

# Transit Talk

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## Philadelphia trolley order leaves Edmonton as only trolley system in North America with no commitment to new trolley buses

The Southeastern Pennsylvania Transit Authority's Board of Directors approved a contract for the supply of a new fleet of low floor trolley buses for the city of Philadelphia on February 22<sup>nd</sup>. The contract was awarded to New Flyer Industries U.S.A., the American counterpart to the Canadian firm that is producing electric trolleys for Vancouver. The contract provides for 38 standard size low floor trolley buses needed to equip three routes in Northeast Philadelphia. An option for 23 more could be exercised to return trolley service to two additional routes in South Philadelphia. A separate contract covers renewal of the overhead wiring on Routes 59, 66 and 75.

The new trolley buses will employ electrical equipment supplied by the Vossloh Kiepe Corporation who manufactured the electrical components for Athens' new fleet of trolleys as well as for the vehicles being built for Vancouver. The Philadelphia trolleys will feature air conditioning. They will be equipped with a small on-board diesel generator to allow them to travel away from the wires in emergencies. This differs

from the battery pack arrangement to be used on the Vancouver order.

Nine cities in North America operate trolley buses. Philadelphia's move to a new trolley fleet leaves Edmonton as the only North American trolley system that has not yet committed to a new fleet of trolley buses.

[H. Levine/SEPTA/Vossloh-Kiepe]

## Low Floor Trolleys to play key role in Vancouver's Main Street Revitalization

Vancouver has unveiled a plan to improve and beautify Main Street, one of the main North-South arterials in the city. Along with public art, benches and landscaping improvements, the plan will incorporate transit and pedestrian friendly features like *bus bulges*—sidewalk extensions that allow buses to stay in their lanes when stopping—and *pedestrian bulges*—extensions to the sidewalks that shorten pedestrian crossing distances. Special traffic signals will give transit priority at intersections, and bus stops will feature lit shelters with seating and seasonal plantings, plus real-time smart displays to tell passengers when the next trolley will arrive. Transit along

Main Street will feature new bike rack equipped, accessible low-floor trolley buses that deliver reliable, quiet, emission-free service while enhancing the focus on quality of life and sustainable transportation. The package aims at making walking, cycling and taking transit convenient and attractive to residents.

The Main Street improvement project is a cooperative undertaking of the City of Vancouver, Translink, Transport Canada and the Main Street community.

[Source: Translink Web site at [www.translink.bc.ca](http://www.translink.bc.ca)]

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# Beating the Impending Oil Crunch

## Will it be a case of too little, too late?



Recent announcements indicate both General Motors and Ford will be scaling back production, closing plants and laying off staff. Canada's main manufacturing sector is approaching a crisis state. With threats of even higher oil prices and low cost auto imports from China on the horizon, things are destined to get worse.

"It's time to rethink where our transport systems are headed," assert Canadian transport experts Richard Gilbert and Anthony Perl. They, along with many others, see these events as indicators that a transition to a new energy regime is just beginning—a transition that could see gasoline prices rising to more than \$4 per litre within a decade.

In order to defer such price increases (and note it would only defer them, not prevent them), there would have to be a dramatic increase in oil production, which is not likely to happen. World demand is just rising too fast. China's oil imports rose 43% last year. Small shortfalls in production in relation to demand result in huge increases in the price of crude. A mere 4% shortfall in daily oil production would cause a 177% increase in crude prices, according to the U.S. National Energy Commission. \$4 per litre pump prices are not hard to foresee. Oil-based transport fuels are destined to become increasingly unaffordable for frequent use.

What would be the result of these sharp price hikes? In one scenario, convulsions in the oil market could cause supplies to break down, leading to an energy and economic crisis. The other scenario involves implementing oil alternatives so that the efficient movement of people and goods can continue with much lower levels of gasoline and diesel consumption despite skyrocketing prices.

The second—and doubtless much preferred—scenario requires a conversion of major means of transportation to other fuels; it requires a break-away from "business as usual". Most surface transportation would use electric drives, drawing current from overhead wires, rails, batteries or both. Vehicles connected to the power grid (like trolley buses, streetcars, and electric light rail) are the answer for mass transit. Plug-in hybrid cars and trucks with bigger batteries so that the vehicle can run for a full day's urban use on electricity are the next step for cars and trucks, where it is not possible to provide a continuous grid connection.

All levels of government need to realize the time to steer our transportation systems in this direction is now. The budgetary issues governments deal with today are minor compared to the financial constraints we would face in an energy and economic crisis. Waiting or using patch solutions

like industry bail-outs and handouts will lead to a too little-too late situation. Funds available today need to be invested in transportation infrastructure that will make sense when the real oil crunch comes. The first key steps involve steering the transport manufacturing industry, including GM and Ford, toward investing in electric vehicle production, and examining the way we design and fuel our urban transport and transit systems.

By making the right moves now, Canada could become a world leader in the shift to a new transport paradigm.

[Summarized from "To the Transport Barricades", *Globe and Mail*, Dec. 2, 2005. *Transport Revolutions: Making the Movement of People and Freight Work for the 21<sup>st</sup> Century* by Richard Gilbert and Anthony Perl will be published in 2007. ]

### Agencies Launch Canadian Electric Mobility Network

Representatives of industry, government and non-governmental organizations met at a workshop in Vancouver in December to discuss and formulate plans for the creation of a nation-wide network to further the adoption and development of electric mobility. Electric Mobility Canada will seek to promote, accelerate and implement electric mobility in Canada's transportation systems.

"It may be time to start serious planning for a future in which electric transport becomes the norm," said Pierre Lavallee, Director General of the Centre for Experimentation in Electric Vehicles – Quebec. The network encompasses electric mobility in all its forms—from grid-connected ("tethered") electric vehicles like trolley buses, streetcars and electric light rail, to battery-electric, hybrid and fuel cell propulsion systems. Faced with the inevitability of peak oil and rising oil prices, Lavallee says that "electric vehicles are a serious but so far underused alternative that can keep us moving without a major disruption".

The workshop was organized by CEVEQ and the Centre for Sustainable Transportation, with sponsorship from a number of agencies including CUTA, Industry Canada, Natural Resources Canada, Environment Canada, CAW, AMT, Bombardier Transportation, Azure Dynamics, Hydro Quebec, Railpower, Ville de Saint Jerome and Toyota.

[Source: *Electric Transportation Solutions*, Dec. 18, 2005]

# Hybrid Buses – The State of the Technology

Hybrid buses are in the news a lot recently. This developing technology could have appeal for mass transit as an alternative to conventional diesels, but some barriers need to be overcome according to a study conducted for the U.S. Federal Transportation Administration (FTA) by the Northeast Advanced Vehicle Consortium (NAVC) and reported in November 2005.

The study reports about 700 hybrid buses are in service in North America, with the largest numbers in Seattle (King County) Washington and New York City. Hybrid configurations differ greatly among the big three manufacturers--GM Allison, BAE Systems and ISE Corporation. Some use a set-up where the internal combustion engine and electric drive are connected in series, others have a parallel configuration where both systems are used to drive the axle. Such variations coupled with the newness of the technology mean that life cycle and performance information is not yet available for any of the products, and won't be for some time.

Hybrid buses cost nearly twice as much as diesel buses of equivalent size. But their economic life is not necessarily any longer. The newness of hybrids and uncertainties about their long-term reliability and maintenance costs have resulted in a slow uptake of the technology by the transit industry. While manufacturers and proponents have predicted the purchase price would drop with increased production, the NAVC points out that the market may actually not be large enough to have this effect. The U.S. transit bus market is about 5,000 units per year. According to the study, "this is not a sufficient number to bring down the price of hybrids to compete with diesel bus prices." A migration of the technology into the heavy-duty truck market would be required to effect a significant change in prices.

Data collected on the hybrids in service show that savings in fuel and maintenance are possible over conventional diesel. In particular, stop-and-go service on busy routes in heavy traffic produce the most significant fuel savings over conventional diesel powered buses. New diesels are likely to have higher maintenance costs from equipment required to meet tighter emission standards. But energy storage is a major cost factor for the hybrid. The energy storage systems--whether lead acid batteries, nickel metal hydride or capacitors--are an expensive component of the initial purchase and remain an ongoing expense throughout the life of the vehicle because they must be replaced every two to ten years, depending on the battery technology and how the vehicle is used. While new fuelling infrastructure isn't required for hybrids, there are the cost impacts of increased training for drivers and technicians, and the upgrading of maintenance facilities to accommodate battery switching and conditioning. Battery conditioning requires a certain percentage of the vehicles to be taken out of service for a period of time. In a large fleet, this would require a higher than normal spare ratio. New York has managed to reduce the reconditioning time on 85% of its hybrid fleet

to under 20 hours with careful management, but the offline time is still considerable.

The hybrid industry and stakeholders are hoping for some changes that would increase the uptake of hybrids as a replacement for diesel buses. Those include changes to SAE emission standards, and more meaningful incentives to overcome some of the capital cost barriers.

[Source: *Hybrid and Electric Vehicle Progress*, November 15, 2005.]



## Local Transit Award Honors Bob Clark and Ewen Nelson

Edmonton's transit advocacy group Citizens for Better Transit, in cooperation with the ETS Advisory Board, presented its 2006 Gerry Wright Better Transit Award on March 11<sup>th</sup> at the annual ETS Community Conference. Named after quality of life champion Gerry Wright, the award recognizes individuals who have contributed significantly to the improvement of public transit.

Honored this year are Robert Clark and the late Ewen Nelson. Clark is known for his contributions to the design and construction of Edmonton's light rail line as well as improvements to the DATS service delivery models, transit planning and the city's electric trolley bus system. He is currently president of the Edmonton Radial Railway Society and was instrumental in the restoration of the city's first streetcar.

Ewen Nelson was a well-known and highly respected advocate of accessible transit services to improve opportunities for the disability community to participate more fully in society. He helped to design and pilot many of the accessible transit services that are now part of standard transit service in Edmonton. He also worked to build awareness of the full range of travel choices available to persons with disabilities.

The annual award is sponsored by Siemens Canada and the Amalgamated Transit Union Local 569. [Source: CFBT]



Diane Bergeron (accepting for Ewen Nelson) and Robert Clark with the 2006 Better Transit Award

## Province Plans to Diversify Energy Sources

In a televised speech on February 21<sup>st</sup>, Premier Ralph Klein announced the government's intent to diversify Alberta's energy industry. This implies the development of a much stronger electricity industry alongside oil and natural gas. Not only will the province continue to foster the development of green electricity sources like the expanding wind power installation at Pincher Creek, but coal has also come back into the spotlight.



*Greater emphasis to be placed on the electricity industry by continued investment in wind power and developing 'clean coal' technology*

The province's easily accessible oil and gas reserves are disappearing with considerable speed, which has led to billions of dollars of investment in the oil sands and gas pipelines to the arctic. Getting oil from the oil sands is an energy intensive activity, using vast quantities of natural gas to create the steam needed for the process of drawing the oil to the surface. Natural gas supplies peaked in Alberta in 2001; peak oil isn't far away according to the experts. With the ever-growing world demand for oil, the realization that petroleum reserves are on the decline even in oil-rich Alberta has sparked the need to develop alternatives, not only to meet our energy needs, but also to provide continued fuel for the Alberta economy.

Once viewed as yesterday's fuel, attention is again turning to Alberta's vast quantities of coal—enough to last 800 to 1,000 years at current rates of consumption according to Alberta Energy. Electricity has been repeatedly billed as the fuel of the future, and it appears Alberta will have plenty to offer a world that depends to a greater extent on this energy source.

According to Allen Wright, Executive Director of the Coal Association of Canada, coal makes up at least 66% of the fossil fuel reserves in Canada, most of it being found in the Western provinces. It is the clearly dominant fuel. Wright also says that, unlike oil and natural gas, coal prices are predictable. They may go up, but nowhere near the rises we will see in oil and natural gas. That translates into stable electricity prices over the long term. But the question, says Wright, is how to use coal better.

Coal reserves can yield both coal and a product called Coal Bed Methane, a substitute for conventional natural gas. The methane can be extracted from the deeper coal, while the coal closer to the surface can be mined. Like diesel oil, coal has developed the reputation of a "dirty" fuel. But Wright says there are new technologies that allow us to burn coal much cleaner. In Genessee 3, for example, an Epcor plant southwest of Edmonton, "super critical" technologies have been employed to increase the energy yield, while reducing emissions. Combined with various scrubbers and other add-ons, the emissions are dramatically reduced—to a level similar to natural gas. Coal can also be "beneficiated" before it is used—that is, cleaned, so that it burns cleaner with fewer harmful emissions.

The premier's speech talks about reducing environmental impacts even further with 'clean coal' technologies currently under development. Through a process known as 'carbon sequestration', 90-95% of carbon dioxide emissions can be prevented from entering the atmosphere. The United Kingdom and China have already committed to a \$6.1 million research project on clean coal technology with the aim of putting clean coal electricity generation into practice. Saskatchewan is also eyeing clean coal technology and hopes to put \$20 million toward having a clean coal plant in operation by 2011. Implementing the technology would go a long way toward meeting the greenhouse gas reductions mandated by Kyoto.

Klein says his plan is aimed to allow Alberta to retain its position as an energy leader. And indeed, clean coal technology could help overcome many of the current objections to using coal as an energy source. Along with the development of wind and other renewable power sources, clean coal will also help electricity to play a larger role in transportation and urban mobility and spark the move away from petroleum fuels needed to ensure future sustainability.

[Sources: Premier's Address, Feb. 21, 2006; *Coalblog*, Jan. 9 and Feb. 8, 2006; Alberta Energy Research Institute, Strategic Research Plan (Draft); "Enekrig Probe", *Globe and Mail*, Feb. 9, 2006]

# Report reveals efficiencies of electricity and hydrogen as future transport fuels

*Hydrogen best used for power generation*



vs. H<sub>2</sub>

A study titled "Carrying the Energy Future: Comparing Hydrogen and Electricity for Transmission, Storage and Transportation" by the Seattle-based Institute for Lifecycle Environmental Assessment evaluated the energy penalties incurred when using hydrogen to transmit energy compared to those incurred using electricity. The research is based on the fact that hydrogen is not an energy source, but an energy carrier.

The study compared the actual energy available as an end product when hydrogen and electricity are used as a means to transport or "carry" energy. It found that electricity delivers substantially greater "end use energy". "Electricity offers more energy efficient options that might preclude mass-scale emergence of hydrogen transportation technologies," it concludes.

To illustrate the efficiencies of the two energy transmission methods, the study evaluated the transmission of 4,000 megawatts of wind energy generated in the Great Plains wind fields to Chicago. Moving the energy generated by a renewable source to another location as hydrogen requires that the electricity be used to break water molecules into hydrogen and oxygen in a process called electrolysis. At the point of use (e.g. in a fuel cell vehicle), the hydrogen must be converted back into electricity.

Energy losses take place in these conversions. When these losses are taken into account, the process leaves only 45-55% of the original energy if hydrogen is the carrier, compared to 92% if transmitted as electricity. Electrical transmission provides roughly twice the end use energy.

Storage is no less of a problem. Hydrogen is envisaged as a medium to store energy generated by renewables, making power available on demand. However, energy penalties apply even to

energy storage. Storing electricity in advanced batteries returns about 75-80% of the stored energy for end use, whereas hydrogen storage returns only 47%.

Grid-connected electric vehicles like streetcars, trolley buses, and electric trains represent the most energy efficient forms of electric transport, but even battery electric vehicles represent a more efficient use of energy than vehicles driven by hydrogen fuel cells. According to the report, using electricity to charge battery electric vehicles (EVs) provides twice the mileage per kilowatt hour as employing electricity to make hydrogen fuel. Lithium ion batteries can store electricity at a density about six times greater than conventional lead acid batteries and go about 250 miles between charges.

While using onboard hydrogen to propel vehicles has multiple inefficiencies, fuel cells would have potential as part of a system

for converting alcohol fuels to electricity.

Fuel cells can operate as stationary electrical generators, potentially at significantly higher efficiencies than current power stations or other distributed generators. The emergence of a fuel cell market is, therefore, not necessarily dependent on a mass application onboard vehicles or the development of a huge hydrogen supply network to support them. Instead fuel cells could find application in power generation, feeding a power grid or supplying power to grid-connected mass transit systems.

The study recommends that research focus on developments that can support both pathways. This includes rapid expansion of renewables as well as improvement and expansion of vehicle-grid applications.

[Source: *Energy Security*, Institute for the Analysis of Global Security]

## Asthma rates in Canadian children jump fourfold



According to a report released January 27<sup>th</sup> by the Montreal-based Commission for Environmental Co-operation, asthma rates have reached epidemic proportions in many areas of North America. In Canada, the Commission's investigation concluded that asthma rates in Canadian children are now four times higher than they were 20 years ago. Children are particularly severely affected by the disease because their lungs and immune systems are not fully developed, meaning their response to triggers is much more adverse than that of adults. 20% of Canadian boys and 15% of Canadian girls aged 8 to 11 have been diagnosed with asthma.

The Commission links the rise primarily to outdoor air pollution, in particular airborne pollutants such as particulates from vehicle exhaust. Previous studies that looked for causal factors found that children living in urban areas near busy transportation corridors showed the highest incidence of asthma and lung disease. Fine particles from diesel exhaust have been a particular concern because of their high toxicity. The present study also names second-hand cigarette smoke and smoke from urban wood-burning fireplaces as contributing factors.

[Source: CBC News, Jan. 27, 2006, courtesy Angela Bischoff]



## National and International News

### Sao Paulo, Brazil celebrates 52 years of trolley bus service

On the morning of Wednesday, January 18<sup>th</sup>, the streets of Sao Paulo, Brazil filled with trolley buses—from historic vehicles beautifully restored, to the latest state-of-the-art vehicles from Brazilian manufacturer Busscar. The public was invited to take a ride aboard the “toxin-free” vehicles through the heart of the city. “The heart of the city from a trolley bus window” proclaimed banners on the sides of the vehicles. Large crowds gathered at the “Patio do Colegio”, the city’s oldest building, to take part in the celebrations.

[Source: International Trolleybus News, information and photos courtesy Giuliano R. Guiari and Ricardo Milani]



*Pictures at right: Crowds gather, balloons soar into the air, and historic and modern trolley buses fill the streets in front of the “Patio do Colegio” as Sao Paulo celebrates 52 years of clean, quiet electric trolley bus service.*



### Diesel buses drive riders away in Shanghai

In the year following the conversion of Shanghai’s Route 21 trolley bus route to diesel operation, the operator reports patronage has shown a marked decline. Although it is not known if the operator will convert the route back to trolley bus operation, new Sunwin low floor trolley buses are currently in production for Shanghai at a local plant. Despite the conversion of Route 21 to diesel operation, Shanghai continues to operate a large trolley bus system. Rising oil prices have enabled a number of Chinese cities to realize operational savings with trolley buses. [Source: Int’l Trolleybus News, courtesy Z. Jiang]



### Toronto Hikes Fares to cover rising costs

Across North America, rising diesel prices and rising transit operating costs have resulted in either transit service cuts or fare hikes or both in city after city. Last fall, Chicago’s CTA announced a shortfall of over \$12 million owing mostly to rising diesel prices. Toronto is the most recent city to hike its fares in an attempt to cover a \$16.5 million budget shortfall. Fuel will cost the TTC \$27 million more this year; staffing costs are also up. Cash fares will rise to \$2.75 beginning April 1<sup>st</sup>, and monthly passes will rise to \$98.75. TTC Chair Howard Moscoe defended the system against service cutbacks, saying he was not prepared to cut service on marginal routes. Some City Council members had advocated making up the shortfall with service cutbacks. Ridership on the TTC is growing, but service levels have remained unchanged since 2001. [Source: *Toronto Star*, February 11, 2006]

### Beijing orders new trolley buses for Olympics

Following consideration of several different models, the city of Beijing China has now finalized an order for 47 new trolley buses from the China National Heavy Duty Truck Company in preparation for hosting the Olympic Games in 2008. The new trolleys measure 12 metres in length and are air-conditioned, the first air-conditioned fleet ever ordered by the Chinese capital. The use of trolley buses to showcase environmentally friendly public transit featured prominently in the city’s bid to host the Games, just as it did for Athens in 2004 and for Vancouver’s bid for the 2010 Olympics.

The new additions to the Beijing trolley fleet will arrive in time to allow the completion of an extension to Beijing’s Route 114 before the opening of the Games in 2008. [Source: International Trolleybus News, courtesy Z. Jiang]

# Earth Day 2006

April 23<sup>rd</sup>  
Hawrelak Park

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