

## QUICK CHARGE EV'S SOLVE THREE PROBLEMS AT ONCE<sup>1</sup>

Blaine Juchau<sup>©</sup>

Can we use the high value of personal mobility to cut our greenhouse gas (GHG) emissions? According to LiveSmart BC, over 40% of average household GHG emissions in BC are from personal mobility; that is, the cars we drive. Since BC's electricity is largely from carbon free hydro, if we wish to cut our emissions by 40%, we just have to switch to electric vehicles (EV). And why not? EVs are clean, and they produce no exhaust to form smog or trigger asthma. They run silently, making our cities quieter. They are simple machines with hundreds of fewer moving parts, which cuts maintenance costs and increases durability. Their current range of 150 km is plenty for most families, most of the time. Slow charging at home means you can always leave with a full battery. And the fact that our current autos last an average of 13 years means that huge emission reductions could happen relatively fast as they are replaced.

So why aren't we driving EVs now? What are the barriers to this shift? First, the availability of vehicles – but this barrier will change this year with the introduction of the Nissan Leaf, followed by other EVs in 2011. But even if vehicles were in the showroom today, many of us would resist buying them because of what is called range anxiety: the fear that the car will run out of power, either by driving too far or by forgetting to plug it in, leaving you stranded waiting for a time-consuming battery charge. No amount of slow charge points will solve range anxiety, because they are slow. And apartment and strata dwellers often park on the street without access to a power outlet.

However, our communities have been built on the freedom provided by the convenience of the personal auto. I submit that the critical path to mass-market acceptance of EVs is to eliminate range anxiety, most likely by making quick charging widely available. Various high voltage quick charging technologies are now available which are comparable to a stop at the gas station for range and time. Battery and capacitor designs are being developed which expand range and shorten charging times further. Thus, we can reasonably expect quick charge convenience that matches a gasoline fill-up very soon. So, if we wish to cut emissions fast, we must eliminate range anxiety by deploying quick charging at critical points around and between cities.

To start this process we should answer a key question: what is the value of quick charge electricity? If quick charging can allow the EV driver the same driving convenience as a gasoline car, I suggest the value of quick charge electricity is approximately the pump price of gasoline for a similar car over the same distance. This is a realistic benchmark, since it's what we pay today for personal mobility.

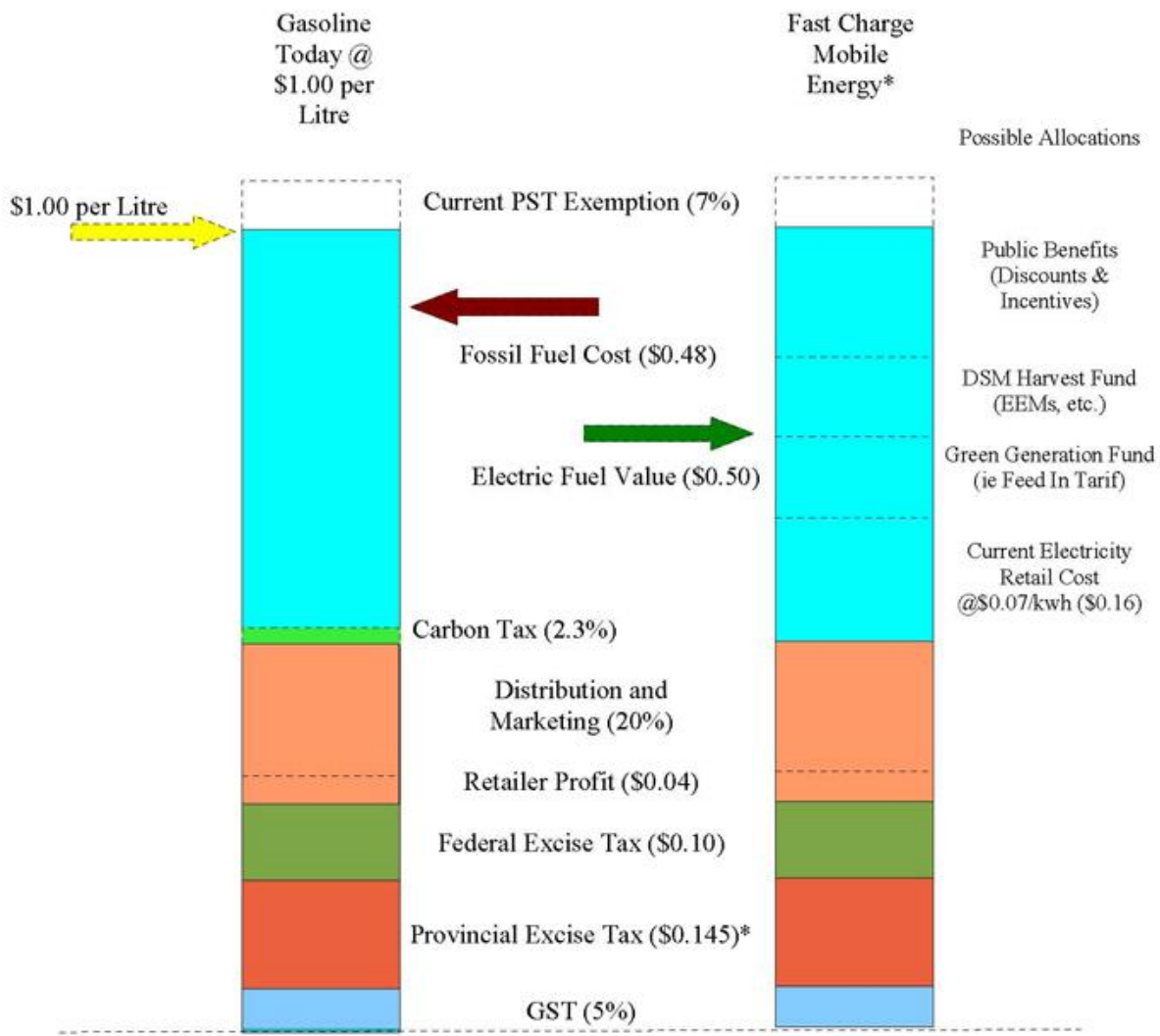
Well, where does that \$1.00/litre we pay go? The left column (see below) shows that it goes to various taxes, distribution and marketing, and, of course, the gasoline itself. If we price EV mobility the same way we pay for gas now, we could solve several problems at once. Here's how: The right column depicts one option to allocate the value of mobility. We could replace taxes for the roadways and services we currently enjoy; pay for distribution and marketing of EV systems; and pay for electricity at the current price. But this would still be cheap, compared to gasoline. A “Quick Charge Premium” could solve several related problems at once.

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<sup>1</sup> BC Sustainable Energy Association, August 18, 2010

For instance, energy conservation in buildings served by cheap, yet clean, hydro electricity is not economically viable for the private sector. Paybacks for the effort are measured in decades. The quick charge premium could finance extensive energy efficiency measures. The precious hydropower that is harvested can be sold to drivers. New clean power sources simply can't compete with 7 cents/kwh heritage hydro. The quick charge premium could finance their development since their new electrical output can readily be sold to drivers at its value to them.

Conceptual Fast Charge  
Mobile Energy Price  
Breakdown Compared to  
Current Gasoline Price at  
\$1.00 per Litre



Sources include Petro-Canada; ITS @UC Davis, PICS & wikipedia.

\* Provincial Excise Tax -aka "Road Tax" - could also be collected by mileage at annual registration renewal to make Province whole and to allocate fairly between gas and electric users. Would need efficiency balancing to avoid regressive effect on smaller cars.

\* Kwh needed to take similar car the same distance

All numbers approximate and rounding means total may be slightly different

To speed the mass acceptance of EVs further, the quick charge premium could pay for buyer incentives such as purchase rebates and quick charge discounts. These choices would also keep the money we now spend on gasoline within the local economy.

There are several simple policy changes that would spark the process. One would be to allow utilities to price EV quick charge power differently than for regular electrical customers, a concept already being discussed in California. Another is to allow retailers and equipment investors to retail quick charge power to drivers without being classified as a utility.

Quick charge power that is deployed to reduce range anxiety could turbo-charge the mass acceptance of electric vehicles. This could be the very fastest way to cut BC's household GHG emissions by 40%. Thus, quick charging power is inherently more valuable than regular utility power, and should be taken advantage of accordingly.

Valuing quick charging for personal mobility as we do now for gasoline allows us to solve three difficult problems at once:

- (1) slashing transportation's GHG emissions,
- (2) funding energy conservation without raising home utility prices, and
- (3) supporting the rapid expansion of new clean power sources.