



January 26, 2023

Attention: City of Cranbrook Mayor and Council:

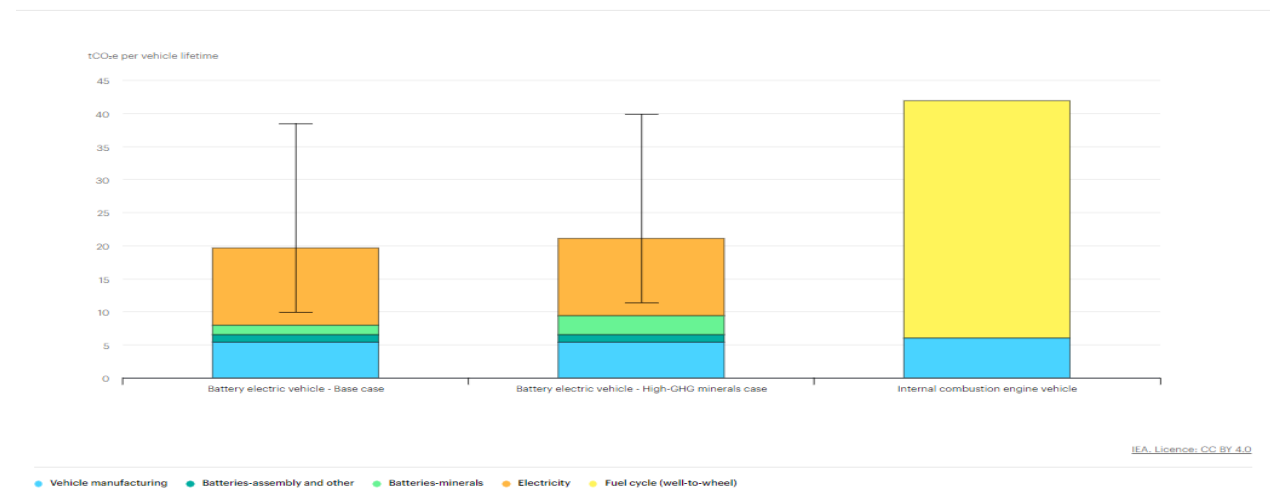
RE: Background information supporting the City's EV investments

At the request of Councillor Peabody, the [East Kootenay Climate Hub](#) (EKCH) is happy to provide some background information regarding the overall lifecycle costs of EV's from an environmental and financial perspective that may provide support for the investments that the City is contemplating with respect to EVs.

A number of reputable investigations can be found for the overall lifecycle impacts of EVs from their manufacture (including the mining of source materials), operation and ultimate disposal. Many of the international studies are skewed somewhat by the use of fossil fuels in most of the global electrical supply, which is more favorable in BC where electricity is predominantly from renewable sources.

The International Energy Association reviewed the GHG emissions associated with manufacturing the vehicle, batteries (in high and low GHG mining situations), and power use during the lifetime operations of the vehicles. The graph below shows the overall GHGs for the different light vehicles using electricity sources with a higher proportion of fossil fuels than those found in BC. While there are some additional emissions during the minerals mined for the batteries, internal combustion engines generally produce this difference in the first year of operations at which point EV's significantly reduce overall emissions. Further information from the IEA regarding EVs can be found here:

<https://www.iea.org/fuels-and-technologies/electric-vehicles>.



IEA, Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle, IEA, Paris

<https://www.iea.org/data-and-statistics/charts/comparative-life-cycle-greenhouse-gas-emissions-of-a-mid-size-bev-and-ice-vehicle>,
IEA. Licence: CC BY 4.0

The impact of the fossil fuels in the electrical grid can be found in this Canadian paper that compares EV's operating in BC and AB against a similar gas powered vehicle (Nissan Leaf vs Nissan Versa) in this paper.

<https://pluginbc.ca/wp/wp-content/uploads/2018/05/Environmental-Life-Cycle-Assessment-of-Electric-Vehicles-in-Canada.pdf>

Table 10 Total life cycle carbon footprint.

	BC EV	Alberta EV	GV
Vehicle life	Tons of CO ₂		
Manufacturing	9.67	9.67	4.46
10000 km	9.70	10.80	6.70
20000 km	9.73	11.93	8.95
30000 km	9.76	13.06	11.19
40000 km	9.79	14.184	13.44
50000 km	9.83	15.31	15.68
60000 km	9.86	16.44	17.92
70000 km	9.89	17.57	20.17
80000 km	9.92	18.70	22.41
90000 km	9.95	19.83	24.66
100000 km	9.98	20.96	26.90
110000 km	10.01	22.09	29.14
120000 km	10.04	23.21	31.39
130000 km	10.08	24.34	33.63
140000 km	10.11	25.47	35.88
150000 km	10.14	26.60	38.12
End of Life	12.18	28.64	38.42

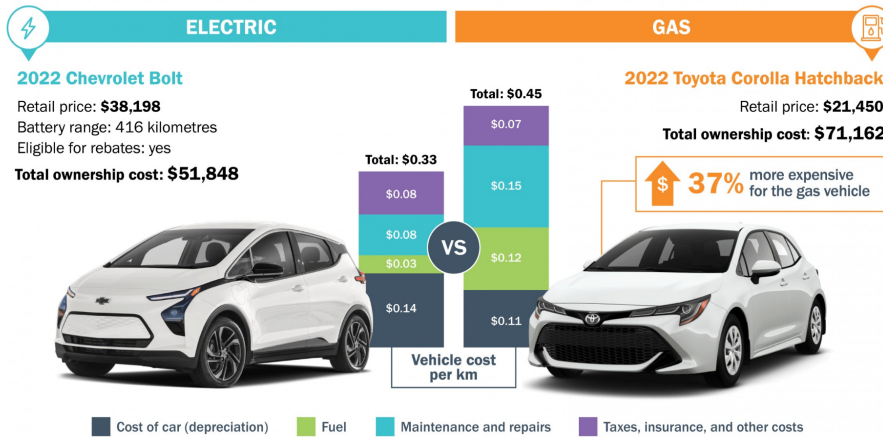
A more locally relevant information source regarding EV's including the financial benefits is presented by BC Hydro in the following link: <https://electricvehicles.bchydro.com/learn/benefits-of-driving-EV>.

The main benefit from EVs is that over 80% of the energy is used for propulsion, while Internal Combustion Engines mostly generate heat with only 20% of the power used for propulsion. For heavier vehicles that stop and start a lot (i.e. garbage trucks and buses), EVs benefit further from regenerative braking where the stopping power is returned to the battery rather than turned into brake dust and heat which is the case for conventional vehicles relying on brakes. This also translates to significantly less maintenance requirements.

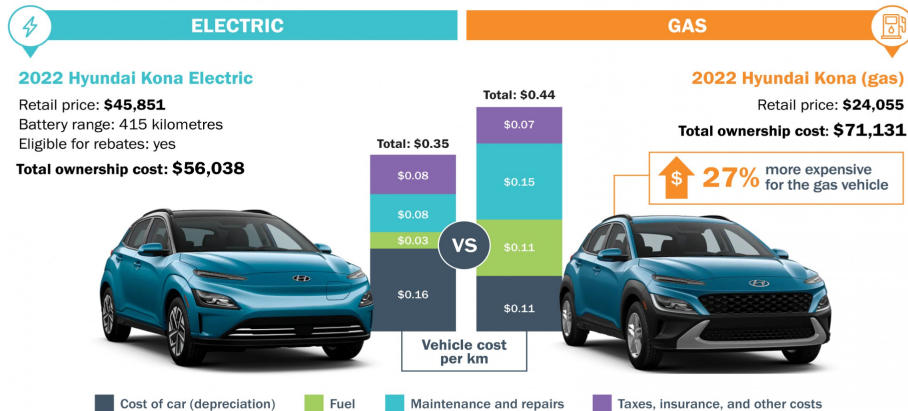
Insofar as the financial analysis for EV vs Gas, it is now well established that EVs are notably cheaper over the life cycle of the vehicle. Here is an analysis of the Chevy Bolt and Hyundai Kona:

<https://environmentjournal.ca/whats-the-true-cost-of-electric-versus-gas-vehicles/>

The full cost of an EV and an equivalent gas car



The full cost of an EV and an equivalent gas car



We trust that this background information on EVs is useful to the City's current budgetary processes that are considering investing in EV charging capacity at the public works yard for further investment into electric vehicles for the City's light duty vehicle needs.

The EKCH supports the City in making these investments that provide a leadership position for the local citizenry and region, while also being pragmatic given the global shift underway in the automotive industry.

Sincerely,

EK Climate Hub

website: [EK Climate Hub](#) Or find us on [Facebook](#)