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Chair

Mr. Larry Miller

Standing Committee on Transport, Infrastructure and Communities

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● (1100)

[*English*]

The Chair (Mr. Larry Miller (Bruce—Grey—Owen Sound, CPC)): We will call our meeting to order. We do have quorum.

I thank our witnesses for being here today. I'll just give you a reminder to keep your presentations to 10 minutes or less. Then we will get into the questions.

From Blueprint Energy Inc., we have Mr. Greg Tarasco.

Mr. Greg Tarasco (President and Chief Executive Officer, Blueprint Energy Inc.): Thank you, Mr. Chair.

My timing on this came in at 9 minutes and 30 seconds. I've been told there is some technical information on translation, so to read a little bit slower. I apologize if I go over by a minute or so.

The Chair: We will be flexible.

Mr. Greg Tarasco: Thank you.

Good morning, Mr. Chair, committee members, and fellow witnesses.

As president and CEO of Blueprint Energy Inc., I am pleased to have been called as a witness and afforded the opportunity to describe our transportation innovation: why it's beneficial, where it adds value, the barriers we face and the support we have received in terms of government regulations, and supportive measures on policy to the committee.

By way of background, I have extensive finance, technology, investment, and business development experience with innovative technologies, typically at the pre-commercial and moving-to-commercial stage. My statement is offered through the lens of an MBA through the University of Ottawa and 20 years of practical experience.

Blueprint Energy is a leader in research and development of flywheel energy storage systems. The roots of the company span over a decade, successfully transitioning from its origins at the University of Ottawa to private sector research projects and now the pre-commercial project stage. Having over 50 projects and totalling $10 million in R and D, Blueprint has a depth of knowledge and understanding of the physics and applicability of flywheel technology that is matched by few in the world.

Our goal is to integrate flywheel energy storage systems into hybrid vehicles and to make them the default energy storage system replacing traditional chemical batteries.

A flywheel, which is sometimes referred to as a mechanical battery, is not a new concept. It's basic in nature and is highly adaptable. Flywheels are nothing more than a disk that spins around a fixed axis. The amount of energy a flywheel can store is proportional to its mass, the square of the speed at which it spins, and the square of its radius. This formula, and a wide range of variables affecting it, takes a simple concept and allows for great engineering latitude.

While the flywheel can be referred to as a mechanical battery, we have to distinguish that there are two different types in how the flywheel receives and releases its energy.

The first type is a mechanical flywheel. Its input and output, if you will, is derived by a mechanical device; that is, a gear attached turns a flywheel and it will spin up the rotating device to store the energy. Conversely, to release the energy from the mechanical flywheel turns a gear, and it in turns moves something.

The second type is an electrical flywheel. Its input and output, as the name suggests, are through electricity or a current; that is, electrical current drives the spinning of the disk to store energy. When energy is released, the output is in the form of electricity, thereby acting like a normal chemical battery.

Blueprint Energy has fully developed, tested, and patented technology for electrical flywheels, and it is this that forms our basis of commercial efforts in integrating flywheels into hybrid vehicles.

So how does a flywheel work in vehicles? What allows a flywheel-based hybrid vehicle to satisfy performance, range, durability, and price metrics without the requirement to change ownership habits or the transportation industry's infrastructure?

Here's how it works. The flywheel simply captures the natural wasted energy produced by a vehicle and stores it until it's called upon by computer modules. We must first understand that the vast majority of wasted energy in fuel consumption in vehicles is in the deceleration, or braking period, and in the acceleration period from a still or near still state to a cruising state—that is, if you will, coming to a stop sign or being in bumper to bumper traffic.

What we do is we capture the wasted energy at the braking process—or heat energy—and convert it into electricity. That in turn spins the flywheel, resulting in stored energy. The vehicle now needs to accelerate, and instead of drawing on the carbon fuel, whether it's gas, diesel, or bioethanol—we're fuel-agnostic—

● (1105)

The Chair: Excuse me. I'll ask you if you could maybe slow down just a hair.

Mr. Greg Tarasco: Sure—and I did get a warning.

The Chair: It's okay. It's for the translators.

Mr. Greg Tarasco: I thought I was slowing down. My apologies to the committee and to the translator.

That, in turn, spins the flywheel, resulting in storage of energy. The vehicle now needs to accelerate, and instead of drawing on the carbon fuel, whether it's gas or diesel—we're fuel agnostic—we draw on the stored energy from the flywheel first to propel the vehicle forward. We only draw on the carbon fuel and the engine when it is optimal to do so. Of course, this is controlled through sophisticated software and computer-controlled modules.

The more a stop-start driving pattern is introduced, the more energy is wasted, and therefore the more energy that can be captured and stored. If you can picture a transit bus driving pattern, a garbage truck stopping at every driveway, and 75% of cars globally that are mired in urban traffic, which equates to 70 million vehicles produced year over year, you can quickly begin to formulate the magnitude of wasted energy, wasted money, and unnecessary emissions.

That answers how it works and why it is necessary.

As for the second part, why flywheels are better suited than traditional chemical batteries, the answer is twofold.

First, the pure physical properties and operational demands, such as high power, short duration conditions, demand a highly tolerant durable technology. As our flywheels were originally designed for space and the Canadian Space Agency, and intense industrial use, we not only meet this demand, we far exceed it.

Typical elements are long life cycles, up to 20 years; high round-trip efficiency; no capacity fade, no power or efficiency fade; a wide range of temperature tolerance—weather is not relevant—low maintenance cost; no end-of-life disposal costs; low cost of ownership, since you do not have to change your batteries—and, particularly from a safety perspective, no high-voltage exposure during operational maintenance or to first responders at the scene of an accident.

Second, it solves the economic barriers that prevent purchasers from buying hybrids, whether it is the fleet operator, such as a transit authority, or a family vehicle. The current economic challenge and barrier to purchasing existing hybrids are price premium, operational expense—which is changing the batteries—and end-of-life disposal fees, all of which have deterred the adoption of hybrids. There is ample proof of this even within this committee's previous witness testimony, mostly by fleet operators.

Flywheel technology is far less expensive to manufacture, which lowers the price premium. There is no exchange of the flywheel, as it lasts the life of the vehicle and reduces operational costs.

Lastly, there are no end-of-life disposal issues, as a flywheel is made out of steel and is 100% recyclable, turning an end-of-life cost into a profit and avoiding further environmental damage by heavy metals that are found in chemical batteries.

There are approximately 100,000 transit buses in the NAFTA region alone that should be hybrid but are not. There are 70 million light-duty vehicles produced year over year. Now 75% of these vehicles demonstrate driving patterns that should be hybrid, and yet there has been a lowly 3.7% hybrid adoption rate over two decades of research and hundreds of billions of dollars spent globally by governments in this industry, with very little result.

As you can see, chemical batteries are not the solution; they are, in fact, the problem. Rising fuel costs and operational costs demand hybridization, and chemical batteries prevent it. In short, the chemical battery is an end-of-century solution to a mid-decade problem. We need a solution now, and we believe flywheels can be that solution.

There are many more and significant benefits for fleet operators, but time today does not allow me to address that in my opening comments. But I am at your service to provide such information that is warranted and appropriate to committee protocol.

With regard to general barriers and allowing our technology to be adapted and to flourish, we take the stance that they are the same for us as they are for any other developing technology in engaging in commercial process; that is, to fight the psychology of preconceived notions in linear thinking.

Auto manufacturers, governments, investors, and scientists alike have all bought into the notion that chemical batteries are the solution. The conventional thinking is that since this battery didn't work, we should try another battery. I liken this to the dot-com bubble, where otherwise very intelligent people were so fixated in a position, they could not see that most of the technology was bunk.

Frankly, our experience with the government has been extremely positive, and we would make two general thematic recommendations. In my attachment, I have gone into more detail.

● (1110)

First, the major problem in Canada is investment in technologies, and private capital is simply not doing the job. The government has gone to great lengths to address this issue, so we have not drawn any conclusions as to the government's need to do more or that private capital is happily willing to let the government do the heavy lifting and then engage when the risk is mitigated. We would support continued government policies that strive to facilitate and foster the introduction of risk capital into developing technologies. This is paramount.

Second, the government has very good programs and sees the importance of post-R and D movements towards commercialization. While these efforts assist greatly, the administration of the program is problematic. I am not referring to the process, as any company should be able to withstand the rigours of due diligence; I'm referring to the timing misalignment between the commercial window of opportunity and the capital requirements of a company. If a company was to be vetted for private capital, the due diligence process typically takes 30 to 90 days to get a term sheet. The government can take six to twelve months, depending on the program, if not longer. For an early-stage company with commercial-ready technologies, this is a challenge. Policies that meet the deployment of capital in a timelier manner would be seen as favourable.

In closing, what we are asking of the committee is to be mindful that there are a variety of solutions that solve transportation issues and not get lost in the noise or pet technology projects. We believe that flywheel energy storage systems will be a core component of successful hybridization now and for decades to come. We are, however, under no illusion that we are the silver bullet. Flywheels will be but one of many new technologies in vehicles that will meet the economic, operational, and environmental issues for all concerned.

On behalf of Blueprint Energy, I would like to take this time to thank you for your dedication and interest in finding real solutions for the transportation industry.

The Chair: Thank you, Mr. Tarasco.

We'll now move to Invotronics Inc. and Mr. Earl Hughson.

Mr. Earl Hughson (President and Chief Executive Officer, Invotronics Inc.): Thank you for inviting me here today to speak.

After graduating from engineering at Waterloo, I've spent the last 25 years completely in OEM automotive electronics systems and new technologies for a number of large Canadian companies, small start-ups, and so on. I've worked in start-ups, R and D, product development, and high-volume electronics manufacturing facilities. And I've done numerous international joint ventures and technology partnerships around the world.

I'm also now a director of the Canadian Automotive Parts Manufacturers' Association. I was brought onto the board over a year ago, when the association started to realize that the electronics content was rapidly increasing. It's up to almost 30% of vehicles, and it's projected to move to 50%. The association is primarily represented by metal and plastics companies. If we don't get on board with electronics in this country, we're going to no longer enjoy the 17% of vehicle-build content we have, which almost represents our purchases of vehicles. We'll be left well behind in automotive parts as a major global industry going forward.

When I took the board position, they asked me to chair a special committee, which we call the Connected Vehicle Working Group, to try to work with government, academia, and industry to see if we can develop solutions and foster growth in advanced automotive electronics in Canada.

Automotive electronics has changed a lot in 25 years. There was nothing much more than radios back then, and they were normally built in factories that were captive to the OEMs. That's changed. It's a highly competitive, rapidly growing, international business with global competition.

We've seen the electronics content in our cars increase. What many people don't realize is that even where there is a mechanical system, electronic controls have taken over and are running the mechanical systems of the car. This has created a great electronic platform that's really going to support some tremendous growth in vehicle electronics and capabilities over the next decade or two.

I want to talk to you today about two emerging areas of technology where I think Canada can be a key player. And I think the timing to make this happen is now.

The first area is infotainment and telematics, often referred to as the connected car. I think you've all seen navigation systems that came in 10 or more years ago. Then lately we've seen OnStar, Bluetooth, and Ford SYNC. The content of these components is very significant. Sometimes the most expensive components in a car are some of these electronic systems.

I'm not really worried about the people who want to get their e-mails or stock quotes. What's more important is that these systems are starting to communicate about where you are. They're helping people navigate. They're avoiding congestion, which helps reduce accidents and improve fuel economy. And they are going to play a big role in the efficiencies of our highways going forward as they start interacting more and more with the infrastructure of the highway system and the vehicles. Vehicles are going to be talking to each other and the intersections on dedicated frequencies. It's going to really revolutionize what we can do.

From various conferences I've been at, it's clear that globally, highway systems, especially in urban areas, are as big as they're ever going to be. The demand for personal mobility is going to continue. Some of these advanced technologies are going to be the ways we get more people efficiently and safely through the corridors we have in the future.

The second area I'd like to talk about is safety, collision avoidance, and autonomous vehicles. These things are moving ahead very quickly. We've seen over the last number of years airbags, seat belts, new crash zones, intrusion beams, and five-star safety ratings. These have had a huge impact on safety, with tons of societal spinoffs and benefits from reducing accidents.

However, the safest vehicle is the vehicle that isn't in an accident, and this is where the automotive industry is going, and this is where some regulatory groups are going.

NHTSA is considering a new five-star rating to promote this way of thinking among the OEMs and to create competition and advancement by looking at five stars of collision avoidance.

● (1115)

We'll start to see technologies like blind-spot detection, radars, rear rollover protection. A number of these things earn stars showing that this car is going to avoid being in an accident in the first place. You're going to see 360-degree vision and sensing around vehicles.

The OEMs are working on developing these technologies as we speak. First you're going to see warning systems, for instance, with blind-spot detection. They'll put a dot on your mirror.

More and more these advanced systems are taking control away from the driver, and I think we're going to see this trend continue.

You already have electronic control of the engine, power train, suspension, brakes, and steering. Cars can park themselves by scanning a parking thing. There are cars you can buy right now that won't let you drive them into a wall, even if you want to.

You may not realize that some of the autonomous systems are already taking control away from you right now. You don't ask the anti-lock braking system to come on; it comes on when it knows it needs to. With advanced stability control, when you finally throw your car totally out of control, it starts moving brakes, adjusting suspensions, and it says “I'll get you back on the road; just give me a second.” It basically takes control away from the driver to prevent accidents.

These are just the beginnings of where this is going.

The other things we're seeing are higher and higher fuel economy standards. Again, I was with my son—he was looking for a car—and we were looking at a new Honda. I touched the body panels, and they were already so thin that you could push them in with one finger. This is going to continue. Cars have to be lighter to improve them. These collision avoidance and advanced technologies are going to be key in providing the safety and protection of the next generation vehicles we're going to see going forward.

We're also now seeing a convergence of the autonomous and advanced safety systems and the connected vehicle. They are starting to work together.

I don't know how soon—the sooner the better, as far as I'm concerned—but you'll be able to get on the highway and link in behind a platoon of vehicles. I drive to Detroit often, once a week or more, and I'm looking forward to linking in behind a platoon, getting onto my e-mail, and disconnecting from the platoon in Windsor.

These technologies are already being developed in Canadian universities and others, and I think this is where it's going.

In the agricultural, construction, and mining businesses, this is already happening. The drivers are being taken out of major mining equipment for safety and efficiency reasons, and it's the same with agriculture and so on. As a matter of fact, tomorrow I'm flying to California to meet with a group specifically on autonomous control of agricultural vehicles.

There's a lot going on. This is an explosive growth period, and the question is, how can Canada be a player in this? The reality is that the core technologies are areas of strength that Canada has from other industries and other investments in R and D over the years. We have a great background in core technology and wireless and telecom. If you look at the connected vehicle, there are some very complex technologies required by the vehicle in the transportation industry right now that are going to be coming from these places.

You already have GPS and cellular coming into your car, which you're aware of, but you also have another RF managing your key fob and another one managing your tire pressure monitoring. We're going to have DSRC radios talking car to car and car to infrastructure. These are very complex wireless telecommunication problems that need to be solved on a massive scale. I think Canada can play a role by transporting the technology it has from other industries into this space.

Similarly, with the autonomous vehicle controls, we're looking for sensors that come from aerospace. We're talking about advanced radars, ultrasonic infrared sensors and more, using MEMS technologies. I know that a lot of this technology exists in Canada, and it's time to apply it to the automotive industry.

The auto manufacturers have been a pretty closed shop on who their suppliers are most of the time, but in my entire career I've never seen them more open to talking to people from other industries—small companies and large companies—to find the technologies they're looking for. They don't exist in traditional automotive electronics suppliers. Even the large automotive electronics suppliers are going to aerospace companies or telecom companies to buy segments of them and participate in this growth market.

● (1120)

The Chair: Could you wrap-up, Mr. Hughson, please?

Mr. Earl Hughson: Let me say what Canada can do. I think the highest impact thing we can do is to fund demonstrations of Canadian technologies in automotive applications.

The automotive industry is from Missouri; it's not from Tokyo or Detroit. They have to see a physical demonstration. The most advanced graphs and PowerPoint presentations won't get you in the next meeting. Equipment installed in a car and demonstrated to them will get you a purchase order.

The Chair: Okay, I'm going to have to....

You'll be able to add more as questions come. Thanks, Mr. Hughson.

We'll now move on to HD-Petroleum. We have Mr. Todd Habicht and Jack Winram.

Mr. Todd Habicht (President and Chief Executive Officer, HD-Petroleum Inc.): Good morning, Mr. Chairperson and committee members.

Thank you for the opportunity to present to this committee. Our presentation today will follow the outline requested by this committee and provide answers to the three questions.

In brief, HD-Petroleum is a company that recycles waste motor oil into diesel fuel. This technology was brought in, via my grandfather, back in 2006, and it has given me the opportunity to develop and commercialize it. Each day, every oil change done on an industrial or commercial basis—in the cars we may have driven to work today... each day that oil is changed adds to the ongoing problem.

The diesel fuel that we at HD-Petroleum produce is not a biodiesel. It is a pure petroleum product. We simply take a hazardous petroleum material and truly recycle it into a green, reclaimed source of energy.

On what innovative transportation technologies are important to our business and why, HD-Petroleum has an innovative technology that substantially reduces harmful sulphur emissions compared to current waste oil processing practices. We're a Manitoba company that has developed and commercialized a micro-refinery technology that recycles used crankcase oil into valuable transportation diesel fuel.

The HD-Petroleum process can remove up to 96% of sulphur from waste oil, ranging from approximately 3,500 to 5,000 parts per million, and reduce the amount below 100 parts per million of sulphur content. This meets the low sulphur requirements.

When this project was initiated, the standard in Canada was the LSD, or low sulphur diesel, fuel. Recently, Canada and most of the world has adopted the ultra-low sulphur diesel fuel requirements, which is 15 parts per million or less. In many parts of Canada and the world, used crankcase oil, if it happens to be collected, is often burned as an unrefined industrial process fuel. Statistics on the amount of used oil that is burned is unclear; however, it is safe to assume in Canada that it is the hundreds of millions of litres.

What we do know is that in 2011 Canada consumed 1.1 billion litres of lube oil, of which approximately 196 million litres are currently being refined, with the remainder lost in use, burned as an unrefined fuel, or simply inappropriately disposed of or inappropriately stored.

HD-Petroleum's recycling technology, while bringing value to a used, non-renewable hazardous resource, also substantially reduces harmful emissions like sulphur and greenhouse gas, as well as displacing emissions and costs associated with the production of fuel from crude oil.

The summary of this micro-refinery technology simply brings the solution to the oil, rather than bringing the oil to the solution. As waste motor oil is distributed to all parts of Canada, including the northern communities, we can provide a locally generated source of energy while cleaning up a locally generated source of contamination.

The second question is what barriers are facing users of these technologies or the entrepreneurs of the companies.

Despite reducing sulphur emissions by up to 96% in the case of HD-Petroleum, users of this technology are faced with a limited fuel market because the economic costs to reach ultra-low sulphur diesel fuel requirements using a conventional hydro-desulphurization process is cost-prohibitive on a micro scale.

Not only is this a barrier to advancing sulfur-reducing technologies, but also the burning of waste oil as a dirty fuel continues to be the foremost alternative for many industry users.

For years, Canada has incrementally moved towards reducing sulphur emissions, and rightly so, due to the extremely harmful impact on health and emissions in the environment when sulphur is emitted into the atmosphere. However, the fuel regulations did not, nor could they, consider waste oil as an industrial fuel source, which has excessively high sulphur concentration, as I previously noted.

In addition, a regionally based, cost-effective technology to manage recycling and waste oil did not exist until now. Today, HD-Petroleum has technology that is capable of substantially reducing Canada's overall sulphur emissions from the existing waste oil use, and it is anticipated that, over time, additional inventors, innovation, and entrepreneurs will continue to discover new technologies in this area.

However, the current regulations requiring less than 15 parts per million of sulphur content for diesel fuel creates a substantial market barrier for those technologies.

● (1125)

I will take a moment and summarize our answer to question number two. In this room there are certainly some members who are very smart. Then there are...the rest of us. After all, when we think back maybe to grade 11 and taking home a report card, it wasn't all of us who took home a report card that had a 100% mark. But if we think of taking home a report card that had a 96%, I know how proud my parents would have been. Quite frankly, they'd have been more shocked and surprised. Report cards with 96% were not something that I brought home.

What we're proposing today, what we currently have, is a 96% solution to the problem. We will get to 100%. The improvement is coming. We just require the support of this innovative and green technology to allow us to economically pursue this.

In summary, we're at 96%. It is net-cost neutral. There is no cost input and no cost output required from the government. We create a micro-refining process in the community where the haz-mat material is generated, offsetting the need for importing a portion of diesel fuel into that community.

As to the third question of what we would like the Standing Committee on Transportation to consider, our recommendation is that, in the case of recycling technologies relating to petroleum waste plastics or waste oils, the conversion to a marketable transportation fuel like diesel should be permitted to meet the less demanding, low-sulphur designation, rather than the ultra-low sulphur designation, wherever the overall net emission reduction is significant. This recommendation meets the intent of the low-sulphur fuel regulation to reduce Canada's emissions.

We recognize that technology development is a constantly evolving process and is impossible to anticipate through specific policy changes. Therefore, we believe that the best method of making policy-makers aware of technologies showing a net reduction in sulphur emissions is to consider them on a case-by-case basis, through an exemption process to the appropriate regulating body. This approach brings a solution to the barrier without negatively impacting existing users in the industry that are currently relying on the burning of unrefined and untreated used motor oils.

The Canada that we're all so proud of happens to be really big, and the business of transportation creates a terrific amount of waste motor oil. We don't live on a small island. We're not in a European community where cities are all relatively close together. To move something from our inland ports to our coastal ports, to the people who need it, requires a terrific transportation network. The generation of this vital piece to our society happens to generate one of the most significant sources of waste motor oil. We at HD-Petroleum are confident that there are many opportunities for green technology to advance with the support of the regulatory considerations we are requesting.

Thank you for your attention to this matter.

● (1130)

The Chair: Thank you very much.

We'll now go into questions.

With that, I turn it over to Ms. Chow.

Ms. Olivia Chow (Trinity—Spadina, NDP): I know that HD-Petroleum received a community adjustment fund of close to $500,000. Are you receiving any other federal funding? And I ask the same question to the other two witnesses.

Mr. Todd Habicht: At this point we have no additional requests for funding.

Ms. Olivia Chow: And the others?

Mr. Greg Tarasco: For Blueprint Energy—a little history—of the $10 million cited in the R and D, a significant portion of that was from NRCan for the Canadian Space Agency, IRAP programs. These were pure R and D plays that satisfied one-off projects for the Government of Canada. So there was economic value in that. It was not just an R and D exercise; they were for specific projects.

We are in the process of finalizing an Automotive Partnership Canada, APC, request for $1 million, for which we have to do 50-50 matching. My preference is to use the capital markets; however, the landscape drives us to use the government as much as possible.

Ms. Olivia Chow: To be precise, the original NRCan is about $1 million, and you're looking for $500,000—

Mr. Greg Tarasco: No, the original $10 million of projects over a decade, where this science and technology was developed, was for projects that benefited the Government of Canada and Canadian entities. NRCan was a large part of that, but that was overall projects. Specifically for the commercialization of flywheels into the transportation industry, $500,000 of the $1 million projects is coming from Automotive Partnership Canada, and we are in partnership with the University of Windsor on that.

● (1135)

Ms. Olivia Chow: Right. That's already received, and you're looking for another—

Mr. Greg Tarasco: That's in the final stages, not received yet.

Ms. Olivia Chow: Okay. And this gentleman from Scarborough....

Mr. Earl Hughson: Currently my company isn't receiving any government funding. I'm licensing two technologies from a Canadian university and a third technology in advanced sensing from another Canadian company, and I'll be looking for funds to assist me there.

On behalf of the APMA and the Connected Vehicle Technical Committee, we've requested FedDev funding of $1.3 million, which would be broken down to support 10 to 15 Canadian technologies to prototype their technologies for demonstration to automotive manufacturers.

Ms. Olivia Chow: If the decision-making process were much faster than the 6 to 12 months, it would be helpful. That's one of the recommendations I've heard. Everybody's nodding their head. Faster is better than 6 to 12 months.

What do you think would be a reasonable time? The federal government has to do due diligence. Is it one month, five months, six months?

Mr. Greg Tarasco: That requires a very long answer.

Really it should tie into the industry norm, the 30 to 90 days of the capital markets. At that point, there's a litmus test that this is either a go or a no go project. The challenge is that the government has to satisfy its mandate and be responsible with the funds it provides, and that's understood. It's in contrast to the requirement of the commercialization, or the industry, which moves at a faster speed than government. One is not better than the other; there's just a misalignment.

Anything that can draw the process down, or a program that can facilitate earmarked projects, however broadly defined that may or may not be, to fast track, for lack of a better term, into that would be seen as favourable, because it matches the reality that companies need to address commercial problems and challenges in the market and they can't wait to address them. If they do, that window of opportunity may close and foreign competitors may take that opportunity.

Ms. Olivia Chow: May I ask HD-Petroleum, maybe Todd, have you been able to establish your refinery, and what capacity do you have right now in terms of converting oil to refined diesel fuel per year?

Mr. Todd Habicht: Certainly. I'll address that question.

If I can first make a correction, Jack reminded me that we are receiving some ongoing IRAP funding for one engineering person. For that we're very grateful. For the record, we have $50,000 IRAP funding for that.

I know Jack may also have a comment that may be complementary to your question.

To answer your question, the full-scale commercialized facility was successfully operated in 2011. The game plan for 2012, to be able to take it to a commercialized product that we can package and market, required a significant engineering effort, of which a portion was essentially that the engineering people had to go inside the interior of the actual refinery to take samples, a chemical metal decomposition analysis, to be able to finalize the engineering process.

We're expecting our commercialized unit to be in production by the end of this December.

Ms. Olivia Chow: Of this year?

Mr. Todd Habicht: Yes, of this year.

The volume on that is targeted. Our volume is 1,000 litres of output per hour; that's around 7 million to 8 million litres of production per year.

Ms. Olivia Chow: That's per year, and you have been able to find some private financing. You were looking at a $2 million target by closing date. Have you had some luck in getting some?

● (1140)

Mr. Todd Habicht: Yes, we've been very successful at that.

Jack has a comment regarding some of the overlap or the timing with funding.

Mr. Jack Winram (Vice-President, HD-Petroleum Inc.): I can speak from experience about what Greg was talking about and the programs the federal government delivers, and linking those with the speed of business. We went through the process of taking a look at the SDTC program, the Sustainable Development Technology Canada program, and if the evolution of your company does not line up with the windows of application for these programs, you can't apply, because you will miss the windows or you'll be forced to rush an application that doesn't have the proper due diligence with proper agreements with stakeholders.

I just wanted to pass on that we experienced what Greg was talking about first-hand.

The Chair: Thank you very much.

Mr. Coderre, seven minutes.

[*Translation*]

Hon. Denis Coderre (Bourassa, Lib.): Thank you very much, Mr. Chair. That is very interesting. We have heard about a number of possibilities with regard to new technology. I will be honest with you; what interests me right now is intellectual property and regulations.

A person can have a wonderful idea, but if he does not have the necessary support from Transport Canada, for example, in terms of certain regulations or the fostering of the investment environment, then there is a problem. Our role here is to make recommendations, particularly with regard to regulations. We must ensure that we are a catalyst and not an inhibitor when it comes to technology.

Mr. Habicht, if I understand correctly, you would like smart regulations to be established that would eliminate paperwork and promote a system that operates on a case by case basis. You spoke about a percentage of 96% to 100%, which I found interesting. To reach 100%, we must change sulphur content labelling. Do you also need other partnerships in which the government could play a role or do you have sufficient regulatory measures in place that allow you to be specific?

[*English*]

Mr. Todd Habicht: The two-part answer is, first, as we stated in our request, when a regulatory body or an act is created, by design, it cannot keep up with the innovation that comes. So our request is that within that there be an opportunity for innovation to come to that regulatory body with a request that says, “The spirit of this act is this. We believe we are meeting it, but we need this to be considered on an individual case basis.”

In terms of transportation and the petroleum industry, the act is very necessary, and it's critical that the traditional diesel fuel and petroleum gasoline that is generated meet the requirements. We support that, and we don't question the value of ultra-low sulphur diesel. However, when we're tackling a global waste management issue of haz-mat, innovation can take time.

HD-Petroleum is not a research and development company. We are a for-profit company that feels we need to get this product to the marketplace as quickly as we can. We do have very encouraging results coming back from some of our next generation testing and innovation for the removal of those last few parts of sulphur. Just so you understand, sulphur gets more difficult to remove the lower you get. The last few percentages take more energy to get out than the first 30%, so as we get to those last few percentage points, it becomes challenging. Some very encouraging results are coming back; however, it will take time. In the meantime, each day that we are not in production in an area that waste motor oil is indiscriminately burned or disposed of in a way that isn't helpful to the environment...we could be providing that 96% solution to northern power generation, northern communities, and areas of the country that simply do not have the population centres for a traditional refinery.

● (1145)

Hon. Denis Coderre: Come to Quebec, too.

[*Translation*]

Mr. Hughson, we are moving more and more into a digital era. You are talking about all the intelligent systems, including SYNC. Are you satisfied when it comes to intellectual property? This is not just a matter of saying that we will bring Missouri's technology to Canada. You know that Montreal is a digital capital. Many things are also being done in Calgary and other places.

Right now, what is the status of our own regulations? We want to ensure that we can maintain our share of the market and be people who will not only promote but also carry out projects in order to be involved in anything that has to do with intelligent systems in this car.

[*English*]

Mr. Earl Hughson: I think with some of these advanced systems the technologies are still developing. The automotive industry will fit within the legislation for other wireless telecommunication systems and so on. It must.

The primary thing that Canada needs to do to be successful is to collaborate and harmonize with other jurisdictions, preferably global, and participate in those activities that are taking place now, that are setting standards for these advanced systems, but especially the United States and Mexico. There can be differentials between vehicles for Europe and other countries, but certainly when a vehicle drives into a Canadian city or an American city, it needs to have the same access to the same infrastructure, as these technologies come along.

For example, the vehicle-to-vehicle frequency for DSRC is reserved in the United States for that purpose. I know we've talked to the government about making sure Canada reserves that. For us not to have that frequency available when it's going to be 100% mandated on U.S. vehicles fairly soon would be a huge mistake; we'd just lose all of the benefits, and our companies would lose their credibility for participating in this market.

So harmonization and participation in those processes, especially in North America, are vital.

The Chair: You have about 10 seconds left.

Hon. Denis Coderre: What about smart regulations? There are issues with red tape. I remember in the past that we've focused on that being the way government works. It's not only just based on risk management and all that. What about smart regulations as a recommendation?

The Chair: You're basically out of time.

Hon. Denis Coderre: Think about it. We'll talk later.

The Chair: You'll maybe get a chance to comment on that.

Mr. Poilievre, you have seven minutes.

Mr. Pierre Poilievre (Nepean—Carleton, CPC): Starting with HD-Petroleum, you have a recommendation for a regulatory change. Is that correct?

Mr. Todd Habicht: Yes.

Mr. Pierre Poilievre: Do you have it on paper in a way that is exact and succinct?

Mr. Todd Habicht: It certainly can be provided.

Mr. Pierre Poilievre: Okay. We would need that very quickly for it to be considered for the final report. Thank you.

Is anyone else at the table recommending a regulatory change to make it easier for your technologies to reach the marketplace?

Mr. Greg Tarasco: Yes, Mr. Poilievre.

My summary notes do have these five points. One copy was provided and not translated—sorry for that. Policies around investment facilities would allow technologies to be brought to the commercialization stage in an easier manner. It has really to do with the.... Actually, to address Mr. Coderre's point, it's around IP and the facility of commercialization, and the investment culture that needs to be put in place—

Mr. Pierre Poilievre: Okay, but is it a regulation?

Mr. Greg Tarasco: Yes, it is.

Mr. Pierre Poilievre: What is the regulation?

Mr. Greg Tarasco: Well, it would border more on a CRA perspective, because it's investment in the technologies, although it does cross into seemingly transportation technologies. The ideas are laid out in five bullets. I don't know which specific policies or acts they would be applied to, but they are delineated in my—

Mr. Pierre Poilievre: But there is a regulation you need removed or streamlined in order to get access to more investment capital? What is it?

● (1150)

Mr. Greg Tarasco: Sorry, no. They are recommendations to help facilitate.... I have the five points right in front of me. They are delivered to you, instead of explaining it. They're bullet points, but there are details to it that must be elaborated.

For example, on tax credits to investors.... Do I have time to give an example?

Mr. Pierre Poilievre: Coles Notes.

Mr. Greg Tarasco: Coles Notes.

An early-stage company looking for money typically can't find investor capital and has to go to traditional friends and family. Friends and family come up with $1 million because they believe in this idea, the technology, and there's a commercial value. That $1 million of invested seed capital from friends and family, in our opinion, should be directly applied as a tax credit against future tax. That removes the government from having to fund early-stage companies, and it puts the onus more on the investor and the technology. It's a facility to draw them closer together, which is the initial problem to begin with, as an example.

Mr. Pierre Poilievre: So it's tax treatment in that setting.

Mr. Greg Tarasco: Tax treatment, yes.

Mr. Pierre Poilievre: Good.

Are there any transportation regulations that need to be changed in order to commercialize your flywheel technology?

Mr. Greg Tarasco: This is a particular challenge; there is no regulation because flywheels aren't in vehicles right now.

You'd have to write a whole new policy surrounding safety—

Mr. Pierre Poilievre: Do you need a new policy?

Mr. Greg Tarasco: We'd need a whole new policy revolving around flywheels.

Mr. Pierre Poilievre: But is there anything that would stop you from putting a flywheel in a car right now? If there is no regulation, what would stop you?

Mr. Greg Tarasco: No, nothing.

Mr. Pierre Poilievre: Okay, well maybe you're better off that way.

Mr. Greg Tarasco: I will take that under advisement, sir.

Voices: Oh, oh!

Mr. Pierre Poilievre: Sometimes if you wish for regulations you might...you have to be careful what you wish for.

Mr. Greg Tarasco: Well, from a safety perspective there is.

Mr. Pierre Poilievre: Any regulations that need to be changed?

Mr. Greg Tarasco: No.

Mr. Pierre Poilievre: Mr. Tarasco, to summarize your technology for the non-engineers in the room, when the driver hits the brakes, they create energy that makes a wheel spin inside the car. When the driver hits the gas pedal later on, energy from the spinning wheel helps power the car forward. Is that it?

Mr. Greg Tarasco: Correct. In a nutshell, that's it.

Mr. Pierre Poilievre: I have a question for all of the witnesses to answer as succinctly as possible. If your idea has a viable business case, why would the government need to help, and if your idea doesn't have a viable business case, why would the government want to help?

Mr. Todd Habicht: We do have a very viable business case, and the private investors have certainly been very welcome to our opportunity.

Mr. Pierre Poilievre: Why do you need government help for it?

Mr. Todd Habicht: It just comes down to the regulation on the sale of our product. We are able to sell it today but with the new ULSD standard, our market is limited right now to stationary diesel generation.

Mr. Pierre Poilievre: You don't need a subsidy, a grant, a loan, anything?

Mr. Todd Habicht: Nothing, no. In fact, we—

Mr. Pierre Poilievre: You just need to get a change in government regulation.

Mr. Tarasco.

Mr. Greg Tarasco: The government funding is required generally to fill the gap or void left by an investment community that's not willing to take on risk in early-stage companies. While we prefer not to have government funding, it is necessary to fill early-stage gaps to get it to a stage where it's recognizable by industry.

Now, on that, at some point there should be a litmus test or a cut-off point that you can't keep going back to the well.

Mr. Pierre Poilievre: Right, I'll come back to that point in a second.

Mr. Hughson.

Mr. Earl Hughson: What we're experiencing in our new start-ups with technologies, as are many Canadian companies I'm talking to right now, is that there is a tremendous amount of funding to get Canadian technologies to the point where they're bookshelf-ready. There is a lot of commercial funding available once I get a purchase order from the customer, and there is this gap in between. Bookshelf technologies are sitting there and there is no commercial funding available to demonstrate.

Mr. Pierre Poilievre: What I don't understand is, if it's commercial.... People always say, "Well, there is no funding for commercialization." Why do you need government money for commercialization? Isn't that sort of counterintuitive? Commercialization is commercial. You make your money by selling the product, not by asking the taxpayer to provide it.

Mr. Earl Hughson: As I said, as soon as you can have a customer enter into a development contract and a purchase order with your technology, you're very good. There is this gap between having the technology proven and having it demonstrated that seems to be a hole for an awful lot of companies. It's crossing the chasm here. We leave at bookshelf technology, and that graph won't get you a second meeting with a car company until you do this demonstration. Once they're engaged, then commercial support is quite available.

● (1155)

Mr. Pierre Poilievre: But if the technology in general is promising and the potential reward is there for the investor, why does the taxpayer need to get involved? Isn't that why we have investors?

The Chair: That's time.

Mr. Earl Hughson: Yes, it goes more to the friends and family search for investment. I think we could be an awful lot more productive in moving our technologies we've invested in to commercialization with a very small amount of focused funding for demonstration.

The Chair: Thank you.

Mr. Watson, you have seven minutes.

Mr. Jeff Watson (Essex, CPC): Thank you, Mr. Chair. Thank you to our panel of witnesses today. This is one of the better panels that we have constructed here, I think.

I have a few questions. First, in thinking about R and D models, university-led research, which is effectively the model in North America, Canada and the United States, hasn't produced major innovative technologies in terms of commercialization that bring revenue back for its use. I'm thinking of warfarin, which is a blood thinner, Gatorade, and voice-activated calling. Of the three, that's the most recent in terms of technology. The other two, of course, are decades old.

Look at the Fraunhofer model in Germany, for example, where for 30¢ on the dollar of government investment, the model has produced everything from MP3 compression algorithms to video compression; triple junction solar cells, which I think still hold the world record for solar energy conversion efficiency; E-Puzzler, which is a system, if you will, that will allow you to repiece shredded documents; and a number of other technologies that are all much more recently converted and that are commercialized into revenue streams in the hundreds of millions of dollars, cumulatively.

Do we have the wrong model in Canada for research and development as it relates to involvement with businesses?

Mr. Earl Hughson: I think so. I've worked with a number of universities.

As I mentioned, I'm just signing a licence agreement for some technologies out of Canadian universities, and I've contracted Canadian universities to do R and D for me in areas where I thought there was a viable product to commercialize. I've also worked with AUTO21 since its inception, supporting them in any way I could, because I think it's a good initiative to get industry and academia working together.

For example, when I first saw AUTO21 when it started many years ago, I asked for a list of the sponsored projects in automotive electronics. I know pretty well everybody in automotive electronics and I was interested to know what was being funded. There was a complete mismatch for all the programs that had been funded, which had great technical merit; there wasn't one company in Canada that was in that industry or space or product area.

Aligning, at least, spending money in areas where there are companies that can even potentially pick up the technology and commercialize it within their venue, makes an awful lot of sense, rather than developing technologies that are really being commercialized by companies in other places.

Mr. Jeff Watson: Mr. Tarasco, do you have a comment too?

Mr. Greg Tarasco: Yes, and this is multi-faceted. It's a great question, in that yes, the system is wrong simply because it doesn't address industry specifics.

To go back to Mr. Poilievre's question, this is wholly dependent on the industry, and the reason in the transportation industry that there's a propensity to use government funds is because the cycle is longer and you're dealing with the large industries that are slow moving in adapting.

Mr. Jeff Watson: In terms of the difference between the granting council model that we have here and the Fraunhofer Institute model, for example, is it overly simplistic to say one has a more bureaucratic mindset and the other has a more entrepreneurial mindset?

Mr. Greg Tarasco: It's not simplistic.

Mr. Jeff Watson: And that's just mindset, but in terms of its construction.

Mr. Greg Tarasco: That would be accurate. It's a culture, and you would be wholly accurate in that assessment. What you want to do is be a facilitator for entrepreneurs to get to the capital markets, or the commercialization. It's one and the same.

Capital is the lifeblood of industry and business, and they must have early access to that as soon as possible. Any measures that facilitate that would be great. Sometimes the challenge is.... We live in a bubble here in Ottawa, and we are fortunate that we have access and knowledge of all these programs; it may not be so outside of the city boundaries. However, I've met many entrepreneurs in my life who are just confused and perplexed by the complexities of government, and their first road, the first route—it's the culture—that entrepreneurs take to seed capital is through the government. That has to change. The notion that they first should seek money in the capital markets must be a cultural change.

● (1200)

Mr. Jeff Watson: One of the upsides of the way we've done research and development is that we've actually built a tremendous amount of university capacity, lab research capacity, for example.

How do we better connect, for example, small and medium-sized businesses into that infrastructure? Is the current model that we use here effective in connecting small and medium-sized businesses and what their research needs are into that type of infrastructure, or do we need a change there?

Mr. Habicht.

Mr. Todd Habicht: In our case and our experience on the first part—ingenuity—I was fortunate in my grandfather. When he passed away last November, the *Globe and Mail* ran a full-page obituary on him. He was listed as one of the great inventors of Canada. One of his inventions was the modern-day combine. If we had cereal, pancakes, or toast this morning, we can give thanks to my gramps.

From there he went on to work in road construction, and that's where he became exposed to the disposal of waste motor oil. He felt there was a better way. With no backing of any research facility or any government, he quite literally started tinkering in his backyard. He created it and almost had it figured out, and we've since finished it off. Fortunately, he did live to see the thing work. That was a proud moment for me personally.

But I've had experience since then. I recently had the privilege of touring a place called Brainport in Eindhoven, in the Netherlands. It's a fascinating micro example of university, business, and entrepreneurial ingenuity coming together and working in such an open format that the inventor—the developer—is not concerned that some guy is going to steal his idea and run a no patent to him tomorrow. They work so collaboratively, and with their access to capital, just the physical building, the environment where they work is very stimulating.

Mr. Jeff Watson: If you'll allow me to interrupt for a second, collaboration as a partnership is a good thing, but who drives the research and development in the country? Should it be researchers or business?

The Chair: Mr. Habicht, would you answer in a couple of seconds? I've given everybody a few extra seconds.

Mr. Todd Habicht: We think it should be need driven. Where there is a need, it should be driven by the need.

The Chair: Thank you very much.

Mr. Aubin, you have five minutes.

[*Translation*]

Mr. Robert Aubin (Trois-Rivières, NDP): Thank you, Mr. Chair.

I would like to take a few seconds to congratulate you on your appointment to chair. I was not able to be here last week. It is a pleasure to work under your direction.

Hello gentlemen. Thank you for being here with us. Clearly, five minutes is very little time in which to share so much expertise. We should also exchange business cards so that we can keep in touch.

My first question is for Mr. Hughson. At the very beginning of your presentation, I believe that you gave an important statistic, but I am not sure whether I understood you correctly. You said that, right now, 30% of cars have a high amount of electronic content and that this number is projected to move to 50%. Is this the statistic that you gave?

[*English*]

Mr. Earl Hughson: The statistics we're seeing are that the electronic content of vehicles has climbed to about 30% of the cost of the vehicle and it's moving towards 50%. This area of technology is very significant compared to the past.

[*Translation*]

Mr. Robert Aubin: So this is not an objective to achieve but, rather, a consequence of the development of vehicle technology. It was 50% of the cost.

Approximately how many years will it be before 50% of the cost of the car is related to computer technology innovations?

● (1205)

[*English*]

Mr. Earl Hughson: The content is going to increase continuously. This decade is going to see a tremendous amount of growth as the sensors take over the vehicle and as the infotainment systems explode to a very high percentage. It will be gradual over the next ten to fifteen years.

[*Translation*]

Mr. Robert Aubin: How could the federal government become a partner in enhancing Canada's visibility both nationally and internationally so that our country can become a major player or a more important player than it is right now in this field?

[*English*]

Mr. Earl Hughson: I think, again, funding demonstrations of Canadian technologies into this market...the time is now. For example, it's already impossible to take the technology and put it on a 2017 vehicle. If it's already proven in the automotive environment, we are looking at 2018 and 2019. There are all kinds of Canadian technologies available that need to be demonstrated into this environment before some other country or companies do it, technologies that are going to have those very advanced systems going forward.

These are very advanced systems. They're very small. They're very exportable. They're made on highly automated manufacturing systems. They are the ideal sort of product for Canada to get into. The core technologies are here, but I think we need to create a stimulus to find those technologies and do it.

In the last one to two years, I have gone out through my committee. We've found 30 to 50 small Canadian technology companies that have relevant technologies. I took a list of 35 to General Motors Canada and asked, “Are you interested in meeting these?” They took a short list of 28. We set up a demonstration of 28 small Canadian technology companies that are traditionally outside of automotive but have relevant technology.

After we did a one-day technology show at GM's Oshawa engineering centre, six or seven of those companies started moving forward with General Motors. This same group of companies is looking for demonstrations because car companies are saying, “Show us.”

[*Translation*]

Mr. Robert Aubin: You are talking about demonstrations, but can you give me concrete examples? Are we talking here about renting a booth at a car show to demonstrate a technology or are we taking about creating prototypes that could be seen on our roads?

[*English*]

Mr. Earl Hughson: What we need are vehicles equipped with the technology in a functional manner such that they can be demonstrated to the major tier ones and the OEMs—manufacturers. What I'm finding is that a lot of these companies are spinoffs of universities, with developed technology. They may be spinoffs from people who came from some of the large Canadian telecom companies and who have a unique idea on how to apply this. They're fairly small businesses that have the technology and are moving in this direction.

As for funding and the association, what we can do, if they can present the technology the way the companies need to see it—in a very practical application—is put them in front of the vice-presidents of the car companies globally. The Canadian embassies are doing a fantastic job of supporting this effort. We need to get these small companies into a position where they can get their technology out of a PowerPoint and into a car.

The Chair: Thank you, Mr. Aubin. Your time has just expired.

Mr. Holder, you have five minutes.

Mr. Ed Holder (London West, CPC): Thank you, Chair.

I thank our guests for attending this morning. This has been fascinating.

I'd like to reinforce earlier comments that we would ask you to undertake to provide the clerk with any specific regulatory change requests you might have. I think time is of the essence; as I say that, I think you'll understand.

If I may, I'd like to start with Mr. Habicht. Did I say that right?

Mr. Todd Habicht: That's very good.

Mr. Ed Holder: All right.

You talk about your technology removing some 96% of sulphur as you recycle waste motor oil. You also made a reference going back to grade school; I actually can't ever recall getting 96%—not even close.

But you know, my Cape Breton mom used to say, "Don't let great get in the way of the good." I think 96% is actually better than good. Can you help me understand what that issue is for you and what that extra 4% means?

Mr. Todd Habicht: Yes. I am going to turn that over to Jack, because I hear that in our office all the time. Jack comes around mumbling that—

● (1210)

Mr. Ed Holder: Are you from Cape Breton, Jack?

Mr. Jack Winram: No, I'm not. I'm from Manitoba, but the perfect is the enemy of the good, which I believe, if I'm not mistaken, is a Churchill quote.

Mr. Ed Holder: He learned it from my mother.

Voices: Oh, oh!

Mr. Jack Winram: To go back to what our ask is in terms of regulation, in time, as Todd said, we can get there, but the legislation does not allow any opportunity for a reprieve to allow us that time to get there.

Right now the limit on sulphur is 15 parts per million. We can get to under 100 parts per million, down from a fuel that is currently being burned at 3,500 to 5,000, sometimes even 6,000, parts per million. One might ask why not simply ban the burning of used oil if it's so nasty. Sulphur is not the only thing in it. I can provide you with a whole list of really nasty things that go into our atmosphere and therefore into the water table, like acid rain, like asthma-causing gases, like carcinogens, that pollute our land and water. Basically we want to create an alternative for those industries without banning it.

The Province of Ontario actually tried to ban the burning of used oil. There was some pushback from stakeholders in that industry, who said "You can't ban it; you don't have a solution for us to do anything with it. If you ban the burning of waste oil, what happens to it? It simply builds up in inventory. You haven't provided a solution." So they had to back off from their legislation and they exempted industry, agriculture, and all northern communities, because those industries and those communities won't have anything to do with it.

We're asking for not necessarily a change in regulation, but an opportunity to have a regulation that will allow us to ask for either an exemption—I don't know what the mechanism is, whether it's a ministerial exemption—

Mr. Ed Holder: I'm sorry, I've got limited time, but I would say that I'm sure that will be clear in your submission to us. Time is of the essence.

Mr. Jack Winram: Absolutely.

Mr. Ed Holder: Mr. Tarasco, I'm very compelled by your technology—in fact I'm compelled by what all of you do—and I'm trying to understand. When you talk about flywheels versus batteries, I thought I heard you say in testimony that you haven't put these into any vehicles as yet.

I have two questions. Number one, why do they have to be hybrids only?

Number two, if I might, why haven't they been put into vehicles as yet, if I've understood that correctly?

Mr. Greg Tarasco: We haven't. They have, though, been put in vehicles. As a matter of fact, this is not a case of if it's going to happen; it's a matter of when it's going to happen.

Williams Hybrid, one of our competitors from Europe, who we're in a race against, actually has this in endurance racing. Their Audi R-18 e-tron came in first and second place—

Mr. Ed Holder: Was that in North America?

Mr. Greg Tarasco: No, in Europe. It's Frank Williams from the Williams Renault Racing Team.

The problem with them is that their flywheels are being used and they're beating everything in the field. It's top-notch, but it's made out of carbon fibre. They're new at the science; it's specific for racing technology, and there's no commercial application as of yet. I highly suspect that's going to change within the next five years.

This is a $10 billion addressable market that only a few companies are racing toward. It will be filled pretty soon, so we need a competitive advantage to get there quickly. We have the core technology and some of the best technology and patented technology in the world, based in Canada, that needs to be quickly applied to vehicles.

Mr. Ed Holder: So my question is—

The Chair: Mr. Holder, you are actually way over time. If we can let Mr.—

Mr. Ed Holder: That's a great response. Thank you all.

The Chair: Thank you very much.

Mr. Sullivan, five minutes.

Mr. Mike Sullivan (York South—Weston, NDP): Thank you, Mr. Chair.

Thanks to the witnesses. I've learned a whole bunch today.

I have some specific questions, though, about the flywheel use. The Chevy Volt is a battery-operated vehicle that doesn't require, in normal city use, any fossil fuel combustion. Are flywheels capable of that kind of duration?

Mr. Greg Tarasco: No. The full electric vehicle is the only vehicle that doesn't work with flywheels. We work with any other type of internal combustion engine and any fuel. We are engine or fuel agnostic.

To address the point more specifically, great marketing positioning from the industry is that the battery that's plugged in is either coal, nuclear, or hydro-based electricity that does it. We don't wave a magic wand and derive it out of thin air. Typically, it's nuclear or coal-fired electricity that's going into that. So the notion that a full electric vehicle is carbon neutral is ridiculous, quite frankly.

● (1215)

Mr. Mike Sullivan: I'm not suggesting that it's completely carbon neutral, but in Ontario it's 75% carbon neutral because 75% of our electricity generation is in fact non-carbon-based. Alberta is different, because it's hugely carbon-based.

Mr. Greg Tarasco: It is regionally based.

Mr. Mike Sullivan: Yes, it's regional.

Rather than think in terms of carbon-based, are we heading towards a technology where a flywheel will be the prime mode of power? We plug it in at night and start the flywheel spinning. How long is it going to continue to spin?

Mr. Greg Tarasco: It's predicated on the natural waste energy of the engine. If we go back for a second, the internal combustion engine is the most efficient source of energy when the vehicle is in motion. It's the stop and start motion that is the waste. This is how we capture and reuse the wasted energy naturally produced by the internal combustion engine. We get the same elements, the 40% fuel savings, as normal hybrids. The challenge is not the notion of a hybrid; the challenge is that no one is adopting it, because the science and batteries don't allow it.

If you have a technology that allows it, we want to change the paradigm question from "Why would I buy a hybrid?" to "Why wouldn't I buy a hybrid?"

We want everyone to have hybrids, and this will be technology that will facilitate that. It will be the catalyst to drive it, with 40% fuel savings, no chemicals, and a litany of other things.

Mr. Mike Sullivan: Second, how do you deal with the gyroscope effect?

Mr. Greg Tarasco: Through the science, we figured that out. That's a 30-page white paper.

Mr. Mike Sullivan: There's a 30-page white paper.

Mr. Greg Tarasco: We see this being deployed in race cars, which are high torque. It's being used right now in the first and second round at Le Mans. Porsche, GTR3, and Audi R18 are already using it in race mode. But they're $100,000 flywheels.

Mr. Mike Sullivan: That's not going to be commercially available.

Going over to Mr. Hughson, one of the things we talk about a lot is what government intervention is necessary. Of course, if we are going to smart vehicles, we need governments, whether federal or provincial, to install RFID tags in highways and roadways and into road abutments to allow the vehicles to communicate with the road. GPS isn't going to manage it, because cloudy days mean that your car is going to stop.

What size of investment from governments are we looking at in the medium to long term to allow this kind of technology? Are we needing to set aside frequencies other than the one you talked about for car-to-car communication?

Mr. Earl Hughson: I think we've gone beyond the point that we need to put sensors every few feet down highways and things like this. The technology and the wireless technologies seem to be integrating so that this sort of infrastructure is not required.

I'm not an expert on the infrastructure side of this, but I did visit UCLA Berkeley, where they have automated intersections and buses and cars running through them.

Where they are developing that infrastructure, a lot of intersection stuff will be looking for bicycles, looking for pedestrians, and monitoring the vehicles that are coming to know whether somebody is going to run a red light, and then it will delay it.

A lot of it is wireless technology. Definitely one of my recommendations is that we invest in the infrastructure. We need it here. You can see the benefits earlier.

I can't say that I'm an expert on the cost of that, but I think the costs are coming down as technology is getting more mature. It's not going the other way.

Mr. Mike Sullivan: You talked about a platoon. It sounds like a VIA Rail train getting in a platoon. But they are not able to get the advantage of the energy savings of having only one engine drive 600 people between Toronto and Windsor. You would actually have to have 600 engines.

Mr. Earl Hughson: Yes, but you are slipstreaming, to begin with. There's a lot of work in a lot of countries, including Canada, on the platooning concept, where you link between vehicles that are going to similar places. There are significant efficiency gains and safety gains. The efficiency of the use of the highways is greatly enhanced.

The Chair: Thank you very much.

Mr. Toet, you have five minutes.

Mr. Lawrence Toet (Elmwood—Transcona, CPC): Thank you, Mr. Chair.

I want to start with Mr. Tarasco. I have a question on your technology in regard to commercialization and use.

Everything you have talked about so far seems to be car-driven. What size of vehicle could you actually go into with your technology?

● (1220)

Mr. Greg Tarasco: It is every type.

Mr. Lawrence Toet: It is every type. So where do you see the first applications of this happening? Do you see it in commercial vehicle fleets or in buses? Where do you see this moving?

Mr. Greg Tarasco: With the APC project, we are developing a heavy-duty flywheel for transit buses specifically. That is the first order of business, because as fleet vehicles or municipalities are struggling with their capital and operational expenditure budgets, they cannot afford to buy hybrid buses. The ones they have bought don't work. They have no ROI—return on investment—in this process. They want to buy hybrids, and their budget pressures demand it. The technology prevents it.

We are specifically addressing that, and in that, we have facilitated the whole supply chain in heavy transit and transit buses to be on our advisory board for this APC. We're in discussion with companies like Purolator and other such well-known Canadian companies to do this. This is an all-Canadian advisory board of some of the largest companies in Canada that will be advising us on how we can address the OEM's, the manufacturer's, pain points for commercialization and the end fleet purchaser's pain points, of which there are many. This is as much a marketing and commercialization process as it is a technology process.

Our technology is done. We just have to integrate it into the vehicle and allow the benefits for the manufacturer and the fleet operators. That's the first step, and that's the key project. That's the pain point in the market right now. It's the fleet operators, the transit authorities, OC Transpo, Transit Windsor—you name every bus transit authority. That's who we're addressing first.

We'll be commercially ready in about 18 months.

Mr. Lawrence Toet: You talked about being much more low-cost than the battery technologies on the hybrids. We've heard various testimonies of what percentage that adds to the cost. What percentage do you perceive adding to the cost of a bus?

Mr. Greg Tarasco: We'll approach it from two different angles.

The premium for a hybrid is about $200,000 over. As I've reviewed the testimony, it ranges from $130,000 to $250,000, depending on the bus; extended buses are roughly $200,000 for a premium, which is onerous by any stretch. We can bring that down by half.

The battery pack is around $55,000, and you have to go through three life cycles, so the original expectation of buying $55,000 worth of batteries is now $155,000 worth of batteries. That's a 200% surprise increase in operational expenditures by the fleet operators.

We come in at $35,000 for a unit. Why? Because it's a blue collar worker, made in Ontario solution, it's metal, it's machined, and no foreign entities are involved. It's a simple process and assembly, a simple application deployed.

On every measure we come in at a lower cost. We can lower by 50% the cost of the energy storage system on hybrid vehicles.

Mr. Lawrence Toet: You've talked about the different transit authorities. Have you had direct contact with the bus manufacturers themselves?

Mr. Greg Tarasco: Yes, I have. We're in ongoing negotiations with all of them.

Mr. Lawrence Toet: That's good to hear.

Just to switch gears a little, I was very interested in your comments regarding investment. You touched on the fact that the closer you're vested to your investment, you're going to work harder on bringing forward a technology that is actually commercially viable.

In other words, the more you're working with your own money, or your family's money, the better the chance—if I'm reading you right, and you can correct me—you're going to come up with a commercially viable product because your stakes are higher. I really liked your example of the government as a facilitator, not the investor.

Can you expand that a little? How you would see us, as a government, be better as a facilitator and not so much as an investor?

Mr. Greg Tarasco: Yes. That's a great question.

There is no better due diligence process for the facilitator than having money on the table in a project. You want it to work. There is no feeling that if it doesn't work, oh well, we'll get on to the next project, skin in the game, if you will.

I have two points.

First, there is a capacity problem in facilitating investments from Canadian investors. If we go to a private equity or venture capital model, the average size of a Canadian fund is about $400 million. The average size of a fund in the U.S. is $7 billion.

Whether we want it or not, our capacity shortfall is there. They can't afford to make wrong decisions, so the risk aversion is based on that.

Second, from a policy perspective, allowing foreign investors or foreign entities under the guise of “it's only used to define R and D, they can't take control of the company” or “the IP still resides with the company and it's Canadian property”, are all measures that go to this length.

At the end of the day, capital is the lifeblood. Whether it comes from private industry, foreign initiatives, or the government, it's still capital. It's still required.

The best way, the most efficient way, is to have the investor who is directly linked to the company get the synergies going there. Remove the barriers, the administration, the red tape, facilitate the investor, develop a relationship, and the result is something like Silicon Valley.

● (1225)

The Chair: Thank you very much.

Ms. Morin, you have the last five minutes.

[*Translation*]

Ms. Isabelle Morin (Notre-Dame-de-Grâce—Lachine, NDP): Thank you, Mr. Chair.

Mr. Tarasco, I find this subject fascinating. I would like to thank all of the witnesses. I learned a lot today.

I would like to come back to investments. If I understood what you said earlier correctly, Williams Hybrid Power is your only competitor. Is that correct?

[*English*]

Mr. Greg Tarasco: No, in the transportation space, flywheel will apply to transportation. There are several that have not done well. They use different flywheel technologies—some patented, some not patented, some mechanical, some electrical.

Why I cite Williams...there are really two competitors based out of Europe, and us, from Canada, so there are really three in the world that are doing this. That space will crowd up pretty quickly.

[*Translation*]

Ms. Isabelle Morin: You spoke about a $10 billion market. In these circumstances, I do not see why you need to wait for government funding before moving forward. Why is that necessary if a $10 billion market is available? If I were in that situation, I would want to move quickly rather than waiting for other industries to use the same technology. I would get ahead of the game.

[*English*]

Mr. Greg Tarasco: We are hurrying up, we are expediting several issues, and we don't naturally seek government money. You're right, there is no need in a market this size. We don't need to. The reality of the issue is that 20 years of hybrid technology with batteries has tainted the market to the point that no one wants to take any risk. On the OEMs, whether it's GM, New Flyer, Ford, if you go down the list of automotive manufacturers, they've been burned so many times they don't want to participate any more.

So we don't have a natural flow or engaging partner. Now, we've worked towards getting that, fine, so you're right, we shouldn't.

[*Translation*]

Ms. Isabelle Morin: If I wanted to equip my electric vehicle with a flywheel, how much would it cost me?

[*English*]

Mr. Greg Tarasco: To make a flywheel for a regular car is around the $2,500 mark, as opposed to $6,000 to $10,000 for a battery. It's steel. It's commodity-based. It's $40 a pound for steel, as opposed to mining, getting heavy metals from companies overseas.

[*Translation*]

Ms. Isabelle Morin: Thank you very much.

Mr. Hughson, you said earlier that new technologies would make it possible to ease traffic congestion. Were you referring to the GPS system or to other innovations?

[*English*]

Mr. Earl Hughson: The more information available between the vehicle and the infrastructure, the more streamlined the flow of traffic can be. It's simple little things like we see on the Queen Elizabeth Way and in Mississauga, and you see it in California. It's just putting in lights that are monitoring the flow of vehicles. It looks like you're slowing people down. You're actually dramatically increasing the flow.

When accidents happen, if you look at the statistical progression, for every second on a highway where there's one accident that could be avoided, it's going to take 15 times longer after it's removed to get rid of the bottleneck. You'll have a traffic jam all through rush hour just because it was there for 15 minutes.

All of these things affect flow. Accidents are one part, but it's also knowing where vehicles are. Vehicles with these technologies can run very safely very closely together as well, compared to a normal car.

● (1230)

[*Translation*]

Ms. Isabelle Morin: That is more about reducing the number of accidents.

A friend of mine has a car equipped with sensors. They are located at the back of the car, making it possible for the car to park itself. The sensors did not pick up the presence of a small metal pole, and his car hit it. He had to spend approximately $15,000 to repair his vehicle. He had to replace his entire back bumper, which was destroyed, and the sensors. They are very expensive parts. It is also very costly for the insurance companies. This type of system is available when you buy a car, but as soon as it breaks down, it is very expensive to repair.

Have you thought about that?

[*English*]

Mr. Earl Hughson: Some of these applications are very new. They're testing power steering in very benign applications that some industries will pay for, like automatic parking. They're testing systems that are needed for much more advanced things in the future when they're proven and placed in more mission-critical applications.

I'm now being approached by OEMs that need some more advanced sensors on the front and back. They're developing what's called electronic bumpers, because the sensing systems aren't where they need to be. They're moving ahead very quickly in parallel, first in more benign applications, and then, as they're perfected, in more active and safety-related applications. So all the different pieces are being proven independently in unique applications that are coming together.

The Chair: Thank you very much. Our time has expired. We have a bit of committee business to do.

I'd like to thank all of our witnesses for coming here today and contributing.

Mr. Pierre Poilievre: Chairman, I apologize for interrupting. I want to make sure, because we are winding down the study. We are going to be testing some of the tax changes that you might be able to suggest to our officials before we file our report. I'm wondering if someone could indicate to the witnesses when they would need to have their suggested changes in to the committee in writing.

The Chair: Within a week.

Mr. Pierre Poilievre: We would need to see this in writing as clear as possible. Then we can consider recommending them to the government.

Thank you for the great testimony, all of you.

The Chair: Thanks for that, Mr. Poilievre, and thanks again to our witnesses for being here.

We have a bit of a budget that we need to approve. We'll just wait until everybody gets a copy here. It's really just housekeeping.

● (1230)

(Pause)

● (1235)

The Chair: Let me ask our members to please return to the table.

Everybody has a copy of the budget. Basically, we're down to the point that we're starting to wind up this study. This amount will just allow us to pay for the witnesses we have coming in.

Unless there are questions, I'd entertain a motion to adopt.

It is moved by Mr. Coderre to adopt it.

Is there discussion?

(Motion agreed to [See *Minutes of Proceedings*])

The Chair: Ms. Chow, you're—

Ms. Olivia Chow: I'm giving the floor to Mr. Aubin.

[*Translation*]

Mr. Robert Aubin: Thank, you Mr. Chair.

This morning a motion was moved and we all had the chance to read it. I would like to talk about it for just a few minutes.

Last spring, I had an inkling of this when I read a VIA Rail press release about the modernization of VIA Rail services. A warning bell went off about modernization and re-engineering. Usually, in my experience, this has never met with great success.

Nevertheless, I thought I had to give the benefit of the doubt because the press release seemed very clear. It announced that there would be service reductions. At the same time, it announced enhancements to VIA Rail services and that, on some lines, for example, there could be more flexibility in scheduling and a larger number of departures and arrivals.

Since then, we have seen that the modernization of VIA Rail services seems to be centred on cutting services, connections and, now, lines, with absolutely catastrophic economic consequences for certain regions in eastern Quebec, and also for the line that links New Brunswick, among others.

I admit that I have difficulty understanding the rationale of modernization. I am not being sarcastic. I can only believe that they are making cuts. For that reason, and with this motion, it would be interesting to talk to VIA Rail representatives about their views on the development of passenger rail service in the next few years as a driving force for economic development in Canadian regions.

As we all know, this country was built around the railway and I do not believe that the time has come, especially in light of major environmental concerns, to drop rail service. However, there are fears about passenger services.

That is the thrust of the motion. We would like to conduct a short study, meet with officials and discuss with them their vision for the future of VIA Rail services.

● (1240)

[*English*]

The Chair: Thank you very much.

Mr. Sullivan.

Mr. Mike Sullivan: Thank you, Mr. Chair.

This is the third major round of VIA cuts since it was formed in 1977. The current cuts will reduce the frequency between Halifax, Moncton, Miramichi, and Montreal; between Montreal and Ottawa; between Toronto and Niagara Falls; between Toronto, Stratford, London, and Sarnia; between Toronto, Brantford, London, and Windsor; and between Toronto, Winnipeg, Edmonton, and Vancouver.

VIA claims that this is modernization and a taking of action to better meet customer demand. It makes little sense. To eliminate service and drive away customers is not to deal with customer demand.

It's especially puzzling when one considers the strategic expansion under way on other passenger railways around the world. Canada's stance is in stark opposition to what's going on even in the country to the south of us, the U.S., where rail expansion is going on at a tremendous pace. At the same time that we in Canada are reducing, they maintain.

VIA claims that it has nothing to do with the reductions in their budgets. But by way of fact, the budget was cut by $6.5 million this year; two more cuts will reduce it by $15.1 million in 2013 and by $19.6 million in 2014. There will be future cuts as a result of these budget cuts, and it's the expectation that they will be even more severe.

Inside sources suggest that all service between Toronto and Niagara Falls; between Toronto and Sarnia; and between Montreal, Gaspé, and Victoria-Courtenay will be eliminated. The future of the two remaining eastern and western transcontinental trains is not secure, as far as we can tell.

Transport Canada is currently conducting an internal and highly critical review of VIA's future, but the public is not being asked for input on this project, which will decide VIA's fate. Nor are we in the transportation committee being asked for our input on this project.

These cutbacks come after we have just spent $923 million to renew VIA's capital. It makes little sense to renew a transportation system that then reduces many of its services.

VIA says additional trains will be added in the Toronto-Montreal triangle at a time to be determined. But if the national train system is to be limited to Toronto, Ottawa, and Montreal, why have a train system? Why are we doing this? And why spend $923 million of good capital to invest in a train system if we're not going to have a train system?

Canadians want a train system. They want to be able to take an environmentally friendly transportation system. The train is the only environmentally friendly transportation system that we use, and many other countries are investing in these things.

VIA's investment program has run into serious problems, ranging from the insolvency of one firm contracted to rebuild the bulk of its rolling stock to cost overruns and demands by one freight railway for more investment in infrastructure projects on its lines that weren't factored into VIA's original budget.

VIA is apparently constantly at the beck and call of the freight railways, who own most of the infrastructure. Passenger rail comes second. It shouldn't.

The cuts will not improve VIA's service, nor will they boost its financial performance. Other passenger railways have proved that reducing train frequency doesn't pay; it costs.

The best example is found on Amtrak. That quasi-public corporation has completed studies and has determined that it actually costs money to reduce service, because employees and equipment have a one- or two-day turnaround delay, during which employees receive held-away pay and equipment sits idle, without generating any ticket revenue. Amtrak is now expanding its service.

But it's discouraging to hear VIA President Marc Laliberté say that passenger trains don't make sense for distances of 800 kilometres or more. A quick look at the maps and timetables of rail passenger systems around the world prove that this is a mistaken viewpoint. The U.S. and Europe are served by modern, efficient trains operating on numerous routes of 1,000 kilometres or more.

If we're to compete globally, we need to improve our passenger service. We're not competing globally by deleting our passenger service. Redesigning, modernizing, and renewing means providing more service, not less. The biggest driver of acceptance of rail service is the frequency of service. If the frequency of service disappears, fewer people will use it, not more.

● (1245)

The Chair: Thank you very much.

I'm going to call the vote.

All those in favour of the motion, please signify.

Ms. Olivia Chow: Mr. Chair, I was going to send it to the steering committee.

Hon. Denis Coderre: On a point of order, the vote has been called.

The Chair: It's not going to the steering committee. You sent it here, Olivia.

Ms. Olivia Chow: It has to come through this committee. I can't just send a motion to the steering committee.

The Chair: I'm agreeing you can't send it there. It's coming before the committee and we're going to vote.

Ms. Olivia Chow: If it's dealing with a study, the natural thing is for it to be considered at steering committee, Mr. Chair. That's normally how it's done.

Mr. Pierre Poilievre: Who raised it here?

The Chair: You brought it up here and we're going to vote on it, and of course depending on the outcome of the vote, then—

Ms. Olivia Chow: So you're not taking my referral motion.

The Chair: Yes, I'm asking all in favour of the motion.

Ms. Olivia Chow: The motion or the referral? I moved a referral.

Mr. Rick Dykstra (St. Catharines, CPC): How do you refer something that hasn't been voted on?

Ms. Olivia Chow: We haven't voted yet.

The Chair: I've already called the vote.

All in favour of the motion?

Ms. Olivia Chow: A recorded vote.

(Motion negatived: [See *Minutes of Proceedings*])

The Chair: Happy Thanksgiving to everybody. We'll see you all here in 12 days.

The meeting is adjourned.

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