Good afternoon and thanks for joining us; I am Judy Simpson. Over the past few months we've brought you several shows about the smart grid and the upgrades to Vermont Electric’s grid. Today we're going to be focusing on the future of electric vehicles in Vermont and whether electric transportation can make Vermont greener. Joining me are two guests; Paul Hines is an Associate Professor of Engineering at the University of Vermont and Karen Glitman is the Director of Transportation Efficiency at the Vermont Energy Investment Corporation. Welcome to both of you. Let's start off with an overview of what the electric car is all about, Paul.

Paul.: Sure electric cars started with hybrid electric vehicles which are not truly electric vehicles like a Toyota Prius for example is a hybrid vehicle. It has a motor but it's really just used to increase efficiency. Electric vehicles or plug in electric vehicles are ones in which you actually plug in the vehicle to your electric stick instead of going to the gasoline station to fill it up you would get your electric energy out of the grid. Here on the screen you can see a couple of different vehicles. On the top is a hybrid vehicle that you put gasoline in and you get your energy out of the gasoline. In the pure battery electric you're just using the power grid in order to get your energy to move. With a lot of new vehicles like the GM Volt there's a combination so this is called a plug in hybrid electric vehicle. In the GM Volt case you have an electric source as well as a gasoline engine and you use whichever one is needed in order to move your vehicle most efficiently. If you have battery capacity you'll run the vehicle based on the batteries and if you run out of battery capacity you run it based on the gasoline engine.

Judy.: How reliable are these vehicles? I think about Vermont winters and batteries and I kind of wonder.

Paul.: To start with electric vehicles the motor is probably going to be quite a bit more reliable than an internal combustion engine. Engines have a lot of moving parts and those parts are bound to break down so there's fundamentally electric vehicle should be more reliable in the long run. Of course it's going to take some time for mechanics to get trained on the new vehicles but I think in the long run electric vehicles will be more reliable. We'll take some time for us to get there but I think it will be better. The batteries are a little bit sensitive to temperature but the vehicle manufacturers are doing a lot in order to make the batteries to insulate them better and warm them to the right temperatures so they're not as sensitive to cold temperatures.
Judy.: In fact they're becoming even more mainstream. Big named car makers are rolling out their own versions of electric cars.

Karen.: I think this calendar year we will see about a dozen manufacturers come out with their electric vehicles. Everything from the GM Volt the Toyota Prius is coming out with a plug and Ford Focus has an electric vehicle. Mitsubishi as well as the Nissan Leaf. So there are a number of vehicles that are out there some of them are already in showrooms in Vermont now and some will be coming throughout this calendar year.

Judy.: Once you buy the vehicle at you charge it to need a special plug in your house or how does it work?

Paul.: Most of the new electric vehicles can be charged using a standard 120 volt electric plug. You can also buy a charger that will allow you to charge the vehicle career four times faster and that costs maybe $1000 including installation but it would actually increase the speed in which you can charge a vehicle so you can charge the vehicle from bottom to top and a few hours rather than overnight.

Judy.: There are some public places to now?

Karen.: There are; so home charging is probably what most people will do when they get back from work or errands will take the plug and plug it in whether it's the regular 120 or 240 level to charger. You can actually buy them on Amazon and some other places so they are readily available. For the public charging we've gone from about one charging station there's the old one on Main and Church Street that was funded back in the nineties. We have well over a dozen and more being planned all the time. We have them throughout Chittenden County there some in Montpelier Addison County just put one in at the regional planning commission. There's one down in Rutland so they really beginning to grow throughout the state and there's plans for electric highway between Montreal and Montpelier with charging stations there as well. I think we're going to see the influence of the Canadian market around electric vehicles especially in Northern Vermont.

Judy.: We should point out too that the spaces used to charge these vehicles are marked so sometimes people who don't have an electric vehicle they look like regular parking places and they'll actually park there. You said there's a term for that?

Karen.: There's actually a term it's called been iced which is internal combustion engine has taken my spot. If you're driving an electric vehicle and you need to charge you need to charge. It would be kind of like blocking the pump of a gas station and going in spending 10 minutes doing whatever else. Those electrics hard for people to be able to charge.

Paul.: It really points at one of the advantages of electric vehicles is that I can charge my vehicle by parking which is something you have to do to your vehicle's anyway whereas with gasoline you have to go to a pump, it's a dirty process, often cold in Vermont but everybody goes home to park their car everyone goes to work to park their car becomes more of a integral part of using your vehicle.
Judy.: Let's talk more about the expense of charging. How expensive is it and how do you pay if you're at a public spot?

Karen.: Right now it is free which makes it very inexpensive. There are mechanisms in place right now to pay so for instance the charging stations at Healthy Living or at St. Michael’s College or at the Burlington Airport garage those are just being absorbed by the owner of that facility. It can change once demand grows there will be some mechanisms for charging whether it's a swipe with your credit card. There may be a mobile phone app so it gets charged. Certainly at home it will be part of your electrical bill as well.

Paul.: Fundamentally running an electric vehicle is a lot less expensive than running a conventional internal combustion engine. Because gasoline costs a lot more than electricity does. Not only that but electric engines are about three times more efficient than an internal combustion engine in terms of getting energy to move your vehicle.

Judy.: I was going to ask you about that because we're all encouraged to use less electricity and here we are promoting electric cars.

Karen.: Yes I think some of the issues about the decomposition of the grid and whether we're using electricity efficiently so with charging at night the big key with electricity is whether or not you're increasing peak demand. The feeling around electric vehicles is people would not be adding to the peak but in fact would be using electricity most efficiently by charging at night doing some of the utility issues of the valley's at night and begin to fill those in.

Paul.: It is really two reasons for efficiency. One is to reduce our carbon emissions and as far as carbon emissions go using efficient electricity is far less environmentally costly then using liquid fuel and burning it in your car. The other reason is to reduce the peak so electricity in the middle of a hot summer day comes from the dirtiest coal or diesel plants in the country and it's really really expensive. It can be 10 times or 20 times more expensive than off peak electricity. Because of that it makes a lot of sense to do the things we can do to use the off peak electricity. It's really quite affordable for the utilities and there are some ways you can begin to pass that savings on to the customer with smart meters and other things.

Karen.: Is also the element of self-reliance. With electricity we know how to generate that here with liquid fuels we have to get it from elsewhere so the notion of being able to control our destiny with this new energy source is very appealing.

Judy.: And of course with gas prices continuing to go up I think probably more people will become interested in alternate ways to get around.

Paul.: 30 to 40% of the energy that comes into Vermont goes into transportation. If there's a way for us to take hold of that energy consumption and write our own destiny through electricity it would be a lot better for Vermonters to do that.

Karen.: And a lot better for Vermont’s economy as a real economic development aspect to it as well.

Judy.: That's interesting because we pay taxes on gasoline that helps with transportation costs in the state so if we are not using gasoline well that will hurt that source of funding.
Karen.: Right that's been going on for quite some time now with the highway trust fund it nationally and the state transportation fund had been seen declining revenues not only because of decreased vehicle miles traveled or stagnant but because of increased efficiency of vehicles. So there's great interest in how are we going to fund the transportation system when we're in a new energy source. There are a number of proposals that have been discussed nationally for quite some time as we see this transitional era. We're moving away from gasoline including the revenues from gasoline to a new source.

Judy.: So electric vehicles are more expensive than the typical gasoline vehicles so how do you counterbalance that or how do you encourage people to take that step and put the money up front for this new vehicle?

Paul.: The Federal govt has some incentives out there for electrical vehicles production. They are putting a lot of investment into the companies that produce batteries so the cost of the battery is one of the most expensive parts of the electric vehicle. So there is a lot of work going on trying to reduce that cost but just for vehicle owners think the Federal subsidy right now is about $7500. That's a rebate you would get if you bought one and that costs is likely to come down over time as better technology improves and car companies figure out how to put pieces together most efficiently.

Karen.: Then there's the cost of usage so what point do get a return on investment and that will depend on gas prices to a large extent. But you have the 7500 tax credit the may or may not go up. There is a proposal to increase it and then the price of the vehicle. Any new vehicle around 30,000 is a nice day vehicle and I think that's what some of them are selling at. You take out the $7500 tax credit and many think about what your actual cost for maintenance as well as gasoline begins to be more attractive.

Paul.: One way to think about it is to think about someone leasing a vehicle. Maybe your lease cost some things like $300 a month. If you drive a lot your gasoline cost is probably about $300 a month. If you can cut that by 1/2 to a third the switching over to electric that is a pretty substantial savings per month.

Judy.: That's another bill you could pay.

Paul.: That's right it's another bill $150 a month. I think for people who do drive a lot this is something at begins to make economic sense.

Karen.: At the macro level if we look at the numbers for taxable gas and diesel sale in Vermont which is about 1.1 billion 2010. Of course it has gone up as gas prices have gone up. Paul's work it looked are today's fleet today's travel behavior 2010 electricity rates and converting it and that came to about 275,000,000. So you're talking about a huge incremental difference between fueling our vehicles with gas and diesel and with using electricity. That does not include any tax for transportation but think about the difference and what it could mean for Vermont’s economy. All that money would stay in Vermonter’s pockets. You need to do little bit more than pay for electricity. There might be infrastructure fees and taxes to help replenish the highway trust fund but even if it got up to 500,000,000 you'd still be talking about between five and 600 $1,000,000 at the 2010 gas prices. If gas prices go up the increment grows. That's a huge amount of money that could stay in Vermont economy.
Judy.: I know there's a PSA that has been produced to help viewers understand the difference between the two kinds of vehicles and it illustrates the difference maybe we could take a look at that.

Time for scheduled service.
Yup and I'm already.
Quite a production.
I know your Electric Motor needs no tune up's but I have to replace engine parts all the time.
I need gaskets filters sensors it's amazing you don't even have a transmission. Yes it takes a lot of money to keep me on the road that now almost as good as new.
I am sorry sir but your card is over limit.

Judy.: That's great. What else should viewers know about electric vehicles. Maybe it's just a simple as if you're thinking about a new vehicle at least consider test driving an electric vehicle.

Karen.: I think we're in this transitional era and removing tour as a new energy source so it's just a matter of whether you want to go test ride them. Think there some on dealer lots here in Vermont I think people are interested in learning more. I think it's a new technology we're going to see more and more of.

Judy.: If people are interested in finding out more what should they do?

Paul.: Definitely test driving a vehicle is a great thing to do I think you can contact Karen or myself and we'd be happy to answer some questions about electric vehicles. The big thing for me is that the transition to electric transportation allows us to make their own choices about energy and that is a real benefit.

Judy.: It must be very gratifying to drive past the gas station.

Paul.: Indeed it would be.

Judy.: I want to thank you both for joining me today. That’s our program for today. I’m Judy Simpson we’ll see you again next time on Across the Fence.

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