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MAXIMIZING VALUE, MINIMIZING EMISSIONS

The cost-effective path for Canada's climate agenda

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Since 2015, the federal government has spent or committed over $113 billion in climate related initiatives. Despite the funding, legislation, and implementation of all policies, regulations, and measures, Canada will still likely miss its 2030 emissions target by 48 percent. Consequently, the federal government risks heavily indebting Canadians without meeting its climate goals. For that reason, the government needs to rethink the money it spends and focus on policies that yield the greatest possible GHG abatement outcomes at the lowest cost.

This paper proposes a more cost-effective climate policy than many policies the government has implemented thus far – one that will reduce emissions more efficiently and provide socio-economic benefits to the parties involved.

Currently Canada – and many other countries – are overlooking the potential benefits of international collaboration. Countries that can cooperate using their comparative advantages, including technologies, lower costs, or mitigation opportunities, to reduce GHG emissions outside their territorial borders should receive credit for doing so. Rewarding emissions reductions from international collaboration can deliver more effective climate outcomes than solely focusing on domestic initiatives.

Article 6 of the 2015 Paris Agreement sets out the guidelines for such cooperative arrangements. Part 6.2 is particularly relevant. It allows countries to collaborate voluntarily on reducing GHG emissions and receive credit for emissions reductions beyond their political boundaries. Recognizing and encouraging market-based incentives create possibilities for more cost-effective emission abatement initiatives compared to those relying on government fiat alone.

Using methane abatement projects as an example, the total cost to complete those projects (that is, those costing under US $10 per tonne of CO2e) in Canada is about US $212 million. Doing so reduces Canadian CO2e emissions by 30,000 kilotonnes (kt). However, spending US $212 million on methane mitigation projects in Africa, Asia, and Canada will reduce global emissions by 55,000 ktCO2e, almost double the amount reduced if projects were limited to Canada.

Under Article 6.2, Canada can enter into arrangements with foreign countries to

cost share or exchange our technical capabilities for mitigation benefits – in other words, by making such arrangements, Canada can reduce emissions globally while also receiving credit towards our formal climate targets under the Paris Agreement. These arrangements will lead to greater global emissions reductions with no increase in expenditure.

Creating cooperative climate initiatives with developing nations has second-order effects as well. For the developing country, the projects can transfer technology, expertise, and advanced processes helping to improve their overall economic development. The projects can lead to further international collaboration and partnerships in other areas. And depending upon the project, local benefits such as job creation, worker training, enhanced water quality, and improved economic productivity are possible extras over and above the emissions mitigation.

However, the federal government does not seem to have much appetite for using Article 6.2 to meet our greenhouse gas emission goals. Canada should look at cooperative emission reduction projects with other countries more seriously. We have abatement technologies across many sectors that other countries can use to generate meaningful GHG emission reductions – some of which Canada would use to meet its climate goals. But the government needs the political will to drive this new policy direction. MLI

Depuis 2015, le gouvernement fédéral *a dépensé ou engagé plus de 113 milliards de dollars dans des projets liés au climat. Malgré le financement, la législation et la mise en œuvre d'une panoplie de politiques, de règlements et de mesures, le Canada est quand même susceptible de rater de 48 % son objectif d'émissions pour 2030. Le gouvernement fédéral risque donc d'endetter lourdement les Canadiens sans atteindre ses objectifs climatiques, et c'est pourquoi il doit revoir l'ensemble de ses dépenses et se concentrer sur les politiques les plus efficaces pour maximiser les réductions de GES, au coût le plus bas possible.*

Ce document propose une politique climatique plus rentable que bien d'autres politiques gouvernementales du passé – une politique qui réduira les émissions plus efficacement et apportera des avantages socio-économiques aux parties concernées.

À l'heure actuelle, le Canada – et de nombreux autres pays – négligent les avantages potentiels de la coopération internationale. Les pays capables de coopérer pour réduire les émissions de GES hors de leurs frontières en tirant profit de leurs avantages comparatifs, notamment en matière de technologies, de coûts ou d'options d'atténuation, devraient obtenir des crédits à cet effet. Récompenser les réductions obtenues au moyen de la coopération internationale peut donner des résultats climatiques plus efficients que ceux issus de projets exclusivement nationaux.

L'article 6 de l'Accord de Paris de 2015 établit les paramètres relatifs à ces mécanismes de coopération. La partie 6.2 est particulièrement pertinente. Elle permet

aux pays de coopérer volontairement à la réduction des GES et d'obtenir des crédits pour les réductions réalisées hors de leurs frontières politiques. Reconnaître et promouvoir les mesures fondées sur la concurrence maximise les possibilités de projets de réduction des émissions plus rentables que les projets établis par décrets gouvernementaux seulement.

Prenons comme exemple le méthane. Les coûts totaux d'achèvement des projets de réduction sur le territoire canadien (c'est-à-dire à un coût inférieur à 10 dollars américains par tonne d'équivalent CO2) atteindront environ 212 millions de dollars américains, ce qui abaissera les émissions de 30 000 kilotonnes d'équivalent CO2. Cependant, les mêmes 212 M$ US dépensés pour des projets en Afrique, en Asie et au Canada abaisseront les émissions mondiales de 55 000 kilotonnes d'équivalent CO2, soit presque deux fois plus que si les projets étaient limités au Canada.

En vertu de l'article 6.2, le Canada peut conclure des accords avec des pays étrangers pour partager les coûts ou échanger ses capacités techniques contre des avantages sur le plan des réductions – en d'autres termes, en concluant de tels accords, le Canada peut réduire les émissions à l'échelle mondiale tout en obtenant des crédits pour ses objectifs climatiques formels dans le cadre de l'Accord de Paris. Ces accords permettront d'abaisser davantage les émissions à l'échelle mondiale sans dépenses additionnelles.

La mise en place de projets de coopération avec les pays en développement dans le domaine du climat a également des répercussions secondaires. Pour les pays en développement, ces projets peuvent entraîner un transfert de technologie, d'expertise et de procédés avancés pouvant renforcer leur développement économique global. Les projets peuvent aussi déboucher sur d'autres collaborations et partenariats internationaux dans d'autres domaines. En outre, selon le projet, des avantages supplémentaires, en plus de la réduction des émissions, sont possibles localement : création d'emplois, formation des travailleurs, amélioration de la qualité de l'eau et de la productivité économique.

Toutefois, le gouvernement fédéral semble très peu enclin à tirer profit de l'article 6.2 pour atteindre ses objectifs en matière de gaz à effet de serre. Le Canada doit envisager plus sérieusement la coopération transfrontalière pour ses projets de réduction des émissions. Dans de nombreux secteurs, il dispose de technologies pouvant être exploitées par d'autres pays pour réduire considérablement les émissions de GES – et il peut utiliser un certain nombre d'entre elles pour atteindre ses objectifs en matière de climat. Toutefois, le gouvernement doit faire preuve de la volonté politique nécessaire pour donner une nouvelle orientation à sa politique.. **MLI**

Introduction: The current state of Canada's climate activities

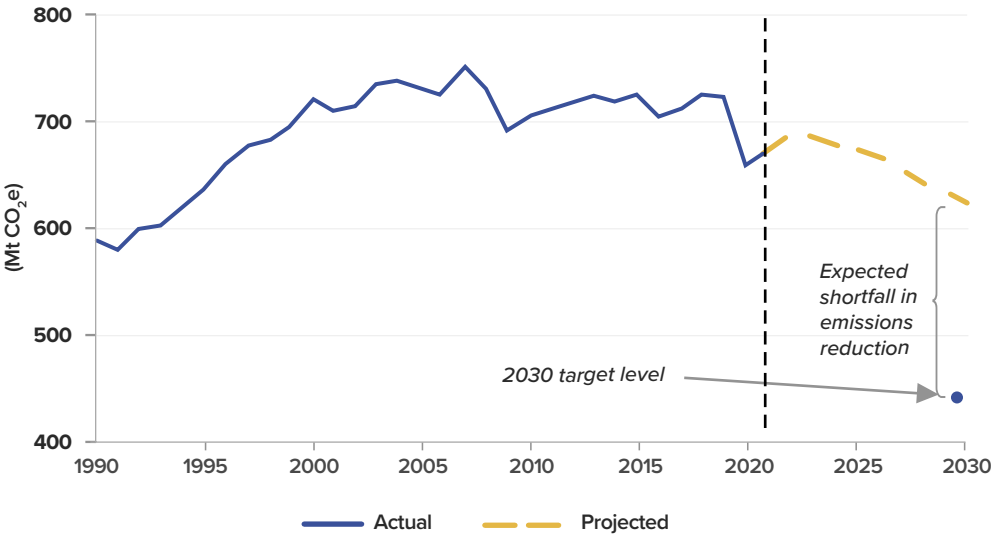
Canada has "committed" to reducing its greenhouse gas (GHG) emissions by 40 to 45 percent below 2005 levels by 2030 (Canada 2023a). To achieve this target the Canadian government has implemented a mixed bag of policies including a national carbon tax, subsidies for GHG emission reduction methods, regulatory changes governing fuel standards and gas vehicle sales, and tax incentives to encourage low-carbon investments.

Since 2015 the federal government has spent or committed over $113 billion in climate related initiatives (Canada 2021). According to some, climate change could have catastrophic consequences if we do not significantly reduce GHG emissions (World Economic Forum 2022). The scale of Canada's expenditures and the potential negative effects of climate change should force us to ask whether the federal government is allocating our resources into cost effective GHG abatement policies. Doing anything less risks leaving Canadians with a significant decline in their living standards and large environmental costs.

Figure 1 shows Canada's past GHG emissions and projects how close our current climate policies and programs will come to meeting our 2030 goals. Despite funding, legislation, and implementation of all policies, regulations, and measures, Canada will still likely miss its emissions target by over 200 Mt CO_2e or 48 percent of its 2030 target[1] (Canada, 2023b).

Some argue that these projections mean we need to spend more money on reducing emissions. A more logical conclusion, however, is that the government needs to ensure that the money it spends leads to the greatest possible GHG abatement outcomes. The government must rethink some of its programs and find better emission abatement methods to get more "bang for

FIGURE 1: CANADA'S GREENHOUSE GAS (GHG) EMISSIONS



Sources: Environment and Climate Change Canada, 2023; 2022a; 2022b.

the buck" on the billions it spends.

This paper will propose a more cost-effective climate policy than many of the policies that the government has implemented thus far. The suggested policy will not only reduce emissions more efficiently, but will also provide socio-economic benefits to the parties involved beyond its GHG mitigation effects.

GHG emission reductions within Canada's borders

Along with the rest of the international community, Canada has agreed to mitigate the effects of climate change based on in the United Nations Framework Convention on Climate Change (UNFCCC). Under this convention, every country must develop its own GHG emission reduction targets, referred to as nationally determined contributions (NDCs). Countries are responsible for meeting their NDCs by reducing emissions within their territorial borders.

While the UNFCCC framework is simplest to administer, it overlooks the potential benefits from international collaboration. GHG emissions do

not respect national borders. Countries that can cooperate using their comparative advantages – including technologies, lower costs, or mitigation opportunities – to reduce GHG emissions outside their territorial borders should receive some credit for doing so. Rewarding emissions reductions that result from international collaboration opens up new mitigation opportunities and can deliver much better climate outcomes than focussing solely on domestic initiatives.

A University of Maryland and International Emissions Trading Association study found that using carbon reduction methods "cooperatively rather than independently through carbon markets could save [signatories] to the Paris Agreement more than $300 billion... per year by 2030" (International Emissions Trading Association 2022).

Voluntary markets and Article 6

The 2015 Paris Agreement subsequently broadened what had been its focus on domestic efforts to allow nations to work together to achieve their NDC objectives. Article 6 of the agreement set guidelines for such cooperative arrangements (UNFCCC 2015a). While considered a significant achievement at the time, there were no practical rules and regulations developed to implement Article 6 in a consistent and transparent manner. It was not until 2021 at the Glasgow climate conference that a rulebook for implementing Article 6 was established.. Article 6 is based on three subsections:

- **Article 6.2** Permits collaborative projects among countries that aim to reduce emissions and establishes a framework for transferring emissions reduction credits, known as International Transferred Mitigation Outcomes (ITMOs), between them. The recipient of ITMOs may apply them towards achieving their Nationally Determined Contributions (NDCs).
- **Article 6.4** Allows countries to collaborate on projects that reduce emissions and facilitates transfers of emission credits (ITMOs), using a more prescriptive method. Certifying emissions credit trading will be administered by a supervisory body of the United Nations

Framework Convention on Climate Change (UNFCCC). Complexities peculiar to this section may delay its implementation (Di Leva and Vaughan 2021).

- **Article 6.8** Deals with non-market cooperation, through financial, technological, or capacity building arrangements to reduce GHG emissions. 6.2 or 6.4 rules do not govern projects under this section. There are no ITMOs between countries with Article 6.8 projects (Di Leva and Vaughan 2021).

It is Article 6.2 that offers Canada the most flexible and interesting possibilities to cooperate in mutually beneficial carbon abatement programs.

> *Article 6.2 has two compelling features making it worthy of Canada's serious consideration.*

Article 6.2: The good, the bad, and the ugly

Article 6.2 has two compelling features making it worthy of Canada's serious consideration.

1. It allows two countries to collaborate on reducing GHG emissions. No matter which country achieves the emissions reduction, the other partner country can use some or all the emissions reductions, as ITMOs, towards their own climate targets, as mutually agreed upon.

   This feature is a departure from the basic UNFCCC framework on climate action, as it enables countries to receive credit for emissions reductions beyond their political boundaries. The article draws explicitly on the *gains from trade*, a classical economic principle David Ricardo developed in the early 19th century. Ricardo argued that by allowing countries to use their comparative advantage to produce

and trade goods, there would be an overall increase in wealth for both of the two trading nations.

2 Article 6.2 does not prescribe the types of agreements or projects countries can pursue. Instead, it allows countries to jointly determine what will be most effective given the particular conditions and issues each faces.

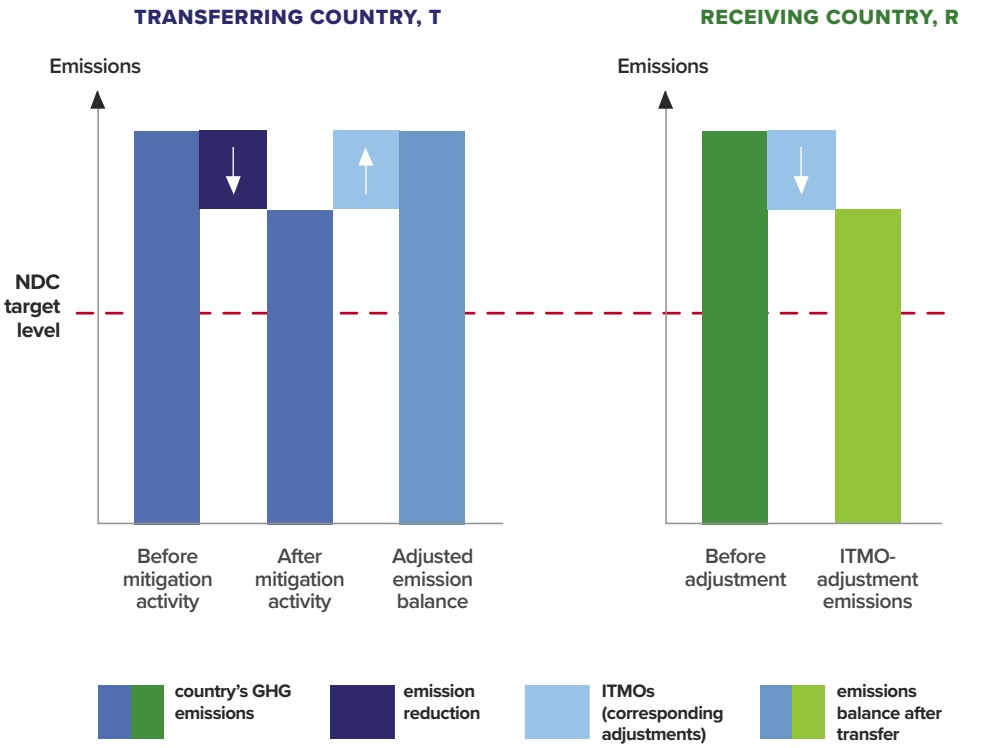
These two features provide a more market-oriented approach to emissions reductions. Recognizing and encouraging market-based incentives creates possibilities for much more cost-effective emission abatement initiatives than by government fiat alone.

Unfortunately, while Article 6.2 is not prescriptive, it does contain significant "guidelines" that must be followed. These include the following:[2]

- The ITMOs are cooperatively negotiated and must be "real, verified, and additional" (UNFCCC 2021b) and either reduce emissions or increase capacity for renewable energy.
- To ensure transparency, the process must be open to scrutiny, and involve robust accounting so that the ITMOs are not double counted. Non-duplication means that only one country can attribute the emissions reduction credit towards their NDC.
- The transfer of ITMOs must not result in higher GHG emissions than if NDC targets had been met through domestic initiatives alone.
- The purpose of Article 6 is to raise ambitions for greater global efforts to decrease GHG emissions rather than to accept that countries can rely solely on domestic mitigation programs to meet their goals.
- Countries using Article 6 must follow substantive and rigorous reporting requirements, common standards, and a tracking registry, which will allow for external reviews, and they must provide necessary data for input into a centralized database.

Figure 2 illustrates how each country will account for their NDCs and the carbon transfer credits (the ITMOs).

FIGURE 2: ACCOUNTING FOR NDCS AND CARBON TRANSFER CREDITS, (ITMOS)



Source: Learning For Nature 2023.

Switzerland shows the way

Switzerland is the first country to use cooperative arrangements under Article 6.2 to undertake projects in another country with the intent of creating ITMOs that will be applied to meeting Switzerland's NDC (UNDP 2022). The Swiss government explicitly states that it is

> committed to halving its emissions from 1990 levels by 2030... this is to be achieved in part by funding climate protection projects abroad. Such bilateral or plurilateral cooperation is envisaged under Article 6.2 of the Paris Agreement. To this end, Switzerland is concluding a number of bilateral treaties, which set the cooperation framework and state the requirements for recognition

> of the international transfer of emission reductions by the treaty parties. (FOEN 2023)

The country has signed agreements with 13 countries. Ghana, one of the 13, announced in late 2022 that it is the first to authorize the transfer of ITMOs to Switzerland based on a climate-smart rice project. The project is also expected to improve food security, create jobs, and improve water usage in Ghana (UNDP 2022).

Critiques of cooperative bilateral agreements and transferable mitigation outcomes

There are two main criticisms of a market-based approach for trading ITMOs between countries. The first is that tradeable emissions may create perverse incentives that work against a country's efforts to lower its own emissions.

The 1997 Kyoto Protocol had poorly constructed rules for generating carbon credits and many of these credits created no GHG reductions but were sold under a framework similar to that of Article 6.2.

Selling emission credits may also give countries an incentive to set minimal goals for reducing GHG emissions. A country can, by lowering its ambition level as formalized through its nationally determined outcomes (NDCs), more easily exceed its climate targets and then sell the "excess" emission credits it no longer needs to meet its NDCs. However, these excess emission reductions would have been created even in the absence of any carbon credit market.

There are also concerns over double counting the credits. This occurs when both the transferring and receiving countries claim credit for the same emissions reduction towards meeting their own NDCs. Efforts have been made to minimize double counting, including through the accounting process, and maintaining process transparency.

Critics of carbon trading argue that carbon credits generated for trading are often from low-quality projects with questionable mitigation outcomes or cause other harms where the projects are located (Kajosaari 2023).

All these objections are valid and mostly originated from earlier carbon projects created under the weaker guidelines of the Kyoto Protocol. However, the Paris Agreement Article 6 guidelines address these concerns to ensure environmental integrity and to prevent double counting in bilateral emission reduction agreements. Environmental integrity requires that emissions reductions must be "real, verified, and additional" with independent third-party verification (German Environment Agency 2020). The guidelines also explicitly call for rigorous accounting, transparency, consistent measuring methodologies, and reporting. Article 6 also emphasizes "additionality," that is, emission reductions that would not have occurred in the absence of a specific project.

> *Environmental integrity requires that emissions reductions must be "real, verified, and additional" with independent third-party verification.*

A second criticism is more ideological. There is a belief that carbon trading simply allows "wealthy high-emitting nations to pass the burden for cutting their emissions on to low-income nations" (Climate Home News 2020). Some even oppose trading carbon credits on colonial grounds: "From a neocolonial perspective, some critics charge that carbon trading is yet another example of neoliberal practices that perpetuate existing imbalances – e.g., an industrialized North versus a pre-industrial South" (Bachram 2004 in Lejano, Kan, and Chau 2020).

There appears to be little substantive evidence to support the ideological criticisms. Those arguing that any asymmetric power imbalance between developed and developing countries will lead to unfair agreements do not recognize the voluntary nature of Article 6 bilateral agreements. Parties will only agree to a bilateral project if each sees a benefit to doing so. Moreover, developing countries wishing to create and sell emission credits can do so through Article 6.4, which will create a centralized carbon market and is overseen by a central UN body (Crook 2022).

Marginal costs, Article 6.2, and a new world of possibilities

An important policy objective for all nations should be to find ways to cost effectively reduce GHG emissions. Fortunately, marginal analysis provides a logical framework for evaluating which projects can deliver the most significant GHG emissions reduction per dollar spent. We begin by estimating the dollars it costs for a project to mitigate one tonne of GHGs. We typically measure GHGs as carbon dioxide equivalents (CO_2e). We do this for all potential emission reduction projects and rank them from their lowest to highest cost. See Figure 3 for illustrative purposes. We then estimate an environmental cost incurred for every tonne of CO_2e we emit.

We can then use a *social cost of carbon*, which is an estimate of the damage or cost incurred to the environment by emitting one tonne of CO_2e to measure each project's cost effectiveness. The Canadian federal government has determined that in 2023, $65 is the social cost of a tonne of carbon. From a cost efficiency perspective, if we use $65 as the social cost of carbon it is straightforward to see which projects yield benefits greater than their costs. Projects A, B, and C all reduce carbon emissions at a cost lower than the costs incurred by the emissions. Note that is possible for a project to have a *negative cost*. In this case, implementing the project would create more monetary benefits than the project's costs.

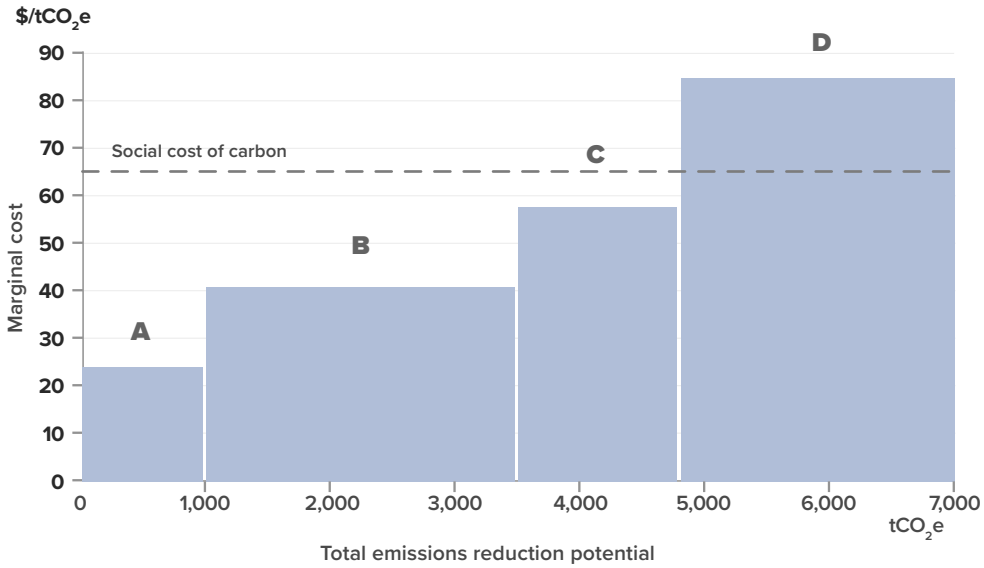
Environmental economists often use this approach to rank the costs and mitigation potential of various projects; from their calculations they create a marginal abatement cost (MAC) curve. Figure 4 shows a MAC curve based on the data in Figure 3. The x-axis shows the cumulative quantity of emissions mitigated by each method. The y-axis shows the dollar cost to remove one tonne of CO_2e. It is a straightforward technique for considering alternative emission reduction projects.

While a MAC diagram is a useful tool, it alone cannot always determine which projects to pursue because there are other factors to consider. For instance, there might be a GHG mitigation method that is very promising but expensive. However, ongoing research and development could make it more cost effective in the future. A good example of this is the 35 percent decrease in the cost of building a carbon capture, utilization, and storage (CCUS) system

FIGURE 3: EXAMPLES OF COSTS OF EMISSIONS REDUCTIONS

Project	Emissions reduction potential in tCO_2e	Cost to reduce one tCO_2e
A	1,000	$24
B	2,500	$41
C	1,300	$58
D	2,200	$85

FIGURE 4: MARGINAL ABATEMENT COST (MAC) CURVE



Source: author:

(Baylin-Stern and Berghout 2021). Another concern is that investing in a current low-cost long-term mitigation method could impede the adoption of even more advanced and effective abatement projects in the future.

Other potential issues may also be beyond the scope of an MAC curve approach, such as cost estimations and regional or market variability. While analysts estimate project costs as accurately as possible, newer and more complex large-scale projects may experience greater cost overruns than routine or estab-

lished projects. For example, there is a greater likelihood of cost overruns from building a small modular nuclear reactor than there would be from building an on-land wind farm.

It is also important to note that the same abatement project may cost more (or less) depending on where it is located. For example, an electric vehicle is much less cost-effective at reducing GHG emissions if operated in Saskatchewan or Nova Scotia, which use significant amounts of coal to generate electricity, than if operated in Quebec or British Columbia, where most electricity is hydro generated. Despite the above limitations, a MAC analysis is integral to any policy framework used to develop emission abatement plans.

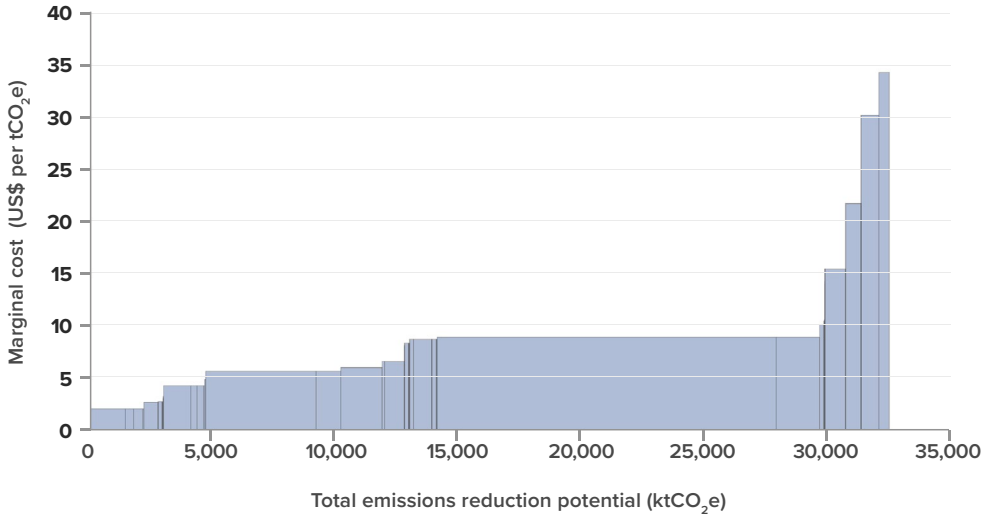
Doing more with less – a case study on methane reduction projects

As a greenhouse gas, Methane is second only to carbon dioxide in importance (Moseman 2021). While we release much less methane into the atmosphere than carbon dioxide, it is approximately 28 times more potent than carbon dioxide (UNECE Undated). Organic decomposition releases methane naturally, while developing and using fossil fuels is a man-made source of the gas. Resource energy companies have developed various methods for reducing methane emissions during the production of oil and natural gas products. Appendix 1 lists the abatement options included in Figures 5 and 6. Figure 5 shows a MAC curve for methane abatement projects in Canada using data from the International Energy Agency's methane tracker database.

Figure 5 illustrates the costs and potential reductions in methane emissions for 43 projects in Canada. The graph reveals a wide range of abatement costs with some projects offering significantly more total abatement potential than others. Project marginal costs show a modest increase all the way to 13,000 ktCO2e in cumulative reductions. After that point, there is a step increase in project costs to between US $8 and $9 per tCO2e, with the potential of mitigating another incremental 17,000 ktCO2e. After that, there are large marginal cost increases with much smaller emission abatements. Holding other caveats constant, as previously discussed, the approach should be to implement the projects from left to right.

We can expand this MAC curve by adding methane reduction projects for Asian and African countries to Figure 5. Figure 6 shows the revised MAC

FIGURE 5: MARGINAL ABATEMENT COST CURVE – CANADIAN METHANE EMISSION REDUCTION PROJECTS



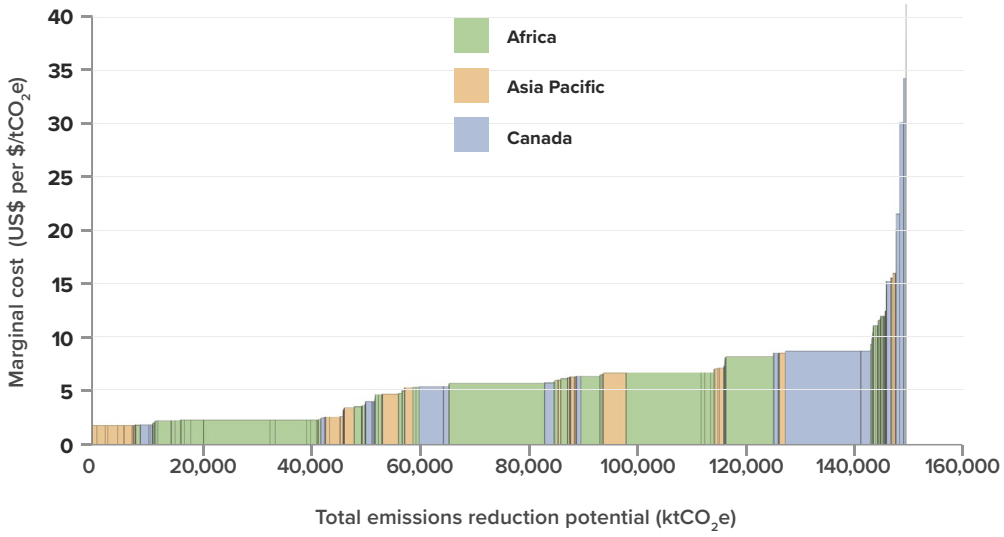
Source: IEA 2023a.

Note: Adapted based on the following changes: (1) y-axis units recalculated from US $ per million British thermal units (BTUs) and x-axis units recalculated from kilotonnes (kt) of methane; (2) only projects with positive costs of US $2/ tCO2e or greater are shown; (3) figure does not include projects with zero emissions savings.

curve representing over 370 projects. Projects in advanced countries such as Japan, Korea, China, Australia, and New Zealand are not included, as developing nations mainly create ITMOs (UNDP 2021). By combining Asian and African countries with Canada's MAC curve, some interesting possibilities become apparent. Compared to Canada, Asia and Africa have many lower-cost methane abatement projects. In fact, most projects costing less than US $10 per tCO2e are outside of Canada. Only one in eight projects costing less than that are in Canada. Looking at this another way – all projects costing less than US $10 per tCO2e will mitigate a total of 143,000 tCO2e. Of that, only 30,000 tCO2e will come from Canadian projects.

The cumulative cost to complete Canadian methane reduction projects with a cost under US $10/tCo2e is about US $212 million. Doing so reduces Canadian CO2e emissions by 30,000 kt. However, if we spend US $212 million on methane mitigation projects in Africa and Asia, we will reduce emissions by 55,000 ktCO2e, almost double the amount reduced if we limit the projects to Canada.[3]

FIGURE 6: MARGINAL ABATEMENT COST CURVE – CANADIAN, AFRICAN, AND ASIAN METHANE EMISSION REDUCTION PROJECTS



Source: IEA 2023a.

Note: Based on data from the Methane Tracker Database as modified by the author. Adapted based on the following changes: (1) y-axis units recalculated from US $ per million British thermal units (BTUs) and x-axis units recalculated from kilotonnes (kt) of methane; (2) only projects with positive costs of US $2/tCO2e or greater are shown; (3) figure does not include projects with zero emissions savings; (4) projects with costs greater than US $75/tCO2e are not reflected in the graph.

Here is the opportunity for Canada under Article 6.2. We can enter into arrangements with foreign countries to cost share or exchange our technical capabilities for mitigation benefits – that is, the ITMOs derived from the various projects and used against meeting our nationally determined contributions. Our investment will lead to greater global reductions with no increase in expenditures. Note that the analysis above only considers projects with a cost of US $2 per tCO2e or higher, assuming that negative and very low-cost projects will be completed under each country's domestic mitigation plans. This approach significantly addresses the additionality concerns outlined in Article 6.

The above discussion pertains only to methane emission reductions. While the proposition looks intriguing, the analysis is not made to explicitly recommend a methane reduction focus. Rather, the intent is to show how the preceding framework can be used for emission reduction initiatives more gen-

erally, on a global level. Canada has a significant opportunity to spend more effectively and achieve its NDC.

Creating cooperative climate initiatives with developing nations has second-order effects, too. For the developing country, the projects can transfer technology and expertise along with advanced processes to help improve their overall economic development. The projects can lead to further international collaboration and partnerships in other areas. And depending upon the project, local benefits such as job creation, worker training, enhanced water quality, more efficient water usage, and greater agricultural productivity are possible extras over and above the emissions mitigation. Article 6.2 mandates that partnering countries will coordinate their policies for mitigating GHG emissions. For example, common standards for monitoring and reporting emissions reduce uncertainty and can encourage follow-on private sector investing.

Where does Canada presently stand regarding using Article 6.2?

The federal government provided input (UNFCCC 2021) into Article 6 of the Paris Agreement and acknowledges its potential (House of Commons Canada 2019; Environment and Climate Change Canada 2021). However, it does not seem to have much appetite for making significant use of ITMOs. While Canada is involved with Chile in a project to mitigate methane emissions by recycling organics in that country, it does not appear that it will be used to generate ITMOs (Climate and Clean Air Coalition 2021). Canada is also involved in projects with Vietnam and Burkina Faso that may qualify under Article 6 (Roth, Echeverria, and Gass 2019).

Generating ITMOs by exporting LNG from British Columbia as a substitute for dirtier fossil fuels in Asia to achieve a net reduction in greenhouse gas emissions has been often discussed (Cedar LNG Project 2022; McCarthy Tetrault 2022).

Saskatchewan was an early proponent for Article 6 to help meet its GHG reduction targets, particularly by exporting its carbon capture and storage technologies. One recommendation in its 2016 climate change white paper stated,

> Canada's main focus should be on the rapid development of Internationally Traded Mitigation Outcomes (ITMOs). Canada's goal must be to allow Saskatchewan to use all international mechanisms to meet its climate change targets by allowing the global marketplace to utilize important climate change technology. (Saskatchewan 2016)

In Alberta, reforestation technology projects have shown potential for reducing GHG emissions and analysts have proposed using this technology to create ITMOs (Mikro-Tek Inc. 2019). Canada needs to more seriously look at cooperative emission reduction projects with other countries. We have developed significant abatement technologies across many sectors that other countries can use to generate meaningful GHG emission reductions, some of which can be transferred to meet Canada's climate goals. But the government needs the political will to drive this new policy direction.

Conclusion

Canada has a 2030 target by which time it wants to reduce its emissions by 40 to 45 percent below its 2005 levels. However, the government's own projections indicate that it will miss this target by a significant amount despite introducing a national carbon tax, a host of new regulations and mandates, and over $100 billion either spent or committed to reducing GHG emissions. Consequently, the federal government risks heavily indebting Canadians without meeting its climate goals. Notably absent is any substantive government plan to work with other countries to lower their GHG emissions which could also help Canada meet its own climate targets. The UNFCCC allows collaborative market-based approaches to reduce large amounts of GHGs in a cost-effective manner. Allowing countries to trade technology, capital, etc., in return for emission mitigation credits is based on principles developed 200 years ago that show the gains from economic trade.

A marginal cost analysis of methane abatement projects shows that it is possible for Canada to reduce its GHG emissions in a more cost-effective way

by looking further afield to other countries than by focusing only on domestic projects. Despite some previous concerns regarding trading and internationally transferrable emission credits (as seen in the Kyoto Protocol) the recent guidelines presented in Article 6 of the Paris Agreement have addressed these concerns. Any remaining objections are mostly ideological, which should not be considered in decisions to pursue these cooperative bilateral agreements.

The federal government should include international collaboration in its climate change policy, specifically by focusing on using Article 6.2 to help Canada meet its emissions reduction target. The government should also provide guidance to companies regarding the rules and guidelines for calculating, reporting, and verifying emissions reductions that are specific to Article 6.2. Additionally, the government should establish a national ITMO registry to facilitate ITMO transfers. Finally, the federal government should develop bilateral climate agreements with other countries. These agreements will assist Canadian companies in carrying out GHG mitigation projects, generating ITMOs, and facilitating their transfer. MLI

About the author

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Endnotes

1 Canada has set a 2030 target of GHG emissions level of 40 to 45 percent below its 2005 level. The 48 percent is based on an average of the two at 42.5 percent.

2 The bullet points provide the primary aspects of Article 6.2's reporting complexity but should not be construed as being complete.

3 The cumulative cost is actually US $162 million, not US $211 million due to the non divisible nature of the mitigation projects. The next incremental project on the MAC curve is very large with a total cost US $105 million. Including it would bring the cumulative cost to US $267 million, exceeding the US $211 million cumulative cost for the Canadian comparison.

Appendix 1: Abatement technologies considered in the MAC curves

ABATEMENT OPTION

- Blowdown capture and route to fuel system (per compressor)
- Blowdown capture and route to fuel system (per plant)
- Early replacement of high-bleed devices with low-bleed devices
- Early replacement of intermittent-bleed devices with low-bleed devices
- Install flares-completion
- Install flares-portable
- Install flares-portable completions workovers WO HF
- Install flares-portable WO plunger lifts
- Install flares-stranded gas venting
- Install flares-venting
- Install new methane reducing catalyst in engine
- Install non-mechanical vapor recovery unit
- Install plunger lift systems in gas wells
- Install small flare
- Install vapor recovery units
- LDAR gathering
- LDAR LDC – large
- LDAR LDC – MRR
- LDAR processing
- LDAR reciprocating compressor non-seal
- LDAR transmission
- LDAR wells
- Mechanical pumping for liquids unloading
- Pipeline pump-down before maintenance
- Redesign blowdown systems and alter ESD practices
- Reduced emission completion
- Replace Kimray pumps with electric pumps
- Replace pneumatic chemical injection pumps with electric pumps
- Replace pneumatic chemical injection pumps with solar electric pumps
- Replace with instrument air systems
- Replace with electric motor
- Replace with servo motors
- Replace with solenoid controls
- Replacement of reciprocating compressor rod packing systems

- Route to existing flare – large dehydrators
- Route to existing flare – large tanks
- Route to flare – small dehydrators
- Route to existing flare – small tanks
- Route vent vapors to tank
- Wet seal degassing recovery system for centrifugal compressors
- Wet seal retrofit to dry seal compressor
- Microturbine
- Mini-LNG
- Mini-GTL
- Mini-CNG

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