

Introduction

Personal

- Emotive EV Ambassador – check out them out on Facebook and their webpage (emotivebc.ca)
- Environmental engineer and owner of a Nissan Leaf EV for 1.5 years
- Active family of 4, two young kids
- Have had an active interest in EVs for several years

EVs/PHEVs

- EV = electric vehicle, battery only
 - Sometimes known as a BEV (battery EV)
- PHEV = plug-in hybrid electric vehicle
 - More limited range, but typical daily driving pattern = can drive on electricity majority of the time

This presentation is going to be quick – go to my website/blog later to see the slides in detail:

www.kootenayEVfamily.ca

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Emotive is a program by Plug in BC, a collaboration of public and non-profit organizations to bring public awareness to EVs

Why an EV?

Environmental

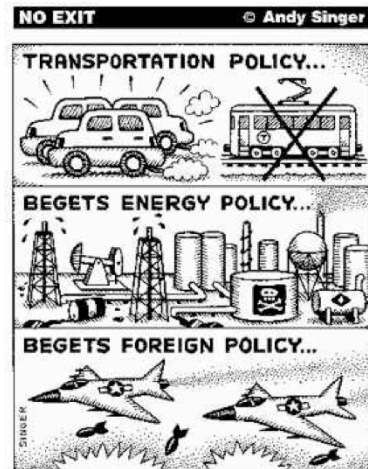
- Improve local/global air quality
- Lower energy/material use over total life-cycle
- In the Koots, “100 mile clean energy diet”



EVs are better than gas cars!

- Single gear + torque = instantaneous acceleration
- Smooth and quiet
- Easy home “refueling”
- Cheaper TCO, little maintenance

Also helps to avoid...



<http://www.lysistrataproject.org/oilandwar.htm>

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The positives for driving an EV

- Quicker because electric motors provide all of their torque right away
- Smoother because there is no transmission lurching around
- Quiet – there aren’t any explosions happening under the hood of your car; only a handful of moving parts instead of thousands!
- Less maintenance because there are less moving parts and no regular fluids to change (aside from brake fluid)

How far can EVs go?



- Numerous factors that impact range:
 - Battery size!
 - Elevation changes
 - Speed
 - Outside temperature (i.e. HVAC use)

Elevation effects on efficiency

	Distance (km)	Efficiency (km/kWh)	Energy Used (kWh)
Nelson to Whittewater	26	2.9	9.0
Whittewater to Nelson	26	-	0
Roundtrip	52	5.8	9.0
Similar distance on flat ground	52	7	7.4

Range (km)	Typ. PHEV	Typ. EV	Tesla
Minor hills, -10C	25 - 50	90 - 120	350
Minor hills, +20C	30 - 60	120 - 150	425
Flat, max range	40 - 80	140 - 180	500

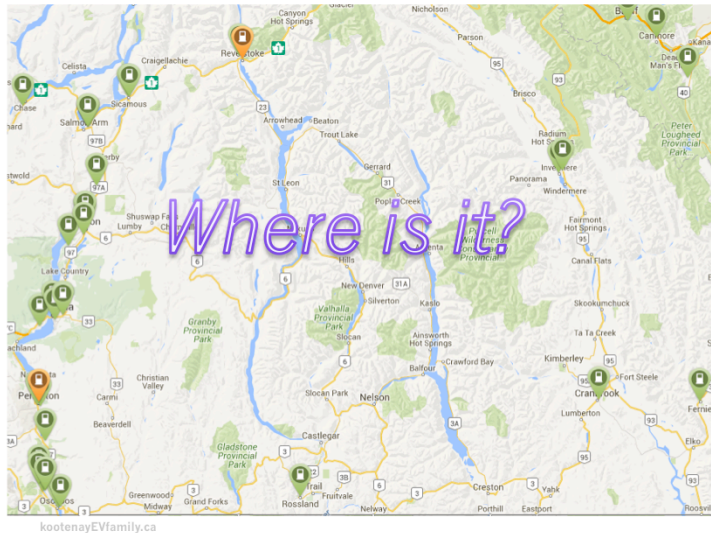
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Typical EV has a battery size of 20 – 30 kWh (the next generation will have 50% more capacity, coming out in around 2017ish)

Typical PHEV 8 – 12 kWh

Model S 85 kWh

Current Public Charging Infrastructure in the Kootenays



Almost zero! Big gaps in all directions.

Thankfully, Nelson, Grand Forks, Christina Lake and Trail are all installing Level 2 chargers in the next few months, so we are starting to get out of the 'chicken and egg' situation

I share my home charger on Plugshare and have had a few travellers use it

Our Typical Usage (> 90% of our kilometres/year)



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Weekdays

- Wake up to a charged and warm car
- Unplug, off to work
- Drive as normal, but more relaxed! (quiet, smooth, etc)
- Get home, plug car in
- Never stop at gas stations!

Weekends

- Camping trips (charge at the campsite)
 - Nakusp, New Denver, Creston, Grand Forks
- Daytrips within range to:
 - Whitewater for skiing
 - Castlegar/Kaslo/Rossland for hiking/biking
 - Garden centres for plants/soil etc
 - Art/farm/culture tours

What about winter?

- Starts instantly; heat available faster than a gas car
- Range reduced up to 30% on really snowy days; but for my commute, this is irrelevant. This does make a difference for trips beyond Nelson though, since the gaps between current public charging can exceed this range. (Will change with next gen EVs, and doesn't matter for a PHEV)

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Road trips with an EV in the Kootenays and to the rest of BC (the other 10%)



- Level 2 charging – 2-3 hours per charge = bring patience! However, our kids love travelling by EV – they aren't stuck in the car for 3 hours at a time!
- Can be done NOW with some planning (see my blog for details)
- DCFC charger roll-out critical for viable future practicality of EVs as a conventional vehicle replacement (see EV table for maps)



Looking back at Osoyoos

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The DCFC in Sechelt

Vancouver to Nelson: the Leaf is not suited for this type of trip unless you have lots of patience! As we get more/better charging infrastructure, this will change. I will create a post detailing the journey for the blog.

Deciding between an EV or PHEV given current vehicle models and Kootenay infrastructure

Consider an EV if...

- You commute one-way 10 – 50km and have no plug at work (up to 80km if you do)
- Your living situation already requires two vehicles (if you can sell one car for the cost of an EV/PHEV, you save money from day 1)
- You want only one vehicle, and the idea of renting for road-trips is fine (or join the car co-op!)

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Payback Matrix	Driving all-electric; how many years to break even when driving					
Price Differential	5,000 km/yr	10,000 km/yr	15,000 km/yr	20,000 km/yr	25,000 km/yr	30,000 km/yr
\$2,000	5.1	2.5	1.7	1.3	1.0	0.8
\$4,000	10.2	5.1	3.4	2.5	2.0	1.7
\$6,000	15.2	7.6	5.1	3.8	3.0	2.5
\$8,000	20.3	10.2	6.8	5.1	4.1	3.4
\$10,000	25.4	12.7	8.5	6.3	5.1	4.2
\$12,000	30.5	15.2	10.2	7.6	6.1	5.1
\$14,000	35.6	17.8	11.9	8.9	7.1	5.9
\$16,000	40.6	20.3	13.5	10.2	8.1	6.8
\$18,000	45.7	22.9	15.2	11.4	9.1	7.6
\$20,000	50.8	25.4	16.9	12.7	10.2	8.5
Savings/yr	\$394	\$788	\$1,181	\$1,575	\$1,969	\$2,363
km/day equivalent	17	33	50	67	83	100

Consider a PHEV if...

- You would prefer to remain a single-car family and take road trips
- Your commute fits entirely (or close to it) within the electric-only range
 - This maximizes the financial return

One-way distances

My website includes more detail on the assumptions in the Payback Matrix

If you are only commuting 5,000km/yr and keeping a car just for that, sell it and ride a bike, an ELF, and/or take the bus! (Your insurance/gas/maintenance savings will pay for even an ELF in just a year or two)



Between New Denver and Kaslo

Questions?

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Electric vehicle tidbits
and adventures in the
Kootenays



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**Electric Vehicle
Enthusiast**

Camping in New Denver

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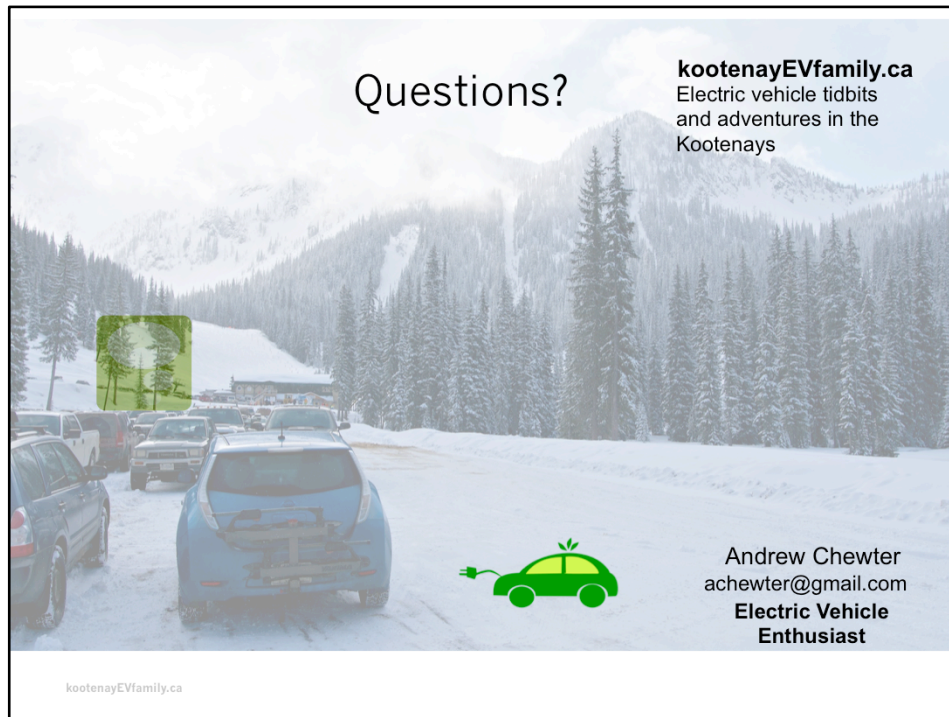
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Went biking in Castlegar at the college trails with the kids, then to Glade to canoe up the river to see the generating stations near South Slokan



Whitewater on Easter Weekend; it handled the crazy mud bogging fine with the LEAFs excellent clearance (for a 2wd car) and traction control