or equipment upgrades. The documentation of these emissions enables water utilities to make stronger business cases to acquire lower-carbon alternatives.

Resources

Inventory Tools

- OWWA/WEAO Climate Change Committee & Greenhouse Gas Emissions Inventory Tool
- Housing, Infrastructure and Communities Canada (HICC) Climate Toolkit for Housing and Infrastructure (CTHI): Climate Library, Baseline Emissions Tool, Climate Insight Resources and Climate Help Desk
- US EPA Local Greenhouse Gas Inventory Tool
- Water Research Foundation (WRF) project "5188 – Establishing Industry-wide Guidance for Water Utility for Lifecycle GHG Inventories" to develop a guidance document and spreadsheet for GHG accounting in water utilities by 2026.

Training

- International Water Association (IWA) Quantification and Modelling of Fugitive GHG Emissions from Urban Water Systems (IWA Scientific and Technical Report Series No. 26, 2022)
- IWA Masterclass 1 - Quantifying, modelling and mitigating process emissions
- IWA Masterclass 2- Monitoring, modelling and mitigating Nitrous Oxide
- IWA Masterclass 3 - Monitoring, Modelling and Mitigating Methane in Wastewater
- The Danish Environmental Protection Agency Proposals for regulatory methods to reduce nitrous oxide emissions from treatment facilities (February 2025)
- WEFTEC - Navigating the Water Sector's Path to Net Zero

CWN Knowledge Products

- Water Research Foundation – Process Emissions Webcast Series
    - Process Emissions Webinar #1 Snapshot – Fundamentals
    - Process Emissions Webinar #2 Snapshot – Methane Emissions
    - Process Emissions Webinar #3 Snapshot – Nitrous Oxide Emissions
    - Process Emissions Webinar #4 Snapshot – Opportunities for Process Emissions Reduction
- Case Study: Road to a Net-Zero Utility: EPCOR Edmonton Water & Wastewater Treatment Plants
- Case Study: Toronto Water's GHG Inventory and Mitigation Journey
- Case Study: Durham Region Water and Wastewater GHG Emissions Management Strategy

Click here to share your Net Zero Water Roadmap experience.

Share your journey, including success stories and lessons learned, to help others in the municipal water sector advance.

Phase 2: Explore Initiatives

Municipalities have several GHG mitigation options available to consider aligned with policies, plans and data identified in Phase 1. Project partners stress the importance of a feedback loop between Phases 1 and 2 to ensure organizational data is updated and accurately maintained to inform decision-making.

Phases 1 and 2 are most successful when municipal staff from various departments are engaged through as many cycles as are required to identify options to present to senior leaders and/or elected officials for approval.

Project partners identified key factors for success through Phases 1 and 2:

- Acknowledge that each municipal net zero water journey and operational opportunities will be unique given the various municipal-specific drivers, system infrastructure and provincial regulatory context. Be flexible to respond to organizational and regulatory changes.
- Consider simultaneous actions, with small improvements tested in several parts of the water system to identify alignments and synergies.
- Adopt a "nudge" approach where small changes can build organizational momentum and instill confidence to address and overcome larger barriers.
- Failures can provide significant insight and inform continuous improvement.
- Align net zero water initiatives to master plans and budgets and embed GHG mitigation initiatives into 10-, 20- or 30-year capital plans.

Business cases are a structured approach to evaluate and present the costs, benefits, risks, and impacts of different mitigation strategies. Decision-makers will need this information to understand the financial and operational implications of each mitigation option to make informed choices that balance environmental goals with economic feasibility. Well-prepared business cases can highlight the potential return on investment, funding opportunities, and long-term savings, which can be persuasive in gaining support from council members and senior leaders.

Energy Efficiency

Water and energy are inextricably linked in the water-energy nexus, as water treatment and distribution use a lot of energy, and energy production uses a lot of water. Apart from operations optimization, there are vast opportunities for water utilities to reduce their energy use, especially through electrification. Canada's GHG emissions from power generation declined by 59% between 2005 and 2022, largely due to Ontario's phase-out of coal generation. There are still opportunities for water utilities to reduce their GHG emissions through electrification in water utility operations to reduce energy costs and GHG emissions from energy use.

Resources

- Water Environment Federation (WEF) resources to help utilities benchmark energy use efficiencies for unit processes.
    - Sustainability and Energy Management for Water Resource Recovery Facilities (MOP38)

- Energy in Water Resource Recovery Facilities, 2nd Edition (MOP32)

Knowledge Products

- Coming soon

Biogas Production and Utilization

Biogas production and use is a dominant method by which WRRFs can recover energy. The efficient utilization of biogas also provides the opportunity for abatement in methane emissions from sewage sludge and wastewater treatment processes, as the Canadian Biogas Association found that municipal wastewater treatment facilities are only utilizing 20% of their biogas potential. Biogas can be converted to energy through combined heat and power (CHP), also known as cogeneration, which can be a reliable, cost-effective solution for managing energy costs in WWTPs. The biogas from the anaerobic digester is used as fuel to generate electricity for the facility and can be used for sewage sludge incineration. The exhaust gas is captured in a heat recovery unit where it is used for digester heat loads and space heating. Ultimately, biogas, as a renewable energy source, is advantageous to water utilities in replacing conventional energy sources.

Resources

- CWN Scan of Canadian municipalities pursuing GHG emission reduction goals. The use of biogas/energy recovery at wastewater treatment plans. (October 2022)
- Canadian Biogas Association
    - National RNG Handbook for Canadian Municipalities
    - Empowering Municipal RNG Market Participation
    - Organic Materials: Maximizing Resource Recovery from Waste Through Biogas and RNG Production
    - RNG Outreach and Market Development
- Biogas cogeneration at Bonnybrook Wastewater Treatment Plant – presentation at the 2024 CWWA/NWWC by Jifan Liu, City of Calgary

Knowledge Products

- Coming soon

Resource Recovery

Mitigation opportunities, in which waste from WWTPs can be repurposed to turn them into water resource recovery facilities (WWRFs) through closed-loop systems, are identified as resource recovery measures in this roadmap. Resource recovery presents the opportunity to utilize biosolids, products and renewable

Wastewater Energy Transfer

Wastewater contains thermal energy that can be recovered at different scales: component, building, sewer and WWTP levels. Sewer heat recovery systems pull thermal energy from wastewater instead of burning natural gas. The wastewater energy transfer (WET) system is installed at the point where wastewater exits and works by extracting and transferring heat from or to wastewater. The heat recovery at the sewer pipe network level is an ideal source of heating or cooling for heat pumps because wastewater abundantly and continuously flows into the system11. Just like biogas production, by closing the loop, GHG emissions from burning carbon-based fuels can be reduced through the process of sewer heat recovery.

Resources

- Markham District Energy (MDE) Wastewater Energy Transfer System (2024)
- Metro Vancouver:
    - Sewage and Waste: Heat Recovery Policy (2017)
    - Liquid Waste Heat Recovery (2017)
- Water Canada: Wastewater heat recovery: From dirty water to clean energy (October 2022) (SHARC technology used by the False Creek Neighbourhood Energy Utility, Vancouver, BC)
- Heat-Seeking Sewer Model: Finding waste heat in sewers and matching it to opportunities (International District Energy Association Q4 – 2015)

Knowledge Products

- Coming Soon

Biosolids Management

Biosolids management touches on public health as we deal with contaminants of concern like Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in biosolids and better ways to manage to avoid climate and health risks. Effective biosolids management for wastewater treatment may include thermal processes to transform biosolids to biochar through pyrolysis for energy recovery and volume reduction. However, this option is still limited by the commercial availability of technologies for this process. With emerging research, improved biosolids management is a mitigation opportunity for WWTPs as more technologies become available. The land application of biosolids benefits the economy and waste management by reducing the demand for non-renewable resources, reducing the demand for synthetic fertilizers, providing carbon sequestration and conserving landfill space.

Resources

- Halton Region Biosolids Recycling Program
- Metro Vancouver Biosolids Hauling de-carbonization and Dryer (2024)
- Biosolids GHGs: Formulas to mitigate climate change
- OWWA Resources:

- Introduction to the Biosolids Emissions Assessment Model (BEAM)
- Case Studies Using the Biosolids Emissions Assessment Model (BEAM)

Knowledge Products

- Coming soon

Alternative Energy

By switching to lower-carbon sources and alternative forms of energy, the reliance of energy use on fossil fuel sources, and therefore GHG emissions, can be drastically reduced.

Solar and Wind Energy

Alternative energy such as wind and solar are low-carbon energy sources that can help water utilities build resilience. Alternative energy sources have been identified as a strong mitigation measure as they directly reduce GHG emissions.

Resources

- Mainspring Energy's new linear generator technology uses a low-temperature reaction of air and fuel to drive magnets through copper coils to efficiently produce electricity with near-zero NOx emissions.

Knowledge Products

- Coming soon

Hydrogen Production

Hydrogen production is an emerging field that explores water electrolysis, steam methane reforming during the biogas process, and sewage sludge conversion into hydrogen during wastewater treatment processes to provide clean energy for use in WRRFs. With emerging technologies and research, hydrogen production may be an effective method of mitigating GHG emissions from wastewater treatment processes.

Resources

- Coming soon

Knowledge Products

- Coming soon

Operations Optimization

There are numerous ways by which water utilities can optimize broader operations to reduce GHG emissions that help them attain net-zero emissions targets. Water utilities upgrade equipment, use and analyze data, and optimize networks to ensure the treatment processes are more efficient by reducing

leaks, using real-time data to adjust pumping and distribution networks, and responding better to emergencies. GHG emissions can be minimized by operating pumps at a consistent rate, reducing pipe velocities, energy consumption and overall costs. These numerous optimization processes allow water utilities to tailor mitigation solutions to reduce their GHG emissions directly by ensuring their systems are efficient and indirectly reducing energy costs. By investing in the workforce with the appropriate technical knowledge and know-how, the workforce is a critical component of optimizing operations. The importance of operations optimization is that it easily applies to the whole water sector, not just wastewater but stormwater and drinking water utilities.

Water Efficiency

The carbon impact and GHG emissions from unmanaged leakage from failed distribution systems are directly related to the energy costs of water losses Reducing water loss is a necessary measure that pertains not only to net zero but is also beneficial to saving energy and financial costs while addressing system efficiency. Similar to the carbon balance of the GHG inventory, it is important to understand the water balance of any water utility to mitigate water losses. Carbon balance can also be calculated alongside water loss to account for the GHG emissions from water losses.

Resources

- Coming soon

Knowledge Products

- Coming soon

Fleet Electrification

The transport sector is the second-largest emitter of GHG emissions, with an estimated 156.3 mega tonnes of CO2e in 2022 (22% of Canada's GHG emissions) . GHG emissions from this sector are mainly driven by the dependence of transportation on fossil fuels, and by electrifying fleet, GHG emissions can be drastically reduced. Electrifying the fleet within the water sector is an important aspect of addressing Scope 1 emissions and an opportunity for the broader municipalities to immediately reduce their GHG emissions. While there are economic benefits of transitioning to electric fleet, the successful adoption of electrifying fleet depends on supportive government policies, availability of charging infrastructure and enablement of service.

Resources

- Coming soon

Knowledge Products

- Coming soon

Machine Learning and Artificial Intelligence

As Artificial Intelligence (AI) and Machine Learning (ML) advancements are becoming more mainstream, there are opportunities to incorporate these technology advancements within the water sector to optimize operations. The use of AI and ML in water utilities has improved leak detection outcomes, water quality diagnosis, pollutant modeling, process control and analyzing customer use, among other benefits. As operations are optimized, GHG emissions reduction is directly linked to energy and cost savings. The use of AI and ML is not limited to operations optimization but can be used to develop a prioritization framework in support of net-zero within the utilities and provide detailed analysis of GHG reduction measures and impacts within the system.

Resources

- Coming soon

Knowledge Products

- Coming soon

Wastewater Process Intensification

Process intensification can optimize operations by utilizing new technologies in existing treatment processes to improve wastewater efficiency and effectiveness. Process intensification can directly improve biological processes by using membrane bioreactors and other technologies, as well as best management practices like pyrolysis and other processes that maximize microbial activity and nutrient removal. As fugitive emissions are linked to biological processes, one benefit of process intensification is that it may increase or decrease Scope 1 GHG emissions. Still, it provides the opportunity for a greater understanding of how intensification can impact fugitive emissions. An added benefit of process intensification is linked to water efficiency, as the process can make it possible for water to be reused in irrigation and other industrial processes.

Resources

- Coming soon

Knowledge Products

- Coming soon

Network Optimization

For the purpose of this project, it is important to optimize water distribution networks for the conservation of water resources and the reduction of water loss. In drinking water utilities, network optimization reduces operational energy use; by optimally operating water distribution and the treatment network, GHG emissions can be reduced . Some studies have found that network optimization can reduce energy costs by anywhere between 5% and 25%, also reducing GHG emissions costs within the system.

Resources

- Coming soon

Knowledge Products

- Coming soon

Asset Management

Asset management is a broad term that touches many of the other mitigation measures but is becoming more important as climate change impacts become more extreme and frequent. Asset maintenance is no longer about just maintaining existing assets while building new assets to respond to population growth but also about responding to emergencies that stem from the adverse impacts of climate change as they occur. The implementation of asset management practices is dependent on the data, education, benefits, planning, regulations and funding mechanisms that are available and should be increasingly adopted across the entire organization.

There is room for natural asset management within water utilities to mitigate GHG emissions. This is not limited to the wastewater sector; it includes implementing green infrastructure in stormwater management as well. The benefits of green infrastructure and natural assets include energy savings and nutrient load reduction, which reduce Scope 1 and 2 emissions.

Resources

- Metro Vancouver: Key Directions for the Healthy Waters Plan (future capital planning, including the development of the City's Public Infrastructure Investment Framework and 4-year Capital Plan) January 2025

Knowledge Products

- Coming soon

Innovative and Emerging Technologies

The role of technologies can be woven into mitigation actions and carbon capture utilization and storage (CCUS) as an offsetting system. Still, this topic explores specific needs for technology advancement while addressing the barriers to technology adoption. Current and innovative technologies are **critically needed** to decarbonize rapidly, as the IPCC recognizes that innovation is a key driver of economic growth and can introduce new ways to deliver essential services.

A great example in which innovative technology can be used in mitigating GHG emissions is Carbon Capture Utilization and Storage (CCUS). CCUS efforts are still in development and are defined by the International Energy Agency (IEA) as the capture of CO_2 from large point sources and are gaining momentum with advanced research. The challenge with CCUS as an offsetting opportunity is that it has a low carbon dioxide mitigation potential and does not address nitrous oxide, which is a substantial part of emissions from WWTPs. There is an opportunity to address offsetting GHG emissions with CCUS as research and technologies develop.

Resources

- California Energy Commission: High-efficiency and Ultra-low Emissions Linear Generator Demonstration Project in Southern California (2024)

Knowledge Products

- Coming soon

Offsetting

The rapid rise of GHG levels in the atmosphere due to anthropogenic causes has necessitated the need to begin offsetting GHG emissions. This is done by putting a dollar amount on carbon to keep organizations accountable for the GHG emissions for which they are responsible.

GHG Credits and the Carbon Market

Canada is one of the few countries that has put a price on carbon and created a carbon market at the Federal level. At the provincial level, the GHG credit system varies and is determined by provincial and territorial governments. The GHG credit and carbon markets are an essential part of holding entities accountable to monitor, measure and compensate for their emissions if exceeded. The role of natural asset management in offsetting GHG emissions cannot be underestimated as WWTPs start to incorporate elements of circularity within their operations.

Resources

- Metro Vancouver Carbon Price Policy (2017)
- FCM Green Municipal Fund: Municipal governance for deep decarbonization
- Government of Canada Roadmap to Net-Zero Carbon Concrete by 2050 (2022)

Knowledge Products

- Coming soon

Phase 3: Anchor Action

Project partners recommended the following approaches and tactics to anchor water utility GHG mitigation and emissions reduction commitments within municipalities.

- **Foster collaborative partnerships and engage stakeholders** - create inter-municipal working groups, develop formal agreements, and maintain transparent communication. Consider involving elected officials, community members, and local organizations in the decision-making process to ensure that GHG mitigation efforts are aligned with broader community goals and receive the necessary support and resources.
- **Maintain transparent and consistent communication –** adopting this approach helps to build trust and foster collaboration among council members, senior leaders, and the community. It enables the dissemination of critical information about the benefits and progress of GHG mitigation efforts, facilitating informed decision-making. Effective communication helps in addressing concerns, gathering feedback, and creating a shared vision, which strengthens the commitment of decision-makers to support and sustain GHG mitigation initiatives
- **Simplify complex issues** - when information is distilled into clear and relatable messages, it becomes more accessible and understandable to a broader audience, including council members, senior leaders, and the public. This approach ensures that everyone can grasp the key points,

making it easier to garner support and drive action. Simplification helps in breaking down technical jargon and presenting data in a way that highlights the most important aspects, such as potential benefits, costs, and impact on the community. Simplification acts as a bridge between technical information and practical, actionable insights.

- **Confirm goals and alignment of initiatives** – confirmation and documentation of goals can help to maintain alignment of stakeholders and partners as future decisions are considered.
- **Seek Approval** – Council and/or senior leader approval is essential for securing the necessary resources, policy support, stakeholder buy-in, long-term commitment, and accountability needed to successfully develop and implement GHG mitigation and emission reduction initiatives. Project partners recommended starting communication with elected officials early in the process with small initiatives to build trust and confidence in the organizational capacity to deliver GHG mitigation initiatives and build buy-in from project partners.
- **Document your unique Net Zero Water Roadmap** to demonstrate alignment and connection to corporate plans and departments and progress organizational targets. Embedding GHG mitigation initiatives into 10-, 20- and 30-year capital plans and Master Plans is critical to plan for the future, even if details are still to be determined.

Below are examples of Net Zero Water Roadmaps to support you on your journey.

Resources

- CWN Beyond target setting: Accelerating net-zero actions in municipal water management (2022)
- International Water Focused Roadmaps
    - Xylem Net Zero: The Race We All Win. Mapping the route to water utility decarbonization (2022)
    - Anglian Water (UK) – Our Net Zero Water Strategy to 2030
    - Water UK – Net Zero 2030 Routemap
    - Water New Zealand – Navigating to Net Zero

Additional GHG Mitigation Research and Resources

FCM:

- Sustainable Municipal Buildings | Green Municipal Fund
- Community Energy Systems | Green Municipal Fund
- Green Municipal Fund: Municipal governance for deep decarbonization

ICLEI Partners for Climate Protection:

- The State of Climate Action in Canadian Municipalities Net-Zero Action Research Partnership
- The current state of local climate action in Canadian municipalities dataset.
- Webinar : Taking the Temperature on the state of climate action in Canada (2024)

Canadian Institute for Climate Choices – Canada's Net Zero Future (2021)

Global Water Intelligence: Water Without Carbon – Mapping Water's Carbon Footprint (November 2022)

Government of Canada Policy on Green Procurement (2022)

Institute of Municipal Finance and Governance (IMFG) The Municipal Role in Climate Policy (2022)

Canadian Climate Policy Inventory

Canadian Infrastructure Benchmarking Initiative

ECO Canada Webinar Series:

- Fundamentals of Greenhouse Gas (GHG) Management | ECO Canada
- Guide to Climate Action by SME: Webinar Series | ECO Canada (topics include: Sustainable Business Practices, Navigating GHG Accounting, Emission Reduction, Carbon Markets for SMEs)

Foresight Canada: Municipalities: Canada's Climate Battleground. Emissions reduction challenges and opportunities from conversations with municipalities across Canada.

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