



CANADIAN GLOBAL AFFAIRS INSTITUTE
INSTITUT CANADIEN DES AFFAIRES MONDIALES

Greening Defence Operations and Fleet Equipment

by Kaiya Jarvis
January 2022

CONFERENCE REPORT

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MGen Nancy Tremblay – Chief Materiel Program, Department of National Defence

MGen (retired) Eric Tremblay – Director of Business Development, Pratt and Whitney Canada

Tadeh Issakhanian – Manager of Transport Electrification, Energy, Tech and Policy, Deloitte

QUESTION: How is the materiel group playing into the efforts of national defence and supporting the Canada's Greening Government Strategy? How is this related to the national security and safety fleet initiatives in particular?

MGen Nancy Tremblay

- At the Department of National Defence (DND) and the Canadian Armed Forces (CAF), the Assistant Deputy Minister of Infrastructure and Environment (ADM[IE]) has led the department over the past 4 years on its steps towards addressing climate change, pollution prevention, environmental compliance, sustainability and stewardship.
- The materiel group is the central service provider. Its mission is to deliver the materiel and services required by the CAF. It procures defence equipment and relevant services that need operational capability requirements for the military.
- The materiel group is a key enabler to greening defence in the areas of equipment procurement and management. We implement ADM(IE)'s strategic environmental direction, environmental objectives in our activities, and the material management policies under the ADM's authority.

QUESTION: What are you doing already and what are you looking to do with the national security fleet in particular?

MGen Nancy Tremblay

- Greening defence is not new to DND. We leverage established green procurement practices in compliance with the Treasury Board Secretariat and departmental policies.
 - Environmental assessments have been an integral part of defence equipment procurement for many years. Mandatory and written evaluation criteria are often incorporated in requests for proposals to broadly address environment and sustainability. Such as compliance, reducing toxins, better energy and fuel efficiency for new platforms.



- Examples include the headquarters shelter system, which resulted in new requirements incorporated in 2015. It has provided significant thermal insulation which reduces heating and cooling requirements.
- The Canadian Surface Combatant design considerations will improve its fuel efficiency by using an optimized propulsion system. This new system, which will replace the Halifax flagship, will result in fuel consumption savings of approximately 15-20 per cent over the same distance travelled.
- These systems have been designed to specifically use F76 fuel, which is cleaner than bunker fuel, which is typically used by commercial shipping vessels.
- The Arctic operations requires being able to operate in the Arctic for an extended period of time while minimizing the environmental impact. We have adopted strategies to not only address energy and fuel efficiency but all aspects of pollution prevention.
- The logistic vehicle modernization project includes mandatory requirements for proposals to include ways to reduce vehicle emissions in cooperation with the fleet. The logistic vehicle modernization is not one-for-one capability replacement but driven by modularity, which allows for fewer vehicles in service. This results in the future fleet being under 1700 vehicles, unlike the current 4000 vehicle fleet.
- The CAF collaborates heavily with NATO on initiatives to lower fuel and electricity consumption in multinational energy projects and improve interoperability. This includes assessing technologies to improve the energy and efficiency of cam designs and operations.

QUESTION: Can you give us a bit of a sense of where you see the landscape evolving with the aerospace sector at large? What about the interplay between what folks are doing for the commercial aviation market versus the government and military aviation market?

Eric Tremblay

- The aviation sector is responsible for 2 per cent of human use carbon emissions, but the aerospace industry is committed to accelerating progress on becoming more climate-friendly.
- We are moving forward with various governments to achieve zero-flying or “net zero” by 2050. It includes working to use more sustainable fuel and include new technologies and materials for engines; steady R&D investment which is critical to achieving greater fuel burn efficiency; the creation of new materials to make aircrafts lighter, as well as integrating engines, either hybrid-electric or electric with sustainable air fuel.



- An example of this is currently being done by Avalon, Pratt and Whitney Canada, who are creating an electric dash eight demonstrators by 2024, which will include an advanced electric motor and controller from Collins Aerospace. The goal of these aircraft is to have a demonstrator that will generate up to 30 per cent reduction in fuel burn and CO2 emission compared to a modern turboprop airline.
- Government programs are directly impacted by the drive from the commercial market for improving technologies. Similarly, government programs can influence the investment in the development of new technologies within the industry.

QUESTION: Can you talk about the United States Navy's initiative on electric vehicles? What are some of the lessons to draw out of that initiative?

Tadeh Issakhanian

- Within the U.S. federal government, all vehicle procurement will need to be zero-emissions electric or plug-in hybrid by 2027.
- Currently, we are setting and executing a strategy to start procurement of vehicles based on the infrastructure that was previously kept separate from transportation. This has resulted in a lot of change in management, addressing apprehension on how going UV will impact missions and the use of our vehicles, and the limitations of which types of vehicles are available.

QUESTION: What are the particular lessons you can draw out of there that you think can be applied to other jurisdictions, such as Canada for example? What should we be mindful of as we look to roll forward on similar programs?

Tadeh Issakhanian

- The biggest lesson is that electrification needs to be approached holistically. For example, with past projects where we have been less successful, we were putting charging infrastructure where it was most cost-effective, but not the most useful location when it comes to supporting staff or the mission.
- This process has to be integrated, everybody has to come to the table and be bought in because there are so many different pieces.
- Be creative about the scope of projects. There are a lot of ways to fund projects, including public-private partnerships.



QUESTION: *Can you give a bit of a sense of how to achieve the broad objectives of less fuel and better fuel when setting them against future time horizons and potential Government of Canada opportunities? If you were to look ahead in the next 5 years, what are the most likely advancements you see? Thinking beyond a 5-year time horizon, what are the types of things that we could be thinking about right now that are likely to come to fruition and be able to drive some significant and meaningful change?*

Eric Tremblay

- The table has 4 pillars: technology development, access to infrastructure to connect them, maintenance of the game (i.e., achieving net-zero), and capacity.
- In the next 5 years, the current development of electric or hybrid-electric aircraft will be fundamental to developing demonstrator programs. This will also increase the demand for alternative fuel or biofuel by 50 per cent.
- When moving beyond 5 years, this number will increase because this is where you are reducing the overall CO₂ emission in your system.
- Moving past the 5-10 year mark, building on those demonstration programs along with the R&D effort to push forward technology development on the electrical side, commuter hours will be reduced.
- Therefore, looking to the future, when we look at the CO₂ emissions, we believe we can reduce these by about 20 per cent if we are able to implement and scale up the infrastructure and technology development. The idea is to try and reduce the cost as much as possible across the industry, including for commercial consumers.
- Currently, the aerospace industry makes up 50 per cent of CO₂ emissions. If we really want to make a difference in reducing that, we need to invest in greater electrical power plants, technology, infrastructure, and capacity for either engine powered aircraft. We are hopeful that we will be able to achieve this before 2050.

QUESTION: *It is likely that some of the fleets we are operating today will still be in operation with the Government of Canada, or at least close to the end of their life by the end of 2050. How do you try and account for managing a total fleet, where you are subsequently buying new assets, but where the emissions profile of some of the ones currently operating is unlikely to be fundamentally different even 40 years down the road?*

MGen Nancy Tremblay

- Adopting cleaner fuel faces constraints such as compatibility with existing platforms, interoperability with allies, fuel availability and affordability, and many operations will occur in areas where access to renewable or cleaner energy sources may not be an option



or will be very limited. Interoperability means we need a standardized approach when adopting low-carbon fuels.

- To achieve cleaner operations, we first need to understand the energy and fuel usage of baseline operations. This takes significant effort and time to complete.
- In terms of cleaner military platforms, although lower-emission options have become available for commercial light-duty vehicles, this remains a challenge due to technological limitations, operational and interoperability requirements. Given the size of the CAF, we have limited market influence to drive transformational innovations in the domestic and global defence industry.
- Until technology catches up, we will have a level of emission in our operational fleet that cannot be fully eliminated. But we will continue to focus on better energy and fuel efficiency options.
- In the Defence Energy and Environmental strategy, we have identified a number of targets that will be met before the net-zero emission target of 2050. For example, reducing GHG emissions by 40 per cent by 2025 is likely to be met sooner, and 100 per cent of the DND commercial light-duty vehicle fleet purchases will be zero-emission vehicles or hybrid when available with a procurement target of 2023.

QUESTION: *What's the relationship between defence and the wider kind of civilian initiatives either in other parts of the government or the civilian economy from a U.S. perspective? Do you have to have full alignment on a national scale or are there opportunities to take a more regional approach? Any thoughts about green initiatives more broadly and recommendations for how Canada can think about moving forward on these?*

Tadeh Issakhanian:

- In the U.S., the federal government and fleet have an enormous impact on the market due to its sheer volume in size.
- Placing these services across the country has a higher impact on the familiarity of the day-to-day consumer. Placing charging stations around to address the massive footprint these services have will also encourage everyday consumers to potentially shift their vehicles to hybrid or electric vehicles.



QUESTION: *What can the government do to leverage the most impact out of the industry? Do you think Canada can get “the most bang for its buck” by working collaboratively with the U.S.? What can the Government of Canada do with its efforts to get the most out of these types of initiatives?*

Eric Tremblay

- Achieving the pillars of technology development, access to infrastructure to connect them, and maintenance of the game (ie: achieving net-zero) and capacity cannot be done in isolation.
- Demanding greater efficiency from the aerospace sector in the way governments define their request for proposals is fundamental. They need to push their requirements for technological development. Keep the pressure on the industry supported by the government and policies, as well as funding when required.

► About the Author

***Kaiya Jarvis** is a fourth-year student Political Studies student at Queen's University. She is the President of Women in International Security-Queen's Chapter and Chief Returning Officer for the Arts and Science Undergraduate Society at Queen's. Kaiya also interns at the Queen's Centre for International and Defence Policy. Her areas of research include Canadian Foreign Policy, gender and politics, migration, cybersecurity, and peace, youth and security. Kaiya has also completed an undergraduate certificate in law through Queen's University and will complete her Bachelor of Honours degree in Spring 2022.*

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