



Legislative Assembly of Alberta

The 28th Legislature
First Session

Standing Committee
on
Resource Stewardship

Natural Gas Production
Stakeholder Presentations

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Standing Committee on Resource Stewardship

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Standing Committee on Resource Stewardship

Participants

Calgary Transit	RS-489
Russell Davies, Manager, Transit Fleet	
Edmonton Transit System.....	RS-489
Holmann Wong, Director, Bus Operations	

6:19 p.m.

Monday, November 18, 2013

[Ms Kennedy-Glans in the chair]

The Chair: Folks, I think I am going to start this meeting. We have a quorum. Welcome, everyone. Apologies to our presenters. We were a little late in the House because there was a vote at 1 minute to 6, and it takes 10 minutes, so we're doing the best we can. We are eating in front of you. Again, our apologies.

Mr. Sandhu, you're on the phone. Is that correct?

Mr. Sandhu: Good evening, Madam Chair. Yes.

The Chair: Okay. Wonderful.

Just a reminder to everyone to try not to touch the consoles. Try to put your phone underneath the desk, and remember that everything is recorded. People might be listening, and they can always look at the record.

I'm chair of the committee, Donna Kennedy-Glans, MLA for Calgary-Varsity. We'll go around the room and just introduce, and if you're sitting in as a substitution for someone, just let us know. We'll start with you, Mr. Webber.

Mr. Webber: Hello. Len Webber, MLA, Calgary-Foothills.

Mr. Allen: Good evening. Mike Allen, Fort McMurray-Wood Buffalo.

Ms L. Johnson: Good evening. Linda Johnson, Calgary-Glenmore.

Mr. Bilous: Good evening. Deron Bilous, MLA, Edmonton-Beverly-Clareview.

Mr. Casey: Ron Casey, MLA, Banff-Cochrane.

Mr. Wong: Holmann Wong, city of Edmonton, Edmonton Transit System.

Mr. Davies: Russell Davies, city of Calgary, Calgary Transit.

Mr. Bikman: Gary Bikman, Cardston-Taber-Warner.

Mr. Barnes: Drew Barnes, MLA, Cypress-Medicine Hat.

Mr. Stier: Pat Stier, MLA, Livingstone-Macleod.

Dr. Swann: Good evening and welcome. David Swann, Calgary-Mountain View.

Ms Zhang: Nancy Zhang, legislative research officer.

Mr. Tyrell: Chris Tyrell, committee clerk.

The Chair: All right. Welcome, everyone.

You've got a revised version of the agenda in front of you. We had a change of the name of one of the presenters. I'm just looking for somebody to move that the agenda for the November 18, 2013, meeting of the Standing Committee on Resource Stewardship be adopted as circulated. Thank you, Dr. Swann. All in favour? Any objections? Carried.

Okay. The meeting minutes from the last meeting. If someone could move that the minutes of the November 4, 2013, meeting of the Standing Committee on Resource Stewardship be adopted as circulated. Thank you, Mr. Bikman.

Mr. Sandhu: I will do so, Chair.

The Chair: Oh, Mr. Bikman beat you to the punch there. Thank you. All in favour? Any objections? Motion is carried.

All right. The reason we're all here tonight is to listen to Edmonton Transit and Calgary Transit come together collaboratively – thank you very much for that, gentlemen – to share a presentation on natural gas fleets and the potential of those fleets, about a 15-minute presentation. We have lots of questions, and we'll go from there.

I will ask the people who just joined us now to introduce themselves, starting with Ms Kubinec.

Ms Kubinec: Maureen Kubinec, MLA for Barrhead-Morinville-Westlock.

Ms Calahasen: Pearl Calahasen, Lesser Slave Lake.

The Chair: All right. Thank you very much.

Over to you, gentlemen.

Calgary Transit Edmonton Transit System

Mr. Davies: Thank you, Madam Chair. By way of our presentation we'll just give a brief background on our two agencies as they stand today and our experiences of CNG to date, and then we'd like to just briefly talk about, I think, the issues we see with implementing CNG within our fleet specifically and perhaps the implementation of CNG in the broader perspective as well.

By way of fleet size right now Edmonton Transit currently operates about 970 vehicles, primarily diesel, and they currently operate two CNG buses that are still running on trial. Calgary Transit has a fleet of about 1,100 vehicles, again, all diesel except for four vehicles that we are currently trialing on CNG as well.

When we first started looking at CNG, certainly in Calgary – and I believe Edmonton was basically running on the same program as us – our concerns were about increasing fuel costs and around the volatility of the price of diesel fuel as it stands in the marketplace today. There were concerns about emissions from the technologies employed in our older buses as well as things like reliability of the buses and noise pollution that we saw from our older engines.

Part of the investigation certainly that was conducted by Calgary was a year-long study of CNG implementation across five of the sites throughout North America, primarily in the States although we did look at Hamilton as well. We tried to focus on agencies in areas such as Boston and New York, that kind of colder weather temperatures that mirrored something like we have on a regular basis. We just sort of carried our investigation forward there.

When we looked at what things actually looked like for CNG as an implementation in an established system, we found that there were things like long-term fuel price stability that helped a lot. There was a reliable fuel delivery system, which is a big issue, certainly in weather like today's. If you operate a diesel fuel fleet, generally your diesel fuel has to get delivered to you, and it has to get delivered to you by truck. In most cases, certainly in Calgary anyway, we rarely carry more than two days' worth of fuel at any of our facilities. So if we have a big snowstorm or any real problems, the reliability of the delivery of fuel becomes an issue; therefore, the reliability of delivery of service becomes an issue as well.

We also found from CNG implementation that environmental benefits are obviously improved, certainly over our older bus engines, quite significantly. The emissions compared to our older

buses were definitely improved. Compared to our newer buses, however, it was not quite so much. There were slight improvements in carbon dioxide emissions, but the biggest improvements were in nitrous oxides emissions, actually.

The noise of the CNG engines was generally considered to be far superior compared to our diesel engines as well. Certainly, when the bus was sitting and standing, just idling, the engine is about 10 times quieter than a diesel engine as it stands. When the bus is running along the roads, then it's not quite such an improvement because the majority of the noise then associated with the bus is more the bus actually just physically moving, so the transmission and the wheels and the road, those kinds of things.

6:25

As a major part of the program when we examined the five other agencies, we wanted to look at their maintenance costs as well. One of the issues associated with diesel buses today is that in order to meet the current environmental regulations, there's a large amount of exhaust processing that has to happen. There are fairly complex systems that affect the reliability of the vehicle as well as the operating costs and the maintenance costs of these vehicles.

The vehicles currently in Calgary today, the newer ones: we spend upwards of half a million dollars a year just cleaning a filter system associated with the exhaust to allow it to meet the environmental requirements. Those kinds of filter systems are not needed on CNGs because that fuel burns a lot cleaner to start with. So from a maintenance perspective there are a lot of advantages to moving to CNG as well.

Lastly, what we also took great favour on with CNG is that it was a local fuel. There's no doubt about it. It was something that held a lot of advantages for us certainly in Calgary, and it was something that we wanted to pursue a little further, actually.

The current plans at Calgary Transit. We've been running our trial on CNG buses now for approximately a year. It'll be a year in December. The figures right now look quite favourable. In all likelihood – I'm jumping the gun a little bit – we will move down a path of implementation of CNG. What that means for us right now is that our next bus maintenance facility, which we're looking to complete in about the 2017-2018 window, will likely be a CNG-compliant facility. It's currently going through the P3 process. We're just awaiting a formal announcement, whether or not that application has been successful. We're expecting that announcement pretty much any day now. Once that goes ahead, then we expect to fully start our P3 process as soon as possible. We'll be looking to build the new facility in 2018. That will likely be a 400-bus facility. It's a reasonable size. That would be one of our biggest facilities in Calgary Transit. We will be phasing in to make it a fully CNG-compliant facility.

Right now the current status of our trial, just so you know, is that we did run four buses. We ran buses from two Canadian suppliers, two from New Flyer industries in Winnipeg and two from Nova Bus in Montreal. The New Flyer buses have been running since December last year and the Nova Buses since March. Initial figures right now have been very favourable. Performance has been good, and reception has been good by operators as well as the public.

The biggest thing that we found that we had to do when we started running these buses in public was the education. There's no doubt about it; the education program was huge. There were a lot of myths to dispel around CNG. We needed that for our own mechanics, we needed that for our operators, and we needed that for the members of the public as well. There is no doubt about it;

you can't underestimate the importance of the education program if CNG is to be implemented on a larger scale.

Where we are today in that trial. If I was to refer to the city of Calgary's triple bottom-line policy, reliability, maintenance costs, and fuel consumption all look pretty favourable. Right now a diesel bus costs about 58 cents a kilometre to operate. CNG buses operate at around the same price as that today, but that's with CNG at an off-the-rack price. That's probably double what we would expect to negotiate as a price. Just to give you an idea, I think that right now the price we pay from a local fuelling station works out to about \$22 a gigajoule whereas the city of Calgary right now purchases gas for heating in their buildings at about \$4 a gigajoule.

Dr. Swann: Fivefold.

Mr. Davies: Absolutely. Yeah. So it's a significant difference in terms of the raw gas price. Obviously, with CNG the gas is only part of the price. There's a compression price, hydro costs associated with the compression of the gas, as well as any distribution costs from companies like ATCO and the like. But we would expect to see the price run at about half the level of diesel.

With that, I'll just leave our experiences there, and I'll just leave the next step to my colleague.

Mr. Wong: Thank you. Edmonton Transit . . .

The Chair: Mr. Wong, just before you start – and I apologize for this – I'm going to allow the people who arrived recently to introduce themselves. I'll start with Mr. Anglin.

Mr. Anglin: Joe Anglin, MLA, Rimbey-Rocky Mountain House-Sundre. I apologize; the Assembly sat about 10 minutes longer than it should have.

Mr. Lemke: Ken Lemke, Stony Plain.

Mr. Khan: Stephen Khan, MLA, St. Albert.

The Chair: Ms Fenske.

Ms Fenske: Thank you. Jacquie Fenske, MLA, Fort Saskatchewan-Vegreville.

Mr. Hale: Jason Hale, Strathmore-Brooks.

The Chair: All right. For those of you who were late arriving, we're hearing from Edmonton Transit first. Russell Davies, Calgary Transit, and Holmann Wong with Edmonton Transit are presenting collaboratively.

Mr. Wong: Yeah. For the time frame for both agencies, both Calgary and Edmonton, we found that we were approaching this at two different angles, and rather than looking at it from two separate streams, we wanted to work together collaboratively on the pilot processes and work extensively and share information as best as possible. Sometimes it's about reinventing the wheel. We wanted to streamline that as best as possible.

Certainly, from the experiences, we've experienced very similar results to Calgary. The time frame for both: again, we're also looking at a new facility as well. It's 400-bus compliant. We've already purchased the land. It's in the northeast quadrant of the city. I don't know if you're familiar with the smokestack, the old Canada Packers site. Currently we're expecting the commissioning of that facility in 2017, so it posed a unique

situation for us to see if we could integrate CNG if not as a major part of that then as a portion of that business.

We're currently in the design and conception phase, so we've retained a couple of agencies that have expertise in this. Calgary commissioned a report in 2011, and we've also hired the consultant that did that report to give us an idea of not only the stuff that's happened, the technology, but realistically some of the issues that we could see in operating a 400-bus facility. So we're looking at a feasibility analysis as well. The fact that CNG as a fuel source works and the system works – in cold weather we understood that there were some restrictions from some experiences in the past in other transit authorities, but those myths are really starting to come out, and we're realizing that they are just myths. With the newer technology a lot of the technological implications have been kind of nullified.

Again, the same thing with the extensive staff training required. There is a separate fuel system, emergency procedures that have to be put in place, maintenance aspects of the CNG field delivery systems as well as policies and procedures. What is the refueling process? What do we have to do that's different than with diesel? Our process is very streamlined, very much similar to Calgary's. It takes us three and a half minutes to get a bus fuelled with diesel. What does it take for CNG? With that, you basically buy the ability to be able to compress natural gas at a certain delivery point, and that gives you your three and a half minutes. Is three and a half minutes the ideal situation? Can we do it in six? These are part of the feasibility analysis, the next steps that we're looking forward to and looking at.

Our trial was a lot shorter. Our trial was between January and April 2013, and unfortunately we were under some strict guidelines from council to bring back some recommendations because we were going into the design phases of our new facility.

Our fuel consumption costs are very much similar to those of Calgary. We converted it a little bit differently. We were at \$50.88 per hundred kilometres for CNG and \$49.79 per hundred kilometres. They're very similar, but that's with no contract. Basically, we're buying off the rack at ATCO right now, so significant opportunity to have cost savings and fuel savings associated in long-term contracts. On top of that, the city of Edmonton has decided to fuel hedge their diesel price. There are advantages in going with long-term contracts and short-term contracts. Diesel is so volatile right now that it's hard to hedge in at a great value.

From a liability standpoint, same thing: no significant issues recorded to date. They're still in operation. The only issues that we found were the compressor stations that we fuelled up at. There are only two in the city, and the one that we fuelled up at had a fairly old infrastructure, so there were issues with the filters that were installed on the systems, which inadvertently caused fuel delivery problems in our CNG buses, but that was rectified really, really early.

6:35

The maintenance costs: again, because the trial was so short – it was only maybe a 13,000-kilometre trial – their numbers are very, very similar. We had similar results in acceleration and power consumption and those types of things. There is no true advantage to diesel over CNG. Yes, the CNG buses were a little slower on acceleration, but in reality that's not what we're looking for. We're looking for the reliability aspect. They performed a little bit better in braking.

Realistically, the only big difference in them was the fact that they were .5 metres taller. We actually have to make some adjustments to make it work over the High Level Bridge here. There are

height restrictions across the city, and, believe it or not, we do also have a pretty substantial canopy. We have to make sure that we don't schedule certain buses to go on those routes.

That .5 of a metre really makes a difference for us in clearance. We had to modify some of our facilities. We have an old infrastructure right now. Certainly, one of the big challenges for us is renovating and modifying bus storage facilities to cover CNG compliancy. Well, that was kind of the question. Whom do we talk to? With our safety codes they were saying: well, do we use a propane type of code, or do we use something else? NFPA was brought up many a time, but that's a national code, and that's predominantly developed in the U.S.

Basically, what we've done from Calgary and Edmonton is that we've really taken ourselves out of the box and said: well, what do we need to do? Not just from a compliancy standpoint, but how do we set the stage for other things? How do we design this? In five years how do we make sure that we're still compliant? If it's not CNG, it's something else.

From an emission standpoint, again, very, very similar emissions. The major reduction was in the NOx, with SOx being similar. In NOx there was almost a 50 per cent reduction. CO₂ emissions: there was about an 8 per cent reduction in the amount of fuel consumed.

From operator feedback and passenger feedback: no news is good news. Frankly, from an operator standpoint, they liked the fact that it was so quiet. From the diesel perspective – it was a lot of idling that we did with the CNG buses, and the fact that you can have a conversation in the back of the bus and actually hear what each other is saying, it was a big impact. Actually, Don Iveson was one of the ones that really first commented on it when we released the buses in March.

I wish I could say more about them. The big thing is that they work. For us and, I think, Calgary there are some things about the perceived barriers.

Russell, do you want to take over?

Mr. Davies: Sure. I think we found that technically the buses have no issues at all. I think we found that from a reliability perspective they're at least as good as if not better than the diesel buses. From a maintenance perspective and a support cost perspective, they're probably better than the diesel buses. That is what we found. Environmentally it's at least as good as anything that a diesel bus can do if not better in most cases, and from a noise perspective it's certainly quieter in most cases as well.

The only issue we have, really, in terms of perceived barriers relating to CNG buses basically comes down to the big one, which is cost. When it comes to costs, a CNG bus currently carries about a 10 per cent premium. So a 40-foot bus, a regular sort of big bus you see driving around town, is around the \$400,000 mark, and it's around about a \$40,000 to \$50,000 extra premium to have a CNG version of those buses.

Unfortunately, that's not the big piece. The big piece is the infrastructure associated with fuelling those buses. That infrastructure is probably the single biggest barrier to the implementation of it right now. Dollarwise, to be able to retrofit a facility, the problem is the compressor station that you need to compress natural gas. You need to be able to get natural gas to the system. You need to be able to convert your existing facilities to be able to adopt natural gas. There are little barriers in there as well in terms of converting a facility.

As Mr. Wong mentioned just now, there's very little by way of codes that tells you what you need to do to your facility to make it CNG compliant. There are some best practices that we tried to adopt from current natural gas companies, but that's about all we

can do. The code right now is almost invisible in terms of what it's telling us we have to do. The compressor station: again, we're kind of following best practice in terms of what we need to do to be able to fuel in an indoor environment, what kind of capacities we need to do operationally. There are a lot of guidelines, I think, that we're currently missing there.

The other area, I think, that probably needs to be worked on in terms of a perceived barrier is just plain perception. We worked pretty hard down there in Calgary in terms of trying to help operators, trying to help members of the public, trying to help mechanics in terms of understanding what CNG is; you know, that you're not driving around or operating a potentially dangerous vehicle. There are a lot of fallacies around how dangerous natural gas actually is in terms of its explosive capabilities and so on. We spent an awful lot of time on that, and I think that if we were to take that in a bigger picture out to the public, that would probably be step number one, really, just making people feel comfortable with it.

As part of that, when we take the next step here and look at recommendations, that education portion is probably the first step that needs to happen. People need to feel a lot more comfortable around natural gas. I mean, they have it at home, but people tend to sort of draw a difference between natural gas running your stove or your barbecue or the heating in your home compared to having a natural gas vehicle. But, really, there is no real difference at all, actually. So that education portion and the awareness of people probably needs to be the first step, I think.

When we look at the adoption of CNG as you go forward – I mean, we've mentioned that technically the vehicle is not a problem. Using the vehicle is not a problem. The problem is always getting the gas to the people. To do that, really, I think that most of the barriers are associated with the fuel distribution to the local area. I think that we look at things like trying to find ways to offset the incremental costs associated with natural gas. So that's offsetting the costs associated with fuelling systems, associated with the vehicle premiums as well. If there's some way that that could be addressed, that would be a good start.

Fuel incentives are also good. Natural gas right now as a fuel for vehicles is not taxed. It should be kept that way. You know, it's never going to get off the ground or keep moving along the ground if that tax is suddenly put in place. It'll kill the idea before it goes anywhere, I think, actually.

There have been a number of other ideas – some have been implemented down in the U.S. – associated with sort of special privileges associated with natural gas vehicles. Now, I should say that they're not associated uniquely with natural gas – they're more with alternative energy vehicles – things like, you know, allowing these vehicles to use high-occupancy vehicle lanes, making them exempt from parking, having reduced rates for things like taxi fees, those kinds of things. There are a number of ideas you could put in place around there.

I think the last point I'd like to make around there, really, is that President Obama back in May 2011 actually made an edict that all federal vehicles in the U.S. would be alternative fuel vehicles. It's that kind of commitment from a high level, I think, that gets that ball rolling and gets the initial adoption. I think that when there are more vehicles out there, the gas company is more inclined to build fuel infrastructure. Where there is more fuel infrastructure, people are more inclined to buy more vehicles. It needs something to get it going, and I think President Obama's direction there was an interesting way to do it.

I think, with that, I'd like to end our presentation unless Mr. Wong has anything to add.

Mr. Wong: I just have the one thing. Being that typically we're not an early adopter, there are other agencies out there that have utilized this technology. However, I don't think that in the other agencies the technology that's available now versus 10 years ago, 15 years ago – there is a significant difference in engine technology, fuel delivery systems, safety systems. All have come probably 10-fold from where it was before.

One of our major agencies that we've been really trying to get information from is Toronto. As some of you might know, Toronto did remove their natural gas program. The initial analysis is that everything that they had was old. It was pre-2007 technology. Mainly, the fuel delivery systems had issues.

We are also looking at – both agencies, Calgary and Edmonton – implementing it in the city fleets, the municipal fleets, whether it's garbage/refuse disposal, where they could take natural gas from the landfill sites, generally from landfill sites, for waste to energy, wheels to energy. Those types of concepts we have been really looking at. However, those applications are a lot different. They are heavy-duty applications whereas ours is passenger transport.

We're looking as best as possible, but we're finding barriers wherever we go. Whether it's getting the infrastructure, as Russell mentioned, we're almost having – from a service standpoint, there are only two service stations in the city of Edmonton and one at the airport, and unfortunately our fleet operates everywhere. I'm sure Calgary is very similar with their delivery systems. Even to get this pilot off and going, we had to significantly change our process in: how do we fuel them, how do we clean them, and how do we store them?

6:45

So without that, I mean, the early adopters piece – I hate to say it, but we are going to be the ones that will implement a new generation of fleets of 400 some-odd buses. Now, our issue is dealing with the uncertainties, the uncertainties of: how is it really going to change our process, how are we going to change the perception within our ridership, and how are we going to leverage this as best as possible to people that this really affects?

Other than that, Russell, if you want, I'd like to open it up for questions.

The Chair: Thank you, gentlemen.

Okay. Just put your hand up if you want to be on the list here.

Dr. Swann: Thank you, gentlemen. A very helpful presentation, bringing us up to speed on what the latest indications are for public transit. I'm going to take us back, a leap perhaps, to ask the question: since natural gas is probably the electricity producer of the future as opposed to coal, have we looked at the cost benefit of electric buses and having natural gas being the generator of electricity and the plug-in system for battery-operated buses? Has anyone looked at that? I know it's taking us out of perhaps your expertise, but I just have not heard of that discussion and would be interested to know if it's even been raised.

Mr. Davies: When we did this initial study here to look at natural gas buses, it was part of a bigger program to look at alternative fuels. Calgary does have a couple of hybrid buses as well. We took a look at those. Certainly, we did look at fully electric buses as well. Now, the only fully electric buses on the market today are, I believe, Chinese. They rely on distributed charging systems throughout the city, so it effectively means you have overhead charging of these buses about every two kilometres throughout the city. It becomes kind of like a trolley system almost, you know.

Earlier, in about March of last year, actually, I gave a similar presentation to the federal government in Ottawa. At the time of that presentation there was actually a gentleman there from some of the major battery manufacturers. Their line was that there's no point in the foreseeable future yet where a fully electric battery-powered bus is viable that they could foresee. So we haven't really pushed that analysis much further, to be perfectly honest.

Dr. Swann: And the hybrid is the same, is it?

Mr. Davies: To be perfectly honest, the hybrid technology hasn't been a stunning success on the buses we've tried. I think that the hybrid technology certainly being adopted down in the U.S. right now has been adopted on a large scale because of federal funding. They get an offset of costs for those buses, where the federal government pays approximately 80 per cent of the cost of a hybrid bus, so it becomes a very attractive vehicle to buy whether it's hybrid or not at that point.

For us when you try to compare it, like with like, it looks as though it's got around a 12- to 15-year payback. The life cycle of a bus is about 15 years as well, so it doesn't give us anything, really.

Mr. Wong: Certainly, from the city of Edmonton's standpoint we do have four buses. We converted two of them back to diesel.

Dr. Swann: These were hybrids or electric?

Mr. Wong: Just diesel. We have two diesel hybrid electrics, and then two diesel hybrid electrics were converted back to diesel because we were just having too many issues with them. It's mainly, actually, the battery supply system, the battery delivery system. The idea about having cold weather application with batteries was one of the biggest challenges for us. Then on top of that in Edmonton getting that plus-30 weather was really taking a toll on the batteries as well.

I talked a bit about hybrid technology. As an early adopter we thought that that was the ticket. We said that we were going to go and replace the whole trolley system and put hybrids in. But there are significant costs to it as well. I mean, the cost of a hybrid bus is about \$850,000 comparatively to the same type of bus in a diesel and CNG, which is only slightly more than a diesel. Council made a really, really tough decision at the time when we were implementing the removal of the trolleys and then buying a big purchase, a bus fleet. Again, it came down to dollars and cents, unfortunately.

Fortunately for us the diesel technology has also improved over the past two decades. Clean burning diesel engines are present. Although, yes, they do consume a little bit more fuel to burn off the particulates, they are still 10 times better than what they used to be.

From a diesel hybrid electric standpoint, yes, it's been explored. From a purely electric vehicle standpoint, absolutely, we are looking at it. Is CNG a bridge fuel or not? I think CNG is a better technology, and it suits our climate a lot better. From my experience in doing some of the research, I found that the biggest problem with our temperatures is that the batteries cannot withstand the heater demand, so you get passengers that say: this is really cold. We need more ridership, so we'll try to keep the cabin as warm as possible.

The Chair: All right. Thank you.

Right now on my speakers list I've got Mr. Barnes, Mr. Webber, and Mr. Casey. If anybody else wants to ask a question, just get my attention.

Okay. Mr. Barnes.

Mr. Barnes: Thank you, Madam Chair. And thank you both for an excellent presentation. The main bottleneck, of course, is the infrastructure around the fuelling stations needed for this. I'm wondering what the chances are of a partnership obviously with a private supplier of the natural gas but, say, with trucking companies, taxi cab companies. I wonder if that's been explored. I'd also like to hear what you think your chances are of something like this working out. I remember reading a few months back about some big companies in the States that were looking at setting up the natural gas stations all along the interstates. I wonder if you have any idea on how that might be going and what the opportunities there might be.

Mr. Davies: Part of the trial that we're running right now on our four buses is that we have entered into negotiations with a large natural gas company in Calgary. They have been very cooperative with us in helping to design our own fuelling system that we would need on one of our sites, and they've actually come to the table and put together some rather attractive proposals for a small fuelling station for what we have right now. So some of the gas companies are willing to help with those costs. There's no doubt about it. But I think that if you were to take that out on the larger scheme of things – a natural gas highway is the term, I think, that people like the Canadian Natural Gas Vehicle Alliance use – you'd need probably a far larger negotiating team than just the city of Calgary. That would need to be certainly a provincial if not federal kind of discussion, I believe, actually.

Mr. Wong: Certainly, from an infrastructure standpoint and the compressor stations, those types of things, we're considering that in our design process to see how we can offset some of the costs. Obviously, fuel contract pricing tied into fuel delivery or maintenance of the compressor station would be an ideal situation for us. We just have to make sure that the nozzle goes in and fuel comes out. That's kind of where we want to go. Unfortunately, again, in Edmonton the only provider is ATCO Gas. We've come in contact with them. They're really looking at where we're going with it. You know, it's hard to get people to the table when you only have two, but when you have 200, then things start to change.

The Chair: Right.

Next on my list are Mr. Webber, Mr. Casey, and then Mr. Bikman.

Mr. Webber: Thank you, Madam Chair. Gentlemen, good presentation. Mr. Davies, you alluded briefly to the safety aspect of the CNG vehicles. Can you get into some more specifics, you guys, with regard to how safe it is for ridership to be on a vehicle that is being fuelled by a pressurized tank of CNG? Possibly, can it explode? Is it vulnerable to, you know, puncturing of the tank, where it can lead to an explosion? What about leaks as well, leaks into the bus? If you can just talk a little about that.

Mr. Davies: Sure. It's funny; I'd spoken to somebody just earlier on about what their first thoughts are with CNG. The first concern is always, like, some sort of explosion risk, and there are a couple of things about CNG, I guess, that need to be considered. The CNG tank, as you mentioned, is a pressurized vehicle that's on the roof of the bus. CNG is a lighter-than-air fuel, so generally if there's a leak in the fuel tank, the fuel is going to leak up as opposed to if it was like a diesel fuel, where it would leak onto the floor and suddenly become a risk for anybody who's in the immediate vicinity. From a strict leak perspective it's not an issue at all. From an explosion perspective natural gas actually has a very small explosion range. It needs to be mixed in the realm of

sort of between 5 and 15 per cent with an air mixture before it's actually combustible. Anything outside that range is almost inert. You can't do anything with it at all. So there's a very, very small range where that fuel actually could explode even it were to explode.

6:55

In terms of things like piercing tanks, bullets, or anything of that kind of nature – Calgary is a rough town sometimes – the technology of the tanks has changed an awful lot over the years as well. They're actually dual skin polycarbonate tanks now, which help a lot. The puncturing doesn't become so much of an issue. We've actually seen videos from suppliers where they've shot tanks with bullets, with various projectiles, and the tank just does nothing at all, actually. Nothing. It's relatively inert in most conditions, as I say.

I think if you look on YouTube on the Internet, you can find cases where CNG buses have caught on fire. All of the ones that I'm aware of right now, the initial fire has not been because of CNG; it's been because of an electrical issue or brakes or something along those lines. You do see the fuel tank catch on fire, but it doesn't explode. The technology on the tanks has something called pressure relief valves. Basically, the gas leaks out in a stream and then that ignites. It looks like a flame-thrower kind of effect. But it doesn't explode. It doesn't do anything more dramatic than that, really.

Mr. Webber: Interesting. Thank you.

Mr. Wong: The offset in costs is actually part of the fuel safety system as well. The fire suppression as well as leak detection is that big difference in diesel and CNG.

Mr. Webber: Right. Thank you.

The Chair: All right. I've got on my list Mr. Casey, Mr. Bikman, and then Mr. Bilous. I'm looking at about 5 to 7, so we've got about 10 more minutes, I think, for questions.

Mr. Sandhu: Madam Chair, could you put me in, too?

The Chair: Oh, yes. Thank you.

Mr. Casey: I guess I'm just curious. If both cities were to convert all of their bus fleets to natural gas, what kinds of volumes are we looking at here?

Mr. Wong: Well, our current diesel consumption volumes range from around 25 million to 27 million litres. So from a consumption – it's significant. I mean, the potential for us to convert everything all at once is probably not going to be overnight.

Mr. Casey: No. But I just wondered if you were successful in converting both fleets – I'm trying to get a handle on what that means in volume.

Mr. Davies: I think that 50 million litres equivalent would cover the two transit fleets, but it doesn't necessarily cover all of the auxiliary vehicles, garbage trucks and those kinds of things as well. But that would probably be the biggest portion, about 50 million litres between the two cities, I would guess.

Mr. Casey: Between the two?

Mr. Davies: Between the two. I think it's about 27 million for Calgary and about 24 million roughly for Edmonton.

Mr. Wong: That's right. Twenty-four and a half million for Edmonton.

Mr. Bikman: I guess maybe it's my turn. I think you made it somewhat obvious, although subtly so, that this doesn't work without some help from taxpayers' money, a subsidy, no fuel tax, other kinds of things like that. It's a huge investment to convert. If it were economically viable just standing alone without a consideration for perhaps future environmental impact, you wouldn't be doing it, would you?

Mr. Davies: Well, I don't think we'd do a wholesale conversion starting tomorrow, anyway. I think what we would do is that we'd wait for the natural life cycle of the existing buses to expire.

Mr. Bikman: I understand that.

Mr. Davies: Then as we replace those, we'd pay a slight premium on top and then purchase CNG buses in their place. The bigger issue is just the infrastructure that's needed to support those buses and maintain those buses before they actually come on-site. Whether you've got 10 buses or a thousand buses, you still need to be able to fuel them, you still need to be able to maintain them. So the majority of the cost is the upfront cost. The incremental cost is probably livable with.

Mr. Bikman: So is it economically viable without government assistance?

Mr. Davies: It probably is. It's the payback period. The studies that we did, the one-year study for natural gas, primarily taking numbers from the other agencies in North America, it looked like it was around an eight-year payback period for a 200-bus facility. So for something like a 400-bus facility I would expect a slightly shorter period, probably in the five- to seven-year window.

Mr. Bikman: Amortize the costs over more vehicles. Gotcha. Okay. Thank you.

The Chair: Mr. Bilous.

Mr. Bilous: Thank you very much. And thank you, gentlemen, for coming today. I just want to mention that the new facility that is being built in the city of Edmonton is in my constituency of Edmonton-Beverly-Clareview. There's been lots of positive feedback about building on that site and making use of it.

Now, again, you gentlemen alluded to some of the answers, and even Mr. Bikman had asked. In my mind, this is one of those situations, converting to CNG, where, like you had alluded to, it wouldn't happen overnight. This isn't necessarily because of an instant cost savings but looking at transitioning out of diesel partly, as you've indicated, because it is so volatile as far as prices. Again, one of the things this committee is exploring is, you know, using the natural gas and the amount of natural gas reserves that we have in this province and how we can take advantage of that.

You talked about taxes on natural gas, and you also talked about what, in my mind, is one of the two major obstacles, education. So I want to get your thoughts on the role, if you see any, the provincial government could take on that piece when we're looking at educating Albertans on CNG. Then, as well, it sounds like the major obstacle is the infrastructure so, again, the fuelling stations, et cetera, so other than just the dollars if there are other roles that the province could play in helping to facilitate this.

Mr. Wong: I'll take the education piece. I think the major role that the government could help with in the education piece is working with the major manufacturers. Right now to buy a CNG off-the-shelf vehicle – you can't buy one. Until people start seeing that and seeing that market penetration of natural gas – because you don't need to have a high-pressure system built. You can get a smaller one, an overnight fuelling station, built at home. But the cost of that is \$3,000.

I know Honda is coming out with something, but to get your hands on one is fairly difficult. Until the market sees either stewards being – as mentioned, economic viability may not be there, but environmental stewardship is very important. It's very important to the citizens of Edmonton, and we've identified that with the implementation of a fully electric vehicle within the fleets, exploring different alternative fuel technologies. But, again, that process is the general – if the manufacturers aren't doing it, what can we trust? I think it's breaking that barrier of trust.

Hybrid technology has got all of the spotlight right now. All the major manufacturers have adopted it. I mean, you can buy yourself a hybrid Lexus and a hybrid this, a hybrid that. They created a buzz. They've created an atmosphere where this is good and this is what you can do to become an environmental steward. Can we do that with CNG so close to the hybrid technology? It might be a little bit difficult. So that could be a barrier that could be helped with. We can work with the manufacturers and see what more we can do.

Mr. Davies: In terms of other ways that help could be provided, I guess, other than just raw dollars, I mean, you're primarily looking at incentives for turning to natural gas, and if it's not going to be dollars, it needs to be sort of performance kinds of things. You need to have the ability to get from A to B quicker. You need to be able to use HOV lanes or bus lanes or something along those lines to sort of say: if you're an alternative fuel vehicle, you can get from A to B far quicker and thereby help the environment even a little more. You could do similar kinds of things for parking schemes as well. I think we already see some parking schemes for fully electric vehicles, where they get to park in prime spots much like, say, disability vehicles. You could do the same thing for energy efficient vehicles or alternative fuel vehicles there as well, I think. Those kinds of situations could help.

I mean, in an industrial perspective if you were to look at the taxi industry, I think you could give sort of tax breaks or kind of licensing breaks to vehicles that ran on CNG or alternative fuels as well. There could be those kinds of measures. But that does have a bit of a dollar impact there, I guess.

Mr. Bilous: Thank you, gentlemen.

The Chair: All right. Mr. Sandhu, I think you're in for the last question here.

Mr. Sandhu: Thank you, Madam Chair, and thank you to all of the guests. I go to India, you know, very often, and I notice that in a big city like New Delhi – they've got more than 20 million people there – they're all on gas. I've talked to their leaders about how they got it converted from diesel to gas. They all said that it's more environmentally friendly. Aren't we behind on the environment? If you look at the way you're explaining it, there's very little difference pricewise. You said that it was a \$40,000 or \$50,000 difference between diesel and gas, CNG. My question is: if the difference costs very little, why are we not moving into CNG? We've got lots of gas which we can use.

7:05

Mr. Davies: From an environmental perspective gas is generally better than all of the technologies. There's absolutely no doubt about it. When we do some comparisons between some of the buses that are probably 10 years old plus, that kind of window, they're significantly better. Since about 2006 or so the buses have had to comply with newer environmental regulations, and they do. The level that they now operate at is comparable pretty much to the CNG buses except in the few areas that Mr. Wong mentioned of the SOx and NOx. So environmentally there's not a great deal to pick between the two today except for the fact that the diesel buses need a lot of technology to be able to meet those requirements whereas CNG meets it inherently because it burns clean. From a cost perspective as to why we haven't implemented it now, as we mentioned, it's the infrastructure costs as much as anything else.

The Chair: All right. Gentlemen, I really regret having to say that we probably have to close this down. If people have questions, is it okay if we send them to you? We just hope that you're able to keep our committee apprised of what you do. Your collaborate model is very, very impressive.

Thank you very much for taking the time.

Mr. Davies: Good. Thank you.

Mr. Wong: Thank you.

The Chair: We've got a little bit of housekeeping stuff to do, which you are welcome to stay for, but we would understand if you didn't. Thank you.

All right. Dr. Massolin, thanks for joining us. We've provided you some requests for research, and maybe you could give us a quick update.

If anybody has any further requests for research services, please let us know. Give me a wave here.

Dr. Massolin: Thank you, Madam Chair. Before I ask Ms Zhang just to update the committee, I would propose in terms of a research task that what we could undertake is just simply a summary of these oral presentations to the committee, with the goal of highlighting the salient issues so that the committee can review those issues at the end of its review in order to facilitate the report-writing process.

The Chair: That's a great idea. We've been thinking already about how we enfold all of these ideas – because we've been doing this for a long time now – into some framework that's comprehensive. The goal is that in early December the working group would sit down earlier and then work with the research team to come up with a framework document. Then we would discuss that in one one-hour meeting in early December and then turn it back to the research team to start digging. This group, if you wish, would probably see ongoing copies and updates of the document. I think getting started on that is a very wise idea.

Does anybody have further comments?

Ms Calahasen: I think it's a great idea. Thank you.

Ms Zhang: Research services was asked to look into some information on the amount of off-grid microgeneration in Alberta as well as how Alberta's natural gas microgeneration compares to other jurisdictions. We spoke with the various sources, and they told us that it was not possible to determine with any amount of certainty the amount of off-grid microgeneration in Alberta, and

the provinces that did respond to our inquiries about the amount of microgeneration powered by natural gas in their jurisdictions returned to us that natural gas was not common. In fact, the two programs that responded to us indicated that they have zero microgeneration by natural gas.

The Chair: It could be something we include in one of our recommendations. Anyway, thank you.

All right. Nobody has any further requests? Do feel free to provide input on an ongoing basis. Yes, Dr. Swann.

Dr. Swann: Sorry. Just clarifying that that was zero off-grid natural gas electricity generation. Is that what you just said?

Ms Zhang: The other jurisdictions did not have natural gas microgeneration that they regulate. In terms of off-grid microgeneration in those other jurisdictions they also have no way of determining the number.

The Chair: Okay. I'm going to have to press along here, but, please, if this is of interest to you, then continue to contact me and we'll keep it progressing.

MEG Energy invited us to visit their facility near Christina Lake. We are going on a field trip to Williams Energy in early December. If there are people who are interested in going to Christina Lake maybe even at the end of January, we do need a motion. You know, I think we should think about whether we want to go as a group. They're doing cogeneration, so industrial application of cogeneration. I personally am interested in going. If there are enough people interested in going, I think we should do it as part of this committee. If not, we can just do it personally.

Mr. Allen: I was just going to say that if you're looking for a motion, I'd certainly put that motion on the floor. If none of you have ever been to an oil sands plant – and this is actually a SAGD or an in situ plant in the Christina Lake area – it's an extremely valuable experience. Based on how much revenue the province gets from bitumen royalties, I think it's important for us to actually see how we're producing that and the environmental initiatives that are going on to make sure that it's more responsible, and we can counteract some of what we hear in other media.

The Chair: So I guess I'm asking you, Mr. Allen, if you could move that

in the interest of learning more about cogeneration, the Standing Committee on Resource Stewardship approve an educational trip to Christina Lake to visit a MEG Energy facility.

Mr. Allen: So moved.

The Chair: All in favour? Any objections? It's carried.

Mr. Tyrell will be in contact with MEG about some dates, and we'll get back to you with some ideas.

Just to recap, Liquiline is scheduled to present in two weeks.

Did you guys notice that we have a week off next Monday? Next Monday night don't come here unless you want to have dinner. [interjections] Yeah, I know. I know you're all upset about that.

One more question, though, about Liquiline. They are located in British Columbia. They've asked for reimbursement of their travel to present to this committee. The cost is about \$350 for the flight and \$135 for the hotel if they stay overnight. We did move this before. The last time we reviewed hydroelectricity, we actually granted somebody the cost to come over from another province. So if somebody would be inclined to move that

the Standing Committee on Resource Stewardship delegate authority to the chair in consultation with the working group to authorize reimbursement of expenses incurred by presenters, that would preclude us from having to do that in the future.

Mr. Sandhu: I'll do that.

The Chair: Mr. Sandhu. Thank you.

Mr. Stier: Madam Chair, I have a question.

The Chair: Yes. Please.

Mr. Stier: You've launched a topic I have no background on. Who is Liquiline, and why would we want to hear from them?

The Chair: They've been on our list for a while. They actually do industrial – I always get this wrong. Dr. Massolin?

Dr. Massolin: Sorry. I can't help you.

Mr. Stier: I guess more to the point, is there a reason we're going out of province? Don't we have a local?

The Chair: Yeah, there was a reason. I'm sorry. I apologize. I should know this.

Mr. Stier: You can get back to me.

The Chair: There is a reason we went out of province, and I will provide that reasoning to you. It's a very good question that you've asked, though. Thank you for looking at that.

Mr. Bilous: Madam Chair, can you send it to the whole committee, please?

The Chair: I will indeed.

Would anyone like to make that motion?

Ms L. Johnson: I'll make the motion once we understand why they're coming. [interjection] Oh, it's a general one.

The Chair: Yeah, it's a general motion. Peter made the motion. All in favour? Any objections? That's carried.

Now, I'm just a little bit worried about timing. The other option is for them to do this by teleconferencing.

Dr. Swann: An excellent option.

The Chair: An excellent option. You're comfortable with teleconferencing for this group? Okay. If you are comfortable with teleconferencing, then let's go with teleconferencing. If anybody has a big objection, can they put their hand up right now?

7:15

Okay. So reminding you that Williams Energy facility is coming up in a few weeks, on Friday, December 6.

The date of the next meeting we've talked about: it's in two weeks' time.

The meeting dates to talk about the research for LAO is – what date is that? – December 4.

I'm just saying that there's no meeting next week, and then we've got a couple of meetings really tight plus the Williams Energy thing. So three more things and then probably the end of January.

Would anybody like to move a motion to adjourn?

Oh, Dr. Massolin.

Dr. Massolin: No, I can't move that motion, I'm afraid, but I can tell you really quickly about Liquiline. It's an independent cryogenic tank container operator and designer and supplier of LNG receiving stations. They're the technological experts in this area to bring that to market directly, for the transportation.

The Chair: It's for industrial application, including in remote locations.

Dr. Massolin: That's right.

Mr. Webber: And just a reminder about Kyle.

The Chair: Oh, yes. We're going to say good-bye to one of the people who helps us in the PC caucus. Kyle Olsen is joining the University of Calgary. We're going to really miss Kyle Olsen.

A motion to adjourn?

Mr. Lemke: So moved.

The Chair: Thank you. All in favour? Any objections? The motion is carried.

Thank you.

[The committee adjourned at 7:17 p.m.]

