The Changing Landscape for Energy Performance Contracting in Canada

An Industry Perspective

September 2021

Developed by:

MCW Group of Companies
www.mcw.com

KWM Consulting Inc.
www.kwmconsulting.com

UNFORTUNATELY, IT'S NOT ALL COVERED

DISCLAIMER

This Industry Paper has been prepared to provide an industry perspective on the history of Energy Performance Contracts (EPCs) in Canada, commentary on the key elements, benefits, risks, rewards, and financing of EPCs, a discussion on the issues and myths surrounding the implementation of EPCs, and industry concerns regarding recent developments that negatively impact EPC projects.

The information presented in this Industry Paper reflects the views of a diverse group of stakeholders across Canada and globally, and therefore is not necessarily reflective of the view held by any single party. The information and material presented herein has been provided to present an industry voice for discussion purposes only and should not be relied upon or interpreted as advice. It is not exhaustive and is not intended to meet every case.

Although reasonable efforts have been made to ensure that this Industry Paper is based on reliable information sources, no representations, or warranties of any kind, express or implied are made about the completeness, accuracy, and suitability of information or for any liability of any kind, direct or indirect, arising from the use of this Industry Paper. Any reliance is therefore placed at own risk.

THE ENERGY EFFICIENCY INDUSTRY SPEAKS

TO OUR COLLEAGUES

The unprecedented global challenges we collectively faced during 2020 because of COVID-19 exacerbated our existing economic pressures, resulting in the payments of staggering government subsidies, substantial job losses, burgeoning global debt, and a significant change to our world.

As we marshalled and refocused our resources and efforts to deal with the ongoing, mutable effects of COVID-19, other important challenges such as energy inefficiency along with Greenhouse Gas (GHG) reductions, and their fundamental drivers, received less attention. As we move forward, we can opportunistically pursue solutions that address our emissions-intensive economy in Canada, while creating new employment prospects, all at minimal or no additional cost to the taxpayer. EPCs provide this opportunity.

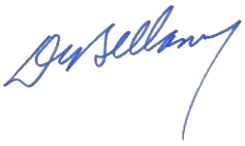
The MCW Group of Companies (MCW) and KWM Consulting Services Inc. (KWM) are delighted to present this Industry Paper to support the advancement of EPCs across Canada.

This Industry Paper represents a momentous landmark in Canada's energy landscape, uniting, for the first time, an industry of pan-Canadian, multi-sector and diverse stakeholders; spanning government, energy clients, Energy Service Companies (ESCOs), energy consultants, academia, and global representatives, to share decades of collective experience, expertise and valuable lessons learned from the implementation and operation of EPCs.

It is our sincere hope as an industry that we take advantage of the opportunity created by the necessity of our rapidly growing environmental and economic issues.

Sincerely,

David Bellamy



Executive Partner

MCW Group of Companies

Kelly Mitchell

President

KWM Consulting Services Inc.

TIME IS UP!

FOREWORD

This is a moment to pause. It's an over-used phrase, but we are at a turning point. The reasons are many. We are approaching the time when the "Sun" will rise as the impact of COVID-19 subsides. This will largely be the result of learning how to manage and control viral threats through medical research and innovation. With the dimming of that global threat, it is time for energy efficiency as a climate change solution to take its rightful place at centre stage. It is time to generate real value for clients embarking on their journey to energy efficiency, and to put the Canadian EPC industry on a firmly sustainable course with access to the capital that will unlock *all* of this industry's benefits.

Why?

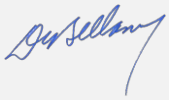
We are closer than ever to having the global community aligned in the understanding of the impacts that excessive Greenhouse Gases (GHGs) emitted from our buildings has, and the desire to deal with that problem. In a sense, the poisonous impact of excess GHGs to our planet is similar to COVID-19's effect on humanity.

Making the *new* the best ever and the *existing* the best yet cannot be done without the deep understanding – and proven results – that the entire Energy Performance Contracting (EPC) community has in helping to create what I call a "healthy, safe and sunny" built environment.

COVID-19 provided a temporary global pause to the increase of GHG emissions. Global emissions from buildings are down 25%, while global emissions from transportation are down 40%. This is all due to the curtailment of human activity. As we enter what many believe could be a modern version of last century's Roaring 20s (occurring right after World War 1 and the last global pandemic), now is the time for the EPC industry and all levels of government to strengthen a framework that will deliver meaningful permanent energy and carbon savings. Creating these savings starts in the core systems that make our buildings habitable (i.e., the "healthy, safe and sunny" feeling). It is the combination of technologies old and new that provides today's building spaces with mechanical and electrical solutions that make these spaces enjoyable to inhabit, and enables them to deliver tangible social and economic benefits for those who use them and invest in them. Delivering these solutions to the places where we live, learn, work, play, and heal has never been so critical for our collective wellbeing.

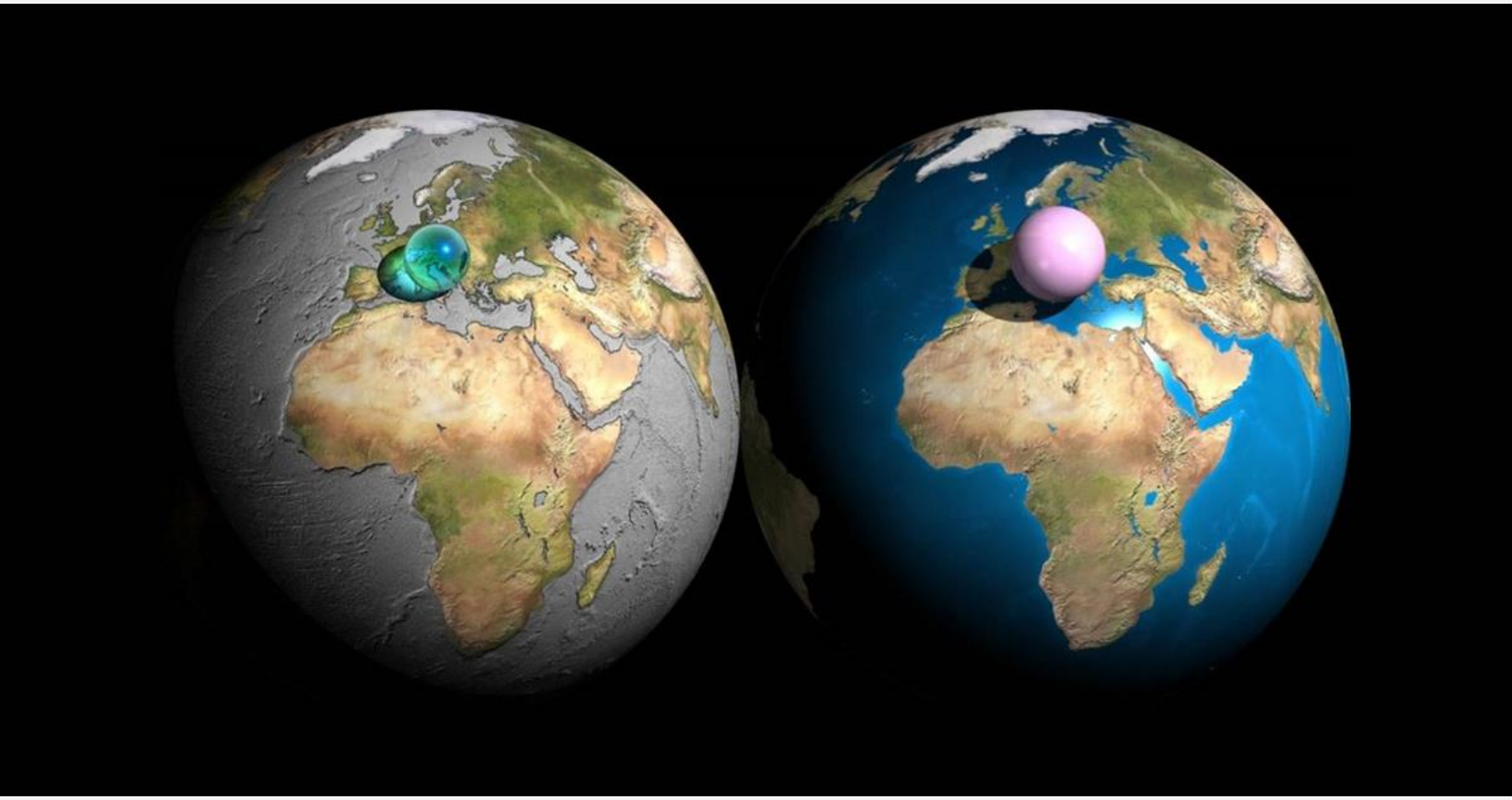
Pure energy savings create the investment capital (cash) to renew facilities and provide relatively short paybacks. EPCs are *not* a requirement for new capital, but a *redirection* of existing cash that is currently paid out year-over-year for utilities and maintenance. In other words, these are projects where *no appropriation of <u>new</u> funds* is required. With the acceptance of slightly-extended payback periods, this cash can also address maintenance backlogs. With the agreement to medium-term payback periods, this cash can address facility renewal. And, with longer payback periods linked to asset lifecycle, this cash can be used to dramatically reduce a building's carbon footprint and set the course (if not complete the journey) towards becoming net-neutral in its carbon emissions.

I have spent my career in this industry with family, friends, business associates, partners, suppliers, contractors, and more. I can't wait for what's next; I know the best is yet to come. Please read this Industry Paper and let's keep the discussion going. Why? Because TIME IS UP!



David Bellamy

A VISUAL REMINDER



It's helpful to remind ourselves of what's at stake through a lack of climate action. This graphic visualizes the sum total volume of **water** (left) and **atmosphere** (right) relative to the size of the Earth. We see from this the startling reality of how limited our two primary, life-giving resources truly are; two resources whose continued 'good health' is directly tied to strong environmental stewardship.

We ask that you keep this simple truth in mind while reading this Industry Paper; we are advocating for the continued support of a proven, financially-viable project model *explicitly focused* on GHG emissions reductions, energy use, and water conservation. We believe the EPC remains one of the industrialized world's best tools in continuing to foster strong environmental stewardship (through resource conservation and decarbonisation) and a powerful asset for governments to demonstrate tangible progress made towards climate change mitigation commitments.

OUR SINCERE APPRECIATION

ACKNOWLEDGEMENTS

This Industry Paper was prepared with significant contributions from stakeholders spanning government, energy clients, ESCOs, energy consultants, academia, and global representatives with a united vision of advancing energy efficiency in Canada.

It is with sincere gratitude and appreciation that MCW and KWM proudly offer this Industry Paper to the advancement of energy efficiency solutions in Canada and the hopeful advancement of EPCs as a climate positive and GHG emissions reducing solution.

The stakeholders that contributed to the development of this Industry Paper are represented in alphabetical order in the table below.

Company	Representative
AECOM	Marie-José Croonen, Vice President Energy Doug Sattler, Vice President Business Development Ashley Edwards, Vice President Energy
Aenergy Capital **SunAlta Power** **Bow Bioenergy**	Jim Goldmann Sr, CEO
Ainsworth Inc.	Randy Topp, Vice President – Ontario Electrical and Energy Services
Alberta Urban Municipalities Association	Alvin Law, Senior Director, Utility Services
Algonquin College	Duane McNair, Vice-President, Finance and Administration
Amber Infrastructure Limited	Peter Radford, Director
Armstrong Fluid Technology	Paul Scarafile, Director, Canada Sales
Beringer Capital	Bill Kostenko, President
Blackstone Energy Services	Ryan Duffy, President and CEO
Conseil des Écoles Catholiques du Center-Est	Marc Betrand, Director of Education
Correctional Services Ontario	Deputy Minister Deborah Richardson, at the time of interview, Deputy Solicitor General Rob Green, Ministry of the Solicitor General Maria Duran-Schneider, Ministry of the Solicitor General

Company	Representative
Econoler	Pierre Langlois, Chief Executive Officer
Ecosystem	Andre Rochette, President & CEO Asaph Benun, Managing Director of Sales
Energy Associates Intl.	Charles Champagne
Energy Services Association of Canada	Stuart Galloway, CEO
Finesco Capital Inc.	Grant McDonald, President & CEO
Hannon Armstrong	Ryan Beard, Senior Manager
Honeywell International Inc.	Luis Rodrigues, at the time of interview Vice President and General Manager Energy and Environmental Solutions Emelie Westdahl, Energy Business Development Specialist at Honeywell
Johnson Controls Canada L.P.	Hassaan Khan, Area General Manager – Performance Infrastructure Canada
London District Catholic School Board	John Kononiuk, Executive Manager of Facilities
MCW Custom Energy Solutions Ltd.	Colin J. Rabnett, Executive Partner
Mohawk College	Tony Cupido, Sustainability Research Chair
Montreal Olympic Park	Maurice Landry, Executive Vice President
National Association of Energy Service Companies	Timothy Unrah, Executive Director
SaskBuilds	Matthew Schroeder, Vice President Strategy
SEEFAR Building Analytics Inc.	Jim Nostedt, CEO
Siemens	Murray Mcintyre, Energy Performance Services Account Executive
TEC Canada	Wayne Cole, CEO and Chair
Thomas Cole Inc.	Tim Cresswell, President
Trane	Leon Hawkins, Automation and Controls Business Leader Darryl Hill, Director Energy Management
United Financial of Illinois, Inc.	Alan Riefenberg - Vice President, Sales

Company	Representative
University of Guelph	Paul Mesman, Director, Design, Engineering and Construction, Physical Resources
University of King's College	Ian Wagschal, Director of Facilities Management
Industry Advisor	Monica Curtis, Industry Advisor Energy Efficiency, former CEO Energy Efficiency Alberta
Industry Advisor	Joe Saldarelli, Industry Advisor (previously Manager - Maintenance & Energy at Grand Erie District School Board)
Industry Advisor	Tyler Bell, Professional Engineer, Certified Energy Manager
Industry Advisor	Tom Tamblyn, Retired EPC Industry Expert

We would also like to thank and recognize all the stakeholders that participated in this Industry Paper but preferred to remain unnamed. Our sincerest gratitude to the contributions and support you offered.

MEET THE SPONSORS

AN INTRODUCTION

Founded in 1964, the MCW Group is made up of engineering companies providing industry-leading engineering consulting, energy management and engineering inspired development services to the energy, power, and buildings construction industries.

As part of the MCW Group, MCW Custom Energy Solutions (MCW CES), provides building energy solutions that help clients reduce their environmental footprint, avoid utility costs, and realize asset renewal. In partnership with building owners, MCW CES develops and delivers engineered, single-source EPCs that deliver guaranteed utility savings, carbon management, occupant comfort, and systems renewal opportunities to colleges, universities, municipalities, school boards and health care facilities across Canada. Our EPC work represents a cumulative investment of more than $650M in increased energy efficiency that has eliminated nearly 1 Million tonnes eCO_2 (equivalent Carbon Dioxide) from the Canadian built environment to date.

MCW is qualified nationally under the Federal Buildings Initiative for the development, financing and delivery of Guaranteed EPCs, and is a founding Board Member of the Energy Services Association of Canada (ESAC).

KWM Consulting is a public-affairs, advisory and strategic counsel firm devoted to providing deep expertise and the highest quality service to our clients. Leveraging a diverse range of strategic, advisory and advocacy experience, KWM's team works collaboratively with clients to build the strategy, messaging, and relationships necessary to advance and accomplish their goals and objectives, and to advise clients in the development of successful projects and initiatives.

With expertise in Infrastructure financing and developments, strategy development, complex deal structuring and long-term partnering arrangements, risk identification, analysis, and mitigation, commercial negotiations and EPCs and deep energy connections across Canada, KWM offer advisory services with seasoned professionals that span decades of experience.

KWM's Advisory Practice believes that successful advice goes beyond the achievement of outputs and goals, to empowering clients to respond in a manner that meets the needs of today and achieves sustainability for the future. KWM's advice is outcome focused, leaving you better off than when you started with a motto of "don't lose value and don't lose value when you need it most."

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A PREVIEW

1 EXECUTIVE SUMMARY

1.1 It's Time

Canada is among the countries with the most greenhouse gas emissions-intensive economy globally. Some of these emissions result from our climate but a significant proportion result from the location of where Canadians live, relative to the vastness of Canada's geographic footprint. With 90% of Canadians living within 100 kilometres of the US Border, a border that is 8900 km long, results in a very energy intensive geographic footprint when it comes to conducting business and staying connected with one another.

In addition, over 80% of man-made GHG emissions in Canada come from the production and use of energy, and existing buildings contribute to roughly 44% of these emissions, with 75% of these buildings expected to remain in existence in 2050.

Unfortunately, the Canadian Government has faced significant challenges in meeting past emissions reduction targets, notably withdrawing from the Kyoto Protocol and not meeting targets set in the Copenhagen Accord. Therefore, to achieve the Canadian government's commitment under the Paris Agreement, of reducing GHG emissions by 30% below 2005 levels by 2030 and its ambitious target of a net zero emissions economy by 2050, Canada can't afford the luxury of ignoring any solution that offers energy.

1.2 EPCs in Canada

EPCs have had a long history in Canada. Several programs and initiatives were started during the 1990s and 2000s to support EPCs across Canada and increased spending on green initiatives followed by stimulus funding in the wake of the 2008 crisis, further supported the increased momentum in the adoption of EPCs.

The motivation behind the adoption of EPCs changed from the early projects resulting in a general increase in the size and payback periods of EPCs to accommodate greater scopes and outcomes to be achieved.

A sample of EPCs that have been implemented across Canada are included at Section 11 of this Industry Report and letters from selected operational EPC clients are included at Appendix B.

1.3 The Benefits of EPC

The benefits of EPCs extend well beyond the often-cited advantages of leveraging energy savings / energy wastage to repay capital invested in energy retrofits and include several economic, societal, environmental and asset related benefits.

Section 4 offers further details on the benefits of EPCs.

1.4 The Myths, Limitations and Challenges of EPC

The narrative about the issues experienced on operational EPCs being the cause for the significant reduction, and in some provinces complete end, to the adoption of EPCs, offers a limited perspective. The stakeholders that contributed to the development of this Industry Paper offered the following reasons for the limited adoption of EPCs:

- The Approach Adopted by Government
- Issues on Operational EPC Projects
- Complexity of EPCs
- Lack of Awareness of Public Sector Clients with EPCs
- Ineffective Procurement Processes & Project Design
- Perceived Cost and Value for Money of EPCs

Section 5 offers further details on the myths, limitations, and challenges of EPCs.

1.5 Structuring a Successful EPC in Canada

While some EPCs are a “partnership” between the public and private sectors, they do not follow the same contractual structure as a Public Private Partnership (PPP) / Alternative Financing Procurement (AFP). The industry has expressed concerns that some prominent Canadian (provincial and federal) agencies, are seeking to apply the PPP model to an EPC. Ignoring the foundational principle that greening solutions are complex and highly dependent on varying factors which do not neatly fit a rigid framework and require flexibility to deliver the most optimal outcome and solution for each project e.g., territories like Europe and the UK are working on a model that will accommodate smaller EPC projects rather than forcing bundling, increasing procurement agency fees and control to fit a rigid predefined framework.

Achieving the net zero emission targets established by the federal government requires collaboration between public and private sectors and the evolution of all stakeholders involved in the energy industry to adopt diverse solutions. It is therefore vital that the procurement processes adopted are not so prescriptive as to disallow true partnering and outcomes to be achieved.

Discussion on the most optimal EPC assets, sectors, capital size, M&V and selected EPC risks is presented at Section 7.

It is important for EPC Clients to consider the cost of M&V against the required certainty of savings and the opportunity for redirecting any saved M&V costs to support other needs and objectives.

1.6 Financing of EPC in Canada

The following financing arrangements have been adopted to finance EPCs that have been undertaken in Canada:

- Self Funded
- Sale of Receivable
- Variations on Sale of Receivable
- ESCO sourced debt in the form of term loans.
- EPC Client secured grants.
- Insurance backed products.
- Capital leases
- Lease purchase agreements where energy savings are used to offset lease payments.
- Energy as a service where asset ownership is retained by the funder.
- Concession agreements with equity and long-term loan financing.

A more detailed discussions about the industry's views on financing is included at Section 8.3.

1.7 Stakeholder Engagement – Partnering for Success

The successes, experiences and lessons learned from past EPCs have demonstrated that the strength of the partnership between the EPC Client and the ESCO is one of the most critical elements to the overall success of an EPC and often an element that is underestimated or deprioritized in favour of a financial / price-based selection.

Certain factors will deter experienced market from participating in this market in Canada. Evidence of this has been experienced with some ESCOs deciding not to bid in certain provinces or federal frameworks. Encouraging experienced market participants with the financial robustness, critical resources, and holistic expertise to successfully deliver EPCs and their associated outcomes, is necessary for a sustainable EPC market in Canada as well as to drive value and achieve the sizeable GHG emissions and other greening targets.

1.8 EPC Procurement Process

EPCs are by their very nature highly structured to the specific outcomes required by the EPC Client, including considerations such as the future use of the asset, the location of the assets which can have different impacts on energy policies and costs and the cultural setting of the asset, which will impact the behaviour of use of the asset. Unlike, traditional procurements and PPPs, where a solution is developed against predefined outputs, EPCs are most successful when the EPC Client and ESCO combine their expertise and knowledge to design required outcomes.

Understanding the nature of EPCs and the factors that drive real success, is critical to achieving an EPC Client's needs.

1.9 Conclusion

The time to act is now and some argue that the time has passed. We can no longer afford the cost of delays and it is the industry's hope that EPCs can be adopted as a viable, necessary and valuable solution to addressing climate change and reducing GHG emissions.

"We're running the most dangerous experiment in history right now, which is to see how much carbon dioxide the atmosphere can handle before there is an environmental catastrophe."

Elon Musk

THE WHAT, THE WHY & THE NOT COVERED

2 OVERVIEW OF THIS INDUSTRY PAPER

2.1 Purpose & Scope of this Industry Paper

This Industry Paper has been prepared to provide an industry perspective on the history of EPCs in Canada, commentary on the recent trends, benefits, challenges, threats, critical issues, risks, and financing of EPCs as well as a discussion on the issues and myths that caused a slowdown in the procurement of EPCs in Canada.

2.2 Reason for Industry Collaboration & Participation

The stakeholders that participated in the development of this Industry Paper did so with the following intentions:

- Promoting government endorsement of EPCs as a contributing solution to the Government of Canada's agenda of achieving a net zero carbon economy by 2050.
- Gaining clarity from provincial governments as to their intended support for EPCs and the likely timescales of this backing.
- Bringing attention to the many benefits offered by EPCs, which extend beyond energy and cost savings.
- Dispelling the myths that have surrounded the adoption of EPCs as a viable solution to climate change.
- Advancing projects that are ready to be procured to take advantage of the significant benefits delivered by EPCs in renewing energy infrastructure, achieving transformational outcomes, leveraging energy and budgetary outcomes, and ensuring a more resilient future.
- Leveraging the lessons learned and significant experience and expertise amassed by experienced Canadian and global ESCOs and clients alike, and to improve EPCs such that they are better aligned with Canadian goals and leveraged towards improving significant asset portfolios.
- Providing a broad market representation from diverse market participants with deep cross sector, pan Canadian and global expertise.
- Aligning interests of stakeholders and creating impactful partnerships between public and private sectors that leverage their respective skills and expertise to achieve transformational outcomes, financial, economic, and enhanced environmental impacts as well as support infrastructure renewal in a sustainable manner.
- Creating standardized programs for provincial and municipal projects that provide a clear and consistent approach to bidding and executing EPCs through which experienced bidders can be shortlisted and participate in, thereby allowing for an expedited realization of energy efficiency projects that support the goals of the Federal GHG and decarbonization reduction targets.
- Expanding the reach of capital allocation to achieve deep retrofits.

2.3 Limitations of this Industry Paper

This Industry Paper is subject to the following limitations:

- The Industry Paper has been compiled from extensive interviews, contributions and materials provided by many diverse stakeholders in Canada and globally. Care has been taken to reproduce the wording provided or in the case of conceptual ideas, the description supplied by each stakeholder. Readers may have expressed these views in different ways and may not agree with every perspective offered, whether in whole or in part. However, the Industry Paper has been designed to share the diverse thoughts and understanding of Canada's EPC landscape, including the differences, the rawness, and the unpopular expressions with the aim of offering the foundation for the best success.
- Some of the views expressed in this Industry Paper vary widely and may appear to conflict. To protect the integrity of the objective of this effort, being the sharing of the views of the energy industry, we have identified in the relevant sections, the range of views.
- The information and material presented in this Industry Paper has been provided for discussion purposes and should not be relied upon or interpreted as constituting advice for EPC arrangements.
- EPC arrangements vary in scope, complexity, terms and structure and this Industry Paper does not represent an exhaustive list of relevant information nor every possible scenario and is not intended to be relevant to every EPC.
- This Industry Paper does not cover all the mechanics of EPCs. There are various other resources available to readers that will address these elements.
- Although reasonable efforts have been made to ensure that this Industry Paper is based on reliable information sources, no representations, or warranties of any kind, express or implied are made about the completeness, accuracy, and suitability of information or for any liability of any kind, direct or indirect, arising from the use of this Industry Paper. Any reliance is therefore placed at own risk.
- This Industry Paper has been developed at a specific point in Canada's EPC journey and is subject to change as the use of EPCs increase and EPCs evolve.

"The best ideas emerge when very different perspectives meet."

Frans Johansson

Part A

“History is a vast early warning system.”

Norman Cousins

HERE'S THE SCOOP

3 INTRODUCTION, CONTEXT & BACKGROUND TO EPCs IN CANADA

3.1 Introduction & Context

COVID-19 changed our world and exacerbated the existing financial and economic challenges in Canada and globally. The reality of job losses, provincial debt levels rising to unprecedented levels and an unpredictable future consumed our focus and other critical challenges such as the significant financial and environmental cost of energy inefficiency, and the impact of emissions on the sustainability of our planet, received less attention. While an understandable response to a mutable threat, the impact of continued neglect and inaction to energy inefficiency, overconsumption, and wastage, will become our next crisis (some argue it already has), and one that will result in food and water shortages and significant environmental disasters.

Consider the important facts below.

3.1.1 Provincial and Canadian Debt Increasing to Historic Highs

The following table provides a view of the effects of COVID-19 on Canada's provincial and federal net debt as of May 31, 2021.

	Net Debt 2019 / 2020 ($ millions)	Net Debt 2020 / 2021 ($millions)	Change (%)
Alberta	40,144	62,500	55.69%
British Columbia	46,229	59,962	29.71%
Manitoba	25,220	27,635	9.58%
New Brunswick	13,922	13,891	-0.22%
Newfoundland and Labrador	14,400	16,300	13.19%
Nova Scotia	15,242	16,680	9.43%
Ontario	353,332	399,463	13.06%
Prince Edward Island	2,205	2,425	9.98%
Quebec	183,726	199,060	8.35%
Saskatchewan	12,289	14,512	18.09%
Federal	721,400	1,079,000	49.57%

Source: RBC Economics Canadian Federal and Provincial Fiscal Tables presentation (May 31, 2021)

The effects of COVID-19 are undeniable and the staggering impact on levels of net debt both provincially and federally, now more than ever, demand prudent investment choices. In addition to these challenges, the effects of energy inefficiency and climate change have not stopped for COVID-19 and therefore, we cannot afford the luxury of ignoring solutions which offer the benefits of energy efficiency and resultant savings at a time when little else will offer the opportunities to increase employment, reduce energy costs and contribute to climate positive results.

3.1.2 The Massive Cost of Energy Inefficiency of Canada's Buildings

In Canada, over 80% of man-made GHG emissions, come from the production and use of energy. Existing buildings contribute to roughly 44% of GHG emissions and 75% of these buildings are expected to remain in existence in 2050. Enhancing the energy efficiency of existing buildings by delivering more energy efficient solutions, reducing energy consumption, and substantially lowering / eradicating GHG emissions, remains an urgent requirement for all levels of government, public institutions, and private companies.

> **"No problem can be solved from the same level of consciousness that created it."**
>
> **Albert Einstein**

3.1.3 The Disappointing Trend of Canada's Energy Track Record

Canada is among the countries with the most emissions-intensive economy globally. Some of these emissions result from our climate but a significant proportion result from the location of where Canadians live, relative to the vastness of Canada's geographic footprint. With 90% of Canadians living within 100 kilometres of the US Border, a border that is 8900 km long, results in a very energy intensive geographic footprint when it comes to conducting business and staying connected with one another. This means that Canada can't afford the luxury of ignoring any solution that offers energy efficiency and in fact, puts more pressure on the need to retrofit existing building stock for carbon savings.

The Canadian Government has faced significant challenges in meeting past emissions reduction targets, notably withdrawing from the Kyoto Protocol and not meeting targets set in the Copenhagen Accord. Therefore, to achieve the Canadian government's commitment under the Paris Agreement, of reducing GHG emissions by 30% below 2005 levels by 2030 and its ambitious target of a net zero emissions economy by 2050, will require strong collaboration between private, public, and institutional sectors, targeted investments and a transformation in approach and mindset to energy use and wastage.

3.1.4 Immediate Attention Required

The mounting challenges we are facing need immediate focus and prudent action. Job losses, the massive backlog of maintenance and repairs of Canada's existing buildings, the burden of energy wastage, harmful impact of emissions that threaten our sustainability, are just a few of the symptoms that can't be solved by ongoing inaction. Given our impending landscape, there is an urgent need to opportunistically pursue solutions that address our emissions-intensive economy in Canada. EPCs have been successfully adopted in Canada and in many global jurisdictions to achieve energy efficiency savings, reduce energy consumption, deliver innovation, resilience, and enhanced outcomes, and achieve urgent energy efficiency targets. They form an essential role in contributing to the revival of our economy, protecting the value of our buildings, and enhancing invested dollars, with minimal or no additional cost to taxpayers.

3.2 Background to EPCs in Canada

3.2.1 Early Canadian EPCs

EPCs have successfully been adopted in Canada since the early 1980s. Various misconceptions and concerns about their implications to the public sector, particularly concerns around the perceived increase to public sector borrowing, had the effect of slowing the adoption of EPCs in Canada. However, the increasing pressure to reduce GHG emissions and reduce energy wastage combined with the demonstrable value and success of EPCs in mobilizing resources to deliver energy efficiency measures and effecting deferred maintenance renewal, has reinvigorated industry focus on the adoption of EPCs in Canada.

3.2.2 Evolution of EPCs in Canada

Canada's EPC journey originated as a public sector response to rising energy costs, with the first ESCO in Canada being founded in 1981, as a collaboration between Hydro Quebec and Econoler Inc. The first project was based on a shared savings, open book approach. Increasing energy prices combined with enormous financing rates, significantly increased the popularity and adoption of EPCs with more than 1,000 EPCs being implemented across multiple sectors in Quebec during the 1980s.

These early projects were almost entirely focused on reducing energy costs and attracting rapid savings to relieve budgetary pressures. They were typically smaller in size with a limited scope to replace elements such as lighting and had relatively short payback periods of less than seven years. The scope of EPCs later evolved to include non-energy deferred maintenance elements, renewable energy components and other building system replacements.

Several programs and initiatives were started during the 1990s and 2000s to support EPCs across Canada. Increased spending on green initiatives followed by stimulus funding in the wake of the 2008 crisis, further supported the increased momentum in the adoption of EPCs. The following are a sample of these government programs:

- The Federal Building Initiative (FBI) was introduced in 1991 and has since delivered a substantial number of projects.
- Ontario Hydro introduced Guaranteed Energy Performance Program (GEPP) in 1991.
- In 1996, the Better Buildings Partnership (BBP) was started to focus on reducing emissions in Toronto.
- British Columbia introduced an Energy Services framework, and the B.C. 'Green Buildings Program' for both "bundled" and "unbundled" services" that ran between 2003 and 2008.
- In Alberta EPCs were implemented for various public facilities between 2004 to 2006.

The motivation behind the adoption of EPCs changed from the early projects that were focused on enabling savings and accessing funding to solve budgetary issues, to addressing unfunded deferred maintenance backlogs and upgrading aging infrastructure and later to a focus on sustainability, decarbonisation, resilience, and the achievement of transformational outcomes. Projects generally increased in size and payback periods extended with some EPCs having payback terms of 20 years.

A sample of EPCs that have been implemented across Canada are included at Section 11 of this Industry Report and letters from selected operational EPC clients are included at Appendix B.

THE GLASS HALF FULL

4 EPC BENEFITS & OPPORTUNITIES

4.1 EPC Benefits

The benefits of EPCs extend well beyond the often-cited advantages of leveraging energy savings / energy wastage to repay capital invested in energy retrofits and include:

- Every $1 invested in energy efficiency measures in Canada, yields $7 in Gross Domestic Product (GDP) growth.
- Significantly enhance the quality of environments and facilities and improve the health and wellbeing of occupants.
- Deliver outcomes that extend beyond the replacement of energy efficiency elements to achieve broader client requirements addressing holistic facility elements.
- Leverage the power of stakeholder partnering to deliver outcomes and innovation compared to traditional approaches that deliver contracted outputs.
- Upgrade infrastructure and deliver safer and healthier facilities and environments.
- Promote environmental leadership.
- Preserve the valuation of buildings.
- Extend the life of facilities.
- Provide a framework for energy efficiency implementation.
- Enable users such as students to take an active role in energy use, performance, and management.
- Create new job opportunities.
- Create apprenticeships, certifications, and training opportunities.
- Reduce unfunded deferred maintenance.
- Ensure greater commissioning and engineering rigor because of the performance guarantees by the ESCO.
- Reduce break-fix maintenance and the number of attempts to repair issues because troubleshooting identifies the exact cause more quickly.
- Transfer accountability for the achievement of long-term outcomes desired by clients for their facilities and business, to an ESCO.
- Reduce strain on client staff.
- Contribute sizeable capacity of both resources and financial support to undertake significantly greater volume and size of energy efficiency upgrades than compared to a public sector client's internal capacity.
- Deliver capital infrastructure improvements that improve resilience and sustainability of facilities.
- Reduce burden on Clients working capital through integrated financing and payment structure.

- Leverage wastage or costs incurred in a client's annual expenditures to support financing the project rather than requiring an owner to generate new budget.
- Enable appropriate risk transfer of elements where private sector has the knowledge, experience, expertise, capacity, and ability to shoulder performance risks.
- Provide a single point of accountability, which simplifies the process for upgrading a facility.
- Ensure persistence of energy / cost savings post-construction, as M&V services enable ongoing attention by an ESCO to ensure that savings do not erode over time.
- Deliver significant energy / cost savings because the ESCO is entirely accountable for meeting guaranteed and contracted and therefore has a laser focus on maximizing these savings.
- Contribute to the achievement of aggressive government energy targets and deliver fiscal responsibility. Public sector entities often do not have capital budgets to undertake required retrofits of their facilities. They have aggressive GHG reduction targets, significant deferred maintenance backlogs and issues with indoor air quality (IAQ), especially in some of the older buildings.
- Engage technology with imbedded intelligence to measure and validate operating conditions of building and maximize real energy savings.
- Integrate the design and build process with holistic building considerations to ensure that a facility owner receives the most effective and optimal solution.
- Bundle comprehensiveness in a multi-year deep retrofit program that when combined with third party financing solves the annual funding cycle systemic within institutions. This differs from single year owner-managed improvement projects where unused / undeployed funds often get clawed back.
- Harness the significant strengths of ESCO including guaranteed savings, sizeable and strong balance sheets, deep expertise and experience, large resource capacity, holistic approach to building solutions, innovation, advanced building management systems, ability to bring finance and capability to bundle projects.
- Augment the facilities management capability and enable the development of preventative maintenance programs that deliver additional value and savings.
- Achieve transformational projects that leverage energy wastage to fund investment for capital improvements, reduce GHG / carbon footprint, modernize facilities, and reduce energy spend in a cost neutral manner with limited risk to a client.

"Without data you're just another person with an opinion."

W. Edwards Deming

THE GLASS HALF EMPTY

5 MYTHS, LIMITATIONS & CHALLENGES OF EPCs

The narrative about the issues experienced on operational EPCs being the cause for the significant reduction, and in some provinces complete end, to the adoption of EPCs, offers a limited perspective. The stakeholders that contributed to the development of this Industry Paper offered the following reasons for the limited adoption of EPCs:

a. The Approach Adopted by Government

- Little political will to support the adoption of EPCs at provincial levels coupled with controlling the autonomy and decision making of public sector clients.
- A perceived limitation placed by certain ministries on the ability of public sector clients to gather information and knowledge about EPCs from industry participants, despite no active procurements being undertaken.
- Inconsistent messaging about the importance of achieving energy efficiency measures coupled by the lack of accountability for not considering solutions that can contribute to the federal government's 2050 zero carbon emissions target.
- The approach to government policy with respect to public sector borrowing and funding for capital projects and sustainability programs having the impact of disallowing the public sector clients to borrow money for these projects.
- Lack of accountability when projects that are ready to be procured are prevented from progressing and lack of responsibility for assessing the loss of associated benefits.
- Government bureaucracy and difficult, rigid procurements.
- Unwillingness to innovate or procure in such a way as to allow for innovation.
- A strong push and endorsement by the Canadian government and government agencies of Canada Infrastructure Bank (CIB) and their EPC model irrespective of need or acceptability and not generally accepted by the industry. It is felt that the views of the market offered during CIB's market sounding were not taken into consideration and that CIB forced a solution that had been predesigned and that the market sounding was simply to allow a response that the market had been consulted.
- Continuing industry concern that Infrastructure Ontario (IO) and Alberta Infrastructure will force EPCs into a PPP type model and will impose approaches such as bundling to justify their fees and procurement model, reasoning that they will introduce efficiencies to EPC procurements. The industry is however aware of other global approaches which offer efficiencies and recommended guidance without forced approaches.
- Inability of many ministries to secure debt financing for EPCs despite the backing of a contractual guarantee. In addition, there is a complete unwillingness, with a fixed and rigid view that the incremental cost of private financing outweighs the cost of public funding, even though the cost has proven to be negligible in comparison to the opportunity cost of delay, the administrative cost of securing public debt and the inflexible terms under which public debt is offered to public sector clients.

b. Issues on Operational EPC Projects

- The outcomes on some operational EPCs differed from contractually agreed levels. This has often been because of changes in use of facilities compared to those envisaged by the client at procurement e.g., savings, or re precisely avoided costs did to materialize as expected because of factors such as extended or changed use of a building. These issues resulted in a lack of confidence by public sector stakeholders as to the effectiveness of performance guarantees and the true benefits of EPCs.
- The ability to measure savings commitments transparently, accurately, and simply has been an issue that has caused concerns for public sector clients on some operational EPCs.
- Some public sector clients have expressed concerns over the timeliness of reporting of savings particularly prior to the recent advent of real-time digitized measurement technology.
- Some EPCs have experienced equipment issues related to solar photovoltaic.
- Implementation challenges such as encountering unforeseen contamination caused delays to delivery and impacted clarity of savings reporting on operational EPCs, resulting in distrust of the EPC model. Many of the implementation challenges that have been encountered have often arisen because of a misunderstanding of the respective roles, responsibilities, and liabilities of each party to an EPC.

c. Complexity of EPCs

- EPCs are perceived by the industry as being straightforward whereas public sector clients have experienced their procurement and operation to be relatively complex.
- Because an EPC project is based on a complex risk allocation, it is important that these risks are not only clearly understood but also managed, to ensure that EPCs will perform at an optimal level and achieve expected client outcomes.
- No easy way to connect utility usage and carbon cost reductions relative to the operating costs of the equipment.
- Complexities around finance and accounting relative to traditional contracts.

d. Lack of Awareness of Public Sector Clients with EPCs

- The inexperience of public sector clients to procure EPCs, exacerbated by the fact that these clients are disallowed by government departments to speak to industry participants to advance their knowledge and understanding thereby perpetuating myths and concerns.
- Stakeholders are not always well versed or informed about the scope of the contract being procured and have greater need to understand risks and outcomes.
- There is a misconception that facilities owners will lose control of their facilities, operations, technical specifications, and project scope.
- Some awarded projects have languished for years before having sufficient client baseline information and needs' statements for ESCOs to move them successfully into implementation.
- Lack of capacity of public sector teams to procure and deliver their ongoing roles and responsibilities under EPC contracts.

- Many public sector teams have a lack of time to gain a complete understanding of EPCs and are unwilling to assume risks. Strong Client leadership is critical to the success of EPCs.
- Earlier EPCs were adopted to address short term budgetary issues, reduce operating costs, and undertake reactive repairs, which meant that they did not deliver innovation and were not outcome based, and therefore were not considered to offer value for money.
- Many public sector client teams do not understand the EPC model, procurement, development, and delivery processes which cause heightened concerns and self-imposed barriers to adopt an EPC model.
- Clients are used to procuring separate elements and often do not have a detailed understanding of the related risk allocation between stakeholders on an EPC, including shared risks and often do not understand the need for collaboration nor the value in an integrated approach.
- Public sector clients perceive 'in-house upgrades to be more straightforward and to offer better value for money than EPCs. This does not consider a holistic or long-term view and life-cycling of their buildings and the major components within, as delivered under the benefits of EPCs.
- Some clients misunderstand the generated value of the EPC, specifically that this is a longer-term investment and not necessarily a short term "gain" where EPC savings are used to repay the investments in equipment (i.e., do not necessarily require capital from the client), and do not typically create 1:1 savings to the end client.
- Client staff have expressed concerns that the complex nature of EPCs coupled with their lack of experience with the model will reflect on them personally to the extent that outcomes are not as expected or required. They are not incentivized or required to consider the adoption of EPCs.
- Decision making around an EPC is not conducted at the business leader level, instead typically being led at building management level, and is therefore not considered as integral to outcome-based decisions around client business drivers.

e. Ineffective Procurement Processes & Project Design

- Rigid procurements that prioritize lowest price over best long-term partnership have resulted in frustration for stakeholders during delivery and operations, causing the perception that EPCs are ineffective.
- Procurement processes that are not sufficiently flexible to allow access to end users to collaboratively scope outcomes can result in client needs not being met.
- Despite not being contractually bound by the EPC Agreement and therefore not accountable or responsible for results, procurement agencies mandate the use of their resources, promote the perception that EPCs are like PPPs and often thwart the real benefits that can be achieved through true partnering and stakeholder engagement.

- Public sector entities typically do not sole source even if a product is truly innovative and there is only one supplier. One of Canada's stated goals is innovation, and some companies offer products that have been verified as truly innovative by a third party such as products qualified under the Build in Canada Innovation Program (BCIP) where technical experts at National Research Council (NRC) have verified their product as superior to others in the marketplace. Procurement processes do not enable or support an outcome for which there is only one supplier and thereby limit innovation.
- More recently, ESCOs are experiencing procurement processes that do not align contract objectives and outcomes with the 'evaluation criteria'.
- Evaluation approaches which devalue the benefits of EPCs e.g., for PSPC to achieve their 40% GHG reduction, the standard cost / savings / payback model is not properly matched with their goal.

f. Perceived Cost and Value for Money of EPCs

- Perception that the EPC's are overly expensive when compared to other delivery models, coupled with the belief that savings are manipulated in their prediction and validation, support the belief by public sector clients that they can undertake required upgrades and replacements in-house cheaper. This is not a sustainable model to achieve energy efficiency given budgetary and resource constraints to procure and implement volumes of independent elements. Additionally, the significant value of unfunded deferred maintenance does not support the notion that work will be undertaken even if it is thought it can be undertaken.
- Some clients perceive that they are paying a premium to an ESCO to receive a savings guarantee which they believe to be deliberately underestimated or ineffective or is added as a $ percentage to the project's bottom line.
- A perception that ESCOs do not assume sufficient risk and therefore that EPCs do not offer value for money, perpetuating the continued distrust of private sector solutions in public infrastructure across Canada. In addition, issues such as labor grievances and a preference for taxpayer supported deficit spending, have negatively impacted the adoption of EPCs.
- Clients often perceive those piecemeal approaches provide better value for money than adopting an EPC that consolidates risk. Experience has suggested that this is not accurate e.g., the University of Alberta undertook renewals in-house using a revolving fund. Results showed that they significantly lag higher education institutions who have undertaken EPC programs on their campuses. Often undertaking the work in-house is adopted to protect the use of client staff, at a significantly higher cost than working together to deliver an EPC.

g. Other

- Since COVID-19 it has been more difficult for Facilities Managers and government Policy Advisors to move energy efficiency / carbon neutrality agenda particularly in the K-12 and Advanced Education sector.
- Governance issues, sectoral differences, provincial differences, and misalignment in government.
- Lack of public sector capital or financing coupled with a client's inability to raise debt financing because of the focus on balance sheet treatment.
- Private sector capital searching to invest in Environmental – Social – Corporate Governance (ESG) investing, that faces demands of clients, particularly Federally, that capital must be put up at risk. This makes the field of Canadian investors very thin, and cautious.

- Lack of industry collaboration and sharing enabling a stronger and more unified voice, thereby mitigating the misunderstanding and mistrust perpetuated in Client teams.
- Various provinces consider their investment in EPCs to be in companies outside of their province and sometimes outside of Canada, typically because local players are often too small to undertake EPCs and therefore preference is to investment in local players through traditional models. Although it is noted that ESCOs employ some local businesses to carry out the contract work.

In summary, over the years, the Canadian EPC market has been characterized by industry players and clients that are not well aligned, which has led to the assessment that EPCs have occasionally failed, especially exacerbated where an expectation gap that led to results that were not understood and not as expected. In addition, EPCs became hard to execute as ESCOs and Clients did not understand their respective roles, project risks were not aligned to success criteria and procurement processes prevented collaboration and selected lowest prices as an interpretation of best value despite being entirely different concepts. Different procurement agencies and jurisdictions dictated processes ignoring years of experience and expertise combined with some public sector clients that have a lack of understanding and education about the EPC model resulted in an extremely difficult landscape for the effective implementation of the EPC model and limited active market participation of experienced ESCOs.

"There are risks and costs to action. But they are far less than the long-range risks of comfortable inaction."

John F. Kennedy

A LOOK TO THE FUTURE

6 FUTURE OF EPCs IN CANADA

6.1 Context for the EPC Industry's View of the Future of EPCs in Canada

Climate change is a global issue. The problem is complex and requires cross stakeholder engagement and agility in adopting solutions before our time runs out. EPCs are one such solution but have yet to reach their full potential as a key solution contributing to mitigating the effects of climate change.

EPCs have changed since they were first implemented, and we have learned many lessons from Canadian and global projects to leverage greater efficiencies, clearer and more certain risk allocation, and greater successes. Therefore, questions about the relevancy or appropriateness of EPCs as a viable model are no longer relevant, especially in the face of an impending crisis and unlike COVID-19, one for which we had ample early warning.

In August 2020, Adelaida Sarukhan, Scientific Writer, ISGlobal Barcelona Institute for Global Health wrote: "Our current model of economic growth has led to increasing deforestation and loss of biodiversity, accelerated urbanization, intensive animal farming, global travel - all factors known to increase the risk of zoonotic viruses jumping to human hosts and spreading with alarming ease. Scientists and public health experts around the world have been warning us for many years that a pandemic caused by an unknown virus was not a matter of "if" but of "when", and that we needed to prepare. But, as German virologist Christian Dorsten pointed out, "there is no glory in prevention", and pandemic preparedness has not received the necessary resources or attention. Hopefully, this will change…".

We have been warned that the climate crisis and its alarming effects will have more devastating effects than COVID-19 and much like COVID-19, will affect all of us. Our time to act is now especially given all the benefits of EPCs to address some of the many losses and pressures caused by COVID-19.

"The pessimist complains about the wind, the optimist expects it to change, the realist adjusts the sails."

William Arthur Ward

How will you contribute to the future of EPC's in Canada?

6.2 The EPC Industry's View of the Future of EPC's in Canada

The contributors to this Industry Paper offered diverse perspectives about the future of Canadian EPCs, some seemingly unhopeful having invested significant resources, time, and money to enable to progress this solution, while others were more hopeful given the significant benefits that EPCs offer especially at a time when ignoring viable financially sound models could be argued to be negligent.

a. Stakeholders that felt greater government support was required to advance EPCs in Canada

- Despite setting ambitious energy objectives, Canada has historically not achieved various global energy targets and it is anticipated that the Paris climate accord will not be met. One of the cited reasons is the unwillingness of government to consider all possible models as contributors to meeting emissions reductions, the lengthy time taken to make decisions or enabling progress.
- Governments have chosen to evidence negative past experiences with minimal and in some cases no regard to the significant number of positive outcomes to prevent EPCs from progressing. In certain cases, some ministries in Ontario have prevented public sector clients from speaking to the industry about EPCs and have stopped projects from being tested. It is therefore unlikely that EPCs will be adopted in a meaningful manner in the future without a fundamental commitment to seek accurate data on projects performed.
- Governments prefer a tax and deficit spending platform with emphasis on "shovel ready" and renewable energy projects. In addition, "green" stimulus, and energy efficiency funding, will only serve to further marginalize the EPC model as the market elects to spend money within these programs. These highly prescriptive funding programs will render the customized nature of EPCs less attractive despite remaining relevant.
- The unwillingness of governments to enable pilot projects that are ready to procure, for example, in Ontario, several school boards have undertaken preparatory work to embark on EPC procurements.
- For EPCs to be adopted, government endorsement is required. This could, for example, be achieved by a public statement that the public sector must consider, on a best value basis, the adoption of EPCs prior to requesting additional / increased government funding. This is unlikely to transpire as issues associated with the accounting treatment of EPCs, will first need to be addressed.
- It is unlikely that EPCs will be more widely adopted in Canada unless and until a templated structure and legal framework is developed to engage the public sector. While templates will help to reduce transaction costs and close a knowledge gap, a balance is required between adopting a standardized approach and enabling stakeholder engagement that enables meaningful collaboration.
- Given the ongoing and protracted lack of government support for EPCs coupled with borrowing restrictions and public sector stakeholders' inability to engage with industry stakeholders, it is unlikely that a reliable long-term sustainable pipeline of EPCs will be developed in Canada.
- Lack of confidence that EPCs will be supported and enabled by government largely because of their accounting treatment. This treatment is influenced by a lack of knowledge about the true mechanics of an EPC and comparisons with PPPs coupled with a doubt that the investment will render returns. This issue is acute in markets with high volatility in utility costs and hard to predict long term costs and savings against fixed equipment costs.

- The industry is disillusioned about the future of EPCs in Canada but feels that this model can not be ignored as contributing to achievement of energy efficiency targets although recommends that the

focus be on the achievement of multiple outcomes rather than limited to renewals or cost savings measures.

- The disconnect between public sector capital and operating budgets has been a significant limiting factor for the implementation of EPCs. As this is unlikely to change, it is considered that it will be another reason to avoid implementing EPCs.

b. Stakeholders that felt that procuring agencies are impeding / delaying EPCs in Canada

- Some of the delivery models that procuring agencies compare and consider for the delivery of EPCs include PPPs, construction financing, Design Build Contracts (CCDC)-14). These models are plagued with inherent self-interest, whereas current delivery models for EPCs are based on concurrence on solution and savings, with mutually beneficial outcomes. Because of these common interests, achievements such as over performance, lead to shorter timeframes that offer significant benefits to the public sector client.
- It is urgent that we focus on climate change and energy saved and energy made will be needed to generate capital for investment in deep retrofits and renewables. The significant economic and climate issues across Canada will necessitate diverse solutions to address a sizeable issue suggesting that EPCs should increase in Canada.

> **"Never before has it been so clear that we need long term, inclusive, clean transitions to tackle the climate crisis and achieve sustainable development. We must turn the recovery from the pandemic into a real opportunity to build a better future."**
>
> **António Guterres, Secretary-General of the United Nations**

- Considering the Federal government's focus on climate change and required GHG reduction targets, combined with aging infrastructure, sizeable, deferred maintenance requirements, budget constraints and employment opportunities offered by these projects, EPCs should increase in adoption. However, lack of accountability for assessing all possible solutions that contribute to addressing challenges and requirements, do not suggest that EPCs will be widely adopted across Canada to achieve this.
- The convergence of successful industry advocacy at a provincial level, combined with a national low carbon economy mindset, supported by funding pools committed to ESG investing, are factors that would suggest that EPCs have a positive future in Canada although history has demonstrated that it could take years to develop.

- The opportunity to adopt a portfolio-based approach to asset renewal, leveraging savings on energy efficiency elements to fund elements that attract little or no savings and to procure outcomes over outputs, within a context of sizeable, deferred maintenance and renewal obligations, urgency of effecting needed works against budgetary and resource pressures, should mean that all viable solutions are adopted to effect change. However, history has demonstrated that despite mounting pressures, governments have responded by establishing 'green energy' programs with rigid requirements around project size and will disallow projects that are ready to be procured from advancing under an EPC model.

c. Stakeholders that felt that EPCs are Set to Increase in Canada

- As Canada is one of the world's most emissions intensive economies and buildings are one of the main sources of emissions, to meet the net zero emissions targets, all solutions that contribute to meeting these targets need to be urgently assessed and implemented concurrently and therefore EPC programs must increase.
- Public sector challenges such as the size of backlog maintenance in many of their buildings, combined with an inability to raise funding and increasing budgetary pressures, will increase the urgency to consider varied possible solutions and create a greater EPC pipeline.

In summary, the many contributors who offered their resources, expertise, experiences and introduced their clients to support the development of this Industry Paper and the success of EPCs in Canada is testament to an industry hopeful about the future of EPCs in Canada and hopeful about the coming together of humanity to avert the next crisis.

6.3 A Global Perspective

McKinsey & Company created a Global Infrastructure Initiative involving several senior leaders in infrastructure and capita projects. Their sixth "*Global Infrastructure Initiative Summit*" refers to various key themes that support the finding of this Industry Paper.

(See: https://www.mckinsey.com/business-functions/sustainability/our-insights/sustainability-blog/its-time-to-scale-up-natural-climate-solutions-heres-how)

"In a world of change, the learners shall inherit the earth, while the learned shall find themselves perfectly suited for a world that no longer exists."

Eric Hoffer

Part B

“Climate Change has not stopped for COVID-19.”

United Nations

INVESTING IN SUCCESS

7 STRUCTURING A SUCCESSFUL CANADIAN EPC

7.1 EPC Definition

In order to provide a common foundation for the comments that follow, for the purposes of this Industry Paper, an EPC is defined as a contractual arrangement between a client stakeholder (for purposes of this Industry Paper we have focused on the public sector) and a private sector entity (that may or may not be an ESCO), where the private sector entity delivers energy efficiency retrofits and / or new measures (in the form of capital works and / or equipment) and related services and guarantees, resulting in energy savings and / or cost reductions, and transformational outcomes. The energy savings and / or cost reductions will create a revenue stream for the public sector to pay for the energy efficiency measures, related services and transformational outcomes.

This Industry Paper does not negate the potential of EPCs to successfully fall outside of the above definition, rather, such arrangements are not covered as part of the scope of this document.

Therefore, for the purposes of this Industry Paper, an EPC must include the following attributes:

- A public sector client that is procuring the EPC (EPC Client).
- A private sector partner that is delivering the EPC (ESCO).
- Capital investment undertaken for the provision of energy efficiency measures, in some cases deferred maintenance which is not energy efficient in nature and transformational outcomes covering construction works and / or equipment (EPC Assets).
- Services provided related to the delivery of energy efficiency and transformational outcomes (EPC Services).
- Performance based payments made by the EPC Client to the ESCO that are based on the delivery of the energy savings guaranteed by the ESCO and EPC Services (EPC Service Payments).

In summary, EPCs develop, and install energy measures that deliver future energy savings guaranteed by an ESCO, to repay the financing of energy measures without the need for upfront capital from the EPC Client.

7.2 Optimal EPC Assets

The most optimal EPC Assets are those that improve the energy efficiency of existing buildings by reducing energy consumption, delivering energy savings, and achieving transformational outcomes and innovation.

Examples include, but are not limited to:

- Combined heat and power (CHP) systems.
- Heating, ventilation, and air conditioning (HVAC) systems.
- Lighting systems.
- Motors.
- Building Management Systems (BMS).
- Commissioning / Recommissioning, and Continuous Commissioning
- Boilers and chillers.
- Windows.
- Hot water systems.
- Plumbing.
- Mechanical & Electrical (M&E) equipment.
- Load shifting. (Thermal Storage)
- Energy storage systems. (Batteries, Compressed Air)
- Smart Grids.
- Fuel conversion systems.
- Steam to HW conversions.
- Energy Centres.
- Co-Generation facilities.
- Conveyance systems.
- Water meters.
- Laundry.
- Kitchen systems.
- Any other elements that deliver real carbon emissions and energy savings.

7.3 Less Optimal EPC Assets

Some EPC contracts include deferred maintenance upgrades that do not deliver energy efficiency measures or that render little or no energy savings resulting in an extended financing payback period and / or requiring subsidy by the EPC Client. Examples include:

- Basic general construction (examples include building superstructure (except central utility buildings), roads, etc.).
- Building envelope upgrades like windows and doors, which do not have energy related returns on investment and / or where energy savings cannot be objectively measured and any other elements that do not have inherent energy or operational savings are less viable for EPC because they require a greater mix of elements that deliver savings or to be subsidized. A contrasting view was offered that to the extent that carbon is appropriately priced, these elements can be included within an EPC and achieve an acceptable payback period.
- Improvements that do not contribute to decarbonization for example M&E replacement that is solely motivated by renewal requirements.
- Renewables technically do not save energy but do help avoid demand charges and carbon taxes. Because renewables are not always viable, they need to be considered on a case-by-case basis. Notably, calculations are based on assumptions of system performance such as weather, etc. and therefore can be less accurate than a typical facility baseline.
- Elements where the mix does not meet the EPC Client's payback expectations are less viable.

7.4 Definition of EPC Services

The term EPC Services refers to energy efficiency measures, transformational outcomes and innovation included in the scope of an EPC that do not involve capital investment, for example:

- Planning.
- M&V.
- Project management.
- Project finance.
- Optimization plans.
- Repair and maintenance of equipment to the extent included in the EPC contract or through the ESCO providing training to the EPC Client's staff.

7.5 Viable EPC Sectors

The contributors to this Industry Paper offered the following considerations about viable EPC sectors:

Healthcare

- Involve complex facilities with high energy use intensity therefore yielding the best leverage impact.
- Assets typically underfunded and due to their critical nature, need reliable and well-maintained systems and innovative solutions.
- Require immediate and quickly shifting COVID-19 and anti-pathogen improvements to facilities.

Higher Education

- Typically, 1960 -1980 facilities with aging building systems and significant deferred maintenance liabilities.
- Large campus environments with both complex and simple facilities, allowing for larger scale renewable initiatives with sizeable projects.
- Complex building systems require innovative solutions to achieve most effective upgrades.
- High energy demands and strong sustainability mandates.
    - Open to testing emerging technologies and the institution can be used as a “living lab” for research.

K-12 Education

- Although facilities tend to have relatively lower energy intensity, typically many facilities, and a high need for asset renewal and limited in-house resources.
- Facilities involve relatively simple technical solutions.
- Require immediate and ongoing COVID-19 and anti-pathogen improvements to facilities.

Municipal (including administrative buildings and libraries)

- Many municipal governments are smaller in size but typically have capital budget restraints, large, deferred maintenance liabilities, IAQ concerns in some buildings exacerbated by COVID-19 pandemic coupled with GHG reduction targets and an obligation for fiscal responsibility.
- Buildings tend to have relatively lower energy intensities however, bundling of buildings will deliver larger savings.

Industrial buildings

- These customers typically manage their businesses on a 2 - 5-year cycle due to their fluid business plans that are based on overarching global production flexibility objectives (i.e., the ability to shut down any operation within 2-5 years depending on commodity risks). Measurements tend to be challenging and high ROIs are demanded. Therefore, the viability for EPCs is limited to elements such as process plants.
- Capital required for the EPC will be evaluated against the internal rate of return (IRR) of other competing projects.

Housing and Multi-apartment buildings (also referred to as MURBs)

- Some previous EPC successes specifically when housing is aggregated and has a single paying EPC Client such as a municipality.
- Diverse views as to viability of EPCs for public housing with some participants considering EPCs less viable because of less complexity of their operating systems enabling less innovation.
- Other participants that considered EPCs because of heightened sensibilities required to deal with tenants within occupied facilities, and the substantial impact of ‘good design’ on modest building stock.
- Private multi-apartment buildings considered difficult to implement EPCs typically because private sector requires shorter payback periods and utility bills often paid by tenants.
- Single family residences were considered not to be viable for EPCs.

Other

- Long term care facilities require immediate COVID-19 and anti-pathogen improvements to facilities.
- Corrections have high energy use intensity but balanced by higher delivery costs due to security requirements.
- Ports, waste, and wastewater treatment plants are considered viable.
- Stadiums, arenas, recreational facilities are considered viable.
- Airports will benefit from EPCs but need to consider implications of COVID-19 on core business models.

7.6 Capital Investment Required for Viable EPCs

EPCs undertaken in Canada and globally have varied significantly in capital size. The participants to this Industry Report offered differing perspectives about the minimum and optimal sizes for an EPC, which are summarized below.

Minimum Capital Size	**$300,000 to $5 million.**
Optimal Capital Size	**$5 million to $20 million.**
Large Capital Size	**More than $20 million.**

- The scope, requirements and objectives of the EPC Client coupled with their desired payback period of the capital investment, will be considerations that impact the capital size of an EPC.
- The availability and capacity of EPC Client resources and their desired involvement in the process will influence the size of the EPC. For example, a thinly staffed University can run a campus-wide program if they manage only to standards but would need to segment the project into phases if they want to have input on product selection and design reviews.
- The minimum capital size of an EPC needs to allow for a sufficient energy base of savings to recover financing costs, M&V costs, front end, and fixed costs such as legal, operational, administrative expenses, repay the capital investment and deliver the EPC Client's outcomes and requirements.
- When third party financing is deemed appropriate or necessary by the EPC Client, the origination costs and administration of the financing will dictate a minimum project size.
- Some funders have minimum size requirements and therefore if third party financing is required by the EPC Client, smaller projects will attract a more limited number of interested funders.
- M&V can be costly and therefore, for small projects, it will either need to be limited to a shorter timeframe or a more simplified approach needs to be adopted.
- Project solutions and procurement processes need to be sufficiently scalable and flexible to accommodate projects of varying sizes. This is especially important as opportunities are being overlooked and prevented for small projects forcing the bundling of EPC Clients.
- The optimal size of an EPC needs to have regard to the level of targeted GHG reduction, deferred maintenance savings and the EPC Client's required payback period.
- An important factor in determining the optimal size of an EPC is the availability of local labour. Larger projects may require labour from outside the area that could divert investment from the locality towards other areas or territories, which some contributors indicated has negatively impacted the appetite for adopting EPCs.
- EPCs are most effective when designed to deliver outcomes and therefore, the optimal size of investment will be tied to achieving these outcomes while delivering an adequate ROI for the ESCO.
- A diverse and robust set of Energy Savings Measures (ESMs) that will result in impactful results (including energy costs and GHG reductions) and value-add infrastructure improvements with a longer payback period, need to be considered in determining the optimal size for an EPC.
- Innovative, capital-intensive technologies are more viable in projects that are larger in size.

Some of the contributors to this Industry Paper commented that EPCs of $20 million to $30 million in size are considered large and that although EPCs as large as $350 million have been delivered globally, these projects have various challenges including, but not limited to:

- Larger projects typically have longer or phased construction periods and longer payback periods, which are more exposed to changes in the use of facilities and to the EPC Client's team and management, which can pose challenges for the eventual perceived success of the EPC.
- Experience in both Canada and other global jurisdictions has demonstrated that the bundling of projects to achieve larger capital investments, coupled with the approach of many Canadian procurement agencies prioritizing the selection of lowest price over stakeholder engagement and true partnering, exacerbates the experience for individual EPC Clients that their needs and objectives are not met. Single EPC Client projects allow for a balance to be achieved between creating a dedicated stakeholder engagement process, delivering EPC Client specific requirements and outcomes, and attaining an EPC Client specified payback term.
- Bundling can be effective for some EPC Clients and projects however smaller projects should not be ignored if EPC Clients do not want to engage in bundling. Rather, smaller projects will benefit from more simplified procurement and M&V processes.

7.7 EPC Term

Minimum Construction Term	• 6 months to 4 years
Optimal Construction Term	• 2 years to maximize impact with two construction seasons)
Minimum EPC Term	• Minimum 5 years to 10 years
Optimal EPC Term	• 7 years to 20 years

The contributors to this Industry Paper highlighted the following considerations regarding the construction period and EPC contract term:

- Longer EPC contract terms of 20 years to 30 years enable deeper retrofits to be effected, and greater efficiencies and GHG reductions to be achieved. According to certain government agencies and ESCO's, these longer terms, targeting deep retrofits are the only way to achieve true net zero refurbishments.
- Some EPC Clients require shorter EPC contract terms to allow the option of ending the M&V process within the first few years. In these circumstances, if the intent is to achieve an aggressive energy savings program, a minimum of 3 years post-construction M&V is recommended. In the event of a shortfall, this approach enables an ESCO time and incentive to mitigate and restore the savings prior to the end of the EPC term.
- An EPC contract term of 10 years allows for a minimal set of ESMs as compared to 20 years, which allows for a more comprehensive and meaningful project with more diverse and robust set of ESMs.

- Often the term of an EPC contract is influenced by the length of an EPC Client's required payback period. It is important that consideration also be given to the importance of the facilities and the expected period of EPC Client need for the assets, so that for critical assets that are likely to have long term use, consideration must be given to the asset renewal and life cycling plans.
- Some EPC Clients expressed that EPC payback terms should be extended where needed to enable deferred maintenance obligations to be addressed in addition to energy efficiency elements being delivered.

7.8 Optimal M&V Standards

There are conflicting views about the value offered by the M&V process in trying to validate the savings, with some participants considering the cost to be high and therefore reducing the overall value of the EPC. In contrast, there is a perception by some EPC Clients that savings shortfalls do not occur and that ESCOs receive a premium for M&V but do not accept any risk and by other EPC Clients that savings data can be manipulated to show that savings materialized when they did not. These perceptions and risks can be mitigated by M&V through the application of recognized M&V standards such as the International Performance Measurement & Verification Protocol (IPMVP), which provides well defined international standards for measurements, adjustments, and a supportable measurement methodology.

It is important for EPC Clients to consider the cost of M&V against the required certainty of savings and the opportunity for redirecting any saved M&V costs to support other needs and objectives.

When determining the optimal M&V standards to be applied to an EPC, the following considerations are pertinent:

- For large EPC projects the IPMVP is considered to be the most effective and appropriate standard.
- IPMVP includes various options, and experience demonstrates that it can be applied for different usage trends for different utilities, depending on:
    - Usage per meter (100,000 ekWh or more).
    - % of utility expected to be saved - per facility (greater than 10%).
    - Likelihood of dynamic change to a facility, which may require several baseline adjustments.
    - Failing the clarity of above, a retrofit isolation option, and demonstration of savings also provides clarity.
    - Often several IPMVP Options are combined depending on the facility and level of transparency required.
- For smaller projects, experience suggests that the cost associated with the adoption of the full IPMVP standard will outweigh the benefits and therefore, Stipulated Savings is considered the most appropriate process based upon a shorter baseline M&V period.

Overall, participants agreed that critical to the success of the EPC is a transparent M&V process.

7.9 Duration of M&V Period

Determining the duration for M&V is widely debated both in Canada and in many global jurisdictions. The views offered by the participants to this Industry Report reflect these differing perspectives. Although the responses may appear to be repetitive or contradictory, this section was intentionally developed in this manner, to preserve the integrity of contributions received.

- It is important to understand the objective for the M&V to determine its optimal length.
- At a minimum, M&V should allow for one full calendar year to enable measurement throughout all seasonal changes and to enable testing of heating and cooling performance under these different conditions.
- M&V should be at least four seasons to allow actual savings to be established before stipulated savings can be set. However, for critical equipment, M&V should be a minimum of three years.
- Two to five years (the Savings Fulfillment Period or SFP). If M&V is longer than five years, its cost extends the payback term often for little added value.
- At least three to five years is recommended for M&V as ESCOs need to understand the reasons for achieving or not achieving results, ensuring that all systems are functioning correctly effectively, monitoring energy savings, ensuring that operations & maintenance (O&M) procedures are well understood and, if required, updating, or improving O&M practices after the completion of construction.
- Three years can be considered sufficient if limited to guarantee of the retrofits. If the EPC Client has continuous optimization objectives, long-term continuation of M&V by the ESCO, helps improve performance and identify future phases as technology and energy cost profiles evolve.
- Five to seven years provides sufficient time to prove the performance of systems, accumulate excess savings and transition the contract. This time frame is not overly costly as to handicap cash flows and not too short to be meaningless.
- M&V for life of the project is recommended where an ESCO maintains responsibility for contractual obligations as this enables collaboration and provides the EPC Client with the ability to stay on top of the building management.
- Some EPC Clients have ended M&V after savings have proven sustainable, selecting to save the ongoing costs in favour of additional renewals or costs savings. If M&V is shortened, the EPC Client will need ongoing monitoring and measurement to enable swift course correction to be undertaken.
- If contracted savings are not achieved, M&V should continue and ESCO contractually required to reconcile annually and recover savings for length of contract term.

7.10 Ownership of EPC Assets

The following table provides a summary of the ownership of EPC Assets at different milestones of the EPC term:

Completion of construction and final acceptance	Ownership of the EPC Assets transfers from the ESCO to the building owner, whether self or third party financed. There is limited chattel value to a lender/funder against product installed in a building and connected to other building systems. The funder relies on the receivable (i.e., energy savings payment), being paid by the EPC Client and guaranteed by the ESCO.
During EPC contract term	Typically, ownership of installed assets remains with the building owner.
After end of EPC term	Ownership of the EPC Assets remains with the building owner and full ongoing responsibility for the performance of the asset transfers to the building owner.
Early Termination	Ownership of the EPC Assets remains with the building owner. As previously stated, there is limited chattel value to a lender/funder against product installed in a building and connected to other building systems. The building owner will retire the remaining unamortized cost for the asset(s) through repayment to the funder.

Legal ownership and accounting ownership are often confused and used synonymously. It is important to note that legal ownership and accounting treatment may not always render the same conclusion as to ownership.

7.11 Key EPC Risks

The following table provides commentary on selected EPC risks. It does not purport to be an all-inclusive analysis of every possible EPC risk especially as risks are project and EPC Client specific.

As a rule of thumb, any variable or assumption that feeds the pro-forma or the savings guarantee, and is not the responsibility of the ESCO, is then the responsibility of the EPC Client. These variables and assumptions need to be viewed as risks, ranked by probability / severity, and then accompanied by a mitigation plan that is signed off by the EPC Client. These may include supply side risks (except for renewable energy system performance under a power purchase agreement (PPA)), facility use changes, escalation rates, operational cost savings, etc.

Risk / Reward	Commentary
Clear Definition of Scope and Outcomes Required	The success of an EPC relies on a clearly and transparently defined scope and required outcomes and remains the risk of the EPC Client. Mitigating this risk can be achieved by strong stakeholder engagement that prioritizes collaboration and therefore combines the best skills, expertise, experience, and knowledge of both parties. To achieve this result, an open, efficient but flexible procurement is required and one that does not select price over partnering.
Specification & Design of Energy Efficiency Measures	Energy efficiency measures and required outcomes can be designed in advance of a procurement by the EPC Client, or collaboratively between EPC stakeholders and some specification and / or design work that is carried out after financial close and which the EPC Client reviews and provides comments. Because the ESCO guarantees the EPC savings / cost reductions and is responsible for achieving the EPC Client's requirements and outcomes (e.g., CO2 avoidance or other metrics), they should bear the risks associated with specifying and designing energy efficiency measures and solution required. **Caution**: If the review and comments provided by the EPC Client on the specification and / or design of energy efficiency measures, result in the EPC Client assuming any of the risks summarized below, the EPC Client will in essence assume a portion of the risk: Impact the achievement of savings / cost reductions guaranteed by the ESCO, and / or Introduce deficiencies to the construction or installation of EPC Assets, and / or Cause an increase in costs associated with construction of installation of EPC Assets, and / or Introduce delays to construction / installation of EPC Assets.

Risk / Reward	Commentary
	This is not intended to discourage collaboration rather, to create awareness of the extent to which collaboration results in the EPC Client assuming risk for the solution.
Access to Site	The EPC Client must provide access to their site / facilities in a timely manner to allow the ESCO to deliver its obligations under the EPC Agreement. Delays in implementation will affect the timing and performance of the energy improvements, which can directly impact the pro forma. **Caution:** Depending on the nature of EPC Client assets, careful consideration needs to be given to parameters for providing site access. Failure or delays in providing access may impact contractual elements such as timescales, payback period, savings and compensation or relief.
Construction and Installation of EPC Assets	The following principles generally underpin EPC contracts: • The ESCO is responsible for constructing and / or installing the EPC Assets to meet the agreed specification and design. To the extent that changes are required to the specification / design during construction / installation, good practice would require the EPC Client to review and accept these changes. This review and acceptance process should not transfer risk to the EPC Client as the ESCO remains responsible for offering a suitable alternative apparatus capable of achieving the guaranteed energy savings and / or cost reductions and outcomes required. • The ESCO is responsible for completing construction / installation of EPC Assets by a fixed date. • The ESCO is responsible for managing all design, construction and installation interfaces between the EPC Assets and the building / site. • Some EPCs require the ESCO to provide the EPC Client with third party performance guarantees to cover the ESCO's achievement of construction / installation obligations. The above principles are established to ensure that the ESCO retains the responsibility for designing, construction and installing EPC Assets that will meet the required specifications and achieve guaranteed energy savings and / or cost reductions and outcomes. **Caution**: If the review and comments provided by the EPC Client on the specification and / or design of energy efficiency measures, result in the EPC Client assuming any of the risks summarized below, the EPC Client will in essence assume a portion of the risk and / or may require compensation and / or relief in mitigation.

Risk / Reward	Commentary
Construction Completion and Commencement of Payments by the EPC Client	The completion of construction and / or installation triggers the commencement of payments from the EPC Client. Therefore, it is important that completion criteria are: • Objective • Measurable / verifiable • Clearly set out in the EPC Agreement and not subject to later agreement or discretion. • Established at a level that enables the EPC Assets to perform to the specification and standards set out in the EPC Agreement. On the basis that completion criteria meet the above requirements, the risk of their achievement and delays in receiving payments remains with the ESCO. **Caution**: To the extent that completion criteria do not meet the above requirements risk may be transferred back to the EPC Client.
Phased Construction Completion and Commencement of Payments by the EPC Client	EPC Agreements can include phased completion of construction and / or installation of EPC Assets and this approach is favoured by the industry. Because completion triggers payments, it is important that phases meet the following criteria: • The EPC Assets completed under each phase must be capable of performing independently and achieving the specification and standards prescribed in the EPC Agreement. • The payments made by the EPC Client must be proportional to capital costs of EPC Assets delivered as part of the phase. On the basis that completion of phases and payments made by the EPC Client meet the above requirements risks remain with the ESCO. **Caution**: To the extent that completion of phases and payments made by the EPC Client do not meet the above requirements risk may be transferred back to the EPC Client.
Maintenance and Lifecycle Replacement of EPC Assets	The ESCO is responsible for planning, designing, constructing, and / or installing EPC Assets that can meet the energy savings and / or cost reductions that they have guaranteed. To be capable of continuing to achieve the guaranteed savings and / or cost reductions, to provide more holistic business case accountability for the EPC Client, to prevent reoccurrence of backlog maintenance and

Risk / Reward	Commentary
	renewals, and to protect their investment, the EPC Assets would be required to be maintained and potentially refreshed. It is therefore important that the EPC Agreement contain the following: • A requirement for EPC Assets to be maintained and where necessary, replaced. • Maintenance standards that at a minimum, meet manufacturers' warranties, legislation, and all standards necessary to maintain the level of guaranteed savings and / or cost reductions. • A planned and reactive maintenance plan. • A regime for monitoring and reporting performance of maintenance standards. • Sanctions for non-performance against maintenance standards where maintenance obligations are within the scope of the EPC. To the extent that these elements are not included in the scope of the EPC, consideration should be given to the following options for the EPC Client: • The ESCO can train the public sector team to ensure they undertake these functions to a required standard; or • Where union agreements limit the maintenance of equipment to in house personnel, in some cases the ESCO can employ the EPC Client staff under their same terms and conditions and deliver these elements. • Funding is set aside and dedicated to the proper upkeep of the assets to ensure that the ESCO guarantee, and any warranties are maintained. Where the EPC Client retains the responsibility for maintaining the EPC Assets, it is essential that the ESCO clearly communicate the EPC Client's responsibilities and include contract mechanisms to deal with impact of non-performing existing equipment, installed equipment out of warranty and a requirement is placed upon the ESCO to implement measures to ensure that the maintenance obligations in the EPC Agreement (including timing, standards, and other requirements) are being upheld by the EPC Client. To the extent that any maintenance obligations are not being met, the ESCO must be responsible for requiring remediation and / or step-in. **Caution**: Where an EPC does not include the requirements listed above, the condition of the EPC Assets and their capability to meet the guaranteed energy savings and / or cost reductions, will be placed at risk.

Risk / Reward	Commentary
Maintenance Fund or Maintenance Holiday Funds Redeployment	To meet future maintenance and replacement obligations, the EPC could include a requirement for the ESCO to reserve cash for the proper maintenance and lifecycle replacement of parts of or whole EPC Assets where their useful life is less than the contract term. Alternatively, maintenance savings that arise from the reduced maintenance requirements of the installed new equipment under warranty (Maintenance Holiday), can be redeployed or reserved by EPC Clients, to address current backlog or future maintenance obligations. **Caution**: The EPC Client's risk will be dependent on the extent to which the EPC Client shares in the risks and / or rewards of the maintenance fund or the value of maintenance savings available to deal with future maintenance / replacement obligations.
Equipment Performance	Provided that the EPC Client has followed the proper O&M procedures, risks associated with equipment efficiency and performance, the performance of control systems, equipment meeting the design intent, guaranteed savings in units of energy, establishment of baseline are the responsibility of the ESCO.
M&V of Savings / Cost Reductions	Routine testing (at minimum annually), of the achievement of guaranteed savings and / or costs reductions is integral to an EPC. It is important that the EPC Agreement defines how savings will be measured, the frequency of testing, the scope, and the standard of M&V to be adopted, and the consequences for non-achievement over and above financial impact. It is important that EPC Clients understand the way performance will be tested so that the EPC Agreement and the impact of any changes can be managed. **Caution**: To the extent that a M&V regime is not included in an EPC or is not sufficiently routine to ensure that guaranteed savings and / or cost reductions are delivered, the EPC Client would essentially adopt some risk. Additionally, in instances where M&V does not continue for the entire term of the contract, it is advisable for the EPC Client to continue its own monitoring to ensure that savings do not erode over time and that issues are identified and resolved at the earliest opportunity. In essence, it is important for the EPC Client to balance the cost of M&V against the benefit of savings certainty.
Changes to EPC Scope during EPC Term	The scope of an EPC contract can be impacted by the following example changes: • Facility expansion or close. • Contamination abatement.

Risk / Reward	Commentary
	• Environmental risks. • Changes in government. • Changes in usage and occupancy and occupant behaviour such as change in operating hours of a facility. • Weather. • State of the asset and / or components which integrate with the new equipment e.g., old pipes. • Utility commodity rate risk (cash flow changes due to rates will always rise and fall). • User required tasks. • Changes in utility rates. • Fluctuation of energy costs. • EPC Client's understanding of the ESM bundling (or lack thereof). • Changing components or operations in the later stages of development. • Regulatory and tariff risks. • Changes in law. • Operating and maintaining equipment and facilities outside of parameters agreed to as part of the ESMs. • Implementation in live plants and delays in schedule for reasons that are not in the ESCOs control. • Building systems operator's failure to respond to fault and alarm warnings and to follow recommended O&M procedures for equipment. • Any other changes in assumptions affecting baseline energy performance and energy savings calculations. **Caution**: It is critical for the EPC Client to understand the effects and risks associated with changes that will impact the EPC Agreement including understanding the impact on guaranteed savings. Many EPCs have been deemed to have been a failure because of changes that impact the level of guaranteed savings but which the ESCO does not control. Equally, it is important for the EPC Client to understand that changes to operations, use of buildings / facilities, need for buildings / facilities may change over the term of the EPC Agreement especially over longer terms and depending on the nature and scope of the change, the EPC Agreement may need to be modified.

Risk / Reward	Commentary
Savings Guarantee	The perception that savings do not materialize in EPC contracts is generally not supported on operational EPCs where many EPC Clients have indicated that savings were met or exceeded and / or payback periods were shortened. It is however important that EPC Clients understand that their buildings / facilities must be operated in accordance with contractually agreed parameters of the EPC Agreement as deviations may impact savings. It is also important for the EPC Agreement to detail non-energy related savings and describe the manner in which they will be measured. **Caution**: EPC Clients need to be equipped with the information and resources to effectively manage their risks and responsibilities under the EPC Agreement. If an EPC Client does not have the internal resources or expertise to manage these risk factors, an independent consultant with proven expertise in managing complex utility/energy contracts and EPC-ESCO projects should be procured. Reliance on resources from procuring agencies can be extremely costly (whether these are internal staff of the procuring agency or where the procuring agency engages the third party) and generally do not enable the extensive expertise that can be attained from an independent provider that has experience of EPCs.
Compensation	Compensation events typically involve the EPC Client assuming the full risk of the event resulting in relief and / or compensation being provided to the ESCO / funder (as the case may be). Typical compensation events include examples such as: • Delays by the EPC Client such as granting access to the site / building. • Unforeseen site or building conditions e.g., contamination. • An EPC Client breach of the EPC contract. • The EPC Client significantly altering the EPC Assets e.g., selling assets. • A change in law. **Caution**: Compensation events can be complicated in determining their effects but should place make the ESCO whole i.e., no better, no worse than contractually agreed.
Indirect or Consequential Damage	ESCOs will generally not accept unlimited liability and indirect or consequential damage risk. These risks will remain the responsibility of the EPC Client.

Risk / Reward	Commentary
Energy Supply	Supply-side risks such as commodity costs, delivery charges and contract issues have implications for savings calculations and cash flows. It is important that EPC Clients understand these risks so that they can develop a robust management plan.
Energy Prices and Escalation	Energy prices and escalation rates are key risks in EPCs and typically, an EPC Agreement uses the higher of the actual utility rates in effect or a mutually agreed upon floor rate uplifted by an agreed CPI escalator. It is important to understand the impact of underestimating or overestimating future energy prices. Under estimating future energy prices will have the effect of achieving lower savings than projected and overestimating future energy prices will deliver greater savings than expected and both will have an impact on the EPC Client's budgeting.

7.12 Key EPC Success Criteria

Evolution of EPC Stakeholders and EPCs Reimagined

Achieving the net zero emission targets established by the federal government requires collaboration between public and private sectors and the evolution of all stakeholders involved in the energy industry to adopt diverse solutions. Instead of including - EPCs as failures, solving the issues that arose on operational projects and creating a more successful model, a reimagined EPC, will achieve urgent outcomes at minimal or no additional cost to the taxpayer. Consider the following elements to achieve the next level of success for EPCs:

- While EPCs deliver upgrades and have been adopted to deal with deferred maintenance, maximum benefits are derived from EPCs that adopt a holistic, long-term approach to buildings and include outcome based, transformational outcomes such as generating economic activity with increased GDP. Essentially the EPC model is most effective when it progresses beyond a products and services scope.
- To protect the investment in renewed assets there needs to be a change in approach which prioritizes long term sustainability of installed assets over savings; considers issues such as the importance of balancing preventive maintenance and repair risk on critical installed assets and objectives that consider facilities management issues that go beyond savings.
- The EPC industry is overly engineering based and prioritizes technical solutions instead of core business and stakeholder engagement with a focus on key outcomes.
- It is important for EPCs to include BMS and building analytics to enable improved management of the project and the buildings after the end of the EPC term.
- While EPCs deliver upgrades are often adopted to deal with deferred maintenance, maximum benefits are derived from EPCs that adopt a holistic, long-term approach to buildings and include outcome based, transformational outcomes and organizational goals.
- EPCs would benefit from an overall outcome objective of delivering net zero energy consumption.
- To drive the highest value of an EPC, political outcomes (local, provincial, federal) and environmental carbon reduction targets should be included as part of outcome objectives.
- Consideration to be given to the evolution of EPCs to include aggregator projects.
- Evolve objectives and model to be outcome based (e.g., buying cooled air) instead of output based (i.e., air conditioning). This also enables different financing mechanisms to be employed, such as leases.
- Bundling of multiple EPC Clients with smaller capital renewal requirements is commonly perceived to deliver greater efficiencies under the EPC model because of transaction and financing costs and limitations. This presumption has not been the experience of all industry stakeholders, because it does not consider issues such as the fact that each customer has a set of objectives, outcomes and needs for which their EPC is structured – e.g. one school EPC Client wants to leverage the EPC to replace unfunded roof replacements, another wishes to leverage the EPC to infuse enhanced learning technology in its classrooms, while another wants to incorporate a broad maintenance and lifecycle agreement to make infrastructure cost more predictable in the long-term. The diversity of these needs means that bundling, although possible, will require significant collaboration between all EPC Clients in selecting the best partner for their cumulative rather than individual objectives.
- The EPC process needs to be well developed through the lifecycle of design, bid, build and close-out and design development should be an integrated process engaging all stakeholders in their appropriate roles.
- Rigorous baseline of facilities is important to the success of an EPC.

- The EPC industry would benefit from increased awareness about the benefits of EPCs and dispelling myths regarding their implementation, the development of a guidance outline for execution of EPCs so that EPC Clients can see end results in a more tangible manner. Such guidance should not be so rigid as to limit stakeholder engagement, outcome-based requirements, long-term partnering, value generation and should enable EPC Clients to benefit from an ability to engage with an industry that has extensive direct experience and expertise in EPCs as opposed to other procurement processes.
- Depending on EPC Client objectives, blending quick return ESMs with longer payback ESMs has proven to be key to the most effective and successful EPCs.
- It is important to include a formal and thorough transition / handover process in the EPC Agreement.
- Include soft measures within the scope of EPCs such as improved education results or changing behaviours of users.

7.13 Innovation in EPCs

Although the energy sector has evolved significantly and innovation has become a significant area of focus for many governments and businesses, EPCs have generally been slower to adopt innovative technologies and practices. This is largely due to the risk averse culture of many ESCOs, especially given the requirement to guarantee savings. If savings cannot be guaranteed, the technology would need to be funded from another source. Although ESCOs have cutting-edge technologies, rather than using an EPC as a research and development (R&D) tool, to accelerate adoption of new technologies, reliance is mainly placed on tried and tested technologies.

If EPCs do not advance and include innovation, it is likely that they will eventually lag best practices. Stakeholder engagement and collaboration are critical to the success of EPCs and more so when it comes to including innovation where it is critical that the ESCO and the EPC Client understand the benefits of innovation and the impact to savings. Additionally, the EPC Agreement needs to include contract language that protects all parties if innovative technology does not meet expectations.

Consider these possible innovations for inclusion in EPCs:

- Many smart building technologies and Artificial Intelligence (AI) driven maintenance platforms are being developed. In particular, the opportunity to automate M&V and allow for continuous optimization while also reducing costs, has been available for some time. Smart technology has been slow to integrate into EPCs because of its cost and therefore difficult to fund from savings. However, “Smart” equipment and technology ensure that energy and operational savings are optimized and do not drift during the guarantee period of the project.
- Some ESCOs have developed proprietary tools for the development of EPCs that ensure accuracy and transparency to the EPC Client as well as enable fact-based decision making upfront and over the course of the EPC including project objectives around sustainability, resilience and pandemic related measures, overall stakeholder engagement and communications. AI driven continuous building commissioning, microgrids, battery storage, building modeling, BIM 360 (laser modeling), building occupancy optimization and virtual energy audits, developed during the COVID-19 pandemic.
- Use of digital solutions to displace costly IT service contracts by upgrading technologies and providing lower cost technology thereby future proofing in non-energy utilities consumed by the customer.
- Transform the role of the ESCO to become a strategic asset advisor that brings holistic asset expertise to optimize spend and drive transformational outcomes.

- Innovative products such as intelligent fluid flow products that use an embedded algorithm to react in real time to changing demand conditions. These products are qualified under the federal BCIP. In addition, they provide sub-system and plant optimization systems that use cloud-based analytics and proprietary algorithms to proactively notify system operators of possible pending problems, and keep the heating, cooling and domestic water systems running at optimal efficiency, thereby preventing the performance drift often seen when energy performance degrades due to conditions that develop over time such as a clogged filter.
- In addition to innovation in technology, there is a need to Innovate business models to become more outcome and transformation focused.
- Supply-side energy management is often overlooked in EPCs. ESCOs are not incentivized or required to look beyond "ECMs", such commodity energy supply procurement and utility contracts impacting regulated delivery charges. Consideration is generally limited to renewable energy, existing retail supply agreements and cogeneration. However, there are significant opportunities to drive additional savings for very low costs by taking a strategic wholesale approach to energy procurement and supply management. This applies in some markets more than others, most notably Alberta for electricity and most other provinces for natural gas. In addition, a forensic billing and utility contract review can often uncover past errors, omissions or clauses that once resolved can yield significant savings, which in turn helps the performance of the EPC. EPC Clients are likely best placed to consider these opportunities in the context of their EPCs. Contractual issues impacting electrical demand or commodity energy can impact an EPC negatively and prevent it from performing after the contract has been signed.
- Renewable energy and onsite microgrids contribute to minimizing energy wastage. An EPC Client's ability to produce and store energy, and use energy during non-peak times, offers greater opportunities to extend and expand the benefits offered by EPCs.
- Link utility savings to GHG and to deferred renewal replacement so that all three agendas are addressed in an integrated manner.
- Some EPC Clients commented that they would benefit from energy savings as a resource and other revenue generating opportunities that extend beyond the term of the EPC project (e.g., such as some municipalities in Alberta are working to become their own energy companies), to enhance the capability of a building / facility to support core business, offset non-consumption costs and / or deliver other outcomes.
- Energy storage offers excellent potential in some markets such as Ontario and can help to pay for the asset over time and introduce new energy savings.
- Inclusion of energy sold so that EPC Clients can advance their needs on achieving carbon free facilities where the benefit of the revenue reverts to the EPC Client.
- Require a guaranteed reduction in carbon.
- Require increased renewables in scope of EPC.
- Aggregation of measures allows ESCOs to include more aggressive measures that help EPC Clients and industry try new technologies and approaches while simultaneously controlling risk.

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8 EPC FINANCING

8.1 Typical Approaches to Financing in Canada

The following financing arrangements have been adopted to finance EPCs that have been undertaken in Canada:

Self Funded

Some Canadian EPC's have been funded from the EPC Client's own resources for the following reasons:

- the EPC Client did not want to straddle a new government.
- Many EPC Clients wanted to leverage the value of public sector financing which is perceived to be cheaper than private sector financing. The observation was offered that this is too simplistic a view and that consideration should be given to the most efficient use of limited funding.
- Instances of university loans against reserves which was cheaper that private finance and the universities controlled the finance rate.

Sale of Receivable

- In Canada, several EPCs have been funded on a Sale of Receivable approach.
- The Sale of Receivable model is based on a tri-party agreement between the funder, the ESCO and the EPC Client.
- The EPC Client and ESCO agree on a capital cost and on projected future sustainable savings. These guaranteed annual cost savings create a stream of funds for the EPC Client, which are used to pay the ESCO for the efficiency measures and / or related energy services (known as the Receivable).
- The Receivable is assigned / sold by the ESCO to a third-party bank or financial organization (Sale of Receivable). This allows a funder to raise financing against the receivable stream to finance the EPC and the ESCO to meet its repayment obligations.
- The EPC Client's payment is based on a predefined schedule subject to provisions for rights of remedy for performance issues.
- This model has no hidden costs, and all the savings are used to repay the financing.
- The cashflow is neutral where the EPC term is calculated to achieve a net present value (NPV) of zero. To the extent that savings exceed the level guaranteed by the ESCO, the EPC Client retains these and can use these to shorten the payback period. To the extent that any shortfall in savings arises, the ESCO will cover the shortfall.
- For Canadian Federal EPCs, the funder takes a first charge on the receivable against ESCO and no security over chattels whereas for Canadian Provincial EPCs, the funder has a tri-party agreement with Personal Property and Security Act (PPSA) registration against the ESCO. This approach follows Canadian Law of unjust enrichment which places the EPC Client in a no better, no worse position on termination.

Variations on Sale of Receivable

- Variation 1: Sale of Receivable model until the end of the M&V period / period where savings have been proven, thereafter, refinanced with an insurance solution.
- Variation 2: Sale of a Receivable with a 10% savings holdback through Project Reserve.

Other

The following are additional forms of funding that have been used to finance or part finance EPCs in Canada:

- ESCO sourced debt in the form of term loans.
- EPC Client secured grants.
- Insurance backed products.
- Capital leases.

8.2 Other Forms of EPC Financing

Other forms of EPC financing that have been used to a lesser degree include:

- Lease purchase agreements where energy savings are used to offset lease payments.
- Energy as a service where asset ownership is retained by the funder.
- Concession agreements with equity and long-term loan financing.

8.3 Key Considerations for Financing of EPC Projects

The respondents to this Industry Paper offered the following observations in relation to the financing of EPCs:

- Equity – diverse views were offered on the inclusion of equity in EPC deals. Some contributors to this Industry Report consider the investment of equity to increase the cost of financing (where equity is priced at a significant premium to debt financing), which could be redirected to renewals and savings. Additionally, some ESCOs believe that unless the role of equity was understood, the comparison with lower cost of public sector finance would negatively impact the perception of an ESCOs bid.

  Some contributors indicated that the investment of equity could be considered on projects over a certain value to support the risk associated with the performance of the ESCO. This could possible be undertaken through a first call Loan Loss Reserve, perhaps in the amount of 10% of the savings per project undertaken.

- Public sector EPC Clients consider the cost of private sector debt to be significantly higher than that of public sector borrowing and therefore are generally unwilling to consider third party financing.

  In response, the private sector suggested that consideration should be given to whether the use of public sector funding can be provided on a sustainable basis and whether there are other priorities for this funding. The observation was offered that given the backlog deferred maintenance and energy inefficiency in public sector buildings, if the public sector were able to borrow money freely and easily, more energy efficiency projects would have been undertaken by the public sector, whether or not, as EPCs.

  Government financing is considered to be subject to a high degree of bureaucracy, slower to achieve approval, based on rigid contractual obligations and the cost of delays were not factored into the comparative analysis with private sector sourced financing.

- Diverse views were offered on the inclusion of government financing in EPC deals.

  Some respondents felt that the investment could be used to encourage ESCOs to take on more risk or innovation by allowing for some risk-sharing in the assumptions of savings from adopting cutting edge technologies or applications that have great potential but limited history from which to base savings guarantees. Also, the investment could be used to pay down the premium on private sector debt financing. This would have a multiplier effect on the public sector investment by attracting private capital at approximately 8:1 ratio.

  Other contributors suggested that government financing could be used to finance building envelope renewal or renewal of elements that do not render energy savings and use private funding for energy savings elements.

  Views that public sector entities such as the Canadian Infrastructure Bank should invest in EPCs to meet Federal and Provincial governments GHG reductions and net zero emissions, while also supporting the reduction in the enormous, deferred maintenance problem that exists in so many publicly owned facility portfolios. Conversely, some respondents felt that such public sector entities would drive a rigid procurement process and require larger project to recover their associated fees and thereby force agendas such as bundling etc. without regard to the most optimal solution for the EPC Client, the local setting, and the elements of success.

- For EPCs, when feasible, appropriated dollars and O&M savings should be applied to EPCs so that the EPC Client is able to manage the debt service as effectively as possible.
- Accounting treatment of EPCs was acknowledged as a difficult challenge for the Ministry of Finance with some EPC projects having been treated as a liability on the public sector's balance sheet without a corresponding asset.
- The Milestone Securitization process adopted by Public Services and Procurement Canada (PSPC) whereby funds are only released in proportion to the annual savings supported by the work completed in the progress draw, although considered by PSPC as a risk mitigant so that progressive costs are matched with progressive savings, is considered inefficient and costly, given the true risk is limited to ESCO default during construction.
- Views from funders in Canada and globally included:
    - Some funders indicated a preference for fixed rate financing indicating that floating rate was more costly.
    - Some funders indicated a preference to take security that is subordinate to government and take interest over assets all subordinate to government rights.
    - Non-appropriation of project in whole so that more expensive to return assets than to pay out for early termination.
    - Do not include elements such as windows that do not offer savings therefore increase loan term and less attractive to finance. The mix of longer payback periods and shorter payback periods make refinance more challenging.
    - In a third party financed transaction where there is insolvency of the ESCO the EPC Client should be responsible to continue to pay the energy savings owed to the funder, which would place the EPC Client and funder in a no better, no worse position otherwise, the event could be considered "unjust enrichment" by the EPC Client and not complying with Canadian law.

IT'S A MARRIAGE, NOT SPEED DATING

9 STAKEHOLDER ENGAGEMENT - PARTNERING FOR SUCCESS

9.1 General Considerations for Structuring Successful Partnerships Between EPC Clients and EPC Partners

The successes, experiences and lessons learned from past EPCs have demonstrated that the strength of the partnership between the EPC Client and the ESCO is one of the most critical elements to the overall success of an EPC and often an element that is underestimated or deprioritized in favour of a financial / price-based selection.

The following are selected considerations that are important to achieve the best EPC partnership:

- Alignment of interests are integral to maximizing financial, economic, environmental, and transformational changes.
- Develop a communications plan which requires that the EPC and associated objectives, outcomes, risks, and responsibilities be well communicated internally and holistically i.e., technical, sustainability, leadership are all involved.
- Invest time in preparation to develop a strong framework for successful collaboration with clear definition and delineation of roles, responsibilities and risks, shared responsibility, and accountability for achieving established outcomes from the start of the EPC.
- Ensure that all EPC Client stakeholders understand key results and progress throughout the EPC to avoid any issues falling on the EPC Client implementation team alone and creating a safe environment for issues to be discussed early. This requirement includes the need to engage EPC Client decision makers in the development phase of an EPC.
- Support stakeholder engagement process with clear and open communications to limit the expectation gap between both parties and eliminate any misunderstanding of the process and achievable outcomes.
- When changes are made to the scope of an EPC later in the development phase, experience has demonstrated that a higher the risk of failure is experienced. Therefore, the longer it takes to develop a project package, the more potential for changes to occur, such as change out of staff or key decision makers impacting the success of the project.
- The strength of a strong collaborative relationship to develop a strategic partnership delivers benefits that are greater than energy upgrades and proceed well beyond the term of the EPC contract. Some operational EPCs have achieved significant outcomes e.g., the introduction of student learning centres and training and certification programs, energy management services and portfolio management services. It is important to view the EPC as a tool to achieve longer term outcomes rather than having a limited focus on resolving immediate challenges and to understand the benefits of a collaborative approach in achieving required outcomes, delivering mutual success and innovations.
- Develop a strong governance structure for the partnership that supports adaptability and commitment from both the ESCO and the EPC Client to work through challenges as the needs arise, make necessary changes, and remain open to innovations.

- Commitment to continuity of key personnel for both the ESCO and the EPC Client is a key hallmark for success. Early efforts to collaborate on a vision and outcomes for the EPC, followed by alignment of the EPC Client and the ESCO on the agreed vision and outcomes and having regular touchpoints throughout the EPC are key to ensure that alignment is maintained, and outcomes are achieved. Changing team members during the EPC typically cause some challenges and misalignment, which does not serve the EPC Client or the success of the EPC.
- Experience has shown that EPC Client staff dealing with operational issues on EPCs typically attempt to resolve the issue before communicating it more widely and often do not communicate issues to executive stakeholders which generally impacts the overall success of the EPC. It is important that EPC Client staff are empowered through a clear governance structure to discuss risks and issues with their executive as they arise and feel part of developing a resolution.
- Industry collaboration and engagement with potential EPC Clients will enable the sharing of knowledge, industry trends and other important changes. This engagement will support EPC Clients to more readily understand EPCs, to develop realistic budgets, establish clear expectations, provide strong leadership, and develop a flexible procurement process which addresses their needs.
- It is important for both partners to support and commit to transparency and clarity throughout the procurement and implementation process to achieve greater predictability of cost savings, reduced O&M costs, required outcomes such as GHG reductions and overall success of execution.
- The strength of the partnership between the ESCO and the EPC Client is a significant factor in the success of an EPC.

9.2 The Hallmarks of a Good Private Sector Partner / ESCO

Procurements often prioritize price when selecting a partner, which can lead to several challenges. A good private sector partner with whom to form a long-term, successful partnership has the following hallmarks:

- Depth of experience, skills, and capacity to support the development, implementation, and achievement of EPC Client outcomes.
- Solid references that support more than the ability to replace equipment but deliver innovation and outcomes.
- A track record of ingenuity, innovation, meeting performance guarantees and the ability to adapt as required by the EPC Client to achieve their outcomes.
- Individuals on their team with experience, expertise, and a commitment to the continuity of staff.
- A commitment to present opportunities to leverage local labour.
- A team that understands the local setting, EPC Client culture, EPC Client context in addition to relevant sector drivers and EPC Client needs.
- Financial robustness to deliver required performance including performance guarantees.
- Professional practices, methodologies, and processes to be transparent, efficient, and auditable.
- Resiliency to consider, develop and undertake EPC Client driven initiatives where desired, and viable.
- Detailed, accurate, timely and transparent communication tools.

9.3 The Hallmarks of a Good EPC Client

Forming a true partnership that prioritizes stakeholder engagement throughout the process, with open and transparent communication about issues and successes combined with a commitment to prioritizing outcomes is key to the success of EPCs. A strong EPC Client to form a long-term, successful partnership has the following hallmarks:

- A clear understanding and description of their needs and desired outcomes to ensure that the EPC can be structured, designed, and implemented to achieve these requirements.
- Strong executive team support and a strong EPC Client champion with a clear vision and ability to motivate the EPC Client team that may have been mandated to deliver an EPC but may not understand, be driven or have the capacity to, deliver a complex project.
- A Project Sponsor that remains involved throughout the scoping, design, implementation and at a minimum the initial M&V phase.
- An EPC Client team with sufficient capacity, continuity of team members and knowledge about the EPC process, clear requirements and responsibilities, reasonable expectations regarding timeframes and an understanding of the measurement and applications of savings.
- EPC Client and EPC Client team's knowledge of the factors that impact an EPC's performance and lead to perceived non-performance and the ability to manage their impact on energy savings.
- An engaged team who wants the EPC project to be success, has the buy-in of key stakeholders, ability to drive behaviours, the willingness and opportunity to participate in partnering activities as opposed to being limited to responses in a submitted proposal developed with limited insight into facilities operation. Facilities users can offer strong insights that maximize results.
- A clear understanding of their rights and obligations under the EPC to ensure that risks are not transferred back and under-performance by the ESCO is addressed.
- A strong project management framework supported by EPC Client resources with skills and experience.
- Ensuring EPC Client staff are well equipped and positioned so that during negotiation they have knowledge of the following elements of the EPC contract:
    - The way the project works.
    - Approach to pricing.
    - Approach to delivery.
    - Savings start date and the factors that could lead to changes.
    - IPMVP and baseline adjustments.
    - When EPC Client is entitled to receive savings shortfalls and how an ESCO mitigates shortfalls.

9.4 Deterrents to Industry Participation in EPCs

Certain factors will deter experienced market participants with the financial robustness, critical resources, and holistic expertise to successfully deliver EPCs, from participating in this market in Canada. Evidence of this has been experienced with some ESCOs deciding not to bid in certain provinces or federal frameworks. The participants to this Industry Report cited the following factors that would discourage their continued participation in the Canadian EPC market:

- Insufficient deal flow of EPC projects in Canada to create a viable and sustainable pipeline will limit an ESCO's ability to invest in the right levels of staff and operations to develop and execute projects.
- Government's lack of support or communication on the direction of EPCs has resulted in uncertainty for ESCOs that are reluctant to invest significantly in an unknown future.
- Protracted, rigid procurements that become costly, are not founded on principles of success, and do not offer the opportunity for true stakeholder engagement.
- Inexperienced EPC Client team that are not capable of balancing technical with financial requirements.
- Commoditization of EPC's via Superescos could limit measures and creativity and try to convert EPC's into a mass purchase proposition leaving public sector entities receiving generic measures their issues related to deep retrofit, GHG reduction, infrastructure renewal or organizational outcomes There would be no room for ESCOs to establish customized programs for public sector entities that make sense for their needs and stakeholders.
- Overly large number of sample buildings in an RFP are costly for the market to prepare in wide competition with the cost of such procurements ultimately borne by the taxpayer. These procurement measures tend to be price focused with little guarantee for ultimate success i.e., the cost significantly outweighs the benefits that are achieved in practice and loses the key understanding of the value of an EPC to deliver EPC Client focused outcomes.
- Continued lack of consistency in the market due to inconsistent government contracting mechanisms and lack of standardization outside of the FBI program. This has led to contraction of the market and loss of faith in the reality of the pipeline of opportunities (Indefinite Delivery, Indefinite Quality contracts (IDIQs)), as well as the ability to complete the implementation of EPCs.
- Reality has demonstrated that some EPCs get stuck in the development phase where the bidder carries the risk for the invested hours and the EPC Client does not commit to the next phase.
- Procurement processes that lack transparency, involve multiple prospective ESCOs investing significant people and financial resources in the bidding process, shoehorned into PPP comparisons and EPC Clients delaying and/or canceling procurements.

9.5 Encouraging Industry Participation in EPCs

Encouraging experienced market participants with the financial robustness, critical resources, and holistic expertise to successfully deliver EPCs and their associated outcomes, is necessary for a sustainable EPC market in Canada. The participants to this Industry Report cited the following factors as critical to encourage their continued participation:

- Clear government support and endorsement for EPCs. This could be achieved through the development of a policy to encourage the adoption of EPCs at all levels of government and to be adopted as a permanent part of government operations. Importantly the policy would need to be non-partisan so that it cannot be altered when a new government is elected. Indecisiveness on policy affects the long-term value of investments and is a significant deterrent for investment in energy efficiency and renewable energy. This has been a problem in jurisdictions like Ontario for several years with newly elected governments changing the rules established by the previous governments so there is a high degree of uncertainty regarding long term value of investments.
- Development of a strong and sustainable pipeline of EPC projects, this will enable the private sector to build its presence in Canada, invest in new jobs and attract more competitive financing.
- Allow ESCOs some control over financing packages where third-party finance is sought.
- More consistency in the market and better standardization that offers clear guidance rather than inflexible mandated and one size fits all templates. This will promote more well-planned EPC programs and EPC Client commitment to the EPC model. A cautionary note is the requirement to achieve a balance between standardization and retaining the ability to consider the best solution for a given project. This balance has been achieved globally and one that offers greater value.
- Prequalify high quality and vetted bidders and have an educated EPC Client base so that the ESCO community can proceed efficiently and cost-effectively with the procurement process.

“Don’t fear failure. Fear being in the exact same place next year as you are today.”

Michael Hyatt

PICKING A PARTNER

10 EPC PROCUREMENT PROCESS

10.1 Procurement Issues

Challenges with the procurement process have been cited as a key obstacle for the adoption and success of EPCs, both in Canada and in other global jurisdictions.

EPCs are by their very nature highly structured to the specific outcomes required by the EPC Client, including considerations such as the future use of the asset, the location of the assets which can have different impacts on energy policies and costs and the cultural setting of the asset, which will impact the behaviour of use of the asset. Unlike, traditional procurements and PPPs, where a solution is developed against predefined outputs, EPCs are most successful when the EPC Client and ESCO combine their expertise and knowledge to design required outcomes.

Understanding the nature of EPCs and the factors that drive real success, is critical to achieving an EPC Client's needs. Experienced ESCOs have the following observations about the procurement processes for EPCs:

- Procurement agencies rely on their historic experience in the procurement of capital and infrastructure projects citing their track record to support inflexible approaches that prioritize the lowest price over finding the right EPC partner, leaving both the EPC Client and the ESCO to manage unforeseen costs and unmet requirements.
- Procurement agencies often interpret best value to mean lowest price resulting in procurements which have little or no regard to outcome-based requirements and innovations that can drive and achieve real value e.g., low-cost bid studies negatively impacting the success of results.
- Procurement agencies and EPC Clients use procurement rules as a reason to disallow true collaboration throughout the procurement process negatively impacting the success of EPCs.
- EPCs are often compared to traditional procurements and PPPs resulting in the adoption of similar, inflexible procurement approaches. Because of the key differences between EPCs and PPPs (such as the fact that under an EPC the ESCO has responsibility to deliver guaranteed savings regardless of the operation or availability equipment), the results of adopting similar approaches do not align well with the custom needs of an EPC and will diminish the true value of an EPC.
- Successful EPCs deliver outcomes that meet the EPC Client's needs and deliver innovation. Procurements need to be more flexible to enable the mutual co-operation required to achieve success and to allow innovation.
- Designing a procurement process that allows the co-development of a project scope that recognize the current and future needs of the EPC Client, the changing landscape, the varying asset use, and the inclusion of soft measures instead of procuring outputs, is critical to leveraging the true value of an EPC.

- EPC Clients often try to control a procurement process without necessarily understanding their associated responsibilities and risks or a clear definition of their outcomes. When an ESCO is selected using a Qualified Bidders List (QBL) process and the subsequent development process is transparent, interactive, and highly engaged with all key stakeholders involved, the highest value, desired outcomes, and success is achieved.
- A common perception is that the ESCO community prioritizes solutions that will advance their interests at the expense of the EPC Client. A key challenge is that procurement processes are not within the control of ESCOs and generally prioritize price at the cost of stakeholder engagement and true partnering. To achieve long term success, an EPC needs to be structured so that a collaborative vision and process is designed, which helps the customer achieve its core business goals and aspired outcomes, is designed.
- A significant number of public sector RFP's have selected the successful proponent based on a NPV calculation. Some of the industry consider this approach to enable ESCOs to alter elements that maximize their NPV, adopting data or assumptions which are inflated. Other participants consider the NPV approach to be the most effective in comparing proposals that have different payback periods, savings, costs and values but have as common, the EPC Client's requirements.
- Procurement processes require ESCOs to predict costs and savings for sample buildings within a range of 10%. This approach enables success through inflated savings and lowered costs. The thinking is that after the bid, the successful ESCO will be required to undertake detailed feasibility studies for the sample buildings and the remaining facilities within a 10% range of their initial numbers for the sample buildings. In practice, this approach allows for some 'bait and switch' i.e., the adage the price you pay is the value you receive. Procurements processes should be designed to achieve success through selecting the best partner and enabling stakeholder engagement rather than prioritizing lowest price.
- During an RFP, many ESCOs have expressed uncertainty as to what will constitute 'compliant' financing. This uncertainty has reduced interest from Canadian ESCOs to bid some opportunities. To maximise interest and provide the best solutions for the EPC Client, procurement processes should be sufficiently flexible to enable innovative financing structures and to be clear about the factors that will be considered compliant.
- The EPC Client team needs to have the experience and capability (in-house or third party) to understand a financing package being offered and to be able to make a judgement on the structure while avoiding the approach that lowest price wins.

10.2 Designing an Effective EPC Procurement – Key Considerations

Canadian and global experience and expertise have demonstrated the following requirements for achieving a successful EPC procurement:

- ESCOs have significant experience and expertise often having developed and delivered multi-million-dollar deals across extensive portfolios. Leveraging, rather than simply engaging industry experience in creating a transparent model for the procurement and the financing of EPC projects is critical to the success of the EPC industry. It is recognized that some engagement processes have been undertaken in Canada but that engaging entities predetermined an approach and solution then adopted the engagement process to be seen as having collaborated.

- An ESCO is a specialist firm with expertise in engineering, energy management, project management, construction management and measurement and verification services. These professional services should be procured based on qualifications and experience to get the right partner. An EPC is a complex,

customized solution that requires rigorous engineering and investigation to succeed. It cannot be boiled down to price during the procurement phase before this work has even been done. An EPC is not a commodity, nor are the services the ESCO provides. In addition to identifying a partner with this expertise, a partner with an understanding of the local geography (including use of / investment in local labour), the local EPC Client context, EPC Client culture, environment and understanding of EPC Client needs, should also be factors that are considered in the identification and selection of the best partner for an EPC Client.

- The true value of an EPC is achieved through the delivery of outcomes e.g., improved learning environments and student experience, reduction in GHG emissions as opposed to the delivery of outputs such as components to be renewed. Procurement processes for EPCs should be designed to enable these results to achieve the best value of the investment.
- An open procurement process with clear guidelines and a collaborative project execution plan limits unexpected and unplanned outcomes and minimizes risk for both parties. Procurement processes designed to achieve EPC Client outcomes that are designed collaboratively and that include clear and transparent approach to risks and rewards, will render significantly greater success for EPCs.
- To leverage the real potential of EPC procurement processes the measure of value as opposed to lowest price will support the success of the overall project.
- The most successful EPCs that have delivered savings earlier than anticipated, maintained savings over the longer term, and achieved significant additional outcomes have been accredited to the strength of the relationship between the EPC Client and ESCO. Procurements need to enable the EPC Client to choose their partner rather than select a partner on price or the mechanics of a solution and sacrifice a good fit.
- The merits of standardization and transparency for the procurement of EPCs is understood and not disputed. However, the need for education on how EPCs work across all sectors so that the influence of standardization is implemented without sacrificing the success factors of EPCs is critical to achieving successful results.
- Procurement processes need to be sufficiently flexible to evaluate design solutions in the context of changing operations and the implications for the EPC Agreement.

CANADA'S JOURNEY OF SUCCESS

11 SAMPLE OF CANADIAN EPCs

11.1 EPCs Procured in Canada

The following tables provide a sample of EPC projects that have been undertaken by some of the stakeholders that contributed to this the Industry Paper. The list is not an exhaustive representation of all Canadian EPCs.

Many of the projects listed over-performed and delivered more savings and shorter payback terms.

Federal

	Capital Value	Annual Savings
Federal military institution (Southern Ontario, ON) - 1 phase	$62 million	$6 million per year
Federal military institution (Ottawa area, ON) - 1 phase	$18 million	$2.5 million per year
Place du Portage: Phases I & II	$4.067 million	$586,100 per year
Place du Portage: Phase IV	$8.599 million	$993,000 per year
NRC – Puddington (M-12)	$3.705 million	$482,800 per year
NRC - 100 Sussex Drive	$9.340 million	$868,000 per year
Major General G.R. Pearkes (NDHQ)	$12.067 million	$1,136,701 per year
Lester B. Pearson (DFAIT)	$5.103 million	$1,110,000 per year
Banff National Park of Canada	$500,000	$70,000 per year
Canadian Forces Base Halifax	$9.5 million	$1.4 million per year
Public Service Alliance of Canada	$1.2 million	$150,000 per year
Royal Canadian Mint	$8 million	$1 million per year

Hospitals

	Capital Value	Annual Savings
Hamilton Health Sciences - 1 phase	$55 million	$5 million per year
Hospital Louis-H Lafontaine	$6.8 million	$840,000 per year
The Ottawa Hospital	$17 million	$2.6 million per year
Hospital organization (Thunder Bay, ON) - 3 phases	$17 million	$2 million per year
Hospital organization (Saskatoon, SK) - 1 phase	$13 million	$1.5 million per year

Universities & Colleges

	Capital Value	Annual Savings
Higher Education institution (Waterloo, ON) – 3 phases	$50 million	$3 million per year
Lakehead University (Thunder Bay) – 2 phases	$22 million	$2 million per year
Algonquin College – ESCO 1	$6 million	$600,000 per year
Algonquin College – LEED-ing the way in Energy Efficiency - ESCO 2	$55 million	$3.7 million per year. Project considered extremely successful because of true partnership between EPC Client and ESCO.
Dalhousie University - Sir Charles Tupper Medical Building & Clinical Research Centre	$11.4 million	$1.48 million per year
Memorial University of Newfoundland	$13 million	$1.5 million per year
University of British Columbia	$37.5 million	$3.4 million per year
York University	$40 million	$5 million per year
University of Guelph	$34 million	$2.6 million per year. The project over performed and partnering was one of the best experiences from the EPC Client's perspective

Corrections

	Capital Value	Annual Savings
Federal prison institution (Southern Alberta, AB) - 1 phase	$26 million	$1 million per year

Schools

	Capital Value	Annual Savings
Large urban school district (Montreal, PQ) - 2 phases	$24 million	$3 million per year
Large urban school district (Calgary, AB) - 2 phases	$20 million	$2 million per year
Hastings / PEC School Board	$10.2 million	$1.2 million per year
Kawartha Pine Ridge District School Board	$5.8 million	$505,000 per year
Halifax Regional School Board – Lights Off, Green On	$34 million	$2 million (payback would have been reduced if the project did not include non energy related deferred maintenance elements with little / no savings). Savings delivered earlier than expected.
Lester B. Pearson School Board	$12 million	$1.1 million per year
Ottawa-Carlton District School Board	$54.4 million	$4.4 million per year
Regina School Board	$3 million	$340,000 per year
Winnipeg School Division (Phase 3)	$5.6 million	$450,000 per year
Regina Catholic Schools	$3 million	$340,000 per year

Municipalities

	Capital Value	Annual Savings
Town of Newmarket	$1.5 million	$157,000 per year
Town of Orangeville	$1.2 million	$176,000 per year
City of Timmins	$3.7 million	$460,000 per year
City of Windsor	$3.6 million	$386,000 per year (actual savings $665, 000 per year, outperformed by approximately 55%)
National Library and Public Archives Canada	$3,871,981	$443,027

Other

	Capital Value	Annual Savings
The Government of Nunavut Iqaluit	$15.6 million	$2 million per year
BC Housing Corporation	$14 million	$2.764 million per year
Montreal Biodôme	$8.1 million	$1.1 million per year

Private

	Capital Value	Annual Savings
League Asset Corporation	$2 million	$245,000 per year

Appendix A

Glossary of Terms

Appendix A: Glossary of Terms

AI	Artificial Intelligence
BCIP	Build in Canada Innovation Program
BMS	Building Management Systems
CCDC2	Stipulated Price Contract
CHP	Combined heat and power
EE	Energy Efficiency
EPC	Energy Performance Contract
ESAC	Energy Services Association of Canada
ESCO	Energy Service Company
ESG	Environmental - Social – Corporate Governance
ESM	Energy Savings Measures
EU	European Union
FASB	Financial Accounting Standards Board
FBI	Federal Building Initiative
GDP	Gross Domestic Product
GEPP	Guaranteed Energy Performance Program
GHG	Greenhouse Gas
HVAC	Heating, Ventilation and Air Conditioning
IAQ	Indoor Air Quality
IDIQs	Indefinite Delivery, Indefinite Quantity Contracts
IEPC	Integrated Energy Performance Contracting
IPD	Integrated Project Delivery
IPMVP	International Performance Measurement & Verification Protocol
IRR	Internal Rate of Return
K-12	Kindergarten to 12th grade

Appendix A: Glossary of Terms

M&E	Mechanical & Electrical
M&V	Measurement & Verification
MUSH	Municipal, Universities, Schools and Hospitals
NPV	Net Present Value
NRC	National Research Council
O&M	Operations and Maintenance
QBL	Quality Bidders List
PPA	Power Purchase Agreement
PPP	Public Private Partnerships
PPSA	Personal Property and Security Act
PSPC	Public Services and Procurement Canada
R&D	Research and Development
RFP	Request for Proposal
ROI	Return on Investment
RTG	Rose Technology Group
SFP	Savings Fulfillment Period
US	United States

Appendix B

Reference Letters

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