



**2012 COMMUNITY EXCELLENCE AWARDS**  
**Category Worksheet**

**LEADERSHIP & INNOVATION**  
**Climate Action**



**Columbia Shuswap Regional District**

**Achieving Carbon Neutrality through the Capture and Beneficial Use of Landfill Gas and Leachate at the Salmon Arm Landfill**

**Project Summary**

As a signatory to the Climate Action Charter the CSRD recognized a need to establish measurable outcomes through innovative projects that would enable the CSRD to become carbon neutral. Knowing that landfill sites are large emitters of methane gas, the CSRD constructed infrastructure at its Salmon Arm landfill site to utilize methane gas and to reuse landfill leachate. Concurrently the CSRD entered into agreements with Pacific Carbon Trust (PCT) for the sale of carbon credits and with Fortis Gas for the sale of raw landfill gas. The gas utilization project enables the CSRD to retain carbon credits to offset the CSRD's corporate emissions and provides any additional carbon credits to its member municipalities. In 2011, 6,907 carbon credits were verified as per the terms and conditions of the PCT contract. The CSRD is on target to be the first local government in British Columbia to become carbon neutral through internal measurement, reduction and offsetting of carbon emissions and to provide opportunities to its member municipalities to also become carbon neutral by investing back into a local project.

**Project Analysis**

**1. CLIMATE**

*Please describe how the program/project contributes to the achievement of one or more of your Climate Action Charter goals:*

- i. Corporate carbon neutrality:*
- ii. Using your community energy and emissions inventory:*
- iii. Creating complete, compact, energy efficient rural and urban communities:*

One of the key driving forces behind the innovative approach to Salmon Arm landfill gas utilization project was the ability to, through a validated project plan recognized by Pacific Carbon Trust, verify carbon credits in order to offset the CSRD's corporate emissions and reach its goal of becoming carbon neutral. By employing provincial accounting standards, via the SMARTTool, the CSRD is in the process of determining carbon emissions and is looking forward to being one of the first local governments to achieve carbon neutrality by using carbon credits created internally through a validated PCT project.

In addition to becoming carbon neutral, the CSRD has partnered with Fortis BC who will use the methane (biogas) collected from the utilization project, upgrade the gas (biomethane) and distribute the gas in their pipeline. The result will be that approximately 500 homes and businesses in Salmon

Arm will be fuelled by biomethane, which is an energy efficient way to develop Salmon Arm's urban community. Biomethane is directly introduced into existing natural gas pipeline systems and is used in the same way as natural gas, but offers the additional advantages of being a carbon neutral and renewable source of energy. Also the liquid run-off produced through landfilled waste (leachate) is being recirculated through a stand of 2,300 hybrid poplar trees to remove harmful constituents from the leachate. This project also removes CO<sub>2</sub> from the atmosphere and adds to community emissions reductions.

## 2. PROCESS

*Please provide a brief outline of the steps involved in the program/project and the status of each step*

1. Corporate Strategic Plan – 2008
  - a. Commitment to environmental leadership and stewardship
2. Signatory of Climate Action Charter – 2009
  - a. Commitment to carbon neutrality by 2012 with respect to corporate emissions
3. CSRD Corporate Climate Action Plan - 2009
  - a. Identify existing carbon footprint and recommendations for reductions
4. Develop Salmon Arm Gas Utilization Feasibility Study - 2009
  - a. Identify options for gas utilization
5. Salmon Arm Phase 1 Closure Plan and Gas Upgrade – 2009
  - a. Detailed design on closure and gas design
6. Salmon Arm landfill Gas Assessment - 2010
  - a. Mandated report to the Ministry of Environment on landfill gas production
7. Agreement with Fortis BC - 2008
  - a. Draft Agreement
  - b. BCUC Approval
8. Agreement with Pacific Carbon Trust to Develop Landfill Gas Protocol - 2010
  - a. Utilize Climate Action Reserve Protocols
  - b. Develop Project Plan
  - c. Validate Project Plan
9. Construction of Landfill Gas Infrastructure – 2010/2011
10. Verify Project Offsets – 2012
  - a. Third Party verification of carbon offsets obtained
11. Agreement with Pacific Carbon Trust to Develop Offset Registry Service - 2012

## 3. RESULTS

*Tell us how your submission addresses climate change issues in terms of reduced GHG emissions and/or supports your community to prepare for the impacts of climate change.*

As a result of the Salmon Arm landfill gas utilization project; in 2011 6,907 metric tons of Carbon Dioxide equivalents (CO<sub>2</sub>e) or 300 tonnes of methane were removed from the atmosphere. This is a significant reduction in GHG emissions, equivalent to the removal of greenhouse gas emissions from 1,229 passenger vehicles. With 2011 being an incomplete year of production (the project was commissioned in February, 2011) and with some minor modifications, the CSRD is on target to remove 10,000 tonnes of CO<sub>2</sub>e in 2012 and will be in a position to voluntarily remove over 100,000 tonnes of CO<sub>2</sub>e before this landfill site is regulated under the provincial Landfill Gas Regulation.

In terms of supporting the community in preparing for the impacts of climate change, the landfill gas utilization project goes beyond the CSRD community. The project paves the road for other local governments to employ similar partnership models and technologies in order to implement this type of small scale landfill gas recovery system. In addition, carbon offsets generated as a result of this project are being made available to the CSRD member municipalities in order for those municipalities to invest in a tangible project within or close to their jurisdictions.

#### 4. LEADERSHIP

*How does the project reflect leadership and excellence in the advancement of climate action?*

The landfill gas utilization project is one of the smallest gas utilization projects in North America. While most small landfill closure projects employ passive systems that ultimately vent methane to the atmosphere, the CSRD choose to voluntarily implement an active methane gas collection system and by partnering with Fortis BC, use the gas to offset the community's natural gas demands. The CSRD is the first local government to partner with the Pacific Carbon Trust. Upgrading landfill gas to pipeline quality natural gas has not been advanced in British Columbia, and this project marks the first project in this regard.

In 2011 our efforts related to this project were recognized by the Federation of Canadian Municipalities (FCM), as the CSRD's "Capture and Beneficial Use of Landfill Gas and Leachate" project won the Waste category of the FCM's Sustainable Communities Awards. These awards showcase projects across Canada that demonstrate; "environmental responsibility and leadership".

#### 5. ECONOMICS

*a. How was the project a good use of budget and resources?*

In 2008, the Ministry of Environment passed the Landfill Gas Regulation which signified the intent to require landfills of a certain size to install active methane gas collection systems. In terms of carbon credits, once a landfill is a regulated entity, it is exempt from taking advantage of carbon credits. The CSRD recognized this early in the process and put forward budget initiatives to act in advance of being regulated.

The CSRD board approved spending resources through past reserve fund contributions from landfill user fees on this voluntary project, with the long term vision of recovering those costs from the opportunities presented with Pacific Carbon Trust, carbon credits and Fortis BC.

The CSRD invested approximately \$1.5 Million dollars into the voluntary landfill gas upgrade project from funds collected through user fee contributions to reserve accounts. No tax dollars were spent on this project. Fortis BC, the BC Bioenergy Network and the Provincial ICE fund also contributed capital funds to this project.

*b. How does the project encourage economic sustainability? (e.g. life cycle analysis, internalizing costs and alternative financing, economic instruments)*

Cost savings will be recognized through the reporting of carbon credits realized by the destruction of methane gas. In conjunction with the British Columbia's Emission Offsets Regulation and North America's Climate Action Reserve Landfill Gas Protocols, the CSRD will report, on annual basis, the amount of carbon credits generated by this project. Carbon credits will be sold to Pacific Carbon Trust on an annual basis and it is anticipated that this project will generate approximately \$100,000 in revenues annually. In addition, a partnership with Fortis Gas will result in an

additional revenue stream of \$50,000 annually. The CSRD will be providing landfill gas to Fortis for their use in a process to upgrade the gas to pipeline standards and distribution to over 500 homes and businesses in Salmon Arm.

The sale of carbon credits generated to PCT, as well as the sale of raw landfill gas to Fortis BC, will enable the CSRD to receive a return on its investment within 15 years. Funds will be used to offset operational costs associated with recycling programs and future climate action initiatives.

## 6. ENGAGEMENT

*How does the project encourage engagement? (e.g. stakeholder engagement, public participation, equity and diversity, knowledge sharing, capacity building, community identity and marketing)*

The CSRD has engaged the public through multiple speaking engagements including presentations to Rotary Club of Salmon Arm and the Southern Interior Waste Management Association. Presentations have also been given at Sustainability Conferences hosted by the Pacific Carbon Trust, The University of Toronto and the Solid Waste Association of North America – Pacific Chapter. Webinars and publications have been presented through the Federation of Municipalities, the Pacific Carbon Trust, and the provincial Ministry of Sport and Culture. Additionally, there have been numerous discussions with the feasibility of advancing similar projects within other local governments in North America. These presentations and discussions have provided other local governments and business groups' detailed information on the project which can and have been used to help plan similar initiatives. Furthermore, efforts have been made to keep the general public, member municipalities and other local governments informed in an effort to create public awareness of the environmental benefits of this project.

## 7. INNOVATION

*What makes your program/project innovative?*

What makes the Salmon Arm landfill gas utilization project innovative is the overall scale of the project. While larger landfills, such as the City of Vancouver's landfill, employ over 300 gas wells to extract methane, the Salmon Arm landfill project consists of 6 wells. This has made the feasibility of installing Fortis BC's upgrading equipment a riskier proposition and innovative approaches have been employed, such as siloxane removal from the gas.

Furthermore, this project involved treating landfill leachate and applying that leachate to a phytoremediation area, consisting of 2,300 hybrid poplar trees. The trees are individually irrigated with leachate, up taking and treating the leachate. To date, the trees have added on average 12 to 14 feet of growth since being planted in 2011. The trees also act as carbon sinks, which add to the CSRD's efforts to address climate change.

The CSRD has been a leader in acquiring relationships with corporations such as Fortis BC to invest in this project as well as engaging with the Pacific Carbon Trust in the first agreement of its kind. This project, although unique and innovative, has been carefully considered and developed to be repeatable in other jurisdictions throughout the world in order to achieve a much larger positive environmental impact than what is seen through positive changes in the local community.

## 8. TRANSFERABILITY

*How is this program/project transferable to other local governments?*

This project has several key elements that are transferable to other local governments. The most important aspect that can be transferred to other local governments is the proof that even smaller local governments, with smaller landfill sites, can take voluntary actions and reduce their greenhouse gas emissions. At the same time, contracts can be established with willing partners such as PCT and Fortis BC, and revenues can be generated to repay the capital investment.

Furthermore, the CSRD is the first local government to establish a Registry with PCT. The Registry is essentially an account whereby PCT will manage Project Offsets, and facilitate the transfer of Project Offsets to offset the CSRD's own corporate emissions, as well as its member municipality's corporate emissions, should they request purchasing locally generated carbon offset credits.

The CSRD is looking forward to partnering with other local governments and sharing the lessons learned through this project.

## 9. KNOWLEDGE SHARING

One of the key challenges for this project was the timing of the start up for the gas treatment plant. Salmon Arm experiences relatively mild winter conditions compared to other parts of the province however, temperatures can drop to below freezing levels. The freezing conditions, combined with the start up of a new gas plant, posed several challenges that were not anticipated during the design phase. Consequently, staff spent a considerable amount of time trouble shooting, responding to alarms and dealing with gas plant down time.

This project involved several partnership models between the CSRD and outside entities such as Pacific Carbon Trust and Fortis BC. The scope of which portions needed to be cost shared should have been specifically outlined in the preliminary stages of the project, rather than having to work out those details after the fact. This project resulted in several situations where the CSRD was forced to go back to partners and work out payment details for unanticipated costs. It is recognized that every detail of a project of this magnitude cannot be anticipated, however, clear procedures for dealing with the unexpected need to be developed and agreed upon early in the planning stages.

## 10. TELL US MORE

The CSRD is proud to be able to supply UBCM with what it feels is a strong application, which recognizes our organization's commitment to leadership and innovation when it comes to tackling the challenges of climate change. The CSRD takes being a signatory to the Climate Action Charter very seriously and through this project, is on track to become the first local government to become carbon neutral without the reliance on the external purchase of carbon credits.

On behalf of the CSRD Board of Directors, we thank you for taking the time to consider our application.