MEMO

Arcadis Canada Inc.
121 Granton Dr., Suite 12
Richmond Hill, ON
L4B 3N5
Tel 905.764.9380
Fax 905.764.9386
www.arcadis.com

To:
Project Management Team (PMT)

Copies:
Patrick Hardy

From:
Arcadis Canada

Date:
October 10, 2017

Arcadis Project No.:
351337

Subject:
Chile – Canada Bilateral MRV Program – Quebec City, Gatineau/Ottawa, Terrebone

---

As part of the Canada-Chile program to reduce emissions from the waste sector to support NDC implementation, a group of officers from the Chilean Ministry or Environment participated in a week-long series of workshops in Quebec City, Gatineau/Ottawa and Terrebonne as per Appendix A. The following memo summarizes the presentations' topics and the key takeaways for each workshop:

Quebec Workshops

Day 1 – Québec Workshop

Presentation #1: Québec's Contribution to the Fight against Climate Change Action Plan 2013-2020 – **Mme France Delisle - Director General, Directorate-General for regulation and emission data**

- Description of Québec's specific circumstances (e.g. population, main GHG economic sectors, etc...) and main concerns related to climate change.
- Overview of Québec's 2014 GHG Inventory.
- Description of targets against 1990 levels and explanation of why the carbon market was selected and implemented to achieve these emission targets.
- Explanation of Carbon Market link WCI initiative and California and Ontario.

- Description of Climate Change Action Plan 2013-2020, including how the GHG emissions will be reduced, adaptation measures and development of a green economy.
- 2/3 of the total revenues of the green fund is aimed at transportation measures to reduce GHG emissions. (e.g. electricity vehicles, charging stations, other innovations).
- Other policies including Transportation Electrification and Energy Policies.
- Explanation on how the results of the plan are monitored, GHG Inventory, Cap and trade results and results of other policies implemented.

Key takeaways:

1. There are green opportunities for QC industry to export developed technologies
2. Must have strong communications with industry (and accompany them throughout the process) to explain and understand what they can do – since the beginning of the carbon market – large emitters where educated on the market, and fossil fuel distributors (about 85% included in the market)
3. Money is made from a cap and trade system but is re-invested in green technologies, mitigations and adaptations.

Presentation #2: Green Fund/Waste Sector Programmes - **M. Philippe Coulombe - Head of Program Division Assistant Directorate of Organic Materials**

- Highlight the importance of having revenues to implement this type of programmes/projects.
- Recyc-Quebec is responsible for managing the waste sector in Quebec (https://www.recyc-quebec.gouv.qc.ca/). They are tasked with education, development and managements of plans and programmes.
- Hierarchy related to waste management practices in Québec.
- Québec objectives by end of 2015: reduce to 700 kg per habitant (see presentation).

Key takeaways:

1. To properly manage waste in the province a source of revenue is very important (royalties of about 22$ per tonnes)
2. Compost and Bio-digester Programmes are funded by the province.

Presentation #3: Regulation Respecting Mandatory Reporting of certain emissions of contaminants into the atmosphere & Inventory for GHG emissions and other contaminants - **Mme Vicky Leblond - Engineer, Carbon Regulatory and Emissions Data Branch**

- History from 1985-2007: Voluntary reporting fuel data, production data, etc… GHG calculations were done by the government.
- Starting in 2007 the regulation was implemented in the Environment Quality Act covering GHG, SO_2, NOx, VOC, Hg, Particulates.
- In 2009-2010 implemented a cap and trade system. Must report production, emissions, raw material data, fuel consumption an demission factors.
- 10 000 tCO_2 is the threshold. 34 mandatory quantification approaches. Also covers importation of electricity and fuel distribution (200 litres).
- Discussion concerning third party verification and accreditation.

- Discussion around fuel suppliers. Reasoning behind including fuel suppliers.
- Discussion concerning landfills not having mandatory reporting protocols, but rather mandatory guidelines.

Key Takeaways:

1. Provide guidelines and prescribed approaches if you want something that is consistent and easier at the beginning (e.g. Use LandGEM). It would be much easier for everyone involved to have prescribed approaches.
2. The Regulation covers industries above 10 000 t CO_2 per year and includes, 34 mandatory quantification approaches. Covers GHG, SO_2, NOx, VOC, Hg, Particulates.
3. In 2016, 232 establishments reported GHG larger than 10 000 tCO_2e. 74 are subject to the cap and trade.

Presentation #4: Regulation Respecting a cap-and-trade system for greenhouse gas emission allowances - **M. Stéphane Legros - Coordinator, Carbon Market, General Directorate of Carbon Regulation and Emissions Data**

- Brief overview of the Climate Change Action Plan (1st and 2nd).
- Carbon Levy from 2006 to 2014. Absolut Cap and Trade System limiting the overall GHG emissions (not intensity based).
- Cap and Trade system is a flexible economical tool that provides incentives to covered entities to reduce their own emissions or purchase offset credits or allowances (compliance units) from other market participants.
- Covered entities account for 85% of emissions in Québec.
- Québec hasn't see an outflow of Capital linked of the cap and trade market.
- If a carbon tax would have been implemented they project a cost of 4to 5 time higher than the current situation.
- Discussion of annual minimum prices, price control mechanism, both prices can increase annually by 5% plus inflation. Management of unsold allowance, free allocation based on real production output.

Key Takeaways:

1. Communication with industry and public is very important.
2. Clear and respected communication channels between the cap and trade group and the industry was very important to achieve a clear understanding of the regulation.
3. Separating the communication by sector was very useful, they also hold individual meeting with individual entities when requested.

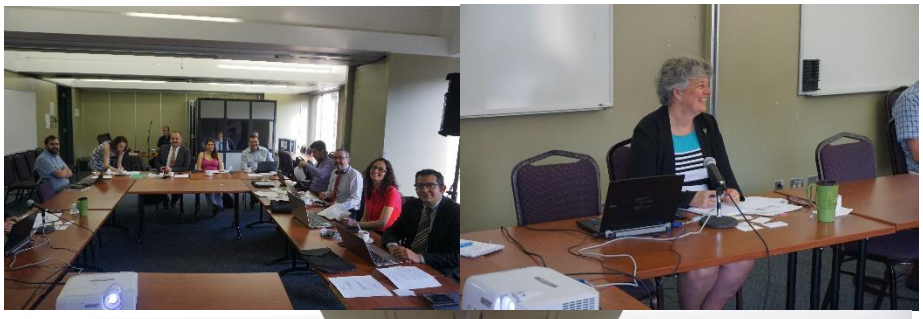
Presentation #5: Protocol 2 – Landfill Gas Capture and Destruction Protocol - **Mme Sophie Houplain - Analyst, Carbon Market Division - & - M. Pierre Bouchard - Engineer and Policy Advisor, Carbon Market Division**

- Offset System overview and landfill gas capture and destruction.
- Offset credits are created for sectors not covered by the cap and trade system.

- Up to 8% of carbon credits can be used instead of allowances.
- Key issues related to offset system is to ensure that each tonne created is equal to 1 tonne of CO2e.
- WCI Criteria, additional real, verifiable/verified and permanent.
- Overview of how emission reductions are created with this protocol. Eligibility requirements related to this type of project. Overview of the SSRs, equations, verification and permanence.

Key Takeaways:

1. Offsets are created from sectors not covered by the regulations.
2. Important to have a buffer account when it comes to offsets (3% in Québec)



Day 2:

Presentation #1: GHG Protocols – Carbon Credits – Waste Sector (23 slides) – **Patrick Hardy**

- This presentation includes a brief overview of the carbon market in Québec with a specific focus on the creation of carbon credits (offsets).
- The main requirements of offset credit creation are covered.
- In addition, an overview of the 5 eligible GHG Offset Protocols and their development process is covered.
- Future GHG Protocol development underway between the Québec and Ontario Governments is also included.

Key Takeaways:

1. There are existing GHG protocol that are relevant and can be adapted by Chile:
    a. Landfill Gas Capture and Destruction
    b. Composting
    c. Biodiesgester

Presentation #2: LFG Capture and Destruction GHG Protocol – Measurement, Reporting and Verification (97 slides) – **Patrick Hardy**

- This presentation summarizes the important eligibility, measurement, reporting and verification requirements contained in the landfill gas Capture and Destruction GHG Protocol currently being adapted by the Québec and Ontario Governments for their joint carbon market system with California.
- The presentation also identifies key requirements and sections where changes are being considered throughout the adaptation process.
- In addition, a detailed example of actual project and verification reports are reviewed as a precursor to the presentation by the Bureau de Normalisation du Québec (BNQ) covering the verification aspects.

Key Takeaways:

1. The Landfill Gas Capture and Destruction Protocol is relevant and can be adapted for Chile
2. Eligibility Criteria, additionality criteria will have to be adapted
3. Measurement, reporting and verification criteria will have to be adapted

Presentation #3: GHG Protocol Adaptation Process (40 slides) – **Patrick Hardy**

- This presentation covers the good practice guidelines and the process suggested to be used throughout the GHG protocol adaptation process.
- More specifically, the presentation reviews the Initiative for Climate Action Transparency (ICAT) guidelines and guidance, the World Bank METRIC guidelines and finally the principles of the Mitigation Action Assessment Protocol (MAAP).

- A six-step protocol adaptation process is proposed and described along with relevant online tools including Collaborase. An explanation of SMART Standards and Standards 2.0 is also provided and examples are detailed.

Key Takeaways:

1. The protocol adaptation process required key stakeholders including technical experts, academia, industry and NGOs.
2. Tools enabling efficient adaptation are available.

Presentation #4: BNQ – Verification Process - Québec Offset Credits - **Charles Landry**

- The Bureau de normalisation du Québec (BNQ) mandate is presented
- BNQ presents the verification requirements from the Québec Offsets System, more specifically the verification activities required under ISO 14064-3 Standard, more specifically
    - Third-party verification
    - Competencies of GHG Verifiers
    - GHG verification approach
    - Main discrepancies identified during verification
    - Involvement in landfill sites verification

Key Takeaways:

1. Third Party Verification is an important part of a system where GHG emissions quantified especially when a monetary value is assigned to the reductions.
2. Standards play a key role in GHG quantification (ISO 14064-1, ISO 14064-2), GHG Verification (ISO 14064-3) and GHG Accreditation (ISO 14065).
3. Ensuring that the verifiers are accredited and demonstrate the required competencies is very important (ISO 14065).

Day 3:

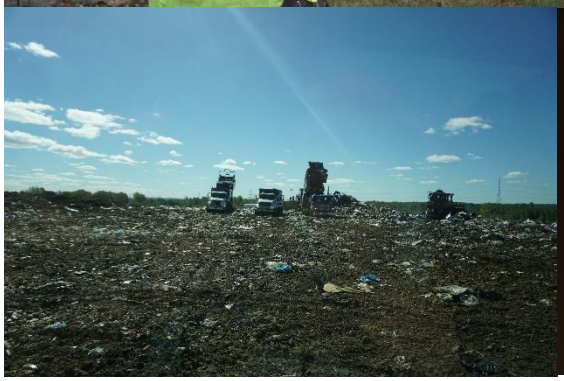
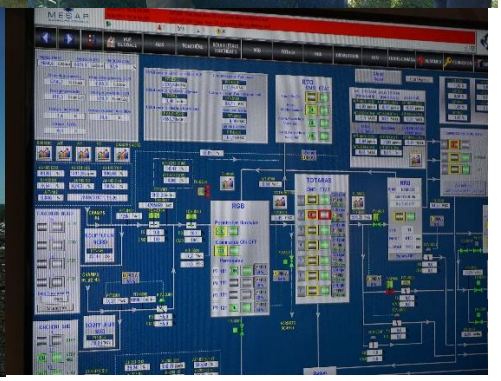
Site Visit – Terrebonne/ Lachenaie Landfill

- Landfill gas and leachate collection system.
- Biogas System – Greenlane Biogas System. Cleaning biogas system (water shower to remove CO2 and H2S). CH4 sent to natural gas system.

Site Visit 2 – EcoCenter Gatineau

- Garbage separation depot. Free for residents and small charge to commercial companies.
- Separates: wood, metal, tires, yard waste, hazardous waste.



Day 4:

Presentation #1: Implementing the Government of Canada's Environmental Priorities (13 Slides) – **Lucie Desforges**

- This presentation covers a general overview of Environment and Climate Change Canada's (ECCC) initiative and responsibility in protecting the environment.
- Discussion on how ECCC is addressing climate change. This includes: Improving air quality, protecting fresh water, conservation, and biodiversity, strengthening the environmental assessment process and promoting clean technology.
- Canada- Chile agreement (celebrating 20 years) includes a workplan until 2018 that includes collaboration on Climate Change, Environmental Protection and Biodiversity and Environmental democracy and governance.

Key Takeaways:

1. ECCC has implemented and plan to implement more initiatives in protecting the environment.
2. Canada is willing to provide support to Chile in preparing and implementing a waste reduction program.

Presentation #2: How Waste is managed in Chile (3 slides) – **Priscilla Ulloa**

- Article 70: Waste Article
- National Policy on Waste – Law on Extended Producer Responsibility
- Looking to control organic waste from Residential. Updating the waste methodology. Organic Waste management. Promoting Waste to Energy technology
- Also looking at composting for Organic portion
- 80% of the population of Chile is in Urban areas (three main cities)
- A portion of the taxes from **some** of the residential dwellings will go towards waste management.

Key Takeaways:

1. Chile processes waste differently depending on the region and are in need of a centralized system to track, and process waste.
2. Chile's waste only contributes a small portion to their overall GHG emissions; however, Chile believes they can make a large impact on the waste sector emissions.

Presentation #3: How Waste is managed in Canada (26 slides) – **Matthew Hamilton**

- Waste is managed through Provincial, Municipal and Federal governments. Canada generates 33 million tonnes of MSW per year which is either landfilled (73%), incinerated (2%) and/or diverted (25%).
- Waste sector emissions have been declining since 2005, due to higher diversion and landfill gas capture.
- New Actions to Reduce waste include: Pan-Canadian Framework, Commission for Environmental Cooperation and Strategy on Short Lived Climate Pollutants.

- Canada is looking to increase landfill gas capture throughout the Provinces and Territories by promoting offsets and looking at implementing collection systems in small landfills.
- Organic Diversion is another area of development for Canada. Looking at the food distribution system and finding areas to reduce waste. By reducing waste, you reduce economic losses, resource loss and reduces food insecurity.
- Canada is part of several domestic and International commitments on waste that include: UN Agenda 2030, NAFTA and ECCC's Strategy on Short lived climate pollutants.

Key Takeaways:

1. As most waste is sent to landfills within Canada, Canada is looking to focus on Landfill gas collection technology and how we can better divert material from landfill.
2. Canada is also looking to reduce the total quantity of waste per capita by understanding the processing of food and products within Canada.

Presentation #4: MRV of GHG emissions from Solid Waste Disposal (25 Slides) – **Jackie Mercer**

- The presentation covered how ECCC monitors, reports and verifies their National GHG inventory Report under the waste sector.
- The National Inventory Report (NIR) is published on UNFCCC's website and is verified by UNFCCC approved experts.
- The NIR tracks 7 major GHG emissions including CO2, NO2 and CH4.
- Information is collected through several different partners and through a questionnaire sent to specific landfills. Partners include: Statistics Canada, natural resource Canada and industry
- After information is collected it is compiled and then peer reviewed by internal and external experts (i.e. UNFCCC).
- The waste sector under the NIR include Solid Waste Disposal and Biological Treatment of Solid Waste, Incineration and wastewater treatment.
- ECCC uses a Tier 2 first order decay method to estimate CH4 emissions from landfill. This allows the model to reflect how waste degrades over many years. Within the model, CH4 captured and oxidated is factored in to accurately predict the CH4 emitted.
- To better estimate emissions from landfill an understanding of waste composition, providing a better survey or questionnaire to the landfills and finding better historical information on waste disposal is required.
- ECCC uses the annual GHG Emissions Reporting system to validate their estimates.

Key Takeaways:

1. Canada prepares a National Inventory Report to UNFCCC to benchmark their GHG impact from waste.
2. Using information from landfills (surveys), stats Canada and other sources they can estimate emissions from Landfills using the Tier 2 first order decay.
3. Emissions are verified by third party and compared against mandatory reporting for Landfills.

Presentation #5: Accreditation Process for Verifiers – **Patricia Chartrand**

- Most jurisdictions and programs require a verification body to be accredited under ISO 14065 to complete any third-party verification. ISO 14065 is an internationally recognized standard for verification.
- SCC currently has 4 companies that are accredited under ISO 14065 and ANSI has another ~20 companies.
- Accreditation requires verification bodies show how they are staying impartial within the verification process, while ensuring appropriate competencies are present in the verification Team (i.e. experience in sectors and the program).
- Accreditation process usually takes 6 to 11 months to complete.
- SCC discussed that they could provide support to Chile in creating their own accreditation body (i.e. similar to SCC) to allow Chile to approve their own local verifiers.

Key Takeaways:

1. To become recognized as verification body in most programs, you are required to be accredited under ISO 14065.
2. It is possible for Chile to create their own “SCC” to approve local verifiers. SCC can provide support.
3. ISO 14065 accreditation confirms that the verifier is acting impartial and is competent within that sector and program.




APPENDIX A

Itinerary

ARCADIS Design & Consultancy for natural and built assets

ITINERARY	
Project	Chile - Canada Bilateral Program / Quebec City-Montreal-Ottawa Workshop
Date	September 25th - September 29th
PARTICIPANTS	
Pablo Fernandois Ramirez - Chilean Ministry of Environment	
Norma Plaza Vergara - Chilean Ministry of Environment	
Rodrigo Ignacio Cabrera Lira - Chilean Ministry of Environment	
Priscilla Ulloa - Chilean Ministry of Environment	
Gerardo Canales - Consultant - Arcadis Chile	
Franck Portalupi - Environment and Climate Change Canada (ECCC)	
Melissa Rouillard Volle - Environment and Climate Change Canada (ECCC)	
Patrick Hardy - Climate-Check	
Michael Sills - Arcadis Canada	
Zachary Zehr - Arcadis Canada	
TIME	**ACTIVITIES**
SUNDAY, SEPTEMBER 24	
PM	**19:25**: Flight Santiago (SCL) to Toronto (YYZ)
MONDAY, SEPTEMBER 25	
AM	**5:00**: Arrival to Toronto **7:55**: Flight Toronto - Quebec **9:34**: Arrival to Quebec City (YQB) - **Hotel PUR Quebec - 395 Couronne St, Québec City, QC G1K 7X4**
PM	Free time in Quebec City **18:00:** Kickoff Meeting **19:00**: Kickoff Dinner - **Restaurant Chez Julez - 24 Rue Sainte-Anne, Ville de Québec**

ARCADIS Design & Consultancy for natural and built assets

Project	Chile - Canada Bilateral Program / Quebec City-Montreal-Ottawa Workshop
TIME	**ACTIVITIES**
TUESDAY, SEPTEMBER 26	
AM	**8:30 - 9:00:** Coffee **9:00 - 9:15:** Welcome and Introductions **9:15 - 9:45**: Presentation # 1 - Summary of the 2013-2020 Action Plan on Climate Change in Quebec - **Mme France Delisle - Director General, Directorate-General for regulation and emission data (French)** **9:45 - 10:30**: Presentation # 2 - Green / Residual Materials Program - **M. Philippe Coulombe - Head of Program Division Assistant Directorate of Organic Materials (French)** 1. Biomethanisation Program - MDDELCC 2. Composting Assistance Program for Small Municipalities - MDDELCC **10:30 - 10:45**: Coffee break **11:00 - 12:00**: Presentation # 3 - Mandatory Reporting of Certain Emissions of Contaminants to Air Regulations (RDOCECA)* - **Mme Vicky Leblond - Engineer, Carbon Regulatory and Emissions Data Branch**
PM	**12:00 - 13:30**: Lunch **13:30 - 14:15**: Presentation # 4 - Quebec's Greenhouse Gas Cap-and-Trade System (SPEDE)* - **M. Stéphane Legros** **14:15 - 15:00:** Presentation # 5 - Protocol 2 - Landfill sites - Destruction of CH4 - **Mme Sophie Houplain - Analyst, Carbon Market Division - & M. Pierre Bouchard - Engineer and Policy Advisor, Carbon Market Division (French)** **15:00 - 15:15**: Coffee break **15:15 - 16:00**: General Discussion - **All** 1. Monitoring, reporting and verification (SNV) 2. Link with California / Ontario 3. Alternative technology to reduce GHG emissions in the residual materials sector 4. Coordination of SNV approaches from a national vs. sector perspective

ARCADIS Design & Consultancy for natural and built assets	
Project	Chile - Canada Bilateral Program / Quebec City-Montreal-Ottawa Workshop
TIME	**ACTIVITIES**
WEDNESDAY, SEPTEMBER 27	
AM	**Location: Hotel PUR Quebec - Conference Room** **8:30 - 9:00**: Coffee **9:00 - 10:30**: ClimateCHECK Presentation - **Patrick Hardy** -Summary of RDOCACE* and SPEDE* -Overview of Existing and Relevant GHG Programs -Overview of Existing GHG Protocols for LFG capture and destruction, Composting and bio-digesters -Overview of relevant WCI* quantification methodologies. **10:30 - 10:45**: Coffee break **11:00 - 12:00**: ClimateCHECK Presentation - **Patrick Hardy** -Review of Modification/ Adaptation made by Quebec, Ontario & California Programmes to the WCI protocols and Quantification Methodologies - Overview of Collaborase (tool to assist methodology/protocol adaptation for Chile)
PM	**Location: Hotel PUR Quebec - Conference Room** **12:00 - 13:00**: Lunch - Restaurant TABLE and located on the first floor **13:05 - 14:15**: ClimateCHECK – Presentation on landfill Gas Project Development, monitoring, reporting and verification **14:15 - 15:00:** Presentation on verifiers perspective - **BNQ*** **15:00 - 15:15**: Coffee break **15:15 - 16:30**: Overview of Internationally Transferred Mitigation Outcomes (ITMO) - **Franck Portalupi** General Discussion - **All** -Summary of Findings to date -Discussion related to current thinking about what would be best for Chile circumstances -Discussion of next steps

ARCADIS Design & Consultancy for natural and built assets

Project	Chile - Canada Bilateral Program / Quebec City-Montreal-Ottawa Workshop
TIME	**ACTIVITIES**
THURSDAY, SEPTEMBER 28	
AM	**8:45**: Hotel Check-out **9:15 - 11:20**: Drive to Terrebonne/Lachenaie **11:30 - 13:30**: Visit to Terrebonne/Lachenaie
PM	**13:30 - 15:00:** Lunch **15:00:** Depart to Ottawa **17:00**: Visit to EcoCentre Gatineau (TBD) **18:00**: Arrival Hotel Best Western Plus Gatineau-Ottawa
FRIDAY, SEPTEMBER 29	
AM	**8:30:** Chilean Delegation to meet in front of Fontaine Building - 200 Sacré Cœur - ECCC Shuttle to Place Vincent Massey **9:00 - 9:30**: Welcome and Introduction - **Franck Portalupi - Climate Change International** **9:30 - 10:15**: Implementing the Government of Canada's Environmental Priorities - **Lucie Desforges- Multilateral and Bilateral Affairs** **10:15 - 10:30**: Health Break - Room MacKenzie **10:30 - 10:45**: How Waste is managed in Chile - **Priscilla Ulloa - Ministry of the Environment Chile** **10:45 - 12:00:** How Waste is managed in Canada - **Matthew Hamilton - Waste Management and Reduction Division**
PM	**12:00 - 13:00**: Lunch - Room MacKenzie **13:00 - 14:15**: Monitoring, reporting and verification of GHG emissions from Solid Waste Disposal - **Jackie Mercer -Pollutant Inventories and Reporting Division** **14:15 - 15:30**: Accreditation Process for Verifiers - **Patricia Chartrand - Standard Council of Canada** **15:30 - 16:00**: Conclusion, Wrap Up and Next Steps - **All** **19:00**: Departure from Ottawa (YOW) **20:04**: Arrival to Toronto (YYZ) **22:55**: Departure from Toronto (YYZ) to Santiago (SCL)

***Notes:**

RDOCECA: Règlement sur la déclaration obligatoire de certaines émissions de contaminants dans l'atmosphère
(Regulation respecting the mandatory reporting of certain emissions of contaminants into the atmosphere)

SPEDE: système de plafonnement et d'échange de droits d'émission de gaz à effet de serre
(Cap-and-trade system for greenhouse gas emissions)

BNQ: Bureau de normalisation du Québec. It the central body for standardization and certification

WCI: Western Climate Initiative