Creating Open Government in Environment and Climate Change Canada

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Executive Summary

Introduction

Open government is a priority for current political leaders in Canada. Canada has made both international and national commitments towards advancing open government to cultivate the many benefits that open government can provide (Treasury Board, 2014). Open government is an opportunity for increased engagement, accountability, transparency, and private or non-profit benefits. There have been many examples across the world of open government initiatives being used to bring about positive impacts (World Wide Web Foundation, 2015, p. 25). Canada ranks 4th best open data implementation in the world in 2015, but drops to 7th in the world when just comparing open data impacts (World Wide Web Foundation, 2015, pp. 31-35).

Canada's most recent iteration of the Open Government Action Plan (OGAP) makes commitments to adopt default policies (all government material that can be made open should be made open, while respecting privacy, security, and other limitations), to increase fiscal transparency, engagement of Canadians, innovation, prosperity, and sustainable development (Treasury Board, 2014). Environment and Climate Change Canada (ECCC) is one of the leaders of open science, an important part of open data. Canada's open by default policy states that the Government of Canada's eventual goal is to release all non-sensitive material (Treasury Board, 2014).

To best support implementation of open government in ECCC, this paper aimed to identify and detail cultural and organizational barriers and enablers of open government within ECCC, including how significant these barriers and enablers are and where they exist within the organization. Building off these results, recommendations were formed to address the barriers and enablers that were found.

Methodology and Methods

Five barriers and six enablers were identified that were encountered in other countries (i.e.: USA, UK, Ireland etc.) were identified. These barriers and enablers were used to craft an interview guide for semi-structured interviews with twenty ECCC employees and managers below director level from five work types: IM/IT, policy, science, communications, and regulatory.

Key Findings

Most the barriers identified in the literature were perceived to be present in some capacity in ECCC, or within some work types. Barriers that were identified within ECCC were: risk aversion, fear of negative publicity, poor data quality and usability, disincentizing/unclear rules, and problems with working with technology and technological procurement. Risk aversion in this context was tied to fear of negative publicity. Data quality and usability was another identified barrier because some open data was not being fully vetted before being released. In addition, many respondents perceived that data was being presented without all the context needed to be useful within the science community. There was a disincentivizing rule that pertained to the data release process and its effect on the careers of science workers. Technology was a barrier for respondents across work types, and contributed towards capacity issues.

Enablers that were identified within ECCC included: engagement and social media abilities, use of a phased approach to open government, use of open government as a part of the department's mandate, and leadership. Engagement skills and knowledge of social media were present within ECCC, but social media expertise was considered by most respondents to be spread thin considering ECCC's current engagement mandate. In addition, science and regulatory respondents held a different view of how to effectively communicate with external stakeholders than communications respondents. This difference in approaches coupled with a perceived history of ECCC releasing information with obfuscated meanings, contributed towards a lack of trust between science and regulatory workers and communications workers. Open government within ECCC is being implemented using a phased approach. However, there are still some perceived capacity issues related to use of technology. In addition, there was an incentive to release open data for on the performance agreements of science workers to counter the potential career disincentives. Connection with the mandate is an enabler because it demonstrates the value of open government to employees (Lee & Kwak, 2012, p. 500). Many respondents knew that open government itself was part of the mandate, but many could not see how it could be used to address environmental problems. Leadership was an enabler that was identified by many respondents, but was not reflected in literature.

Recommendations

Open government implementation should strive towards creating both transparency/ democratic impacts and economic impacts. This set of recommendations use a phased approach to implementation that builds up capacity and leverages leadership to form a culture that is receptive to the changes that open government will bring.

YEAR 1: SETTING THE FOUNDATION

Establish Open Data Standards through Engagement

To support data quality and usability of data by a broad base of users, ECCC should engage academia, private sector corporations, non-profit groups, and citizens to establish what data standards are needed to make ECCC's open data useful.

Adjust Data Release Policies for Scientists

To address a dincentivizing rule that ECCC scientists experience, ECCC should implement a specified period that scientists have in which they should be able to reasonably use their data before they must release it. The specified period should be established by a comprehensive set of criteria to determine a reasonable length of time.

Address Transparency Related Risk Aversion

To address the fear of negative publicity and risk aversion barriers, ECCC should use a leadership driven approach that involves some training for senior management (director and above).

Improve Social Media and Engagement Expertise

Open government requires additional social media and engagement expertise to support use of open data and information for transparency purposes. This expertise gap should be addressed by increasing the number of communications workers within ECCC to work on open government related initiatives. In addition, a social media and engagement skills toolkit should be created to distribute to junior managers to increase communications expertise across the department.

Support Trust between Science and Regulatory and Communications Workers

A key cultural factor that should be addressed is the perceived mistrust between science and regulatory workers and communications workers. Through effective leadership based intervention, the culture of communications workers and science and regulatory workers can develop to better support goals of transparency and engagement in the long-term.

YEAR 2: BUILDING POSITIVE IMPACTS

Promote Open Data

ECCC should create a competition to create a model for a problem. This competition will leverage citizen choice and encourage private sector organizations, academia, non-profit organizations, and individuals to participate. Each application will be evaluated based on pre-determined and open set of criteria, and winner's idea should be implemented within ECCC.

Use Plain Language, Engaging Communication

Using blogs crafted by ECCC employees, these blogs will help bring appropriate context to open government materials. This will enable non-experts within the department, and outside of the department to learn about environmental topics, even if they do not have advanced scientific or data literacy.

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1.0 Introduction

1.1 Defining the Problem

Open government is not a new concept, but it has been recently enabled by technological advancements (Hansson, Belkacem, & Ekenberg, 2014, pp. 540-541). Open government has been conceptualized by Treasury Board Secretariat (TBS) as a type of governance that allows Canadians to have access to government information and proceedings (Treasury Board Secretariat, 2014). Open government involves making government data and unstructured information publicly available and engaging with Canadians (Harrison, Pardo, & Cook, 2012, p. 903). This involves both proactively releasing data, and using this data to engage Canadians on issues that the Government of Canada is addressing.

Open government can provide a multitude of benefits to Canadians, government stakeholders and private sector stakeholders. Open government makes government institutions more transparent. By publicly releasing government information and raw data, citizens are given the opportunity to examine the information that government organizations use, learn how government organizations use that information, and provide organizations with additional information, critique, or a different perspective (Ubaldi, 2013, pp. 4-13). This can inform the policy making process by generating richer information about a topic, potentially resulting in better decision making (Ubaldi, 2013, p. 34). In additional to democratic benefits, open data can be used by private sector organizations to create or improve products and services, contributing to economic growth and supporting their national economy (Huijboom & Van den Broek, 2011, p. 4). The Government of Canada has made an international commitment to implement open government (Treasury Board Secretariat, 2014). ECCC is mandated to take part in implementing open government. However, other governments that have implemented open government have encountered some challenges due to the structure and culture of the government organizations. The culture in many government organizations are often not conducive to open government (Barry & Bannister, 2014, pp. 140 - 149). Many governments can be characterized as hierarchical; an organizational culture that is focused on control and stability. It is characterized by rigid rules and structures for accountability, efficiency and decision making. Although this type of culture has benefits, such as consistency and efficiency, it is also often internally focused and inflexible to change (Cameron & Quinn, 2006, pp. 37 - 46). These factors can contribute towards problems when implementing open government (Barry & Bannister, 2014, pp. 140-149).

1.3 Project Objectives and Research Questions

To make recommendations on how to implement open government, there must be an understanding of the possible barriers and enablers of open government (Huijboom & Van den Broek, 2011; Zuiderwijk & Janssen, 2014). For this project, a barrier is an obstacle towards optimal open government implementation, and an enabler is something that encourages optimal open government implementation. This project addresses cultural and organizational barriers and enablers. Culture in a workplace is a shared set of factors within an organization that establishes appropriate ways of acting. These factors include leadership, values, norms, habits, unwritten rules, skills, shared meanings, symbols, and rituals that are developed out of a shared experience and history (Schein, 2004, pp. 1 - 14). For the purposes of this project, organization will be defined as formal sets of rules, procedures, and mandates within ECCC.

This project will determine if barriers and enablers to open government identified in the literature are present within ECCC, and if any other barriers or enablers exist. The main objective of this project is to learn how ECCC can mitigate barriers and leverage enablers to support effective open government implementation and governance by creating relevant, targeted recommendations. The primary question that this project aims to address is: *how can ECCC help support ECCC employees in embracing open government*?

Several sub-research questions help to clarify the aims of this project:

1. What is the current status of open data, open information, and open dialogue in ECCC?
2. Are the barriers and enablers described in the literature present within ECCC and how significant are they?
3. Are there other, unanticipated barriers or enablers to open data, open information, and open dialogue?
4. Do different types of workers experience different barriers or enablers? Do different types of workers experience different levels of open government readiness?
5. Are there lessons learned from the public service of other countries or other levels of government in Canada or outside of Canada?
6. What steps can be taken to facilitate open government implementation in ECCC?

1.4 Organization of Report

This report will begin by explaining the international, national, and organizational context of open government within ECCC. This report will describe relevant national, international, and organizational background in section 2. In section 3, the current literature on open government will be summarized. Section 4 provides a description of the methods and methodology used to examine barriers and enablers for five different work types within ECCC. Section 5 explains the barriers and enablers present in ECCC in detail, including relevant contextual information. Section 6 will compare what was found in ECCC with the current literature to demonstrate how the barriers and enablers present within ECCC could affect the ability for open government to generate impacts from open government initiatives. Section 7 will make recommendations that aim to develop useable and comprehensible data and information that can be used by a variety of stakeholders to generate positive impacts.

2.0 Background

2.1 Introduction

To fully understand open government within ECCC, it is important to understand its context. This section describes the international and national commitments that the Government of Canada has made to implement open government, followed by what open government commitments ECCC has made. This section aims to situate ECCC within its nation, international, organizational, and media context.

2.2 Canadian International Commitment

The Canadian federal government has made strides to implement open government. In 2012, Canada joined the Open Government Partnership (OGP) (Treasury Board, 2014). The OGP is an initiative involving 65 countries and a commitment to transparent, citizen-involved, and technologically enabled open government. The commitment involved creating an Open Government Action Plan (OGAP) (Treasury Board, 2014). The third OGAP, re-branded as a biennial plan for Open Government partnership, also makes a commitment to promoting open government internationally. This involves learning from the successes and challenges of open government implementation in other countries, sharing Canada's successes and challenges, and supporting open government implementation in other countries (Government of Canada, 2016).

2.3 Canadian National Commitment

Canada's first OGAP covered for 2012-2013, and the second plan for 2014-2016. The current OGAP outlines open government commitments for 2016-2018. Each plan involves consultations with Canadians to continuously improve open government implementation. Consultations for the first plan determined that Canadians wanted the Government to pre-emptively release data, while still following privacy and security legislation. Canadians wanted this information to be easy to read and use (Treasury Board, 2014). Feedback from the first OGAP emphasized the need to increase specificity of open government goals, find better ways to engage Canadians and stakeholders, increase emphasis on open dialogue and open information commitments, and create standard open data formats (Government of Canada, 2015).

The second OGAP involved 12 commitments under three broad themes: open data, open information, and open dialogue. The Government of Canada has created an open government site that houses the open data portal, the open information portal, and open dialogue resources. These sites have released many datasets and studies funded by the Government of Canada (Government of Canada, 2015). In January 2016, an appraisal of the progress made towards open government goals outlined in OGAP was released. The eight commitments on schedule were Directive on Open Government, Canadian Open Data Exchange, Open Data for Development, Open Data Core Commitment, Mandatory Reporting on Extractives, Open Contracting, Open Information on Budgets and Expenditures, and Digital Literacy. The four delayed commitments were Open Data Canada, Open Science, Open Information Core commitment, and Consulting Canadians (Government of Canada, 2016).

The latest OGAP was rebranded to demonstrate that open dialogue, open data, and open information are interrelated. It includes four themes and 21 commitments. The four themes are:

1. *Open by Default* involves data and information related goals, an engagement goal, and organizational change goals. Information and data related goals include: consistently formatting data and information appropriate for release, and improving the process Canadians can use to gain access to government information and their own personal information. The engagement related goal included facilitating informed engagement of Canadians with government. The organizational change goals include educating public servants on how to leverage open government in their own position and increasing transparency in government service delivery. This theme also includes a commitment to improve the Access to Information Act, which has not been significantly updated since the 1980s. This commitment is being implemented by TBS, with the assistance of Privy Council Office and Justice Canada.

2. *Fiscal Transparency* involves releasing information about how government funds are spent, including departmental spending, the budget, and grants and contributions. This theme also involves improving information on Canadian private sector organizations.

3. *Innovation, Prosperity, and Sustainable Development* involves making user friendly geospatial data, making science activities funded by the federal government more transparent, enhancing open data across the federal government and internationally, and engaging with the private sector to understand their open data needs. Open Science, an open government initiative led by ECCC and Innovation, Science, and Economic Development Canada (ISEDC), is included in this theme.

4. *Engaging Canadians and the World* involves collaborating with Canadians in policy making, encouraging other countries to implement open government, and encouraging the creation of more useful tax data.

Although the Government of Canada has made a commitment to open government in the political sphere, the Government has been criticized for not supporting public access to scientific research under Stephen Harper's leadership. In 2013, the Environmental Law Clinic at the University of Victoria filed a complaint with the Information Commissioner of Canada, attaching a report "Muzzling Civil Servants: A Threat to Democracy". The complaint requested that the Information Commissioner investigate the media relations policy of several departments, including ECCC. ECCC's policy aimed to ensure that media was getting consistent messaging from across the department by filtering media requests through the media relations team (Sommers, Sandborn, Greenwood, and Kovak, 2013, p. 5-6). The report explained that ECCC's information requests from media that were not requesting routine weather information must be approved by the minister's office, and requests about certain policy areas or from major news outlets must be approved by Privy Council Office (Sommers, Sandborn, Greenwood, and Kovak, 2013, p. 11). This process resulted in unnecessary delays for information requests for media. It also references an ECCC internal document that stated that this policy resulted in an 80% reduction in media coverage of climate change science (Sommers, Sandborn, Greenwood, and Kovak, 2013, pp. 11-25).

The Trudeau government has asserted its support of open government through its ministerial mandate letters. ECCC's mandate letter shows support for transparency through proactively releasing government information and data (Trudeau, 2015). Canada's commitment to open government was also reflected in the December 2015 Speech from the Throne and the March

2016 federal budget (Government of Canada, 2016c). Open government policies seem to be a priority under Trudeau's leadership, and some public engagement on climate change is starting.

2.4 ECCC Commitments

One open information commitment is Open Science (Treasury Board, 2014). OGAP states that an Open Science Implementation Plan (OSIP) should be crafted and made publicly available (Treasury Board, 2014). OSIP must include information about public consultation and promotion of open science activities within the public service, and include a list of publicly funded academic studies (Treasury Board, 2014). Open Science is not limited to sharing publicly funded scientific studies, but also engagement with the private sector, Canadians, and the science community outside of government. Open Science will also extend to include releasing information on ECCC's routine monitoring functions (Environment Canada, 2015a).

ECCC has also developed a departmental document to guide the department more generally. The Open Government Implementation Plan (OGIP) was created in October 2014 and is led by Corporate Services and Finance Branch (CSFB), a branch within ECCC. It outlines the specific actions that ECCC has taken and is planning to take to support open government including creating an open database, incorporating open data principles into information management policies to enable release all ECCC data, and providing information that departments are required to under TBS rules. It mentions working with the Blueprint 2020 (BP 2020) team and the information management steering committee by contributing to awareness raising and engagement (Environment Canada, 2015b, pp. 3-7).

Open Government within ECCC is promising, particularly in Open Science and science workers. Recent changes in political and departmental leadership and performance structures have given science workers senior level support and incentives to make their data and information open, and engage with media about the science work that is done within the department. Science employees are showing signs of embracing open data and information as the new way that work is done within ECCC. However, open government implementation is nascent, and is held to a high standard by the Canadian public. This project will seek to optimize open government implementation, identify gaps in implementation, and identify unaddressed issues.

2.5 Project Client

ECCC is a science based, federal department that focuses on environmental issues such as protection of wildlife, water, air, pollution mitigation, weather prediction, weather emergencies, and climate change mitigation while working with private sector organizations to assist in sustainable development. The department has approximately 6,800 employees, of which 65% work outside of Ottawa and Gatineau. It is composed of 11 branches, each has a slightly different mandate.

The main two branches involved in implementation of open government initiatives are the CSFB and the Science and Technology Branch (S&T). However, other branches are also engaged in open government. CSFB is the result of a consolidation of the Finance Branch and the Corporate Services Branch, and is responsible for financial services and providing information management, IT, procurement and security systems. ECCC's Open Government Implementation

Plan (OGIP) was crafted by CSFB and has a strong focus on changing information management practices to facilitate use of open data.

S&T conducts scientific research to learn about the environment including soil, air, water, climate, and ecosystems. It also is engaged in risk assessment, environmental monitoring, and regulatory activities. S&T is involved with an interdepartmental open government initiative called Open Science. However, a key piece of the Open Government Directive is open by default. The open by default policy requires that all data held by Government of Canada organizations must be proactively released unless it is subject to exemptions. This means that all branches will likely be involved in open government initiatives.

This project's client is ECCC's BP 2020 Team. BP 2020 is a federal government wide innovation project, aiming to transform how the government works to better serve Canadians (Government of Canada, 2014, p. 1). Each department has its own iteration of BP 2020, sometimes consisting of a small full-time or part-time team, and/or a senior management champion of the cause. One implicit goal of BP 2020 is adjusting the culture within the federal government to remain relevant now and into the future. To best support innovation, BP2020 aims to facilitate culture change to encourage Canadian government organizations to become more externally focused, flexible, and open (Charette, 2015).

Within ECCC, a small team of advocates works full time on BP 2020 initiatives, and is led by a champion. One function of ECCC's BP 2020 team is to start initiatives that promote a modernized culture which supports internal and external engagement with the public service. A modernized culture involves becoming more responsive to changing environments, citizen needs, and demographic changes, using modern technology, working collaboratively internally and externally, working efficiently and innovatively, and continuously improving the workplace (Charette, 2015, pp. 8-13). Although other teams in ECCC are responsible for open government implementation, the BP 2020 team has an opportunity to assist by promoting a culture that supports proactive information sharing (Environment Canada, 2015, p. 7). The BP 2020 initiative was aligned with open government in a 2016 open government progress statement by building a more open public service and engages Canadians towards the public good (Government of Canada, 2016).

3.0 Literature Review

3.1 Introduction

To implement open government optimally, it is important to think about what impacts that that open government can generate and how they can be fostered. The potential benefits of open government help determine what impacts should be fostered through open government, and which barriers and enablers effect open government's potential. Placing open government among a broader eco-system of actors can help establish how to design open government to generate its intended impacts. This provides a backdrop and basis for the analytic framework to how ECCC can mitigate what is preventing optimal open government implementation (barriers) and what should be leveraged to support open government's use (enablers).

3.2 Potential Benefits: Democracy and Economic Benefits

Open government has the potential to enhance democracy and foster economic benefits. It is important to consider these benefits when designing open government initiatives, as they provide insights on what is possible and provide direction on impacts open government should generate.

3.2.1 Enhancing Democracy through Transparency and Participation

The OGAP presents democracy and transparency as key benefits of open government implementation in Canada (Treasury Board, 2014). Open government has the potential to significantly enhance democracy by facilitating citizen participation. Transparency and access to all relevant information made in governmental decisions, coupled with active citizen engagement, can lead to a better-informed population (Heckmann, 2011, pp. 1 - 3). With more information, citizens are better able to understand government reasoning and the constraints that government faces in the process of decision making, leading to citizens developing a better understanding of government decisions (Meijer, Curtin, & Hillebrandt, 2012, p. 21). Open information and open data allows citizens to educate themselves on issues that are relevant to their lives and interpret problems for themselves, increasing deliberation within democracy (Davies, 2010, pp. 14 - 15). Open dialogue can facilitate a responsive government, as engaging citizens can help governments become more responsive to citizen needs (Heckmann, 2011, p. 9).

However, open government policies alone do not necessarily support transparency and increased participation (Huijboom & Van den Broek, 2011, pp. 3 - 5). Other elements are needed to fully realise this benefit, including citizens comprehending the data and information provided, data and information must be trustworthy, and citizens need access to and competency with technology (Jetzek, Avital, and Bjorn-Anderson, 2013, p. 16). These factors are important to consider when trying to use open government to enhance democracy, as it is necessary for non-experts to understand open data to use it to support government transparency. In addition, transparency must be an explicit focus of open government initiatives. Yu and Robinson discussed the American open government implementation as an example of how providing open data did not result in increased transparency. As the open government initiative developed, transparency became less of an explicit focus, while other benefits (such as improving services) became the focus. This led to a number of agencies presenting information and data already available, instead of releasing data and information that could hold agencies accountable for their decisions (Yu & Robinson, 2012, pp. 14 - 16).

A legal framework in which citizens are encouraged to learn, ask questions about, and respond to government information is critical to support access to government information (World Wide Web Foundation, 2015, p. 8). Without a strong legal framework that facilitates access to data, while protecting privacy open government can be venerable to "open washing". This happens when government calls itself open, but open government implementation does not result in any democratic benefits (World Wide Web Foundation, 2015, p. 14). Canadian laws secure the right for citizens and stakeholders to have access to government information prior to open government. The law that requires the federal government to release information in Canada is called the Access to Information Act (ATIA), made into law in 1982 (Roberts, 2002, p. 176). ATIA allows anyone outside of government to gain timely access to non-confidential government information, including outside stakeholders, such as interest groups, the media, the opposition party, and others. Exemptions to ATIA include (but not limited to): information given in confidence from another country, a provincial government, or an aboriginal government; anything that could negatively impact federal-provincial relationships or international relationships; information that risks Canadian national security; information that could interfere with the safety and privacy of Canadians or their economic interests; information that contains third party information; or advice to cabinet (Access to Information Act, 1985).

Although Canada has a legal framework for transparency, the Office of the Information Commissioner considers ATIA to be outdated. The Information Commissioner has crafted a report "Striking the Right Balance for Transparency: Recommendations to modernize the Access to Information Act" that contains recommendations to improve ATIA, including creating a requirement to document the decision-making process, a requirement to report loss or destruction of records, requirements to limit extensions to the 30-day ATIP processing time, requirements to strengthen oversight, and other recommendations that aim to update and improve ATIA (Information Commissioner of Canada, 2015). According to the Office of the Information Commissioner's annual 2015-2016 report, Canada's OGAP commitment to reform ATIA has been subject to numerous delays. As a result, the weaknesses of ATIA are still being used to avoid accountability by delaying ATIP requests, inadequately recording decision making criteria, and by other means (Office of the Information Commissioner of Canada, 2017, pp. 6-7).

3.2.2 Fostering Economic Benefits

Another potential benefit to open government is to generate economic value. Governments own large amounts of data that is suitable for public release. Much of this data could be used by the private sector to generate value if made accessible and leveraged (Chan, 2013; Zuiderwijk & Janssen, 2014). Jetzek, Atival, and Bjorn-Andersen (2014) argue that the recent advancement and proliferation of ICTs grant opportunities for data and information to be released cost-effectively, and provide opportunities for the data to be used to make new products and services (p. 64). Although open government is not currently used optimally, open data has been estimated to have the potential to bring $3 trillion USD to the global economy per year (Jetzek, Atival, and Bjorn-Andersen, 2014, p. 64).

Governments can help private sector organizations innovate through open government by making the large quantity of non-sensitive data and information publicly accessible and licencing it for diverse uses. There is potential that non-sensitive government data and information could be leveraged by private sector organizations to improve their products or services, towards the aim of supporting the economy (Chan, 2013, p. 1890).

3.3 Open Government Ecosystem

Open government can be conceptualized as being an eco-system (Graves & Hendler, 2014; Harrison, Pardo, & Cook, 2012; Ubaldi, 2013; Jetzek, Avital, & Bjorn-Andersen, 2014). The eco-system metaphor refers to an inter-connected network of open government data and information users and producers (Harrison, Pardo, & Cook, 2012, pp. 905-906). The eco-system model helps to conceptualize how open government can generate impacts for a variety of stakeholders (Jetzek, Avital, and Bjorn-Andersen, 2014, p. 63).

The eco-system includes: governmental organizations, NGOs, citizen groups, private sector organizations, and media. If open government policies are too internally focused, it could have limited impetus (Chan, 2013; Zuiderwijk & Janssen, 2014). Like a natural eco-system, the open government eco-system changes and develops with changes to the environment. Unlike a natural eco-system, the open government eco-system can be developed and directed towards a vision. Government organizations have opportunities to develop an open government eco-system that achieves certain goals, such as fostering innovation, and developing better governance (Harrison, Pardo, & Cook, 2012, pp. 908-910).

It is important for ECCC to understand and develop the conditions that would help stakeholders and citizens generate value from open data and information (Ubaldi, 2013, p. 18). Jetzek, Avital, and Bjorn-Andersen (2014) set out to understand these conditions, and proposed that there are four mechanisms of generating value within an open government eco-system. These mechanisms can work by themselves, but can also work together.

- *Information Transparency*: can produce value when open data is used to inform and reduce information asymmetry.
- *Data-driven Efficiency*: can produce value when open data is used to improve efficiency or effectiveness, possibly resulting in cost reduction or improved services.
- *Collective Impact*: can produce value when a group uses open data to work towards a common cause.
- *Data Driven Innovation*: can produce value when open data is used to create innovative services, concepts, or products (Jetzek, Avital, and Bjorn-Andersen, 2014, p. 68).

These value-generating methods are unlocked by five factors:

- *Incentives*: Good incentives can motivate different stakeholders to work toward a positive outcome.
- *Open Access:* unnecessary limits should not be placed on the use and reuse of data.
- *Data Governance*: Data must be governed to ensure that it meets the needs of multiple stakeholders, while protecting privacy. Governance practices should consider information management, quality of open materials, process management, and risk management.
- *Capabilities and Skills of Stakeholders and Citizens*: Citizens and stakeholders must have the skills to understand open data and information, and access to technologies to generate value from the data.
- *Use of Technological Tools*: To better make sense of massive amounts of data, technologies should be incorporated to enable stakeholders to interpret and use data (Jetzek, Avital, and Bjorn-Andersen, 2014, pp. 69-72).

3.4 Barriers

To best implement open government, the barriers to open government should be identified. Although many drivers for open government lie outside government, many of the barriers are internal (Huijboom & Van den Broek, 2011, p. 9).

3.4.1 Risk Aversion

Open government often aims to increase transparency in government organizations (Heckmann, 2011, p. 1). Transparency is defined as the degree that government shares information about its decision making, and its policies regarding delivering their mandate (Jetzek, Avital, & Bjorn-Andersen, 2013 p. 8). Meijer, Curtin, and Hillebrandt (2012) suggest that too much openness can contribute to risk aversion towards transparency, and inhibit decision-making (Meijer, Curtin, and Hillebrandt, 2012, pp. 23-24). Risk aversion within government organizations can be a barrier to open government.

3.4.2 Fear of Negative Publicity

The pattern of an increase in transparency triggering a fear of negative publicity has occurred in the past, in response to ATIA. The request for information process, Access to Information and Privacy (ATIP) has been criticized for handling requests for information differently depending on who is requesting information or what information is requested. This delay in response is a reaction to fear of negative publicity, a pre-existing barrier that could be exacerbated by additional transparency. A study on requests for information submitted in 1999-2001 to Human Resources Development Canada found that process times for requests for information varied depending on who was requesting information, and whether or not the subject of the request was a controversial issue. If a request for information was from a political party other than one that was in power, or if the subject was controversial, processing times tended to be longer. This study accounted for several factors that tended to lengthen response times and impacted information refusals (Roberts, 2002). In addition, the Office of the Privacy Commissioner noted delays in processing time of requests for information depended on the communication needs of the Minister of National Defence. These delays interfered with media's ability to report on government action, and were perceived by reporters as strategies used by government to avoid negative publicity (Roberts, 2002, p. 180).

Roberts argued that delays were often due to increased centralization within government, in which the political sphere has significant power over communication. The centralization of communication is seen as the political sphere having undue influence over the non-partisan public service (Roberts, 2005, pp. 4-9). This is a reaction to a changing media environment in which governments are under increased scrutiny, and feel the need to phrase messaging carefully to avoid negative representation in the media (Roberts, 2003). This cultural fear of negative publicity that exists within government agencies is a barrier to transparency and open government implementation. Departments are trying to fit openness into a pre-existing government system in which information is tightly controlled, instead of trying to redesign governance systems to work in a more open environment.

3.4.3 Fear of Loss of Power

Another barrier to open government implementation is fear of loss of power. Citizens and external groups have increased ability to impact government decisions. Many academics argue that open government could lead to governance that is more networked and collaborative,

changing the relationship between government and citizens (Lee, Hwang, & Choi, 2012, p. 150; Tolbert, Mossberger & McNeal, 2008; Yen & Evans, 2005; Yen & Evans, 2006; Janssen, Charalabidis & Zuiderwijk, 2012). A more networked and collaborative context can change the role of government in relation to its information and data. According to Janssen, Charalabidis & Zuiderwijk (2012), a collaborative form of governance also results in a loss of power as government agencies no longer have sole ownership over data (p. 5). In an open government context, government acts as a distributer, and has less control over how information and data is used (Jetzek, Avital & Bjorn-Anderson, 2003, p. 2). Governments are no longer expected to act and make decisions on behalf of the public, but seriously consider the public as a partner in achieving departmental mandates (Lee, Hwang & Choi, 2012, pp. 158-159).

A more networked governance structure can result in a system that is more difficult to govern because government might exert less control. Governments can be characterized as a highly bureaucratic environment with defined flows of information. When government systems increase transparency by sharing information and data, government must contend with elements outside of government that are unpredictable. This makes central planning and decision making more difficult, as government has less control over the flow of information. For government to adjust to this new system, new governance strategies need to be in place (Janssen, Charalabidis & Zuiderwijk, 2012, pp. 5-6).

3.4.4 Poor Data Quality and Usability

Poor data quality and usability is another barrier because it affects the ability for potential users to make use of the data. Data usability was shown to be an issue for open data initiatives in several countries (Huijboom & Van den Broek, 2011, p. 8). Open data can have poor usability for several reasons, including data provided without context, poor data quality, and citizens' inability to comprehend data. Open data and information is often presented without context, creating difficulties for non-experts in determining the significance of the data and how the data is used for policy purposes. This could potentially lead to misleading conclusions about what the data or information means (Evans & Campos, 2013; Jetzek, Avital, and Bjorn-Anderson, 2003). Data quality was found to be problematic in several countries (Janssen, Charalabidis & Zuiderwijk, 2012; Huijboom & Van den Broek, 2011). Poor data quality, in the form of missing or inaccurate data, can create confusion about the data and decrease trust in government.

Open data and information must be comprehensible to the average person. If data and information released by government is difficult to find, not relevant to the average person, contains jargon, or is at a reading level above average comprehension, it may only be accessible to those that are highly educated and highly knowledgeable (Janssen, Charalabidis & Zuiderwijk, 2012, p. 16). If open data and open information is not accessible to the average citizen then open dialogue initiatives are vulnerable to the influence of a small knowledgeable vocal minority or special interest groups (Evans & Campos, 2013, pp. 173-183).

3.4.5 Disincentizing/Unclear Rules

Disincentivizing or unclear rules were represented as a barrier to open government (Zhang et al, 2005; Ubaldi, 2013). Pre-existing rules in the organization, such as management practices, performance agreements, and incentives can run against open government aims (Zhang et al, 2005, p. 552). In addition, rules that enforce a too-rigid structure on information flows and access to information can create problems with external communication (Bertot, Jaeger &

Hansen, 2012, p. 31). Government organizations should make a concerted effort to identify potential disincentivizing rules and revise them to avoid their disincentivizing effect.

3.5 Enablers

3.5.1 Open Dialogue

The ability to foster engagement and open dialogue with citizens and other stakeholders is key enabler to open government. Engagement with a broad variety of stakeholders and citizens is an important feature of open government if open government is intended to be used to enhance democracy and give citizens access to decision making rationale. Open government is not limited to informational transparency, but about connecting open data and information to decision making. Engagement is a way to meaningfully connect open data and information to decision making processes (Meijer, Curtin, & Hillebrandt, 2012, p. 11). This connection to decision making processes can contribute towards democratic outcomes.

The potential relationships between open government and decision-making process is explored by Meijer, Curtin, and Hillebrandt, by distinguishing between vision and voice. Vision refers to access to relevant information and data used by government to make decisions; voice refers to the ability for citizens to impact decision making processes, formally and informally (Meijer, Curtin, & Hillebrandt, 2012, p. 14). They identify three different relationships between vision and voice with open data and information: synergistic, complementary, and undermining (Meijer, Curtin, & Hillebrandt, 2012, p. 15). A *synergistic* relationship is the ideal relationship in which government releases data and information, and citizens, stakeholders, and government have a dialogue about this data and can influence decision making. In a synergistic relationship, both the vision and the voice reinforce and support each other. A *complementary* relationship involves vision and voice coexisting, but not working together in mutually beneficial ways; for example, if government releases information, and citizens can view the data and information, but they cannot talk back to the government and influence decision making. The worst relationship is an *undermining* relationship, in which open data and information becomes detrimental to voice. This can occur if government is risk averse, inhibiting both vision and voice (Meijer, Curtin, & Hillebrandt, 2012, pp. 15-18).

The Organization for Economic Co-operation and Development (OECD) suggests that many open government initiatives have a complementary relationship between vision and voice (Caddy, Vergez, & OECD, 2003, p. 15). To encourage a synergistic relationship, governments must find a balance of participation and transparency. Some academics also emphasize the importance of learning through problem solving, which requires good feedback (Meijer, Curtin, & Hillebrandt, 2012; Chang & Kannan, 2008). Creating opportunities for open dialogue can facilitate citizen feedback into decision making. A well planned open dialogue with citizens requires creating a system in which government information is released, citizens engaged, responses collected and interpreted, and government responds to feedback. If the government opts for a different approach, the rationale of this approach needs to be made clear (Bertot et al, 2010, p. 56). The OECD recommends three steps when engaging with the public: ensuring data and information is good quality and in plain language, clearly defining what input is sought after, and leaving enough time for citizen feedback (Caddy, Vergez, & OECD, 2003, p. 18). It is very important that open dialogue initiatives are implemented well, and citizens know that their feedback was considered in policy decisions. Unsatisfactory implementation can lead to a decrease in credibility and legitimacy (Caddy, Vergez, & OECD, 2003, p. 20).

3.5.2 Social Media

Ability for government to effectively use social media is another important enabler to open government, including developing the necessary skills and abilities to use social media. Social media provides governments a cost-effective way to communicate and share information with citizens (Bertot et al, 2010, p. 57), and address issues before they become they create negative publicity (Mickoleit, 2014, p. 27). Social media platforms can be used to promote open data and information, ensuring that it is not simply made open but actually used (Ubaldi, 2013, pp. 13 - 35). In addition, social media supports the ability for citizens to participate in policy processes and impact decision making. If effectively and creatively leveraged, social media can also be used to engage youth, and other populations that are not reached by traditional forms of communication (Mickoleit, 2014, p. 31). Although there are disparities in social media use, evidence from the US indicates that social media uptake is similar among gender, education level, income level, and race (Mickoleit, 2014, p. 31). However, the fact that these demographic groups are present on social media, does not mean that these groups will automatically become engaged with government communications. Most countries within the OECD do not effectively use social media for engagement purposes, but rather treat social media posts like mini press releases. It does not take advantage of social media's potential to incorporate input from citizens and stakeholders into policy making and shaping processes (Mickoleit, 2014, pp. 3 - 26).

Engaging with citizens online also require government employees to have the skills and resources to support online engagement (Mickoleit, 2014, p. 58). Lee and Kwak created a framework which demonstrates a maturity model for progress towards open government engagement via technology (Lee & Kwak, 2012) (see Figure 1). Effective online engagement and use of social media have a vital role in implementing open government is critical. It provides a comprehensive, realistic model of how engagement capacity and social media skills can be built up over time to avoid overwhelming an organization (Lee & Kwak, 2012, p. 493).

FIGURE 1: LEE AND KWAK'S ONLINE ENGAGEMENT MODEL

- *Pre-open government*: this stage takes place before any open government engagement efforts. Engagement is limited to formal surveys; there is no interaction between the government organization and citizens. Data that is available online is sparse and not up-to-date (Lee & Kwak, 2012, p. 496).
- *Open data release*: Data set release is limited to high value data sets to ensure efficient use of resources. A process is established to locate the most valuable data sets and release them publicly. Data infrastructure, governance, and privacy policies are established, and data quality factors, such as completeness and accuracy are developed. Engagement with the public begins through promotion of the data and experimentation of use of social media for broader, more fulsome engagement (Lee & Kwak, 2012, pp. 496-498).

- *Interaction stage*: Government bodies start to initiate two-way interaction about the data and what it means, with timely answers to citizen feedback. This interaction could be conversational in nature and involve 'expressive' social media platforms that encourage web conversations, connections between citizens, sharing links, and receiving citizen made media such as blogs or videos. Within government, a culture of transparency is fostered (Lee & Kwak, 2012, pp.497-498).
- *Co-creation stage*: Incorporates citizen feedback into decision making and solution crafting. Use of social media includes platforms that can be used to work together, such as Google Docs. A defined process for collaboration with the broader public is established (Lee & Kwak, 2012, pp. 498-499).
- *Pervasive and integrated engagement stage:* This stage involves full integration of these engagement activities into government decision making processes and solution making processes, and fostering an eco-system for engagement. It involves making government information accessible on many devices and committing to continuous improvement (Lee & Kwak, 2012, p. 499).

Lee and Kwak's model provides a benchmark for how government is progressing towards engagement aims, but has its limitations: it is limited to progress towards online engagement; does not account for engaging a diverse population; does not account for the need to simplify and interpret the information to make it accessible to those who are not subject-matter experts or data-literate. If an engagement system did not consider issues of accessibility to a broad audience, many citizens would be excluded.

3.5.3 Limiting Data Release

Limiting data release to useful and high-quality data sets can ensure that limited government resources are not stretched without benefit to stakeholders and citizens. The release of data should be done purposefully and not arbitrarily (Janssen, Charalabidis, and Zuiderwijk, 2012, p.16). Publicly releasing a data set does not automatically produce value, but value is created once data sets are used (Chan, 2013; Janssen, Charalabidis & Zuiderwijk, 2012). Therefore, governments should seek to release data that is well structured, high quality, and useful. Chan (2013) asserted that promoting data to possible users and designing sites that hold open data in a coherent manner can encourage data to be used (p. 1897). When structuring data, it is important to provide granular information and data, and format data in a way that allows users to combine datasets from multiple sources (Chang & Kannan, 2008, p. 7).

3.5.4 Employee Buy-in: Incentives, Connection to Mandate, and Phasing

The literature discusses three important organizational enablers to open government: use of incentives, connection to mandate, and avoiding capacity problems through a phased approach. Open government entails several large changes for government employees, and incentives can help employees start to engage with open government initiatives (Lee & Kwak, 2012, p. 499). In addition to providing incentives to participate, government organizations can encourage participation by using open government to fulfill their mandate. Aligning with departmental goals can highlight how open government adds value to the department, instead of perceiving open government initiatives as another task to complete (Lee & Kwak, 2012, p. 500). In addition, aligning with departmental goals might act as an incentive to open government. To avoid capacity problems, a phased approach to implementation is recommended (Lee & Kwak, 2012; Layne & Lee, 2009; Gottschalk, 2009; Klievink & Janessen, 2009).

Past open government initiatives have encountered problems because departments and agencies within limited capacity have attempted to implement many open government initiatives simultaneously. Implementing open government initiatives at a pace that is achievable can increase the chances of successful long-term implementation by limiting negative effects such as overworking employees. It also gives government organizations the time they need to generate citizen interest (Lee & Kwak, 2012, p. 501).

3.6 Cultural and Organizational Barriers and Enablers to Open Government

This section identifies barriers and enablers to open government. Understanding the larger context can help establish how the barriers and enablers work, and can help develop strategies to mitigate barriers and leverage enablers. To summarize, Tables 1 and 2 compile a list of cultural and organizational enablers and barriers identified in the literature review.

Table 1: Cultural and Organizational Barriers for Open Government found in Literature

Barrier (Theme)	**Barrier (Specific)**	**Source**
Cultural	Risk aversion	Janssen, Charalabidis, and Zuiderwijk (2012); Barry & Bannister (2014); Zhang et al (2005)
	Fear of negative publicity	Ubaldi (2013); Barry & Bannister (2014); Lee & Kwak (2012); Roberts (2005)
	Fear of loss of power	Ubaldi (2013), Zhang et al (2005)
Organizational	Poor Data Quality and Usability	Janssen, Charalabidis, and Zuiderwijk (2012); Huijboom and Van den Broek (2011); Barry & Bannister (2014); Ubaldi (2013)
	Disincentivizing/unclear rules or processes to release data and information and engage with citizens	Zhang et al (2005); Ubaldi (2013);

Table 2: Cultural and Organization Enablers for Open Government found in Literature

Enabler (Theme)	**Enabler (Specific)**	**Source**
Cultural	Ability and willingness to use social media (Facebook, twitter, google docs, wikis) to engage citizens and other stakeholders	Lee &Kwak (2012)
	Knowledge of how to engage Canadians for open dialogue	Ubaldi (2013); Lee & Kwak (2012)
Organizational	Incremental open government implementation that works within the capacity of the organization	Ubaldi (2013); Lee & Kwak (2012); Gottschalk (2009)
	Use of open government to contribute to mandate	Lee & Kwak (2012)
	Limit open data release to high quality data (timely, consistent, and accurate data)	Lee & Kwak (2012); Ubaldi (2013)
	Employee incentives to participate in open government	Lee & Kwak (2012)

3.7 Conclusion: Barriers and Enablers Analytic Framework

The barriers and enablers flow chart (see Figure 2 next page) is a framework for analysis based on the literature review. It shows how barriers how barriers are caused by negative reactions to open government, and how enablers support positive results. The left side of the chart demonstrates the conditions in which these barriers exist, bringing better insight about these barriers and why they exist. The right side of the chart demonstrates how enablers support open government, sometime indirectly through supporting employees. This framework was used to structure the interview guide (see Appendix C) and interpret the findings. It is important to note that some of these barriers already exist in the public service. However, existing barriers could be exacerbated by open government initiatives (Janssen, Charalabidis & Zuiderwijk, 2012). To create an organizational culture that supports open government, barriers must be mitigated, and enablers leveraged.

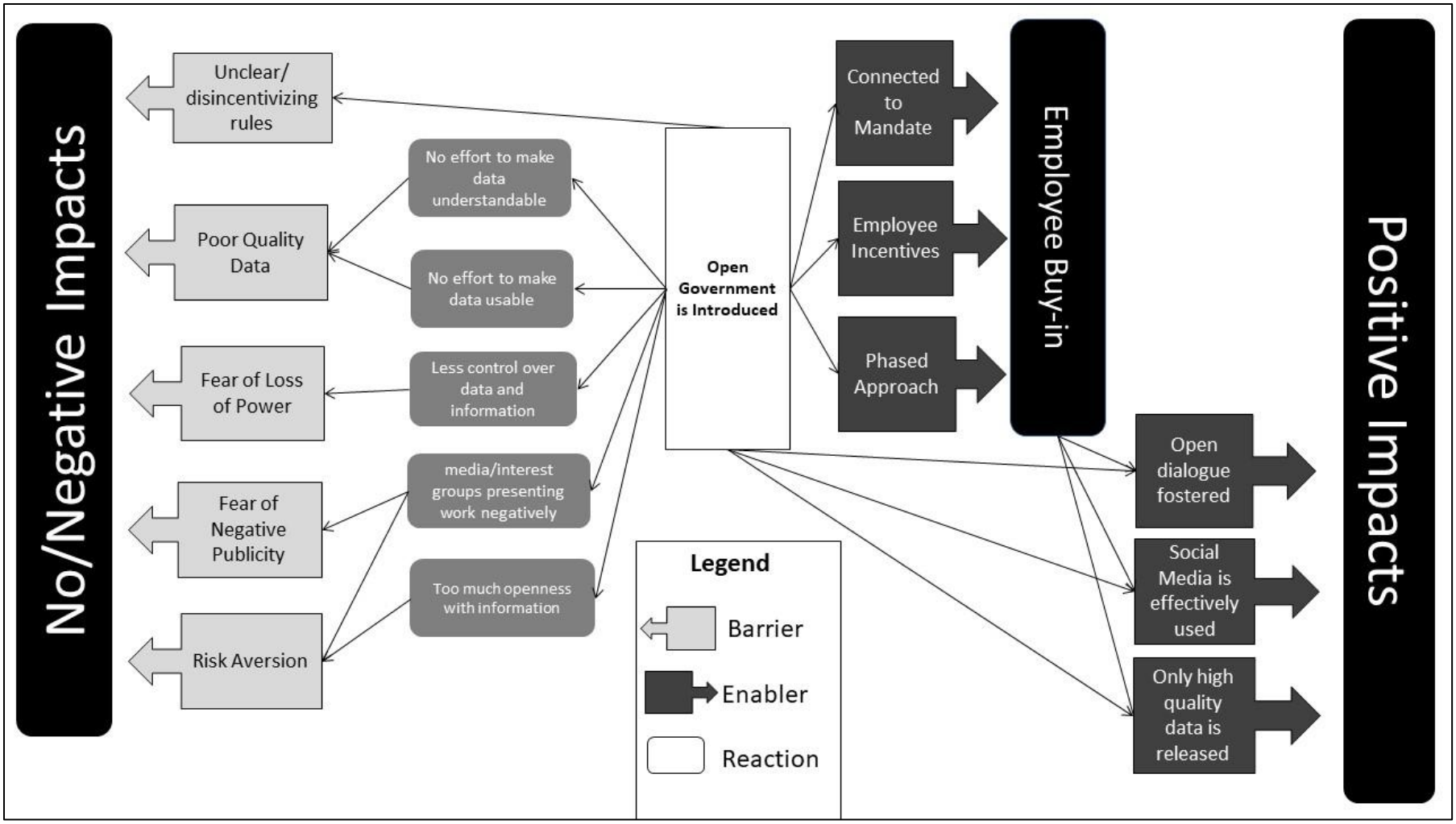

FIGURE 2: BARRIERS AND ENABLERS FLOW CHART

4.0 Methodology and Methods

4.1 Methodology

This project used qualitative methodology to identify organizational and cultural barriers and enablers within ECCC, and to determine how they effect open government implementation and success. This project aimed to understand how different ECCC workers understand and interact with open government initiatives. This includes people directly involved in applying open government practices (such as scientists releasing data onto the open data portal), supporting players (such as IM/IT specialists), those within the department that are using open data (such as policy analysts), those workers involved in communication with stakeholders and Canadians (such as those in communication roles), and those employees more peripherally involved in open government.

Qualitative research can capture how an event is interpreted differently by people in different roles, and can be designed to allow previously unanticipated information to emerge (Sofaer, 1999, p. 1106). Interviews were used because they bring up rich, detailed descriptions, highlight new explanations and bring up conclusions that have not been previously considered, instead of limiting barriers and enablers to what is already present in the literature. The barriers and enablers found in the literature were identified in other countries. Given that Canada has a unique public service structure, there is the possibility that other barriers and enablers are relevant. These findings will be used to create a detailed look of ECCC and how open government is currently functioning, including its successes and challenges.

4.2 Methods

This project consisted of interviews with public servants within ECCC. Participants from five work groups were sampled. A total of twenty individual interviews with participants were conducted, with two employees and two managers (below director level) each from the following work groups: IM/IT, policy, science, communications, and regulatory work. These groups were chosen because they represented a reasonably broad view of the department. These groups represented the different roles involved with open government implementation, and different experiences fitting into their day-to-day activities. As such, these groups might have different perspectives of open government. Using groups based on work type enabled the researcher to capture the diversity of experience within ECCC and provide more specific and targeted recommendations.

4.3 Sampling

Participants were sampled using snowball sampling. Snowball sampling uses the knowledge of well-informed people to tap into their networks to identity respondents. It is often used to identify difficult to reach participants (Noy, 2008, p. 330). Although ECCC employees are not hard to reach, the population of ECCC employees that participate in or have some knowledge of open government is not known by the researcher or recorded. The use of random sampling would likely lead to selection of respondents that know very little about open government because open government has not been implemented across ECCC yet. Snowball sampling uses the knowledge of ECCC employees who have some open government expertise to identify others that are somewhat knowledgeable. The researcher limited sampling to who had some understanding of

open government because this project aims to establish barriers and enablers that effect open government specifically. Without pre-existing knowledge of open government, respondents would not be able to detail how these barriers and enablers effected open government, and would only be able to comment on how the barriers and enabler affected them in other respects. Without this understanding, the importance of why these barriers and enablers need to be addressed within ECCC would be lost. In addition, this project also aimed to identify barriers and enablers not mentioned in the literature. To identify these barriers and enablers, respondents needed to be somewhat knowledgeable of open government.

A casual conversation led to the initial contact used to start the sampling. This person volunteered to identify participants. The initial contact was asked to use their judgement to identify ECCC workers that could provide insight into open government within ECCC (open data, open information, and open dialogue), and have worked long enough in the organization to develop an understanding of ECCC culture and organizational norms and practices. Each respondent's contact information, team, and position title were found on Government Electronic Directory Services (GEDS) and selected several potential respondents from the list provided by the initial contact. The goal was to recruit a diverse sample, so recruiting multiple members of the same team was avoided. Heterogeneity was ensured by recruiting respondents who work with a diverse array of subject matter. Interviews were scheduled based on respondent availability.

After each interview, respondents were asked if they could identify others with ECCC who could provide insight into open government. The researcher sometimes prompted the participants to identify potential respondents to meet quota in all the work types, and to avoid having too many potential respondents in certain work types. In each work type, two employees and two managers below director level were interviewed. Interviews were limited to working level and management below director level to ensure confidentiality of respondents and avoid gaps in data due to difficulties in recruitment.

4.4 Interviewing

Semi-structured interview format used to ensure all the enablers and barriers were explored, and to allow the respondents to identify other barriers and enablers. Semi-structured interviewing involves an interview guide, or a list of questions that address the topics that a researcher wants to cover. However, semi-structured interviews enable flexibility that gives respondents the opportunity to introduce unanticipated topics and for the interviewer to probe to collect more detail (Edwards & Holland, 2013, pp. 29 - 30). Interviews addressed employee knowledge of open government, the barriers and enablers they experience, and the impact of those barriers and enablers on them and on open government progress. Respondents also had an opportunity to identify their views about open government, how implementation was progressing, and how they believe they could be better supported.

Once identified (see Sampling above), barriers and enablers identified in the literature were used to create questions for the interview guide (see Appendix C). The researcher also asked follow-up questions in all interviews to better understand the context of respondents, further articulate their perspectives, and better understand the relationship between certain work types.

Respondents were recruited using a recruitment email (see Appendix B). Respondents were emailed the consent form (see Appendix A) prior to the interview when the interview time and

location were confirmed. All respondents were asked to provide the researcher with a signed copy prior to the interview. These interviews were conducted in-person or on the phone, dependent on respondent location and preference. Interviews took place between November 2016 and March 2017. All interviews were audio recorded and transcribed to ensure no important points or phrases were missed. Interview length ranged from 30 minutes to 60 minutes.

4.5 Data Analysis

In addition to the model of barriers in Figure 2, and the following list of enablers, a symbolic interactionalist lens was used to clarify the relationships between work-types and the rules, policies, and circumstances that shape the experiences, perceptions, and behaviour of ECCC workers. Symbolic interactionalism is a theoretic lens that can help define the relationship between social systems and individuals. Symbolic interactionalism is a theory that supposes that social norms within society are co-creating through social interaction (Stryker & Vryan, 2006, p. 8). According to Blumer, the symbolic interactionalist frame involves three principles. The first principle is people behave around phenomena that they encounter (i.e.: other people, laws, rules, circumstances) based on the meaning that these phenomena have for them. The second principle is that the meanings around these phenomena are created by interaction between other members in a social system. The third principle is that how people use meanings to guide their behaviour within a social system. These principles have been expanded upon to have methodological implications. To understand behaviour in a social system, the perspective of the people within the interaction, particularly how the people make sense of their behaviours in an environment, must be sought out (Stryker &Vryan, 2006, pp. 4 - 5).

The researcher used the barriers and enablers identified in the literature as the starting categories for analysis. Blumer's symbolic interactionalist principles were used to help explain ECCC's culture and how it affects or could affect open government progress. Experiences were compared within and between work types to develop an understanding of respondents' workplace cultural and organizational system and how they understand each barrier and enabler affects open government progress. By establishing similarities and differences between different respondents and work types, the researcher developed an understanding of how these barriers and enablers fit into the culture and organization of ECCC. In addition, comparing interview codes allowed the researcher to identify one barrier and one enabler that were not identified by the literature.

4.6 Project Limitations and Delimitations

The scope of this project is limited to examining internal cultural and organizational factors that affect open government. The project only attempts to capture the perceptions of employees and managers below director level within ECCC. Other players important to the success of open government were not interviewed. This decision was made to keep the project at a manageable scope, and to finish this project in a time frame in which the recommendations in this project could be used by ECCC.

To limit scope and ensure confidentiality of respondents, this project included only working level employees and management under director level. Anyone at a higher level was not interviewed because of their small population (there were as little as three directors in total in one of the work types, one ADM in most work types), so respondents could have been identifiable. In addition, the small population of ECCC workers that are director and above may have led might have to

insufficient participant recruitment in senior management levels. Insufficient recruitment could have resulted in gaps in data collection that could have led to misleading conclusions. Participation was limited to employees and managers who speak English. The researcher cannot speak French, so could not conduct interviews with those that only spoke French.

Another limitation was the potential for sampling bias from the use of snowball sampling. By tapping into a network of expertise, there was a risk of recruiting similar participants (van Meter, 1990, p. 39). This could result in a less diverse sample than the population of ECCC employees. One way to address the problem is to use a sampling quota (van Meter, 1990, p. 39). This project used quotas for work types, and for employees and managers. This ensured samples were dispersed throughout the department, and not isolated to one branch or a few work types. When snowball sampling produced more potential samples than necessary, the researcher selected participants who worked with a diverse selection of subject matter, and diverse team membership.

5.0 Findings

5.1 Introduction

Many of the barriers identified within the open government literature were also present within ECCC, along with several other barriers. Before the barriers and enablers are discussed, some key contextual elements that were brought up within the interviews will be explained. Next, the barriers will be detailed including loss of power (a barrier that was present within the literature, but not within ECCC), and technology (a barrier that was not present within the literature, but was present within ECCC). Lastly, the enablers that were in ECCC will be described, including leadership, an enabler not detailed in the literature.

5.2 Context

In addition to the barriers and enablers, the interviews illuminated some important context that can help establish how some of these barriers and enablers developed. These points include how ECCC currently deals with transparency, the differences in communication styles between work groups, and how the science working group differs from other working groups.

5.2.1 Transparency and ATIP

An ever-present concern within ECCC involves the Access to Information and Privacy (ATIP), which has been in existence for decades. ATIP is a mechanism, frequently used by media, that enables anyone to receive government information. Respondents recognized that access to government information was important; however, the fact that any written record is subject to ATIP creates a pervasive consciousness around the content of written products such as briefing notes and email. This creates a concern from decision makers and decision shapers that their work could be released via ATIP and represented in an unflattering way in the media.

The risk of negative publicity or creating controversy was perceived to be addressed by the previous government by creating a strong emphasis on controlling messages about departmental decision-making, science, and other departmental findings, to ensure messages that were given to external parties were consistent and presented in the best possible light. In practical terms, this meant that information released to the public was thought to require approval by many levels, often through central agencies such as the Privy Council Office and sometimes the Prime Minister's Office.

5.2.2 Differing Communications Styles

There is also a fundamental difference in understanding about how ECCC should communicate to external audiences between science and regulatory workers and communications workers. These groups ascribed different meanings to their communications, resulting in different style of writing. When discussing how to communicate with external audiences, communications workers emphasized the importance of plain language. They thought that when writing on behalf of a government organization, it is important that products are written in a way that people who do not have technical expertise can understand, and emphasized the importance of writing for a broad audience. They considered messages that science and regulatory workers wanted to communicate were often too long and difficult for a reader unfamiliar with the topic to understand. Science and regulatory workers seemed to value being very detailed and precise when communicating externally, much like how one might talk to other subject matter experts

with similar educational backgrounds. They tended to think of reduction in detail and precision in their language as a loss of accuracy and could change the significance of the message.

5.2.3 Scientific Community

Science workers have slightly different working arrangements than other working groups within ECCC. How scientists create meaning that drive their behaviour around open government is through the influence and impact of the science community writ large than just within ECCC. Reputation with the broader scientific community is important to science workers, and they perform in a competitive field. Scientists also have a different set of performance criteria from the rest of the department, scoring well on these performance criteria can lead to promotions. In addition to publishing many high-quality papers to high ranking journals, scientists are encouraged to upload data sets onto the open data site, a recent change to incentivize science workers.

5.3 Barriers

5.3.1 Risk Aversion and Fear of Negative Publicity

Risk aversion and fear of negative publicity were linked within ECCC. Negative publicity, and the meaning that ECCC workers ascribed to it, fostered risk adverse behaviour to avoid further negative publicity. This pattern existed in ECCC before Canada's commitment to open government, but might be exacerbated with transparency requirements from open government.

Many respondents perceived a recent commitment to increase transparency. However, there was some doubt about the commitment to openness, particularly from those who had been in the department for over 10 years. These respondents felt this way because their past experiences within government (including ECCC) indicated that departments tended to react to negative publicity by becoming less transparent. Most respondents perceived that there is a concern that ECCC information will be used to create a story that puts ECCC in a negative light. Respondents recognized the adverse effects that negative publicity had on the organization. The shared meaning created from negative publicity is that it demonstrates to those outside of government that ECCC is not doing its job effectively. ECCC reacts to this phenomenon through very calculated behaviour and communication to the outside world, often becoming risk averse.

An example of risk aversion is perceived long process times for requests for information, and perceived long response times when ECCC communicated with media. Communication with the media was described as very constricted. Many respondents reported that external messaging was highly edited with obfuscated meanings. Instead of messaging coming from individual subject matter experts, media relations were considered to play a large role in shaping messages with specific wording that subject matter experts could use. Many respondents, including communications respondents, reported that this circumstance fostered a mistrust of communications workers by other working groups, mostly science and regulatory workers. Science and regulatory workers thought that their findings and the material they wanted to share with the public was tightly controlled and over simplified. They felt the meaning and importance of their message was obscured. This dynamic, coupled with the difference in communication styles, generated a mistrust between science and regulatory workers and communications workers. This lack of trust continues despite the change in political leadership bringing a renewed focus on transparency and openness.

In addition to just a fear of negative publicity, there was concern that negative publicity could foster misunderstandings about science through misinterpretation of open data. In the scientific community, conclusions are based on analysis done by knowledgeable experts and vetted through a rigorous process, including review from other experts. When non-experts try to interpret the data without the technical expertise or without sufficient data literacy, they risk coming to conclusions not supported by the data. If these conclusions are published or become widespread to a non-expert audience, it can create misunderstandings with implications on departmental agenda-setting, such as focusing on a problem that does not exist, or focusing on a problem with smaller environmental impacts than another.

Respondents understood misinterpretation of data as fostering negative experiences for those within the department that worked with the relevant subject matter. By creating additional work for ECCC to correct the misunderstanding, or by prioritizing less important issues, respondents recognized that the misinterpreted data fostered negative outcomes. These outcomes were made possible by the presence of open data, and the inability for non-experts to understand the data without context.

5.3.2 No Fear of Loss of Power found in ECCC

ECCC workers did not report fear of a loss of power due to open government because they perceived benefits from a stronger network of environmental actors. Many respondents thought the ability to change environmental outcomes was distributed to many different parties, including environmental NGOs, other levels of government, and private sector organizations. Additional openness might help Canadians better understand ECCC's limited role in affecting environmental outcomes. If Canadians better understood the broader context and information ECCC staff were working with, and the constraints they work under, Canadians might better understand the rationale behind a decision. Secondly, respondents recognized that their role would persist. Even if more decision-making power was given to Canadians, ECCC would still need people to do science work, to craft and implement regulations, and to design and update technological systems. However, some policy respondents thought their roles would change to include more engagement activities. This was generally conceptualized positively.

5.3.3 Data Quality and Usability

Most respondents reported that the data that was uploaded onto the open data site was high quality; thoroughly vetted and standardized. However, data quality and usability issues that were identified that pertain to open data's usability for experts and non-experts. Three data usability related concerns were mentioned.

- *Provisional data*: Although most respondents (science, regulatory, and IM/IT respondents) mentioned that data went through a rigorous process to ensure data quality, some of the science worker respondents that worked with monitoring data thought that in the rush to release as many data sets as possible, monitoring data is being released without going through the full vetting process. This vetting process ensures that samples were collected and measured correctly. This could result in people analyzing the data and forming misleading conclusions, even if the user interpreting the data was an expert in the data's subject matter.
- *Data presented without context*: For open data to be useable, there is certain contextual data that needs to be included. Specifics about this information vary depending on the type of

data, but they can include how the data was created, what equipment was used, and what the data is used for. Without this additional information, the data's usability decreases.

- *Unlinked or hard to find data*: Some IM/IT and regulatory respondents mentioned that data that ECCC helps create is already effectively open on another, better organized platform. Considering it already open, these respondents did not prioritize releasing those data sets. However, that data set is not linked on the open data site, creating gaps in the data available. Many respondents also commented that the open data site was difficult to navigate. Those that were not familiar with the exact data set they were looking for would find searching for information difficult.

Data usability by non-experts was limited. The open data produced and uploaded onto the open data site by ECCC would not be understandable by someone who did not have technical expertise; even policy workers might not understand the open data in their subject area. For a lay audience to glean some meaning from the data, data requires curation and contextualization. Some ECCC staff are seeking to find ways to present data in a user-friendly manner, usually seeking to use data visualization. This involves identifying ways to present data meeting TBS standards of visual accessibility, ensuring that it is accessible to those with a visual impairment such as colour blindness.

5.3.4 DISINCENTIVIZING RULES

Science workers experience informal and formal disincentivizing rules with open government not experienced by other parts of the department. Science workers at ECCC, much like others within the department, were very supportive of open data (the aspect of open government science workers interacted with most), but had some concerns. These were not about open data in principle, but rather about the release of data too soon, or non-transparent use of datasets. Some scientists thought that other scientists could use the data before they could, gain credit and a reputational boost by analyzing data that an ECCC worker collected. Not only could this impact the scientist's reputation, but it could affect their performance review if the resulting paper is published in a lesser ranking journal. Many respondents asserted that because the data generated is owned by ECCC and paid for by tax payers, science workers should not get to decide when to release it. Although all the science workers acknowledged that the data they were generating was ECCC's property, some still felt that releasing data before they were finished using it was unfair because it put them at a relative disadvantage to others in their field outside of government.

5.3.5 TECHNOLOGY

The greatest barriers to open government lack of technology and technological support. Two main technology-related challenges were reported by respondents: lack of sufficient and appropriate technological infrastructure for open data, and long, onerous processes using engagement technologies.

Respondents who uploaded large amounts of data onto the ECCC open data site reported that the existing technological infrastructure was not large enough to support such uploading. This was a problem for those that worked with weather and monitoring data. These activities generate huge amounts of data, and the open data site did not have the capacity to upload it all. Respondents also noted that there was not enough support to help facilitate uploading data, from understanding policies surrounding data release to help using the site. Some respondents reported that uploading a large amount of data is time-consuming and took them from other

responsibilities, such as analyzing the data. One respondent was concerned that this could have broader impacts on ECCC, such as diminishing the amount of time that scientists can use to interpret data.

Communications workers also perceived that technology, particularly for procuring technology for engaging the public, was a barrier to the success of open government. One respondent, involved in an initiative to engage stakeholders and Canadians in agenda setting, reported that they encountered several technology-related challenges, including challenges with long process times for procurement of licenses and software (even those already used by ECCC) and with limited bandwidth. These technological problems, in this specific example and others, led to compressed timelines and capacity issues.

5.4 Enablers

5.4.1 Building Open Dialogue Capabilities and Social Media Skills

Two key enablers towards the success of open government are ECCC's ability to develop open dialogue and social media skills. However, ECCC lacks sufficient employees with engagement or social media expertise. Although many respondents recognized that engagement was important, those not already involved in communicating with the public struggled with it. Those involved in communicating with the public felt like their services and expertise were stretched thin.

Open dialogue can be facilitated by social media; however, use of social media in ECCC is very limited by expertise and security concerns. Since the change of political leadership, the visibility of the Minister and ECCC has increased on social media. Respondents considered this a sign of renewed interest in environmental issues, and that engagement was important.

Although respondents knew that using social media is important, most non-communications respondents had little knowledge or expertise of how to use social media. Only a few respondents understood the value of social media over other types of communication, and understood that social media was a tool that could be used to cost-effectively to engage an audience not usually engaged by ECCC's work. Most seemed chiefly concerned on how to better engage with stakeholders or groups already engaged by ECCC. Use of social media that was not driven by the Minister was limited.

5.4.2 Phased Approach to Implementation and Capacity

Despite a phased approach to implement open government, there were still perceived issues with capacity. Capacity impacted on open government within ECCC: lack of engagement expertise, and trouble with technology. The bulk of ECCC's engagement expertise is in the Communications Branch, but the communications respondents perceived this branch is understaffed considering the increase of communications activities of the new mandate; they had trouble keeping up with their workloads and producing quality work. In addition, respondents with communications or consultation skills outside the Communications Branch feel that they were dedicating a substantial amount of time to helping others with their engagement responsibilities because of ECCC's limited amount of engagement expertise. Capacity issues were also generated or worsened by slow technological procurement processes or working without user-friendly systems. These technical problems took up an unnecessary amount of time which could have been dedicated to other work.

5.4.3 Connection to Mandate

Almost all respondents commented that open government by itself was an important part of the mandate, only a few could identify how open government contributes to the mandate beyond open government for the sake of open government. All working groups were able to characterize some benefits for ECCC; different working groups identified different internal benefits to open government.

IM/IT respondents recognized that open data provided an opportunity to improve ECCC's information management. Prior to the emphasis on open government, IM/IT respondents thought insufficient focus was put on managing and organizing departmental data. Open data provided an opportunity for ECCC to improve its information management.

Policy respondents explained that ECCC does not hold all the scientific expertise. Information and data about the environment was dispersed through a variety of other organizations, such as NGOs, provincial governments, municipal governments, environmental NGOs, academia, and the American government. Some respondents regularly collaborated with these players, and thought that sharing more information with those players could help foster good collaborative relationships and support better information sharing in existing networks or support the development of new networks. A few policy respondents noted that the influence of open government could also improve information sharing within the department. They thought that more openness could lead to a more fulsome understanding of environmental issues throughout the department and result in better work.

Science workers and communications workers identified educating the public in environmental issues as contributing towards achieving ECCC's mandate. Science and communications respondents thought that open government, if implemented effectively, could help Canadians become more informed about important environmental issues such as climate change, and demonstrate the importance of the work done at ECCC.

These factors contribute towards respondents ascribing a positive meaning to open government overall, possibly contributing towards a culture that embraces open government. However, there is also a concern that some data sets could be used in a way that is detrimental to ECCC's mandate. One respondent notes an example of how open data could be used for purposes that are detrimental to ECCCs mandate to protect species at risk by highlighting where certain species are located. These factors could create additional work for those in the department to address the public's misunderstanding, or impact the ability for ECCC to deliver on its mandate effectively.

5.4.4 Leadership

The interviews pointed to an enabler that was not present in the literature review: the influence of leadership. This factor can work to promote and support many different types of initiatives. Leaders effect how employees generate meaning in their workplace, and can shape an organization and culture supportive of open government. Respondents perceived both senior management and junior management could benefit open government implementation, but conceptualized their roles towards advancing open government differently.

For most respondents, leadership was seen as senior level support for open government. Most respondents saw leadership as senior management identifying open government as important and a work priority. This is important because some areas noted finding difficulty engaging with

open government because of the pressure of other responsibilities. For many respondents, engaging with open data was a small part of their responsibilities. Open government activities overlaid on other responsibilities and did not minimize their workload. Recognizing that open government is important could push open government higher on their priority list.

A few within the policy and regulatory groups thought support for transparency in decision making and openness more generally would help attract acceptance of the changes that open government would entail. Respondents usually described ECCC workers as reacting to the stimulus that they received from senior management. Leadership here involved senior management making clear statements about the importance of transparency and openness is the public service, and promotion of open government. A critical challenge for one respondent was acting consistently with that message, even when transparency resulted in negative publicity.

A few respondents thought about leadership in lower hierarchical levels, specifically when referencing initiatives in which team leads played a substantial role in an initiative's success. In this case, leadership consisted of someone who took initiative, persuaded others to work towards its success, and made linkages across the department to contribute to its success. It also involved pushing against defaulting to standard procedure and promoting a more effective approach, usually involving adopting of new technology or using social media platform to promote or collaborate with others outside of government.

5.5 Summary

Open government within ECCC is within its early stages of implementation. This section provides an overview of what was found by interviewing a diverse set of ECCC workers. Barriers that were described in the literature review were present in ECCC, with the exception of fear of loss of power. Enablers were usually present in a limited sense. However, leadership was an enabler not present in the literature.

6.0 Discussion

This section aims to bring together the findings of this project with the information found in the literature review. ECCC contained most of the barriers described in table 1, and had not fully leveraged the enablers described in table 2. Tables 3 and 4 (see below) outline their presence or lack of presence in ECCC, along with the barrier and the enabler not found in the literature. Pairing the literature and the findings can connect ECCC's open government implementation to its goal of enhancing democracy, and economic benefits. Thinking about open government as an eco-system can help to conceptualize how open government can be shaped to generate better impacts (Chan, 2013; Zuiderwijk & Janssen, 2014). Through using Jetzek, Avital, and Bjorn-Andersen's methods to produce value and using the five factors that unlock these methods mentioned in the literature review, ECCC could begin better link open government with tangible, positive outcomes. This section will address each barrier and enabler and connect it to the literature to demonstrate how the barriers and enablers could assist or interfere with generating positive impacts from open government.

6.1 Barriers

6.1.1 Risk Aversion and Fear of negative publicity

A pattern of risk aversion fostered by fear of negative publicity was identified in the literature and in the findings. Respondents perceived that there is pre-existing risk aversion that permeates through the organization, and is not limited to open government activities. Although fear of negative publicity is a significant barrier, ECCC should not work to eliminate it. Media plays an important role in democracy. Journalists play the role of watchdogs, pushing organizations to remain transparent and accountable (Knight Commission, 2009, p. 3). Although this project's findings suggest media's watchdog positions can have negative effects on some public servants, particularly those in communication and policy roles, their role in promoting accountability of government is important feature in the open government eco-system.

The risk of negative publicity will likely always be present, and should be present in a healthy democracy. Instead, ECCC should aim to make the experience of negative publicity easier for ECCC workers to deal with, and prevent negative publicity from resulting in risk adverse behaviour. Mitigating the effects of negative publicity could help prevent ECCC from developing an undermining relationship between vision and voice, which could inhibit the democratic potential of open government (Meijer, Curtin, & Hillebrandt, 2012, pp. 15-18). Avoiding an undermining relationship could also support the use of open data and information for information transparency and collective impact. This barrier effects policy, communications, and some regulatory roles more frequently. Therefore, the ability for ECCC to communication with citizens might be affected.

6.1.2 Data Quality and Usability

Data quality and usability are important for open data to be useful to a broad range of users (Janssen, Charalabidis, & Zuiderwijk, 2012, p. 16). Overall, respondents usually thought that the data that was being released was good quality, but there were some cases of releasing preliminary data. Unfortunately, this might reduce the data's usefulness for academics and could potentially limit data driven efficiency or data driven innovation.

For many work types, a widespread concern was data usability. Many respondents perceived that the available open data that is only helpful for a narrow range of users because of its lack of context. Incomprehensible science can result the inability for non-experts to understand the importance of the claims or why they are trustworthy (The Royal Society, 2012, p. 38). However, steps could be taken to help non-experts understand open data and information. Open data and information could be displayed or framed to help the average person understand data and information with the use of technological tools. ECCC could make more comprehensible and engaging open information and open data to non-experts by using plain language written documents, visual representations, or video. Although this might generate more work, presenting information in this way will make open data more understandable to the average person and help support using open data and information for information transparency and collective impact.

6.1.3 Disincentivizing rules

Findings from this project demonstrate that there are perceived disincentivizing rules within ECCC, mirroring what is identified in the literature, but disincentivizing rules were limited to science workers. Although ECCC chose to address this issue by including data release as a criterion in performance reviews, government scientists could still be at a disadvantage over scientists that do not work for government. This could have implications beyond open data. Goldenson (2002) studied the application of US freedom of information laws on government scientists (p. 331). This article suggested that requiring scientists to publish their data before they have had an opportunity to use it is an unreasonable imposition on the scientific process (Goldenson, 2002, p. 311). These rules disadvantaged scientists who work for the government. Scientific data generated by non-government scientists is considered privileged information that only requires release in a narrow set of circumstances. Scientists working for government face a disincentive to continue working for government, resulting in a loss of technical expertise, possibly impacting decision making (Goldenson, 2002, pp. 313-314). To avoid this potential draw back of open data, ECCC could reformat data release policies to avoid this disincentive.

6.2 Enablers

6.2.1 Open Dialogue and Social Media

Lee and Kwak's (2012) five-stage model for online engagement (see Figure 1), suggests that ECCC is at Stage Two, release of data stage. Teams are now releasing all releasable data onto the site, and grappling with associated technology. It appears that ECCC is striving towards the next stage, interaction. There are three barriers between stage two and stage three that should be addressed to support citizen to government interaction: lack of engagement expertise, lack of social media expertise, and limitations on how ECCC workers can use social media. Lee and Kwak (2012) found that lack of engagement and social media expertise were common barriers in US government agencies. Without addressing this expertise gap, government institutions will have difficulty generating the sort of engagement that can produce democratic impacts (Lee & Kwak, 2012, p. 499).

Finally, a cultural barrier specific to ECCC poses as challenge to science and regulatory workers working effectively with communications workers. The differing levels of fear of negative publicity coupled with different understandings of how ECCC should be communicating and a history of tightly controlled communications likely contributes towards the distrust between communications workers and science and regulatory workers. Given that engagement expertise

is important for the success of open government, it would be ideal if these groups did not have this tension.

6.2.2 Phased Approach to Implementation and Capacity

Open government implementation should ideally proceed with government organizations by building capacity for each phase of implementation. An organization should not rush to complete everything at once to avoid unsatisfactory implementation (Lee & Kwak, 2012, p. 496). ECCC seems to have taken a phased approach, but some respondents reported that lack of engagement expertise and problems with use of technology contributed towards open government related capacity issues. To address this issue, ECCC could strive to streamline technological processes and build up engagement abilities to support open dialogue. This could support all methods of generating value within open government.

6.2.3 Connection to Mandate

One important way that governments can get the most value from open government is by linking open government to other work within a department (Lee & Kwak, 2012, p. 500). Respondents recognized open government within the department could bring some benefit to themselves in their work, or towards improved functioning of ECCC. However, few workers could identify a substantial way in which open government contributes to other ECCC mandate items like mitigating climate change. This may indicate that open government within ECCC is not in alignment with the department's other goals, connections have not been actualized yet, or connections that exist are not well known throughout the department.

To connect open government to ECCC's mandate, ECCC should aim to encourage use of data in ways that benefit the environment. It is best practice to promote use of open data and open information to potential user bases to maximize its usefulness and value (Zuiderwijk & Janssen, 2014, pp. 18 - 19). External organizations, such as NGOs, academic organizations, science communities, and environmentally-oriented private sector companies would likely be interested in using open data and information towards goals that align with ECCC's mandate, or overarching open government goals. By connecting open government with achieving departmental goals, this could help ECCC workers see the value of open government, which could assist in generating all types of value.

6.2.4 Leadership

The effect of leadership was not mentioned in the literature on open government, but was a pattern within the interviews. Respondents frequently asserted that leaders make a significant impact on their work life. By endorsing values and initiatives and supporting important open government, senior management could help open government implementation. Through working with other teams to ensure buy-in across the department, junior management could make significant contributions by working with other teams, using more effective implementation methods, and encouraging others. Leadership can have a positive effect on a workplace's culture (Schein, 2004). Leaders can affect a workplace through communicating their beliefs, values, and assumptions, either through explicit endorsement or through subtle communication (Schein, 2004, pp. 426-427). Communicating beliefs, values, and assumptions can be done through several key mechanisms, including what a leader pays attention to, how leaders react to important events, how a leader distributes resources, who leaders decide to promote, hire, and fire, how employees can improve their status, a leader's emotional reactions, what leaders model, and leaders to and do not pay attention to. Leaders at any level can use their power through these

mechanisms to impact an organizational culture, if these mechanisms are used consistently and consciously (Schein, 2004, pp. 426-427). If leadership is used effectively and consistently, this enabler can indirectly, but powerfully, help generate many impacts.

6.3 Summary

Open government within ECCC presents similar barriers as what was found in the literature, with some exceptions. Findings were consistent with the barriers and enablers identified and fleshed out in the analytic framework. However, the findings give a much more detailed perspective on how these barriers and enablers exist within one government organization, in addition to identifying a barrier and an enabler not present in the literature review that could be added to the analytic framework. This section aimed to connect the barriers and enablers found in ECCC with the open government ecosystem to illuminate potential opportunities that could be lost if a barrier is not addressed, or enablers are not leveraged. It becomes obvious that these barriers can affect the success of open government by interfering with the generation of impacts, like open government's potential for enhancing democracy or the ability for open data to be used by a diverse population. If these barriers are addressed, and these enablers are developed and leveraged, ECCC can improve open government implementation within ECCC, and foster better usability for Canadians, stakeholders, and the science community.

Table 3: Cultural and Organization *Barriers* for Open Government found in ECCC and Literature

Barrier (Theme)	**Barrier (Specific)**	**Presence in Literature**	**Presence in ECCC**
Cultural	Risk aversion	Yes	Yes
	Fear of negative publicity	Yes	Yes
	Fear of loss of power	Yes	No
Organizational	Poor Data quality	Yes	Yes, for some types of data
	Disincentivizing/ unclear rules or processes to release data and information and engage with citizens	Yes	Yes, for science workers
	Technological Issues	No	Yes

Table 4: Cultural and Organizational *Enablers* for Open Government found in ECCC and Literature

Enabler (Theme)	**Enabler (Specific)**	**Presence in Literature**	**Presence in ECCC**
Cultural	Ability and willingness to use social media to engage citizens and other stakeholders	Yes	Limited
	Leadership (junior and senior roles)	No	Established as important
	Knowledge of how to engage Canadians for open dialogue	Yes	Limited
Organizational	Phased Approach to Implementation (to avoid capacity issues)	Yes	Yes, however there are still some capacity problems
	Use of open government to contribute to mandate	Yes	Limited
	Limit open data release to high quality data (timely, consistent, and accurate data)	Yes	Mostly, some examples to the contrary

7.0 Options and Recommendations

7.1 Introduction

To begin moving towards generating the impacts from open government, ECCC should address the barriers and enablers described in previous sections. Using a phased approach and leveraging leadership, implementation emphasizes building up capacity and forming culture, and giving time to improve data quality and usability, fix disincentivizing rules, increase social media and engagement expertise in the department, and address fear of negative publicity and risk aversion. After building up these capacities, these recommendations will build on the foundation to generate positive impacts that connect to ECCC's mandate and help citizens understand open government materials.

7.2 Setting the Foundation

The first step to generating impacts is establishing the foundations for open government success. Setting the foundations aims to mitigate multiple barriers: data quality and usability, and disincentivizing rules. It also aims to develop engagement and social media skills and leverages leadership. Setting the foundation aims to achieve three broad goals: ensure that open data is user friendly, develop a culture that would support increased transparency and engagement, and increase engagement capacity within ECCC. These goals should be completed in the short term to set the stage for creating impacts.

7.2.1 Establish Data Standards through Engagement

The first step to open data being used to foster impacts is ensuring that it is highly useable, and conforms to a standard that is expected from users. These recommendations aim to help ECCC align open data with user's expectations. To create data that is most useful to scientists, ECCC should design open data to be useful to scientists, and external users.

1) *Data Standards Engagement limited to ECCC:* Conduct a small engagement within ECCC to determine scientific standards with ECCC scientists. In addition, feedback mechanisms on the open data site such as short questionnaires on the site usability, data quality, and data format should be used to evaluate data usability for external users. Although this option is the least expensive, requires less implementation time, and leadership commitment, it is dependent having many users on the open data site. It also limits engagement to just ECCC scientists. Although ECCC scientists are likely understand the data standards in their fields, limiting analysis to just internal expertise could bias the results, resulting in less useful data for external users, particularly for those that are not scientists. This diminishes the potential for democratic and transparency benefits, and could result in very internally focused open data.

2) *External and Internal Data Standards Engagement:* Conduct an engagement externally using webinars and social media. Webinars will be used to start the conversation about open data standards and provide an opportunity for questions. Social media will provide a platform for discussion and feedback. The engagement should be in conjunction with feedback mechanisms on the open data site such as short questionnaires on the site usability, data quality, and data format. This option will can use existing technology to host webinars, and therefore will need low financial resources, but will require a

significant amount of implementation time. This option will likely result in higher democratic impacts and economic benefits because it will offer a more comprehensive perspective. This fulsome perspective brings a greater potential for benefits.

Table 5: Option Analysis for Establishing Data Standards through Analysis

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time*
Option 1	Low	Low	Medium
Option 2	Low	Low	High
Potential Benefits	*Democratic/ Transparency Impacts*	*Economic Benefits*	*Internal Positive Impacts*
Option 1	Low	Low	Low
Option 2	Medium	Medium	Low

Recommendation: Option 2 External and Internal Data Standards Engagement

7.2.2 Adjust Data Release Policies for Scientists

Open data implementation should be crafted in a way that does not create undue harm to scientists' careers. To address this potential, ECCC should consider implementing a specified period in which scientists should reasonably could use their data before they must release it. Giving science workers enough time to use their data could help minimize potential career repercussions for scientists that work for government.

1) *Formal Data Release Policy:* Senior management could create a template, based on relevant factors to determine an appropriate 'grace period' for scientists to work with their data before they must release it. Although this option requires more effort up front then the previous option it is more likely to be consistently applied.

Table 6: Option Analysis for Adjust Data Release Policies for Scientists

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time*
	Low	Medium	Low
Potential Benefits	*Democratic/ Transparency Positive Impacts*	*Economic Benefits*	*Internal Positive Impacts*
	None	None	High

7.2.3 Address Transparency Related Risk Aversion

Although ECCC cannot eliminate negative publicity, leadership within ECCC can work to make the experience of negative publicity easier for ECCC workers. It is very important for leaders, particularly those in work types that fear negative publicity (communications and policy groups), to model behaviour that supports open government and open communication in the face of media scrutiny.

1) *Transparency Supportive Leadership*: To better support the commitment to transparency and openness, leaders of all levels need to avoid making reactive decisions or becoming less open with information if there is media scrutiny. When there is negative publicity, leaders should still be transparent. To assist leaders in supporting transparency, senior management in ECCC (director level and above) should undertake training to best understand how to work transparently, even when encountering negative publicity. This will require some funds to pay for training, and involves some continuous leadership effort to change behaviour. This option could indirectly foster democratic/ transparency benefits by helping ECCC workers become more comfortable with increased transparency. It also has the potential for internal positive benefits as it could make negative publicity less stressful for ECCC workers.

Table 7: Option Analysis for Transparency Related Risk Aversion

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time Commitment*
	Low	Medium (continuous)	Low (Continuous)
Potential Benefits	*Democratic/ Transparency Positive Impacts*	*Economic Benefits*	*Internal Positive Impacts*
	High	Low	Medium

7.2.4 Improve Social Media and Engagement Expertise

To best support the creation of high quality communications material, social media and engagement skills should be more developed and widespread within ECCC. Developing social media and engagement skills and building communications capacity within ECCC would support future needs. This goal could be developed in two different ways:

1) *Social Media and Engagement Skills Training:* Social media and engagement skills could be developed through training that teaches how to use social media platforms to generate engagement, and how to write plain language, engaging materials. This training should be targeted to science, regulatory, and policy workers. It should be available online or through workshops or seminars. This should be coupled with leadership promoting the importance of developing social media and engagement skills. This option requires few financial resources, as there is likely already some plain language learning tools available through the Canada School of Public Service, but could also involve workshops or seminars which could be designed and implemented by communications experts within the department. This option could foster some internal benefits because learning a new skill might help employees improve their performance evaluations. However, developing this skill set will be require time and energy from many workers and could impact their ability to complete other tasks.

2) *Increase Communications Staff and Craft a Toolkit*: ECCC could hire additional workers with engagement and social media skills and experience to work with science, policy, and regulatory workers to create engaging initiatives or products that help non-experts understand open materials better. Although this recommendation could carry a significant financial cost and a short-term leadership commitment because of the hiring process, this could help fill a skills gap that could affect open data and open information's ability to be

used for transparency purposes. In addition, hiring experts in communications might help design better initiatives and products than giving many workers a cursory knowledge of communications. In addition, this option avoids potential capacity issues, increasing the potential for internal positive impacts. In addition, there should be some effort to increase engagement expertise throughout the department. This could be most effectively done by providing junior managers (particularly in science and regulatory fields, but this toolkit should be available to everyone) a toolkit of all existing resources (ie: plain language writing, science communications, using social media for engagement etc). This toolkit should be made available on the ECCC intranet or on the GCTools. Junior managers should then recommend those on their team to use existing resources to enhance their communication skills.

Table 8: Option Analysis for Improve Social Media and Engagement Expertise

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time Commitment*
Option 1	Low	Low	High
Option 2	High	Medium	Medium
Potential Benefits	*Democratic/ Transparency Impacts*	*Potential for Economic Benefits*	*Potential for Internal Positive Impacts*
Option 1	Medium	Low	Low
Option 2	High	Low	Medium

Recommendation: Option 2 Increase Communications Staff and Craft a Toolkit

7.2.5 Support Trust between Science and Regulatory Workers and Communications Workers

One cultural factor, related to differences of values and different cultures between work types, was the mistrust between science and regulatory workers and communications workers.

1) *Promoting the Value of Plain Language and Transparency*: There should a conscious effort on the part of all levels of leadership, promoting openness as a value to communications employees, and the importance of engaging, plain language communication to science and regulatory employees. For senior levels of management, this should involve actively supporting initiatives and activities within ECCC to demonstrate that open government activities are considered valuable. For junior levels of management, this could mean advancing initiatives, pushing employees towards openness and plain language communication, and providing opportunities to improve engagement and social media learning (toolkit from previous recommendation could be used). This recommendation involves no financial resources, but requires some effort from leaders by promoting initiatives and encouraging employees. It has the potential to create some internal positive benefit by helping science and regulatory workers work with communications workers more effectively.

Table 9: Option Analysis for Support Trust Between Science and Regulatory Workers and Communications Workers

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time Commitment*
	None	Low	Low
Potential Benefits	*Democratic/ Transparency Positive Impacts*	*Economic Benefits*	*Internal Positive Impacts*
	Low	None	Medium

7.3 Building Positive Impacts

After setting the foundation for open government, ECCC should move towards creating impacts. These goals aim to connect open government to the mandate of the department, and support transparency through the creation of plain language materials. These are long term goals which should be started after the setting the foundation goals are achieved.

7.3.1 Promote Open Data

To help align open government with ECCC's mandate and encourage use of open data to generate impacts, ECCC should promote open data and open information to organizations that would find ECCC's information useful. This might also demonstrate how open government can bring value to ECCC as an organization. This goal could be achieved in three distinct ways:

1) *Competition to Create Problem-Solving Model*: Create a competition for using ECCC's open data sets to develop a helpful model for solving an environmental problem. ECCC should identify a few potential environmental problems, and allow Canadians to vote to determine which problem should be addressed by this method. There should be a write in option, so citizens can bring up problems that are important to them that were not anticipated by ECCC. Once a problem is identified, this process should be promoted to involve private sector organizations, universities, and non-profits. Applicants will be evaluated based on well-defined criteria, and a top five will be selected. The winner will be determined by an open vote. The winner's idea will be implemented within ECCC. This option requires a moderate amount of funding for an online page on ECCC's website and a promotional campaign, and a moderate amount of implementation time and effort. However, this project has the potential to generate moderate democratic benefits because it directly includes citizens in solving a problem. In addition, it has the potential to generate some economic benefits if private sector companies use participation in this initiative to demonstrate their commitment to improving environmental outcomes. It also has the potential to foster good internal benefits because it can help solve a difficult problem, and generate an environmental impact that Canadians care about.

2) *Competition to Create a Data Related Service*: Identify a data related service that is not currently being implemented by ECCC, and challenge individuals and private organizations to create a solution for this problem using the data available to create a model for a service. To evaluate the usefulness of each application, ECCC could creating a voting mechanism that encourages citizens to identify which service they would use. This initiative will likely use a moderate amount of financial resources to create a

platform and conduct promotional activities, take a moderate amount of leadership commitment to lead this initiative, and take a moderate amount of time to implement fully. It does however, have the potential to generate economic benefits if a private sector organization creates a service that generates profit. Although citizens could benefit from the service that is created, unless the service is designed to make open data and information more comprehensible, this option will likely not produce significant democratic or transparency impacts. This initiative has some ability to generate internal impacts by helping to address an environmental problem, however, these benefits are limited because ECCC will have limited involvement in the solution beyond creating this challenge.

3) *Commit to Open Policy Making*: A general issue should be identified that could be addressed by open policy making. Through all the steps of the policy-making process, agenda-setting, implementation, monitoring, or evaluation, ECCC will use an open policy making process. This will include using open processes to identify what problem to solve, how ECCC should solve this problem, how ECCC should implement, and monitor the solution, and use citizen feedback as part of the evaluation of the results. This solution will require a high amount of financial resources to create a platform and to promote contribution of input at multiple times, and a high amount of leadership commitment to guide this process. Implementation time will likely be lengthy because the policy process can take years to complete, and decisions will need to be communicated at multiple times. However, this option could have high democratic benefits because of its inclusion of input in every stage of the policy process. Although this option likely will not generate economic benefits, it could generate internal benefits because it could provide policy workers with an additional perspective that could help them provide better advice.

Table 10: Option Analysis for Promote Open Data

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time Commitment*
Option 1	Medium	Medium	Medium
Option 2	Medium	Medium	Medium
Option 3	High	High	High
Potential Benefits	*Democratic/ Transparency Positive Impact*	*Economic Benefits*	*Internal Positive Impacts*
Option 1	Medium	Low	Medium
Option 2	Low	High	Low
Option 3	High	None	Medium

Recommendation: Option 1 Competition to Create Problem-Solving Model

7.3.2 USE PLAIN LANGUAGE, ENGAGING COMMUNICATION

To support the creation of democratic impacts, data and information should be supplemented to make it comprehensible to a non-expert audience. There are two options available to help make open data and information comprehensible to non-experts.

1) *Use Data Visualization tools on Open Data Sets*: By using data visualization tools, and relevant context factors with each data set to help non-experts. This recommendation will involve high financial resources to procure technology, potentially hire contractors to create data visualizations, and involve significant and continuous implementation time to add data visualization and context to each data set, particularly if this must be done to each added data set. In addition, this option will require some leadership commitment to co-ordinate resources. This option will likely have high internal positive impacts because the data visualization and context will likely be particularly helpful to policy workers to help understand complex data. It could also be very useful for other levels of government. It could also be a great resource to gain a better understanding of what ECCC does. However, this format might be overwhelming to Canadians because they would have to search through multiple data sets to gain a general understanding of one issue.

2) *Context Blogs*: Policy, regulatory and science workers should create blogs to explain ECCC's research, and work from the perspective of subject matter experts. This option gives ECCC workers the opportunity to provide context to their field. Blogs can include pictures, easy to read graphs, links to related research papers and data sets, and the ability to comment. This information should be linked to ECCC's website, and on the open data site for those looking for a general understanding of a field of research. This option requires few financial resources, only the cost of adding blogs onto ECCC's site and linking those blogs on the open data site. It requires little leadership commitment to co-ordinate, and little implementation time (just the time it takes to write blogs and post them). This option has high potential for democratic/ transparency impacts because it does not require Canadians to sift through many pages to gain a general understanding of a field. This option could generate some internal positive benefits because it could be used to highlight the work of ECCC and could enable those within ECCC to gain a general understanding of particular fields of work, but does not provide the detailed information of option 1.

Table 11: Option Analysis for Use Plain Language, Engaging Communication

Costs	*Financial Resources*	*Leadership Commitment*	*Implementation Time Commitment*
Option 1	High	Low	High (continuous)
Option 2	Low	Low	Low (continuous)
Potential Benefits	*Democratic/ Transparency Positive Impacts*	*Economic Benefits*	*Internal Positive Impacts*
Option 1	Medium	Low	High
Option 2	High	Low	Low

Recommendation: Option 2 Context Blogs

7.4 Foundation to Impacts Diagram

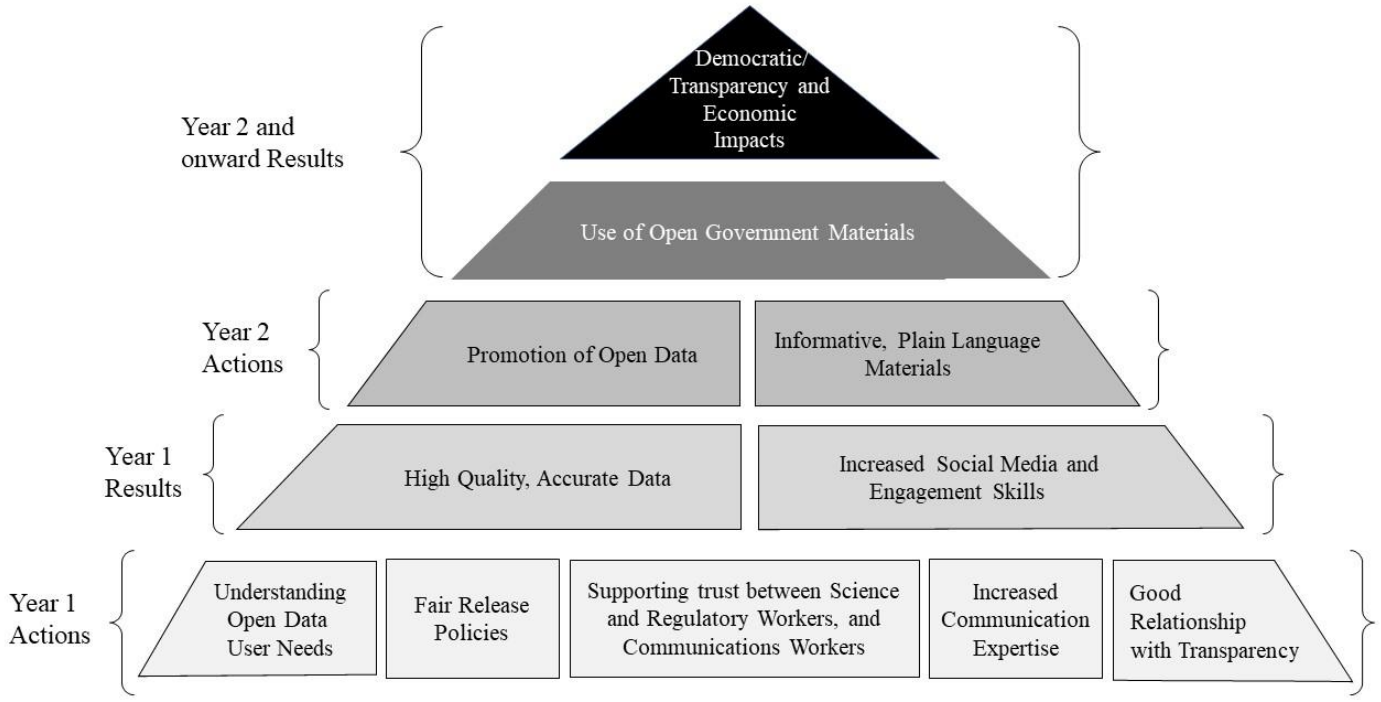

FIGURE 3: BUILDING TOWARDS IMPACTS DIAGRAM

Figure 3 (above) illustrates how the recommendations detailed above build on one another, starting by building up the skills, and abilities to support and generate use of open government material to create democratic/transparency and economic impacts. The bottom row shows Year 1 actions, which aim to build the foundation for open government by improving open data usability and quality, adjusting disincentivizing rules, building communications capacity, and shaping culture to support transparency and beneficial relationships. The second row from the bottom demonstrates the results of these efforts. Year 2 builds upon the progress of Year 1 by promoting improved open data, and using the increased communication skills to create plain language materials that could support transparency. The second row from the top demonstrates the intended: improved open government impacts.

7.5 Implementation Activities

Within each of the goals listed above, one option has been recommended, based on weighing the costs and potential benefits of each option. Assuming this project begins in January 2018, these recommendations are estimated to take around two years to complete.

7.5.1 YEAR 1: SETTING THE FOUNDATION

January 2018

- Establish stakeholders to target for data standards engagement, with the aim to include many different environmental science fields, private sector organizations, academic stakeholders, non-profit stakeholders, and other potential stakeholders.
- Draft engagement materials, begin designing social media page for data standards engagement.
- Determine relevant factors that should be included for data release policy.
- Identify appropriate transparency supportive leadership training.
- Communications leaders begin to emphasize transparency as a value, science leaders to emphasize the value of comprehensible communication to achieving ECCC's mandate.
- Start communication worker hiring process.

February 2018

- Draft data release policy.
- Identify resources for social media and engagement skills toolkit.
- Finalize engagement materials and create social media page, begin planning webinar logistics for data standards engagement.

March 2018

- Start data standards engagement promotion (send out targeted invites, promote via departmental social media accounts etc.).
- Enforce data release policy.
- Create social media and engagement skills toolkit to junior managers.

April 2018-May 2018

- Run at least one webinar for data standards engagement, continue to promote initiative.
- Start to design webpage for the competition to create problem-solving model.
- Promote social media and engagement skills toolkit to junior managers.
- Identify all fields that need contextualizing for context blogs, and identify potential employees to write blogs.
- Start transparency supportive leadership training.

June 2018-August 2018

- Run at least one webinar for data standards engagement, continue to promote initiative.
- Identify several problems that would be most appropriate for competition to create problem-solving model recommendation, then identify who ECCC should target for promotion.
- Draft evaluation criteria for competition to create problem-solving model recommendation.

September 2018

- Run at least one webinar for data standards engagement, continue to promote initiative. Begin to compile feedback.

October 2018

- Compile feedback, craft recommendations for open data standards.
- Share data standards recommendations on social media page.

November-December 2018

- Apply open data standards recommendations.

7.5.2 YEAR 2: BUILDING POSITIVE IMPACTS

January 2019

- Continue to apply open data standards recommendation.
- Start to build webpages for competition to create problem-solving model recommendation and context blogs.
- Start promotion for competition to create problem-solving model recommendation.
- Identify workers to write blogs for context blogs and inform them of their task.

February 2019

- Task workers selected to write blogs, allow two months to finish. Communications workers should provide input to ensure blog is easy to understand and engaging.
- Plan an e-townhall with Assistant Deputy Ministers and/or the Deputy Minister to talk about the cultural and leadership changes that have happened so far, and the new commitment to transparency supportive leadership. The e-townhall should include time for participants to ask questions. Follow up this event with a summarizing email to all ECCC employees.

March 2019

- Start voting process to determine which environmental problem to address. Continue to promote voting process broadly.

April 2019

- Start to post blogs online (one per week, two a week), provide links to open data sets.

May 2019

- Identify problem with the highest votes, and create a detailed problem statement.
- Finalize evaluation criteria.
- Post problem online.
- Promote competition online, and through targeted invitations.

June 2019-September 2019

- Continue to promote competition and accept submissions.

October 2019

- Rank submissions by criteria, and determine a winner.

November 2019-onward

- Implement competition winner's idea and share results.
- Evaluate competition process.
- Continue to post blogs if necessary.
- Update subject matter expert blogs when necessary.

8.0 Conclusion

With the recent advancement of ICTs, there are opportunities for government information and data to be used to support accountability and transparency, enhance democracy through dialogue, and provide information that could be used to create or enhance goods and services by the private sector. Open government is being implemented across the Canadian federal government, and in governments across the globe. Cultural and organizational factors internal to government organizations likely have a significant impact on the success of open government initiatives. This report aimed to identify the cultural and organizational barriers and enablers for open government within ECCC and their significance, establish the status of open government within ECCC, and craft recommendations to support successful open government implementation. First, this project identified barriers and enablers present in the literature. Through interviews with a diverse selection of work types within ECCC, this project found that most of the barriers present in the literature were also present within the ECCC.

This project provides an account of how open government looks inside a government organization. It describes how open government affects different employees that perform different types of work. Science workers appear to have unique career related concerns within ECCC, and this project provides a perspective on how scientists or other public service researchers are impacted by open government. It provides some insight into how open government can be implemented to maximize potential impacts by recommending actions targeted to mitigate barriers to open government success, and leverage enablers. Although this project's recommendations are tailored to ECCC, these findings and recommendations might be applicable to other government organizations. The insights contained in this report could be especially relevant for other science based organizations in the Government of Canada, such as Natural Resources Canada, and Department of Fisheries and Oceans.

Although this project could potentially have many uses, it does have some limitations. ECCC employees were interviewed from November 2016 to March 2017, at a time when open government implementation was rapidly advancing. In the time between when ECCC employees were interviewed and when this project is completed, there could be some changes to ECCC's organization or culture that were not captured. In addition, this project interviewed a small slice of the ECCC population. Although heterogeneity was sought through the sampling and methodology, there is a potential that these results are not fully representative of ECCC's workforce. In addition, this project did not sample ECCC employees that are in senior leadership positions, who likely have different experiences with open government. In particular, there might be instances of fear of loss of power in roles that have more decision-making responsibilities, such as senior management within ECCC. In addition, fear of loss of power might be present for other actors that have a role in open government such as politicians. Lastly, the researcher's interview skills improved over the course of conducting the interviews, and gained more information and more nuanced information in later interviews than in earlier interviews. Earlier interviews were more likely to be IM/IT or policy workers, while later interviews tended to be communications or regulatory workers, with science worker interviews spanning evenly throughout. This pattern could have resulted in a fuller, clearer picture in communications and regulatory groups than in IM/IT and policy groups.

Despite limitations, this project is a useful resource on the cultural and organizational barriers and enablers of open government within ECCC. The Government of Canada has made great strides in open government implementation, which will likely result in benefits for Canadians and businesses. However, without addressing the cultural and organizational barriers and leveraging enablers, open government might not be implemented optimally. By using these findings and practical recommendations, open government implementation can minimize barriers, and maximize benefits to Canadians, academia, other stakeholders, and the environment.

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Appendix A: Consent form

University of Victoria

Participant Consent Form

Project Title: **Creating Open Government in Environment and Climate Change Cana**
Funded by: *N/A*

Client*: Holly Palen, Blueprint 2020 Advocate at Environment and Change Canada*

Researcher(s): Michelle Murphy, Graduate student and co-op student on the Blueprint 2020 team in Environment and Climate Change Canada, Public Administration, University of Victoria, 250-885-6439, mimur8@uvic.ca.

Supervisor: Richard Marcy, Public Administration, 250-721-8054, rtmarcy@uvic.ca

Purpose(s) and Objective(s) of the Research:

- The main objective of this project is to learn how ECCC can help create a culture and organization that supports open government.

This Research is Important because:

- *It could assist in the implementation of open government policies within ECCC by recommending solutions to potential problems for its implementation.*
- *Smooth implementation could increase likelihood of open government benefits to service to Canadians, and prevent undue stress on employees.*
- *Contributes to the literature about open government in the Canadian federal government context.*

Participation:

- Selection of participants was through snowball sampling. You were referred to as a potential participant through a colleague.
- Participation in this project is entirely voluntary.

Procedures:

- Researcher explain the purpose of the study, confirm consent to participate, and ask if the participant has any questions before beginning the interview.
- This is a semi-structured interview that will consist of 11 questions, with some follow up questions. All questions will relate to your experience the culture and organization in ECCC.
- You are free to refuse to answer any questions you feel uncomfortable with answering.
- **Duration:** one hour
- **Location:** workplace of participant, or on the phone.

Benefits:

- Assist in the smooth implementation of open government in participants' department, which could limit employee stress.
- Allows employees and managers below director level to voice their concerns and opinions about open government within Environment and Climate Change Canada.
- Assists in maximizing positive outcomes of open government policies, possibility resulting in improved policy making, governance, or service to Canadians.
- Contribute to the current knowledge of open government in Canada.

Risks:

- This project may pose a slight economic risk. The information that is being gathered relates to attitudes that could contribute to management forming a negative opinion of an employee that could pose a barrier to career advancement or other workplace opportunities.
- **Risk(s) will be addressed by**:
    - The researcher will ensure that participants cannot be identified in the final report by not disclosing their exact team or directorate in the final paper.
    - The researcher will delete the audio files as soon as they are transcribed, and eliminate any identifying information from the transcriptions.
    - All interview data will be framed in positively in the final paper, as something that could help identify gaps and weaknesses to better the department.

Withdrawal of Participation:

- You may withdraw at any time without explanation or consequence.
- Should you withdraw, your data will be discarded and will not be used in this project.

Anonymity and Confidentiality:

- Participation in this study cannot be anonymous as interviewing necessitates the researcher to know the identity of the participants.
- Confidentially will be protected by storing interviews on an encrypted USB stick. Transcriptions of the data will leave out any identifying information and will be stored on the encrypted USB stick.
- Transcripts will not be shared.

Research Results will be Used/Disseminated in the Following Ways:

- Published on University of Victoria d-space. This paper will be available online.
- Report given to Blueprint 2020 team (Holly Palen) and champion (George Enei); possibly given to others in ECCC.
- Dissertation presentation.

Disposal of Data

- Audio files of the interview will be deleted after transcription is complete. The transcript will be disposed of when the project is complete.

Questions or Concerns:

- Contact the researcher(s) using the information at the top of page 1;

- Contact the Human Research Ethics Office, University of Victoria, (250) 472-4545 ethics@uvic.ca

Consent:

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project.

Name of Participant	*Signature*	*Date*

A copy of this consent will be left with you, and a copy will be taken by the researcher.

Appendix B: Email to participants

Hello [insert name],

You have been referred to participate in a study on organizational and cultural barriers to open government within ECCC. This study is being conducted by me, Michelle Murphy. I am currently working for the Blueprint 2020 team in Science and Technology Branch and am enrolled in a Master's of Public Administration in the University of Victoria. This project will be submitted to my client, Holly Palen, Blueprint 2020 Advocate in the Blueprint 2020 team within ECCC to help foster a culture and create an organization that best supports ECCC employees in embracing open government. It has been approved by Values and Ethics, by the members of the Blueprint 2020 team, and has gone been approved by the University of Victoria Human Research Ethics Board.

You have been referred to me as a potential participant by [referral name]. Participation in this study will involve an interview in English only that will last approximately one hour and will take place in a boardroom and time convenient for you (must be within the NCR), or by phone at a time convenient for you. The interview will be audio recorded and transcribed. Participation is completely voluntary, and information you disclose will confidential and will not be attributable to you in the final project. My client will not be informed if you agree or decline to participate in this study. Declining participation will not result in any penalties.

If you are interested in participating in this study, please reply to this email by [date one week after email is sent] indicating your interest. If you have any questions or concerns, please do not hesitate to contact me at michelle.murphy@canada.ca, my work phone [work phone number], or my personal cell [personal cell phone number]. Please note that I work part time and will only be available by work phone three days a week.

Thank you for your consideration,

Michelle Murphy

[email will include my email signature as follows]
Co-op Student
Blueprint 2020 Team @ECCC
Science and Technology Branch
Environment and Climate Change Canada
Tel: 819-938-4682

Étudiant
Équipe Objectif 2020 @ ECCC
Direction générale des sciences et de la technologie
Environnement et Changement Climatique Canada
Tél: 819-938-4682

Appendix C: Interview Questions

Barrier/ Enabler	Research Component - Definition	Interview Guide Question(s)	Source
Risk Aversion	Risk averse attitudes/organizational attributes because of: -disruption of highly controlled bureaucracy of government organization -moving from a closed to an open system (harder to manage, could be perceived as threatening)	An open by default government results in less control over what information is shared with Canadians, and how data and information is interpreted. How do you think this will impact ECCC?	Janssen, Charalabidis, and Zuiderwijk (2012); Barry & Bannister (2014); Zhang et al (2005)
Fear of negative publicity	Fear based attitude towards open government related to media exposure	How will the effect of media impact how you interact with open government?	Ubaldi (2013); Barry & Bannister (2014) Lee & Kwak (2012)
Fear of loss of power	Fear based attitude towards open government related to loss of power	Some literature suggests that there is a change in relationship between government and citizens when open government is introduced. Governance becomes for networked and collaborative instead of decision making power being concentrated in the public service How do you feel about this change?	Ubaldi (2013)
Data quality sufficient for data release	Quality of data (timely, complete, accurate)	Interview Question: Tell me about the process, data quality standards, and rules involved in releasing data or information.	Janssen, Charalabidis, and Zuiderwijk (2012); Huijboom and Van den Broek (2011); Barry & Bannister (2014); Ubaldi (2013)
Disincentivizing/ unclear rules (formal or informal) about open government or open data release	-Level of knowledge of how open government works in ECCC (Both by the participants and perceived level of clarity by others in the department). -How rules incentivize or disincentize participation in open government (Both by the participants and perceived level of clarity by others in the department)	Interview question: Is there anything (rule, aspect of your work, etc.) that you find prevents you from participating in open government?	Zhang et al (2005); Ubaldi (2013); Huijboom and Van den Broek (2011)
Defined parameters for open dialogue in ECCC	Level of knowledge of how to engage with Canadians or external stakeholders	Who is being engaged with the information the department is releasing? How are these stakeholders being engaged?	Ubaldi (2013); Lee & Kwak (2012)

Barrier/ Enabler	**Research Component - Definition**	**Interview Guide Question(s)**	**Source**
Social Media competency	Level of competency/confidence with social media usage	1) What are the opportunities of social media platforms to engage Canadians with open data and information? 2) How is a dialogue between ECCC and stakeholders or citizens being fostered? 3) What is the strategy to incorporate citizen and stakeholder perspectives and ideas into ECCC work?	Lee &Kwak (2012)
Implementation within departmental capacity	Employee/manager perspective of implementing open government within capacity	Interview Question: Did you or your team have trouble completing or maintaining the quality of other work because of open government?	Ubaldi (2013); Lee & Kwak (2012); Gottschalk (2009)
Alignment with departmental goals	Level of knowledge of how open government can be used to assist in open government goals, attitude towards open government	How do you think open government effects material that you work on? Do you think it helps ECCC employees achieve its mandate?	Lee & Kwak (2012)
Formal or informal incentives	Employee/manager identification of incentives	Can you give me a sense of any factors internal to the public service that encourage you to engage with open government? (i.e.: PS wide, department level, branch level, directorate level, team, etc.).	Lee & Kwak (2012)
Unanticipated barriers or enablers	Employee identification of perceived barriers and enablers to open government not present in literature	1. Do you perceive any other barriers to open government that have not yet been brought up? 2. Can you identify anything that you think would help implement open government that has not yet been brought up?	Meijer, Curtin, & Hillebrandt, (2012)
Variance in barriers and enablers by work type	Employee experience of other barriers and enablers to open information, open data and open dialogue depending on their work type Comparing interview data by work type	1. Can you give me a high-level sense of what your position at ECCC entails? 2. Tell me about your experience with open government.	Meijer, Curtin, & Hillebrandt, (2012)