



SOUTHERN ONTARIO WATER CONSORTIUM

LE CONSORTIUM POUR L'EAU  
DU SUD DE L'ONTARIO



# Getting to Net Zero II

Workshop Outcomes

October 30, 2017



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## Purpose

Southern Ontario Water Consortium (SOWC) and Ontario Clean Water Agency (OCWA) convened this forum to facilitate engagement between technology companies, municipal and provincial government and researchers focused on driving net zero wastewater facilities in Ontario. Building on a successful event held in London, Ontario in March 2016, this event was intended to highlight specific opportunities presented by the current policy and funding context and to address the following **key question**:

*What specific actions will facilitate the transformation of at least 5 wastewater treatment plants to net zero in the next 5 years via the uptake of innovative approaches and technologies?*

## Morning Session

### The current policy and funding context for Net Zero wastewater

**Brenda Lucas**, Executive Director, SOWC provided an overview of recent changes, including policy and funding initiatives that support the opportunity for “game changing” approaches and net zero projects in Ontario.



### Ontario realities and opportunities for biosolids management



**Wayne Parker**, Professor in Civil and Environmental Engineering at University of Waterloo presented information from a recent scan of wastewater management practices in Ontario, and relevant emerging technologies. He addressed the state of data on biosolids disposition and current disposal practices, and present a scan of the use of anaerobic digestion and basic treatment processes such as stabilization that are necessary practices for energy and resource recovery.

## Ontario success story: Planned Net Zero Energy installation in Stratford, ON

**Ed Dujlovic**, Director of Infrastructure and Development, City of Stratford described the drivers and process behind a recent collaborative project among OCWA, GE Water and the City of Stratford to install a net zero energy facility. The overview focused on the current status and timing of the project, key steps and challenges in getting to this point, and what's next – with some thoughts about how to make it easier for other municipalities to implement net zero projects.



Participants were provided a handout for the morning sessions, inviting them to track:

- why a Net Zero goal is attractive/desirable;
- what readiness conditions seem to help; and
- their “base case” or current starting point (for municipalities).

## Afternoon Session

*What are the key challenges standing in the way of greater uptake of Net Zero?*

Four critical challenges were identified, with brief context provided for each by an expert “catalyst” speaker. Participants were then invited to discuss two of four challenges presented, in small groups for 20 minutes each.

### *Challenge #1: Integrated Planning - Rick Kester, CAO, City of Belleville*

Solids waste managers and wastewater managers need to drive these options together, driven by commitment and leadership from throughout the municipality.



#### **Rick's key points:**

- Belleville integrated its services department: water, wastewater, brownfields and solid waste together
- A “green committee” was established to advocate and engage elected officials
- All departments need to be engaged, even recreation (community education events)

### *Challenge #2: Data - Don Hoekstra, Director of Innovation, Technology, and Alternative Delivery, OCWA*

What data exists and what data is needed to support the local and regional considerations that are needed to make this a viable and understood opportunity?

#### **Don's key points:**

- Need both accurate data and understanding key values for strategic decision-making
- Data needs to drive insight and inform decisions
- Need a strategy and strategic priorities defined (ex. energy conservation and resource recovery)
- What questions do you need to answer?
- What data do you have? Note it was probably created for another purpose!
- OCWA's tracking database generated over years.
- Gaps in data that is available:
  - Quantity, quality and disposition of Source Separated Organics
  - Growth projections, climate change plans
  - Lifespan and expansion plans, is there adequate space for pre-processing for example?
  - Digester capacity (how much sludge and how much hauled sewage)
  - Biogas quantity and quality – it's likely you don't have this data!
  - Funding programs will require validation of GHG reductions



### *Challenge #3: Regional Approaches - Phil Sidhwa, President & CEO, Orgatec Energy, Inc.*

Solutions will require going beyond municipal boundaries to manage the movement and processing of organics in ways that optimize its beneficial use and minimize unnecessary trucking.

#### **Phil's key points:**

- Municipalities need to consider whether there will be enough waste material generated? Some small and medium will not.
- Having regionalized facilities further complicates the issue of municipal boundaries





- Have to look at both availability and transportation distances (and costs)
- If doing co-digestion, encourage optimization study first; make there is adequate capacity (and future capacity) and that operations won't be compromised.
- Considerations of location ex. locating pre-processing facilities (at WWTP or a transfer station?). Pros and cons of each.



*Challenge #4: Approvals, Environmental Assessment and Regulations - Barb McMurray, Project Manager, Environmental Innovations Branch, MOECC*

To what degree are regulatory approvals and environmental assessment requirements a potential barrier? What are the recent improvements and what uncertainties remain?

**Barb's key points:**

- Acknowledged that uncertainties remain – does a particular project require a Renewable Energy Approval (REA)? Does it need a Class EA? This depends on the nature of the project.
- What progress has there been? Air and Noise ECA backlog has been eliminated, waste ECAs are taking under 1 year
- “Innovative initiatives” are prioritized. It's standard operating procedure now. These can be done within weeks.
- Have begun accepting “innovative technology verification” or ITV so that applicants can focus on the necessary site-specific information
- Modernization of Approvals allows for low- to medium- risk approvals to be covered by an EASR (environmental activity and sector registry) approval
- Strongly encourage pre-submission meeting. Understand that clarity of requirements is the goal, incomplete applications tend to be a big impediment
- MOECC has recently committed to implementing a 12-month service standard for approvals (beginning January 2018). Will be releasing information and doing consultation in the coming months.

## Challenges and Ways Forward

Summary of feedback from discussion tables

Topic/ Challenge	Specify particular aspects of the challenge. What action or change is needed to address each?	Who needs to do this?
<p><b>Integrated Planning</b></p> <p>Total Attendees: 28 over two rounds</p> <p>Round 1 – 13 Round 2 - 15</p>	<ul style="list-style-type: none"> <li>• Every municipality has ‘silos’ that limit communication/information sharing. Solid Waste (SW) managers and Wastewater (WW) managers do not speak to each other (silos). This increases the larger municipality. The missing group is the largest barrier, you miss the integrated thinking. You need to have a champion, and should not exclude politics/politicians, they will have to be one to integrate the various groups.               <ul style="list-style-type: none"> <li>○ Political will</li> </ul> </li> <li>• You need a strong core group to support the champion with political support</li> <li>• Each group is motivated by the same goal (KPI’s)</li> <li>• Identify the drivers               <ul style="list-style-type: none"> <li>○ Goal, problem statement</li> <li>○ Regulatory change (can force partnership)</li> <li>○ Funding opportunities currently available</li> </ul> </li> <li>• Stage and timing in planning process</li> <li>• Economics and scale</li> <li>• Separate commission for water, waste and waste water</li> <li>• SW is contracted out and WW can be done internally               <ul style="list-style-type: none"> <li>○ Facility owned by municipality (WW)</li> <li>○ SW – stations are privately owned</li> </ul> </li> <li>• SW &amp; WW – perception that there is a difference between the two</li> <li>• WW: risk aversion – why take risk if there will be issues</li> </ul>	<ul style="list-style-type: none"> <li>• The champion</li> <li>• Find common objectives               <ul style="list-style-type: none"> <li>○ Different funding models</li> <li>○ Political (director of Public Works or director WW/SW)</li> <li>○ Have a common director for W/WW</li> <li>○ Maybe involve “planning department” as focal point</li> <li>○ Commonalities between energy plans to work together.</li> </ul> </li> <li>• Funding bodies create common objectives</li> <li>• Education and Public Awareness               <ul style="list-style-type: none"> <li>○ Cross-pollination and education of folds in different areas (SW &amp; WW)</li> </ul> </li> <li>• Collaboration with multi-disciplinary teams including regulator/ private sector</li> <li>• Creation of normalizing metrics to make it viable</li> <li>• Funding/taxing needs to change by political will</li> <li>• Green committee:               <ul style="list-style-type: none"> <li>○ Integrate people from WW/SW for involvement</li> <li>○ Organics Action Plan</li> <li>○ Expand stakeholder group</li> <li>○ Approvals/SW/W</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• WW – decisions made on compliance, SW- decisions made on ROI</li> <li>• Folks need to speak to each other (W/SW)</li> </ul>	
<p><b>Data</b></p> <p>Total Attendees: 26 over two rounds</p> <p>Round 1 – 13 Round 2 - 13</p>	<ul style="list-style-type: none"> <li>• Lack of knowledge of SSO – volume (seasonal), variability (and other input materials – different properties)</li> <li>• Lack of knowledge of flared gas</li> <li>• Lack of knowledge of forward industrial/business/residential profiles</li> <li>• “Value” of sustainability versus (shorter term) cost effectiveness</li> <li>• Shift from “compliance based” thinking to process (optimization)</li> <li>• Examine financial data/obligations in addition to capacity/process data</li> <li>• Interaction between solid and liquid waste train, processing (recycling)</li> <li>• Bias is data gathering</li> <li>• Who knows what happens to their biosolids/ SSO? <ul style="list-style-type: none"> <li>○ Volumes of biosolids, quality of biosolids</li> <li>○ Volumes of SSO, quantity, are there varying qualities?</li> <li>○ Generation rates/capture rates</li> <li>○ Standard nomenclature of quality and characteristics (i.e. 80% organic, 20% toxic)</li> <li>○ Define what resource you want to recover (i.e. no diapers, pet litter)</li> </ul> </li> <li>• Class 2A compost solids are defined as are biosolids parameter limits – not sure what the quality of biosolids could be with the introduction of SSO</li> <li>• Resources required – where can it go, quality standards</li> <li>• Need a strategy to support the initiative and identify data gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal (or plant operator)</li> <li>• Municipal (or plant operator)</li> <li>• Municipal planning department</li> <li>• Municipality</li> <li>• Municipality</li> <li>• Municipality</li> <li>• (Tech providers), municipality</li> <li>• Municipality</li> </ul>



<p><b>Regional Approaches</b></p> <p>Total Attendees: 42 over 2 rounds</p> <p>Round 1 – 22 Round 2 - 20</p>	<ul style="list-style-type: none"> <li>• Variety of plant sizes, plant structure</li> <li>• All of the regional facilities are under different municipal jurisdiction</li> <li>• Need to get to a certain minimum size to get to a baseline gas production</li> <li>• Does jurisdiction match (on the waste water as well as waste)?</li> <li>• Can funding opportunities help to push municipalities and regions together?</li> <li>• Don't have full cost recovery</li> <li>• Various agreements between lower and upper tier</li> <li>• Barriers within municipal dept and across various municipalities</li> <li>• Concern with accountability</li> <li>• Lack of provincial mandate that tells municipalities to act/cooperate</li> <li>• Mandates must accompany incentives and dedicated funding mechanisms – funding/subsidies must be viable and sustainable</li> <li>• Municipal boundaries – political back lash – there may not be enough data for decision makers</li> <li>• Acceptance of food waste – competition for organics – capacity issue, if # of plants exceeds the supply required to operate, not feasible</li> <li>• Lack of data to make informed decisions</li> <li>• If government changes, ban on organics to landfill may also change (uncertainty)</li> <li>• Challenge – mix of urban and rural, different aspects transportation</li> <li>• Examples of rate structures/business models payment structures, tipping fee/quality</li> <li>• Identify common regional problems – could save money, have good regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Advantageous funding scoring (province)</li> <li>• Province</li> <li>• \$ question</li>   <li>• Council – elected officials</li> <li>• All stakeholders – politician driven</li>   <li>• Gov't legislation</li> <li>• Find the sweet spot, understand differences urban/rural/large/small, define better structure</li> <li>• Identify common regional problems</li>   <li>• Bring in industry partners</li> </ul>
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	<ul style="list-style-type: none"> <li>• Collection/defining standards for regional approval</li> <li>• Industrial partners could play a role</li> <li>• Resource value</li> <li>• Peel/Toronto challenges – water diversion, financial investment</li> <li>• Design guideline for common assets/infrastructure</li> <li>• Dispute Resolution Mechanisms - challenge <ul style="list-style-type: none"> <li>○ Build new infrastructure using partnerships</li> </ul> </li> <li>• Rural should centralized organics planning; consider regional facilities for resource recovery</li> <li>• Do we need to look at organics differently?</li> <li>• Neighboring municipalities are always in different stages of planning, building, etc. <ul style="list-style-type: none"> <li>○ Risk taking municipalities need to also lead</li> </ul> </li> <li>• To what extent can regulations drive – none of these programs work with incentives i.e. FIT program</li> <li>• Utilities are limiting factor – don’t want to accept more than the system/grid can handle. Hydro Engineers are bottleneck</li> <li>• Volume minimization key – Waterloo in the past received up to 100 trucks/day</li> </ul>	<ul style="list-style-type: none"> <li>• Better dispute resolution mechanism</li> <li>• Common Asset Management Plan</li> <li>• Time</li> <li>• Utility Commission (Assets separate)</li> <li>• Regulatory body to force everyone in the same directions, at the same time <ul style="list-style-type: none"> <li>○ Private sector to drive the municipalities</li> </ul> </li> <li>• Feed-in-tariff (FIT) based payback is not sustainable – need other drivers/incentives</li> <li>• Dewatering technologies implemented, down to 4 trucks/day year round</li> </ul>
<p><b>Approvals and Environmental Assessment</b></p> <p>Total Attendees: 23 over two rounds</p> <p>Round 1 – 12 Round 2 – 11</p>	<ul style="list-style-type: none"> <li>• Consistency – standard template (terms and conditions – innovation developing) but every draft ECA is different comments. No consultation on the template (past 3 years).</li> <li>• Stratford – innovative project approvals</li> <li>• Management/sharing of risk by MOECC. Reviewers don’t always have experience to deal with the technology details</li> <li>• Uncertainty ex. Do you need REA/Class EA?</li> <li>• Used to have pilots and operator flexibility in the past – didn’t need ECA. Then required ECA and therefore brought and LOF!</li> </ul>	<ul style="list-style-type: none"> <li>• Send details to innovations branch so they understand the inconsistencies (proponents)</li> <li>• Take out the “risk” for reviewing engineers through third party validation. Flexible approaches accepted?</li> <li>• Protocols for implementing pilots – so far treated differently</li> <li>• Municipalities use the Limited Operator Flexibility (LOF) provisions.</li> </ul>

	<ul style="list-style-type: none"> <li>• Help approvals go smoother/faster</li> <li>• What is the balance between risk and regulatory requirements</li> <li>• Consolidating ECAs to create consistencies. (14 facilities – have one ECA – not 14)</li> <li>• Consistency of ECA reviews and therefore consistent protocol for inspectors</li> <li>• ex. new things (issues) raised in ECAs</li> <li>• Different ECAs with same receiving streams</li> <li>• Concern regarding expertise at the MOECC for review of approvals – do they have knowledge as design engineers?</li> <li>• Implementing pilots – what is the process? Need consistency. Some structure around process would help.</li> <li>• Organics considered a resource (not a waste)</li> <li>• Clarification on EA and approval process and its application. Need REA/Class EA? <ul style="list-style-type: none"> <li>○ There are certain triggers (generating electricity does require, gas to pipeline doesn't)</li> </ul> </li> <li>• Encourage acceptance from other jurisdictions – doing ETV</li> <li>• Pre-submission meeting – lead to a high level “approval in principle.” <ul style="list-style-type: none"> <li>○ Define in advance in writing what will be required? MOECC can't do this because projects change</li> </ul> </li> <li>• Encourage applicants to come in -more inviting, lay out the process in more detail “operational guidelines.” Clarify the info/guidance that does exist?</li> <li>• High level criteria – key elements – clarity of the process and requirements</li> <li>• MOECC – consistency (regional and corporate)</li> <li>• Need to learn from different jurisdictions, accept info from other jurisdictions. MOECC can help build the case with that relevant info</li> </ul>	<ul style="list-style-type: none"> <li>• OCWA/Region to write to MOECC on this</li> <li>• B.McMurry noted – yes – significant expertise</li> <li>• Everyone recognizes and talks about this differently</li> <li>• Stratford example to inform this! Help fill in the gaps together!! (conversation, share info)</li> <li>• MOECC third party validation (they are doing this)</li> <li>• MOECC – noted they are encouraging pre-submission meetings; there are EA consultants regionally plus expedited process for innovative approvals.</li> <li>• SOWC work with MOECC on clarification of requirements.</li> <li>• Everyone – engage corporate and facilitate discussions and coordinate. Help MOECC smooth this over too!</li> <li>• Applicant – need to have the site specific data – need to have the municipal client involved</li> </ul>
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- Really new technology or application? Need to bring in standards branch etc.
- Note: ECAs (even the high risk) will be part of the 12 month service guarantee. Will also have expected a complete submission which means applicants now to do all of the detailed studies and be prepared.



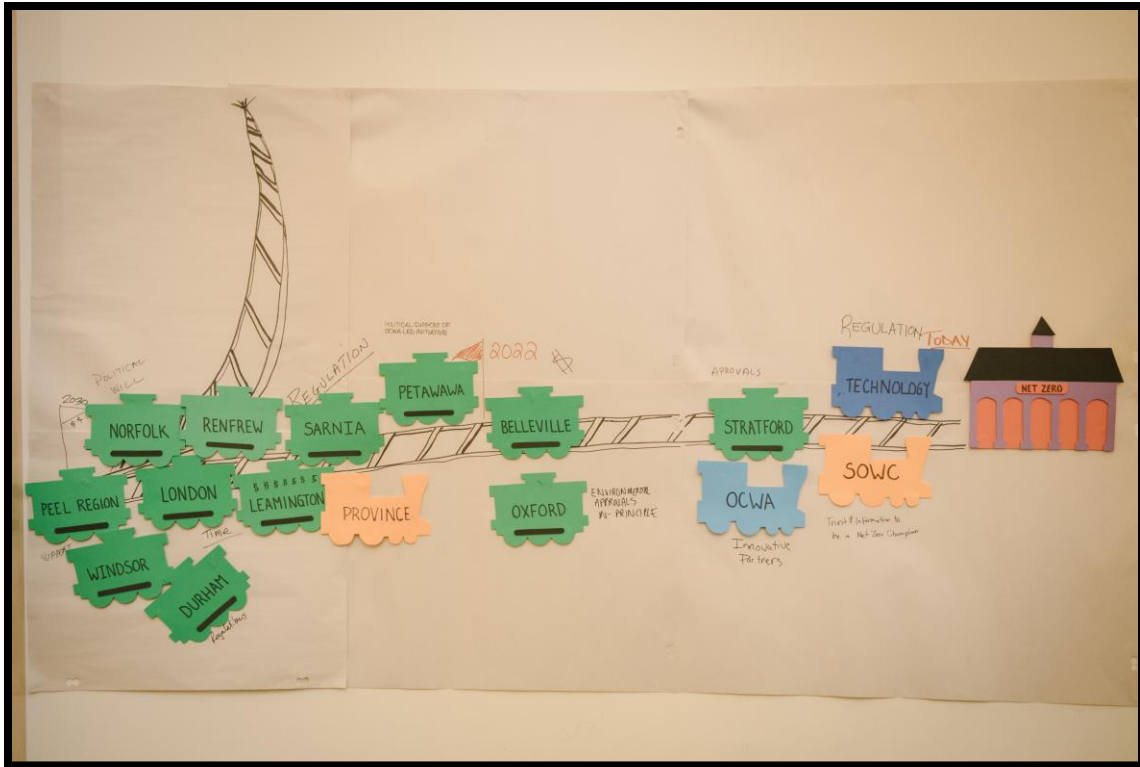
## Accelerating Readiness

Participants then sat in geographic groupings (for municipal/academic) and stakeholder tables (for industry and provincial) to discuss what it might take to accelerate progress toward net zero in each case. Common factors described included: funding, champions (both municipal political champions and support from enabling organizations like OCWA and SOWC), provincial leadership for coordination and integration of planning efforts (to avoid competition for organics), acceptance of innovation in approvals, communication and information sharing, and data to support the business case.

## Where do things stand?

Participants representing individual municipalities, as well as the provincial, industry, OCWA and SOWC groups, were then invited to indicate visually how far away they are from being ready to achieve net zero in a wastewater plant. They each noted one key change that would make the biggest difference to their progress.

<b>Stakeholder</b>	<b>Most critical need identified</b>
Belleville	Money
Durham	Regional buy-in
Leamington	Money
London	Time
Norfolk	Political will
OCWA	Innovative Partners
Oxford	Environmental approvals-in-principle
Peel Region	Support
Petawawa	Political support of OCWA-led initiative
Sarnia	Regulation
SOWC	Trust and information to be a Net Zero Champion
Stratford	Approvals
Technology	Regulation



## Barriers and Accelerants

The group then discussed their interpretation of the “train diagram” as follows:

- Why are some of the large, progressive municipalities such as Peel and Durham so far back?
  - Might solid waste/organics staff answer differently in terms of readiness?
  - The need very large plants (big investment), so will need to make a decision like this more slowly – higher stakes.
- Are trains at the junction because of indecision or because that was the farthest available point away from the station?
  - Further away (longer time)
  - Need more “destination clarity” and “signal clarity”
  - Lots of unknowns (might be different destinations)
  - Waiting on regulatory changes before committing – will there be incentives? Funding? Targets? Demand?
  - Risk management, as Net Zero involves lots of money, expectations and accountability, within the context of competing priorities. We are “sales people” (to Council) and it’s hard for a large municipality to be an early adopter.
- Don’t forget that gains can be achieved through conservation, optimization of current facilities, cultural changes internally – not just expensive construction or a “quantum leap.” Small gains add up.



- There is a large, evident gap between technological and municipal readiness. Perhaps try pilots, at a manageable size and provincially funded, then scale up?
- Bring together waste water and solid waste people, as both groups are meeting on the same things.
- Need incentives to spend money – that would change the equation.
- The impact on GHG emissions by electricity in Ontario is small. Landfill diversion is more significant due to lower methane release.
- There are trucks taking organics to private digesters today. They could be coming to municipalities tomorrow, but we're not getting in on it fast enough.
- The story behind the decision is key, and this is a compelling story – e.g. “energy recovery and storage”

## Conclusion

The three municipalities closest to the “station” (most likely to execute Net Zero projects in the next 5 years) were acknowledged as “Net Zero Heroes.” SOWC and OCWA articulated their commitment to continue to work to advance opportunities for Net Zero projects in Ontario.



## Appendix

### Appendix A: Accelerating Readiness – Breakout Discussions

Table Focus	Specifically, what would it take to accelerate your progress?
<p><b>East &amp; North</b> 8 participants</p>	<ul style="list-style-type: none"> <li>• Concern over size of facility (approx. 5000 m3/day) along with aerobic digestion – not feasible – can you consider a Regional Scheme</li> <li>• Gas companies are biggest GHG emitters, a regulation will be in force requiring them to have a min. amount of RNG molecules – they are eager to proceed with RNG projects</li> <li>• Can OCWA be a broker for these projects? Yes.</li> <li>• The best solution is to have Regional SSO facilities, Regional Anaerobic Digesters</li> <li>• Should have gov’t intervention so we don’t have an influx of RNG projects that starve each other out</li> <li>• For small municipalities that have aerobic digesters, funding is available (\$10 million) to build anaerobic digester – there are so many funding opportunities, regulator is on side, tech partners are on side – are these performance agreements? The off-take agreements are still being developed</li> <li>• Compressed Natural Gas- will be the new fuel for diesel engines with public transit (city of Toronto)</li> <li>• Petawawa? Still too political, elections year. We can revisit in 2019 but will the funding be there? Indra will put together business case. Sales pitch needs to come from somewhere?</li> <li>• Belleville – Rick Kester (has signed)</li> <li>• Renfrew – business case factors around sludge production, where is ROI, rate payers get concerned with investing in principal. Need stronger AHA emissions case. Cost of practice needs to be shown and then show cost savings</li> <li>• Council wants to know               <ul style="list-style-type: none"> <li>○ How much more sludge will we have to get rid of?</li> <li>○ What’s the difference between class A and Class B (fertilizer) (restricted land application)</li> <li>○ How many trucks? Through residential neighborhood</li> </ul> </li> </ul>
<p><b>Central</b> 9 participants</p>	<ul style="list-style-type: none"> <li>• Future planning</li> <li>• Money</li> <li>• Solid business strategy/ROI</li> <li>• Time to understand what you should build</li> <li>• Limitation on taxes</li> <li>• What is best</li> <li>• RNG future value</li> <li>• How much time is needed</li> <li>• Value of GHG credits</li> <li>• Site constraints</li> <li>• GHG and asset management plans</li> </ul>

	<ul style="list-style-type: none"> <li>• Size of plant/municipality</li> <li>• Live life of asset</li> <li>• What regulations are coming?</li> <li>• Quality</li> <li>• Appetite for project</li> <li>• Use funding to force integration</li> <li>• Political alignment/will</li> <li>• Existing infrastructure issues- remaining life</li> <li>• Council changes/boards</li> <li>• People resources</li> <li>• Lack of strategic plan</li> <li>• Funding window is short</li> <li>• Third party impacts i.e. power use/sale</li> <li>• Proportional design not in alignment with reality</li> <li>• Technology issues/hit or miss</li> <li>• Risk exposure</li> <li>• Very optimistic look at projects</li> <li>• Integrations of waste management is difficult odor control</li> </ul>
<p><b>Industry</b> 9 participants</p>	<ul style="list-style-type: none"> <li>• Money</li> <li>• Regulatory perspective – approvals – hitting multiple drivers</li> <li>• Payback</li> <li>• “Perception” of digested sludge, SSO, mixed SW (compost) – need to look @ integrated regulation</li> <li>• Champion in the municipality</li> <li>• Old “irrelevant” reviews of feasibility (masterplan) but technology is way ahead</li> <li>• Need politician/CAO as a champion</li> <li>• Innovations needs to be an important component of MOECC – folks @ MOECC need to be innovative</li> <li>• Business cases by technology providers</li> <li>• Having a champion is the KEY priority in the municipality</li> <li>• Political acumen within industrial groups would help get into the market to develop champions</li> <li>• Business case (10 year payback)</li> <li>• Technology “scaled down” so that it can make sense?</li> <li>• Robustness of technology</li> <li>• Operator/operations – early involvement in design and properly train</li> <li>• Education (public) – important</li> <li>• Early adopters in plant ownership</li> <li>• Incentives for EFW products/incentives for municipalities – financial – P’s models/partnering clarity (vs. standard municipal procurement process)</li> <li>• Acceptance of technical performance data from other jurisdictions (to MOECC and operators)</li> <li>• Industrial (tech. developer) voice at the policy level</li> <li>• Alignment of municipal/provincial/federal policy and funding</li> </ul>

	<ul style="list-style-type: none"> <li>• AWT is a good model of technology funding – municipal funds – matching funds?</li> <li>• Need various levels of funding (small \$ start up; larger \$ for integration of technology(ies) at the plant-scale – role of academic partners (with municipal connections)</li> <li>• Clear directive go to reporting requirements (that are tied to funding \$ in some cases)</li> <li>• Sharing of risk amongst project partners (time to correct pilot problems)</li> <li>• Government as first reference client should be encouraged – facilitate new technology selection (sole source justification)</li> <li>• Networking (larger group ) to share info, funding opps, info about pending regulation</li> <li>• Multiple province dialogue/pulling in other sectors (e.g. mining)</li> <li>• Encourage dialogue amongst first –adapters</li> <li>• Connection between municipalities and providers to showcase technology</li> <li>• Increase connection to venture/seed capital community (&amp; EDC, BDC, SDTC) – federal clean growth hub (new)</li> </ul>
<b>Southwest</b>	<ul style="list-style-type: none"> <li>• Foster approvals at gov’t level</li> <li>• Ban of organics in landfill</li> <li>• More composting facilities?</li> <li>• Funding?? – pre-processing?? Gas cleaning??</li> <li>• Source separation!</li> <li>• Frond end of WWT needs to be looked at?</li> <li>• Change in paradigm of making of WWTP operations!</li> <li>• Pre-treatment. Digester is one component</li> <li>• Use university resources to improve processes /student faculty – many universities, lots of expertise</li> <li>• Quality of gas depends on feed! Al and Fe – phosphorus treatment</li> <li>• Economics?</li> <li>• Digester feed from different sources – problem needs to be addressed</li> </ul>
<b>Group Represented: unidentified</b> (sheets not labeled, represent one Southwest group, one provincial and one industry table)	<ul style="list-style-type: none"> <li>• Leadership through goals and targets that are broad enough to enable cross-sectoral innovation – tech sector, colleges/universities, leading municipalities</li> <li>• Outcome-based environment that enables multiple provincial and municipal priorities to be targeted through an initiative</li> <li>• Need more than just one strategy so communities can adapt – integrated, multi-pronged approach that targets multiple goals (e.g. solid, water, packaging, reduction)</li> <li>• Standardizing data measurement, methodology, collection to promote data-based decisions across the province (including open data) toward broad common goal</li> <li>• Provincial direction to encourage municipalities to collaborate, regionalize and consistency</li> </ul>

	<ul style="list-style-type: none"><li>• Partnerships to create long-lasting adaptable, ground-up initiatives that affect long term outcomes</li><li>• Other types of net zero</li><li>• Dedicated funding that helps not only AMPs but also to make the upfront optimization investments that otherwise have too long a payback period</li></ul>
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*Appendix B: Participant List*

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>
Ajay Singh	Technical Director	Lystek
Alicia Fraser	Vice-President	OCWA
Amarjeet Bassi	Professor	Western University
Andy Bruziewicz	City Councillor	City of Sarnia
Ann Matyas	Senior Business Consultant, Commercialization and Scale-Ups Division, Scale-Up Services Branch	MEDG/MRIS
Anna Ziolecki	Manager, Research Partnerships	SOWC
Anthony Parente	Director, Wastewater	Region of Peel
Barb McMurray	Innovations Branch	MOECC
Blair Henderson	Operations Manager	OCWA
Brenda Lucas	Executive Director	SOWC
Brent Wootton	Associate Vice-President, Business Development, Applied Research, Government and Partner Relations	Fleming College
Brian White	City Councillor	City of Sarnia
Chris Duke	Senior Program Analyst	OMAFRA
Chris Manzon	Manager, Wastewater Operations	City of Windsor
Christine Haas	President and Founder	Renix
Cindy Spencer	Regional Hub Manager, Kawartha-Trent	OCWA
Clare Armstrong	Technology Development Specialist	EKS
Dan Scissons	CAO	Town of Petawawa
Dave Ellis	Principal Consultant	Azura Associates
David Simpson	Director of Public Works	Oxford County
David Unrau	Director of Public Works	Town of Petawawa
Deo Phagoo	Vice President	Anaergia
Don Hoekstra	Director of Innovation, Technology, and Alternative Delivery	OCWA



<b>Name</b>	<b>Title</b>	<b>Affiliation</b>
Ed Dujlovic	Director of Infrastructure and Development	City of Stratford
Elsayed Elbeshbishy	Professor	Ryerson University
Geoff Totten	Regional Sales Manager	GE Water / SUEZ
Geordie Gauld	Division Manager, Wastewater	City of London
George Nakhla	Professor	Western University
Gerald Hamaliuk	CEO	SusGlobal
Hailin Wang	Partner	ETO
Hank Andres	Senior Project Manager	OCWA
Hilda MacDonald	Deputy Mayor	Leamington
Indra Maharjan	Program Manager, Energy Conservation	OCWA
Jim Nardi	Regional Hub Manager, Peel	OCWA
Jim Whitestone	ADM, Climate Change and Environmental Policy Division	MOECC
Jin Chao	Co-author with Wayne Parker	University of Waterloo
Joe Green	Project Engineer, Technical Support	Durham Region
John Glass	Manager, Treatment Capital, Wastewater Division	Region of Peel
John Vogan	General Manager Canadian Operations	Arcadis
Kathleen Kauth	MaRS Advanced Energy Centre, Director of Partnerships	MaRS
Lisa Prime	Principal	Prime Strategy & Planning Inc.
Martha Dagnev	Professor	Western University
Michael Simoes	Energy Coordinator	Norfolk County
Mike Asselin	CAO	Town of Renfrew
Mike Deprez	Director, Business Development	Walker Environmental
Mike Theodolou	Senior Product Manager	GE Water / SUEZ
Oliver Schraa	CTO	inCTRL Solutions
Parminder Sandhu	Chair of Board	Green Ontario Fund
Phil Sidhwa	President & CEO	Orgatec Energy Inc.
Raad Seraj	Senior Analyst, Client Engagement	WaterTAP
Rahim Kanji	Manager, Industry Partnerships	SOWC

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>
Rajeev Goel	CEO	Hydromantis
Richard Junkin	Vice President, Operations	OCWA
Richard Pinder	Senior Engineer - Asset Management	Region of Waterloo
Rick Kester	CAO	City of Belleville
Rob Andrews	Managing Principal Consultant	RF Andrews Consulting Ltd
Robin Kind	General Counsel and Corporate Secretary	OCWA
Sangeeta Chopra	Director of Process Optimization and Technical Services	OCWA
Senthil Perichiyappan	CEO	Envirogem
Shelly Bonte-Gelok	Engineer	MOECC
Sheng Chang	Professor	University of Guelph
Steven Liss	Vice-President, Research	Ryerson University
Susan Budden	Business Development Manager	OCWA
Susan MacFarlane	Manager	Lambton Area Water Supply System
Ted Mao	Vice-President, Research	Trojan Technologies
Terry Bender	Vice President, Operations	OCWA
Theresa Gavin	Manager, Resource Recovery Planning and Analysis	MOECC
Trevor Brown	Manager, Engineering and Wastewater Programs	Region of Waterloo
Vince Pileggi	Senior Engineer	MOECC
Wayne Parker	Professor	University of Waterloo
Younggy Kim	Professor	McMaster University
Youngseck Hong	New Technology Research Lead	GE Water / SUEZ