



1. Please tell us a bit more about the work that you're doing and any projects you're currently involved in.

- Currently working with governments across Canada on transportation emissions reduction to 2030
- Working with the provinces and the federal government regarding increasing zero emission vehicle penetration without the need for zero emission vehicle mandates
- If we do have mandates – what else does the government need to do to ensure success at reaching the targets
- Working to preserve Canadian vehicle manufacturing in the face of a discriminatory EV tax Credit in the U.S.
- Consulting with the federal government on longer term emission standards
- Participating in federal and provincial privacy consultations

2. In your opinion, over the next decade, which trends or innovations will impact the auto/aero industry the most?

- The push to decarbonize transportation
- The cost of energy
- Increased levels of automation in vehicles

3. What are some of the key changes occurring in the manufacturing sector and how do you think these are impacting the supply chain and surrounding ecosystem?

- The shift to electrified vehicles based on essentially global goals to have 100% of new vehicle sales be zero emission by 2035
- This will fundamentally change the supply base in terms of the components required for a vehicles production (different) and the number of parts and components (fewer)
- Battery production requires critical minerals and rare earth metals that currently can only be found in volume in very few places in the world
- As batteries are very heavy, they will need to be produced in close proximity to vehicle assembly plants (or vice versa)

4. What strategies are needed to help strengthen global supply chains and minimise risk today?

- The industry has faced many supply shocks that the pandemic really amplified. The pandemic underscored the fragility of global supply chains when factors/sole suppliers cannot operate because of disease disruption
- The microchip shortage is the most visible and perhaps longest lasting of these vulnerabilities but there are others as well which has prompted some to move away from just-in-time inventory models to just-in-case as well as building redundancy into their supply base, while also prompting the re-shoring of some supply manufacturing

- 5. How can industry promote an open and transparent approach to supply chain management?**
 - The more visibility you have into your supply chain, the more you are able to manage the constituent pieces of it
 - Dialogue with the supply chain is important to understand from the different links in the chain, how they see it working and what could be improved

- 6. How would you classify the current level of digitisation and integration across the transport manufacturing industry? What more could be done to encourage adoption?**
 - Digitization is rapidly being deployed across the industry
 - Skills upgrading and training are key

- 7. In your opinion, which intelligent technologies offer the most value to the advanced manufacturing ecosystem?**
 - Blockchain and artificial intelligence offer the opportunity build robustness into the advanced manufacturing ecosystem

- 8. What are the biggest challenges or inhibitors facing SMEs for building digital operations capabilities, and how can these be mitigated?**
 - There is a lot of demand on the capital of SMEs at the moment and some degree of government assistance in terms of guidance etc may be useful

- 9. How can technological innovations contribute to sustainable manufacturing practices?**
 - Technological innovations can assist in areas like design for repairability, design for end-of-life
 - Technological innovations can also contribute to optimizing the manufacturing process to minimize waste and utilize more sustainable inputs in the manufacturing process

- 10. How will achieving zero carbon emissions benefit companies operating in the transport sector?**
 - Increased emphasis from the investor community on carbon disclosure so having a plan to reduce emissions will be important to the investor community but also to customers themselves

- 11. What are the biggest roadblocks to the adoption of electric propulsion systems and how can they be overcome?**
 - Cost, infrastructure, and education. These are the big three

- 12. How can manufacturing SMEs stay relevant in the face of disruptive technologies and trends?**
 - Keep your eye on where the puck is headed and determine if you have the skill set and core competencies to compete in a disrupted industry

- 13. What are the advantages to implementing a cross-industry partnership approach to R&D?**
 - There are many things applicable to road and air transport that could potentially be shared to reduce R&D cost
 - I see more partnership occurring across players in the auto industry than between sectors at least in the short term however

14. How is workforce development becoming a key challenge for industry at present, and how are companies looking to address this?

- The world is hungry for talent and as the automobile becomes much more of a computerized device run by software, we are competing for talent with other titans in that space Google, Apple, etc

15. How can industry and academic/ training institutions work together to prepare the workforce for current and future challenges in automotive or aerospace manufacturing?

- There needs to be dialogue between industry and educational institutions
- The industry is moving ahead far faster than the training community so that there is often very little formal training available to assist in the new realities
- Micro credentials and specific courses devoted to key aspects of the modern automotive manufacturer will be important