Fleet EV suitability assessment

Results Presentation

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3 Step Approach to Successful EV Integration

(1)

Data log existing fleet of vehicles

How are vehicles currently used in the fleet?

3 weeks

(2)

Test your duty cycle data in FleetCarma's EV computer models

Will EV be capable to do the job?
Will it save fleet money?

3 days

(3)

Track EV metrics to ensure fleet goals are met and charging is managed correctly with utility

After vehicle purchase

Review of the assessment and timeline

Vehicles were selected for the fleet assessment

Loggers were pre-configured for vehicles by FleetCarma

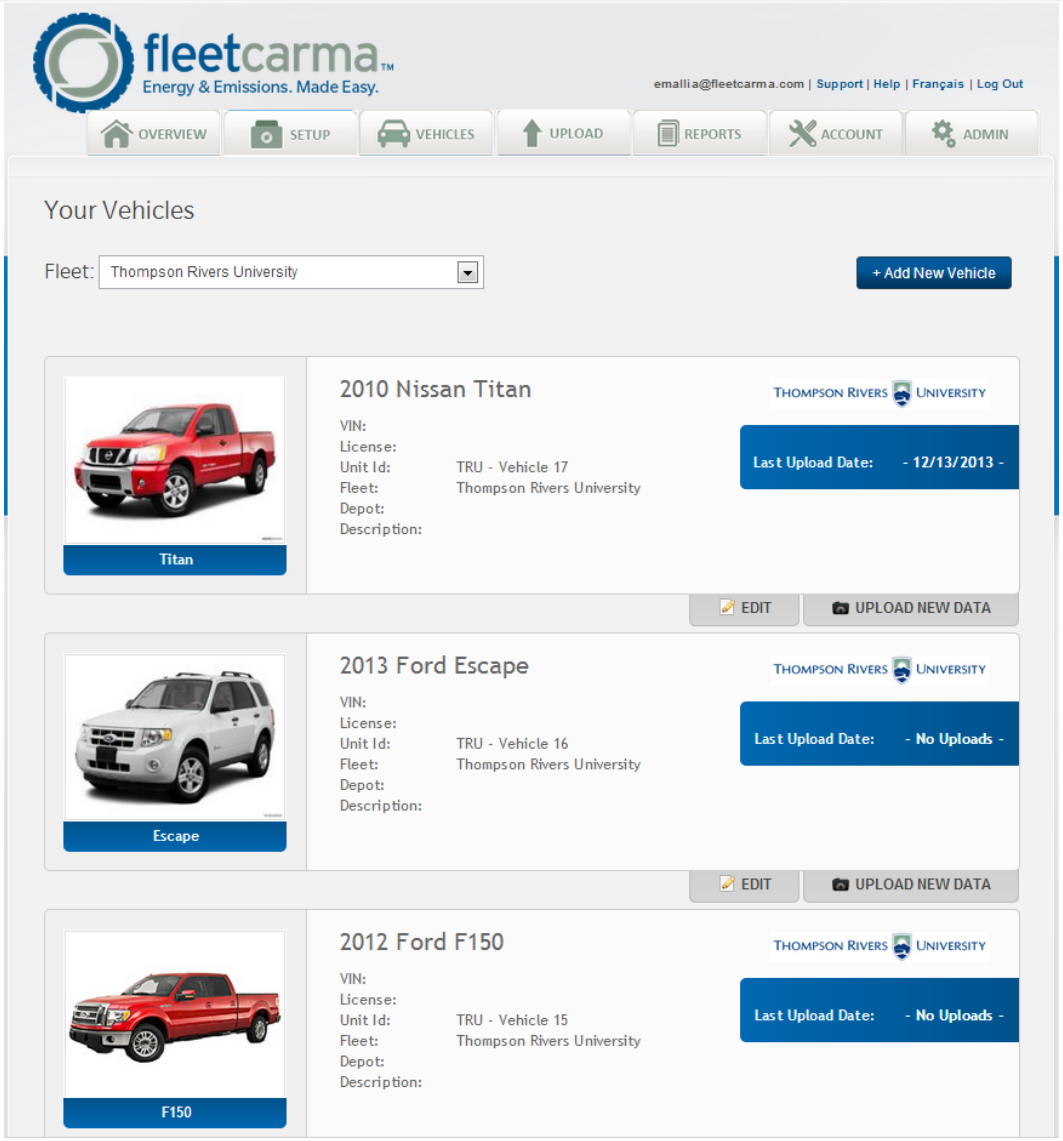
Fleet team clipped loggers in vehicles within 1-3 days

Logged for approx. 24 days

Software drove virtual EV models in computers with your fleet-specific data

FleetCarma summarized results

Web portal contains the individual vehicle assessments



Benchmark this duty cycle

Astro

Fleet:	Thompson Rivers University
Depot:	None
Vehicle:	1999 Chevrolet Astro
Unit Id:	TRU - Vehicle 5
Description:	Need unique ID, Confirm Astro
Log Dates:	November 14 - December 04 2013
Logtime:	19 Days, 22 Hours
Operation Hours:	20.6 (1.0 h/operating days)
Time Idling:	639.3 min (51.7%)
Total Distance Travelled:	203 km
Longest Single Day:	24 km

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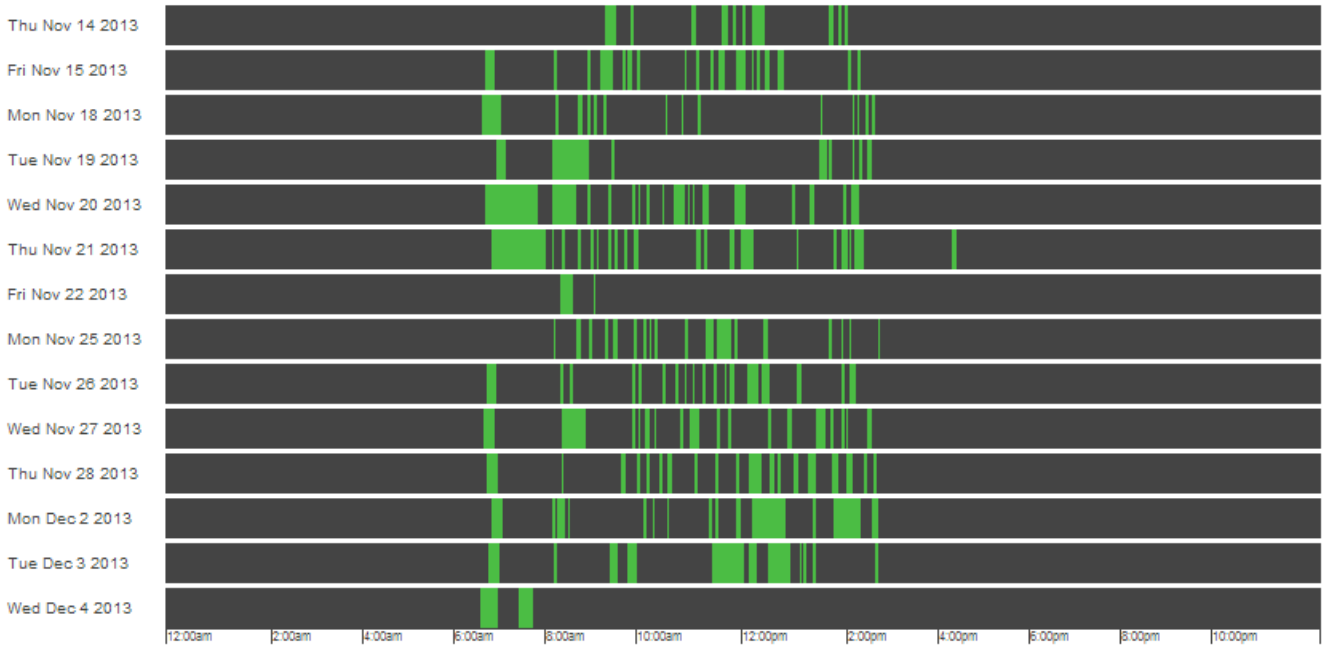
Consumption:	33.4 L/100 km
	2,975 Wh/km
Carbon Emissions:	1,031 g/km

Daily Utilization



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The EV utilization challenge for fleet operators

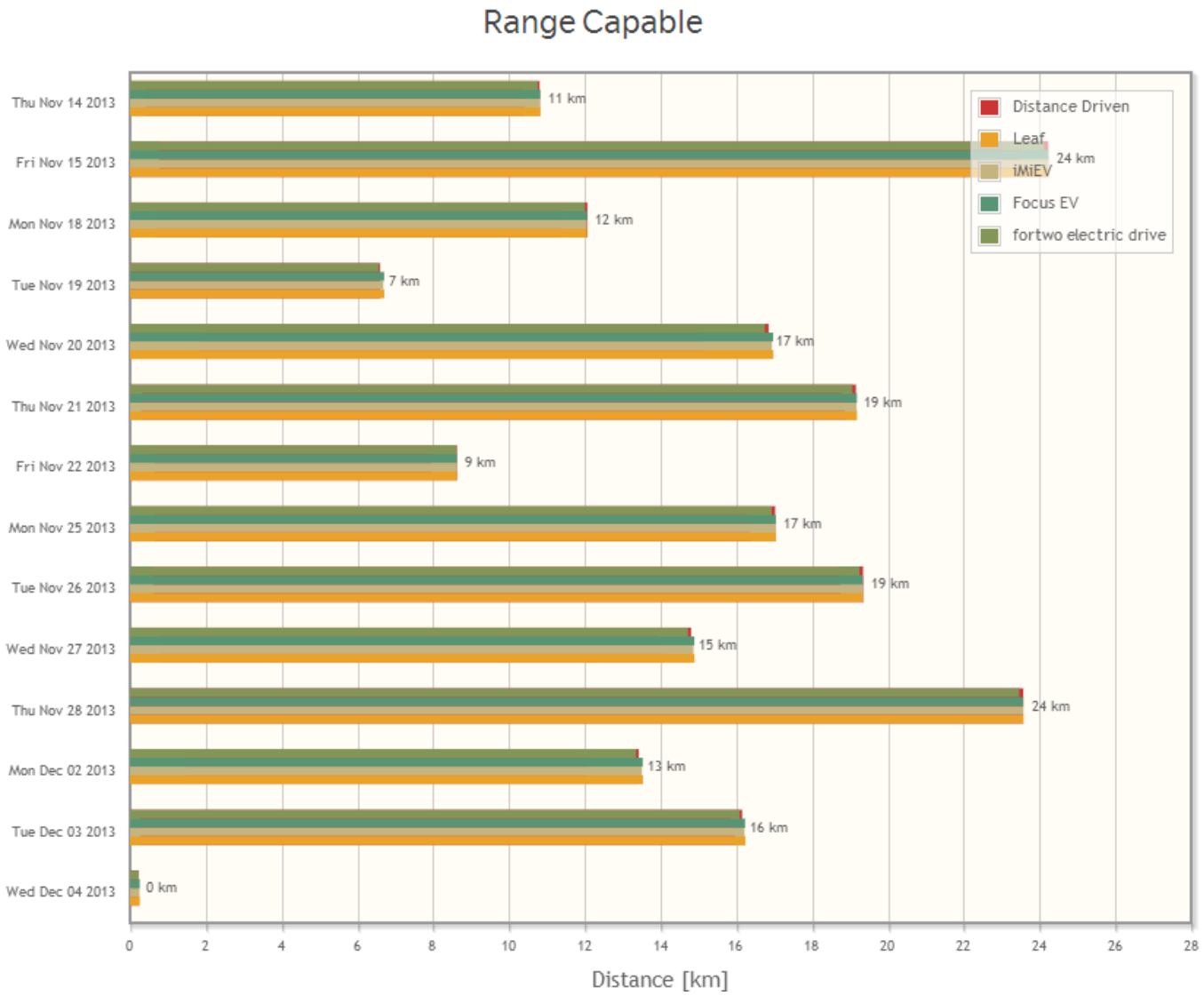
Battery Electric Vehicles (BEV) need to:

- Be range and charge capable for their intended use
- Keep vehicle utilization up

Plug-In Hybrid Electric Vehicles (PHEV) need to:

- Maximize their electric driving as a proportion of total utilization
- Reduce the payback periods

Which all-electric vehicles would have enough driving range each day?



Summary stats on this duty cycle and ranking of EVs

	Range Capable	Charge Capable	Energy	Emissions	Annual Cost	FleetCarma Score	Details
 1999 Chevrolet Astro	-	-	2,975 Wh/km	1,031 g/km	$5,384	-	-
 2013 smart fortwo electric drive	✓	✓	97% ↓	100% ↓	$2,971	98	▼
 2012 Mitsubishi iMiEV	✓	✓	96% ↓	100% ↓	$3,056	97	▼
 2012 Nissan Leaf	✓	✓	95% ↓	100% ↓	$3,349	91	▼
 2013 Ford Focus EV	✓	✓	96% ↓	100% ↓	$3,703	87	▼
 2013 Chevrolet Volt	✓	✓	95% ↓	100% ↓	$3,798	84	▼
 2014 Toyota Prius-Plugin	✓	✓	95% ↓	99% ↓	$4,053	81	▼
 2013 Ford C-MAX Energi	✓	✓	95% ↓	100% ↓	$4,152	79	▼
 2013 Ford Fusion Energi	✓	✓	95% ↓	100% ↓	$4,295	77	▼

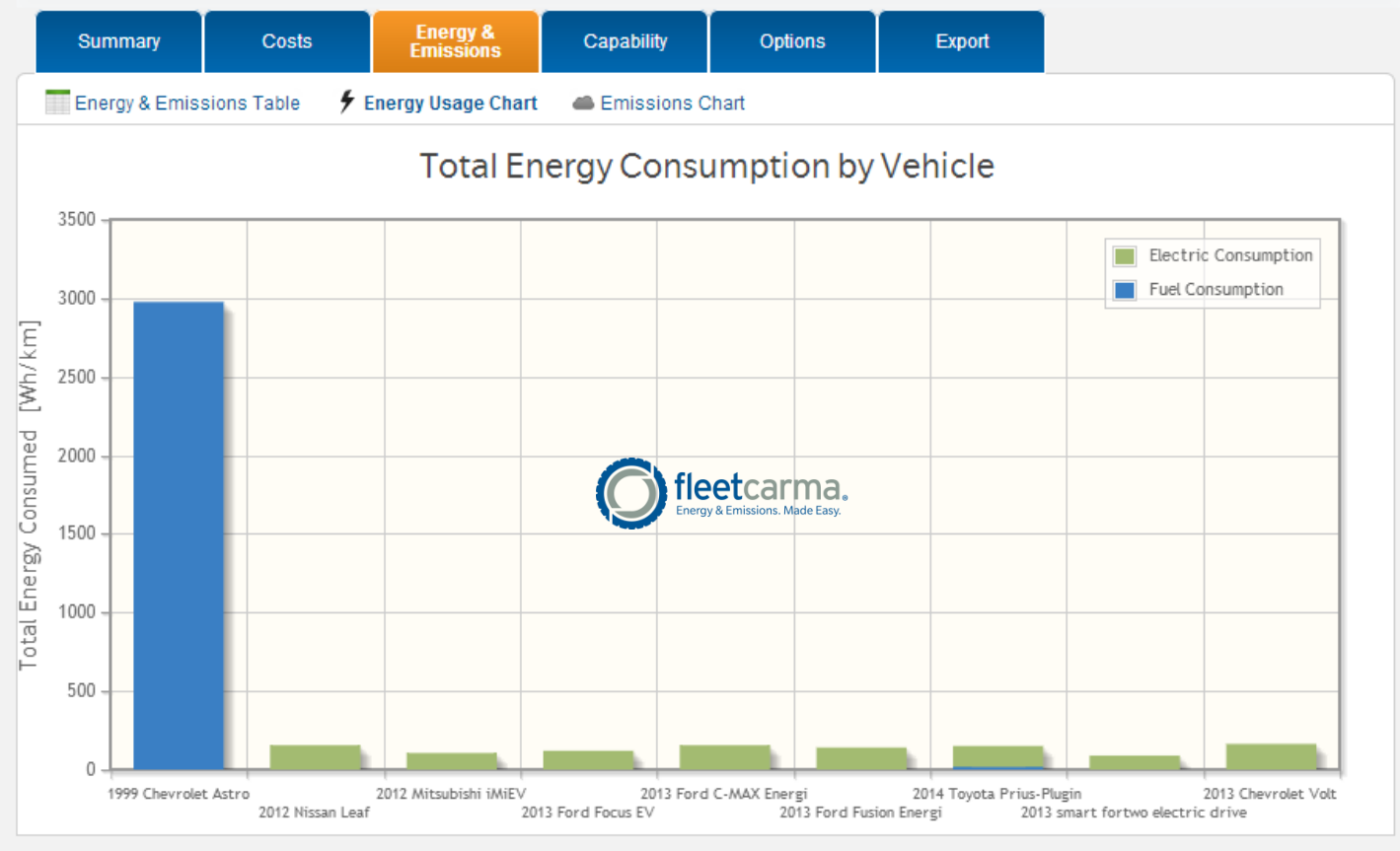
Life-cycle costs of each EV in is the portal

	2012 Nissan Leaf	$3,266	$57	$25	$0	$3,349

Base Ownership	Purchase: $31,500 Incentives: $5,000 Resale: $14,242 Financing: $0 Insurance: $9,195 Admin: $1,410	Total $22,863	Total Per Year $3,266
Fuel and Energy	Gasoline: $0 Electricity: $402 Diesel: $0 Natural Gas: $0	Total $402	Total Per Year $57
Maintenance	Service: $65 Parts: $110	Total $175	Total Per Year $25
Emissions	GHG: $0	Total $0	Total Per Year $0
Total Cost Of Ownership		$23,440	$3,349

Environmental benefits specific to this duty cycle

Use the FleetCarma system to present the environmental case for effectively adopting plug-in electric vehicles in the right applications in your fleet



Questions for your consideration?

- Knowing the economic and environmental benefits of changing this vehicle from a SUV to an electric car…
  - Is there an opportunity to use a car instead?
  - Which EV would you prefer?

- If the answer is “Yes”, then the model predicts:
  - Life-cycle financial benefit of $16,892 in savings
  - Life-cycle GHG emissions reductions of 26.5 tons CO_2e
  - Fuel reduction of 8,662 litres of gasoline

Benchmark this duty cycle

Rav 4

Fleet:	Thompson Rivers University
Depot:	None
Vehicle:	2011 Toyota Rav 4
Unit Id:	TRU - Vehicle 12
Description:	Need unique ID
Log Dates:	November 12 - December 03 2013
Logtime:	20 Days, 23 Hours
Operation Hours:	38.4 (1.8 h/operating days)
Time Idling:	224.9 min (9.8%)
Total Distance Travelled:	2,549 km
Longest Single Day:	426 km

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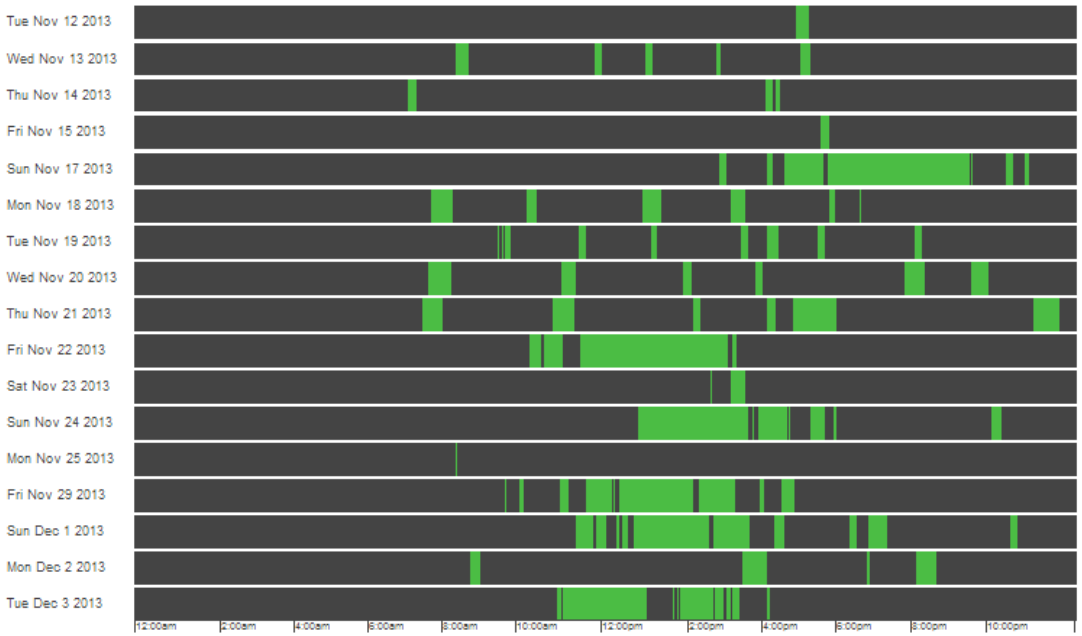
Consumption:	9.4 L/100 km
	833 Wh/km
Carbon Emissions:	289 g/km

Daily Utilization



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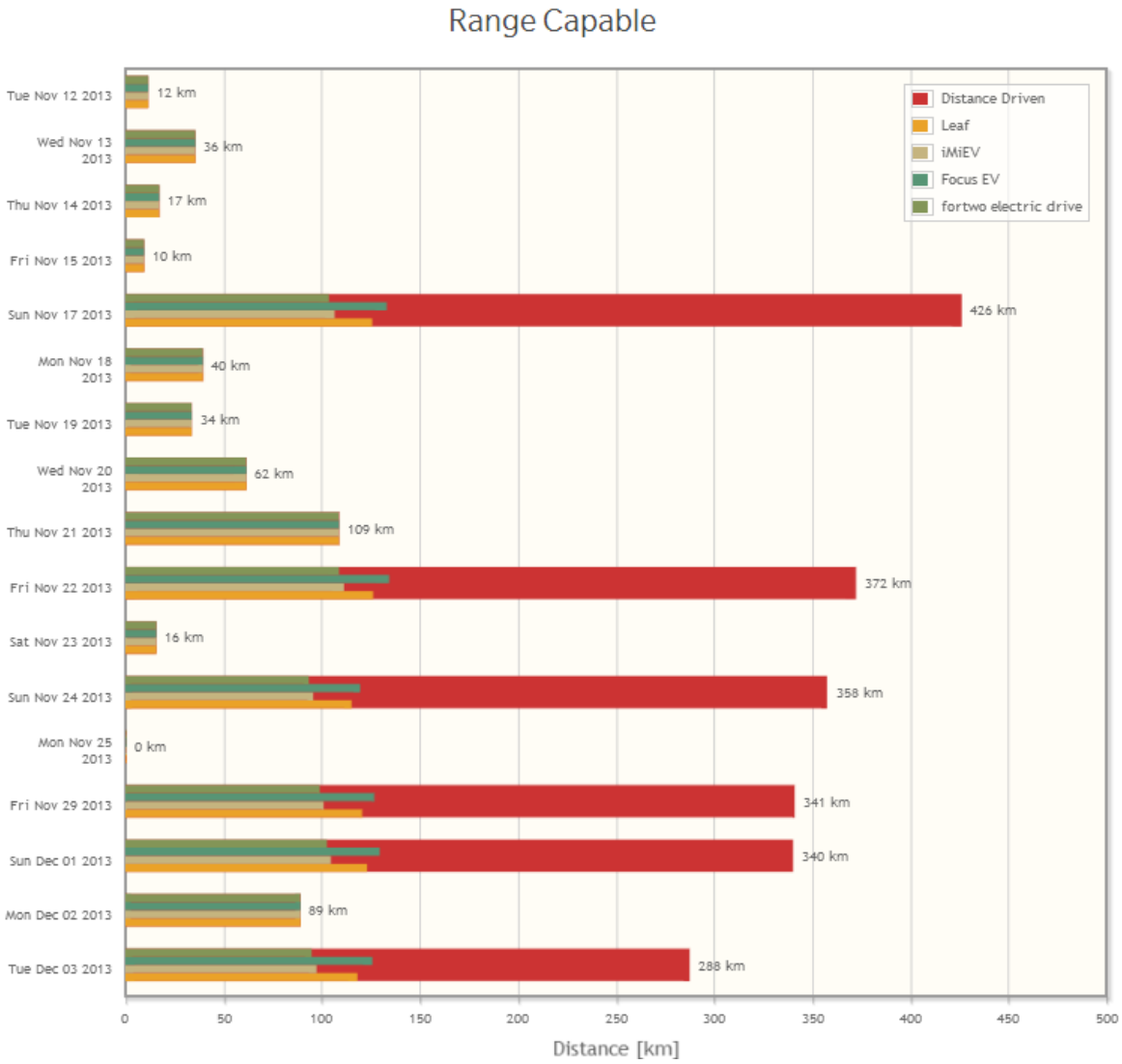
In this case, BEVs won't be range capable

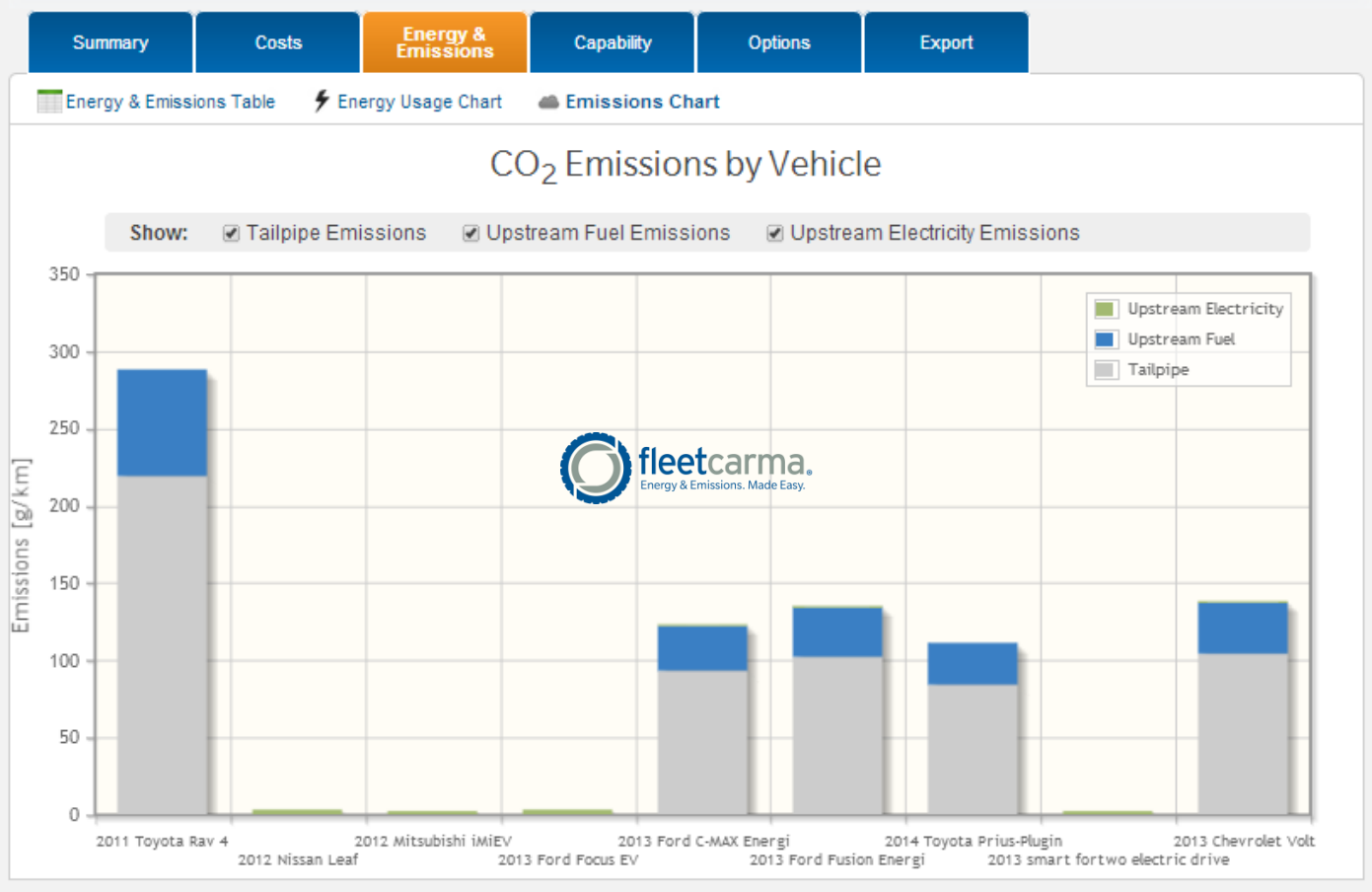


Plug-in hybrids make the most sense here

	Range Capable	Charge Capable	Energy	Emissions	Annual Cost	FleetCarma Score	Details	Compare
 2011 Toyota Rav 4	-	-	833 Wh/km	289 g/km	$12,975	-	-	-
 2014 Toyota Prius-Plugin	✓	✓	60% ↓	62% ↓	$9,608	61	▼	☑
 2013 Ford C-MAX Energi	✓	✓	53% ↓	57% ↓	$10,124	56	▼	☑
 2013 Ford Fusion Energi	✓	✓	50% ↓	53% ↓	$10,587	52	▼	☑
 2013 Chevrolet Volt	✓	✓	47% ↓	52% ↓	$10,125	52	▼	☑
 2013 smart fortwo electric drive	◔	✓	86% ↓	99% ↓	$5,932	14	▼	☑
 2012 Mitsubishi iMiEV	◔	✓	85% ↓	99% ↓	$6,088	13	▼	☑
 2012 Nissan Leaf	◔	✓	79% ↓	99% ↓	$6,752	9	▼	☑
 2013 Ford Focus EV	◔	✓	83% ↓	99% ↓	$7,218	8	▼	☑

Present the environmental benefits specific to you

Use the FleetCarma system to present the environmental case for effectively adopting plug-in electric vehicles in the right applications in your fleet



Life-cycle costs specific to each duty cycle to best match EV model

Prius PHEV

Base Ownership	Purchase:	$35,700	Total $39,660
	Incentives:	$2,500	
	Resale:	$4,145	
	Financing:	$0	
	Insurance:	$9,195	
	Admin:	$1,410	
Fuel and Energy	Gasoline:	$16,442	Total $16,886
	Electricity:	$443	
	Diesel:	$0	
	Natural Gas:	$0	

VOLT PHEV

Base Ownership	Purchase:	$37,000	Total $38,309
	Incentives:	$5,000	
	Resale:	$4,296	
	Financing:	$0	
	Insurance:	$9,195	
	Admin:	$1,410	
Fuel and Energy	Gasoline:	$20,309	Total $21,857
	Electricity:	$1,548	
	Diesel:	$0	
	Natural Gas:	$0	

The Volt has a larger battery pack, allowing it to run on electricity more often, however the Prius Plug-in turned out to be more efficient in hybrid mode in this particular application.

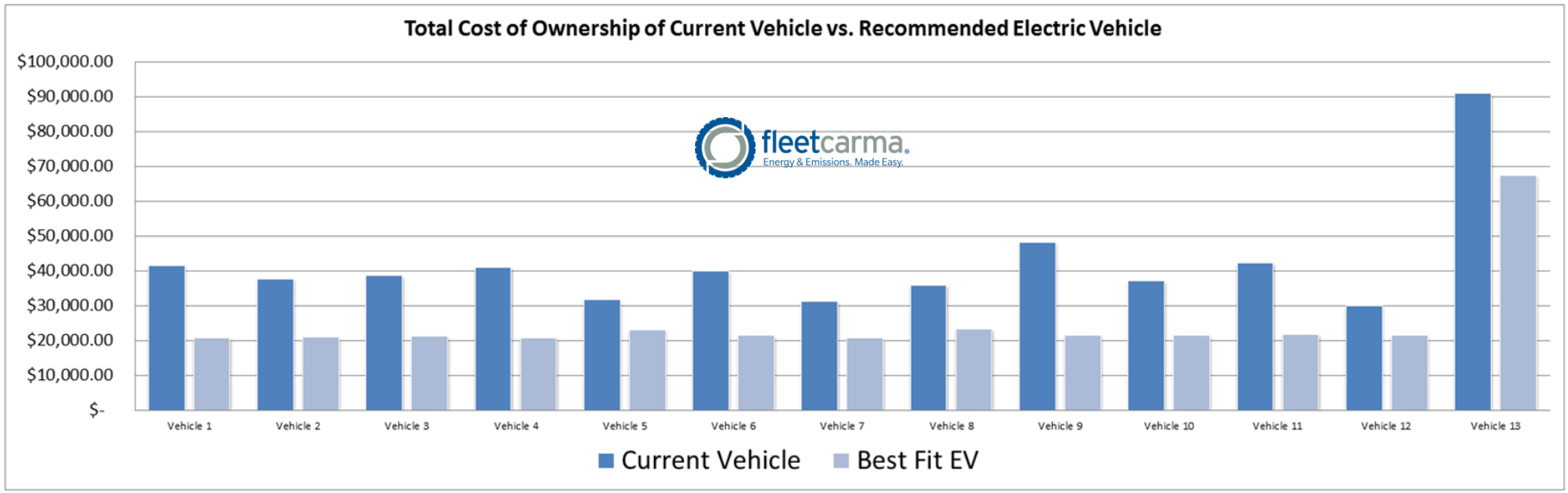
Choosing the Volt instead of the Prius Plug-in for this application would cost an extra $3,620

Questions for your consideration?

- Knowing the economic and environmental benefits of changing this vehicle to plug-in hybrid
  - Can you remarket this 2011 Toyota RAV4?
  - Can the 2011 RAV4 be move to another application?

- If the answer is “Yes”, then the model predicts:
  - Life-cycle financial benefit of $23,571 in savings
  - Life-cycle GHG emissions reductions of 53.4 tons CO_2e
  - Fuel reduction of 17,987 litres of gasoline

Fleet-wide Summary Results



Fleet Savings with Adoption of the Recommended EVs:

Financial savings:	40% ↓	$	220,357
Fuel avoided:	91% ↓		116,754 Litres
Emission reductions:	91% ↓		355,878 kg of CO_{2e}

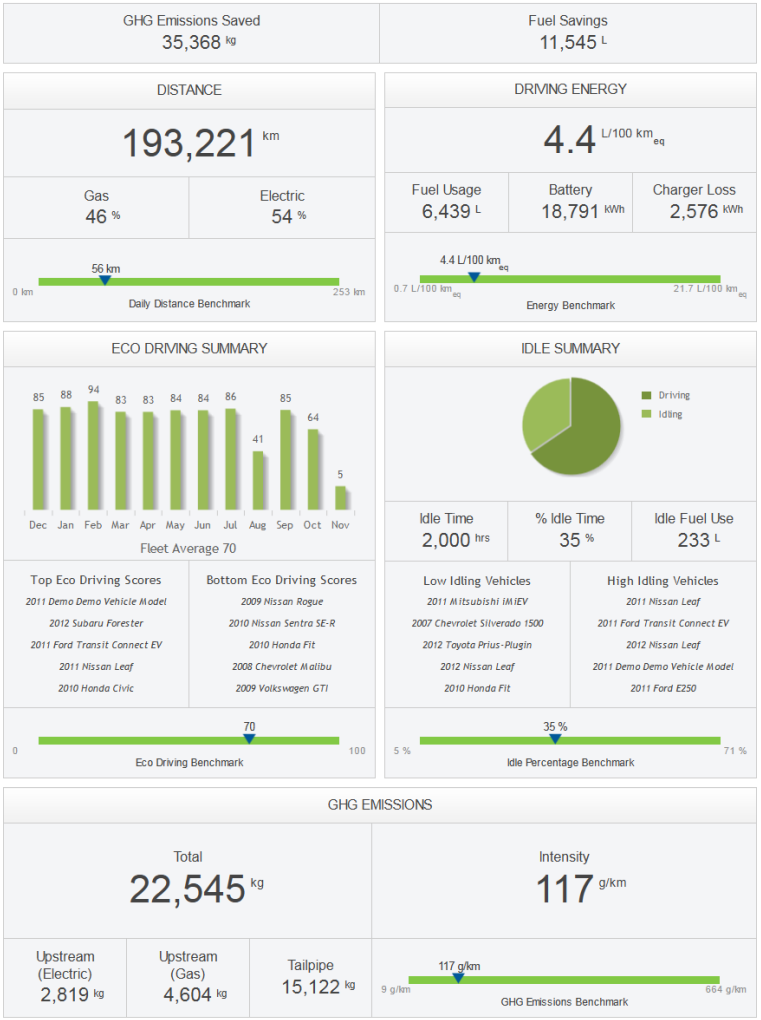
Plug in BC

Thompson Rivers University

Monitoring EVs to maximize their benefits

- Fleets get to manage their new EV assets to ensure they achieve their required utilization goals.
- Easily report the real-world savings to senior management and other key stakeholders.

Data automatically aggregated for each department and for the entire fleet



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Our company profile

CrossChasm

CrossChasm

Hybrid & Electric Vehicles:
Faster, Better, Cheaper

Design services & prototypes sold to vehicle OEM/ manufacturers.

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Save dollars, litres, and tons.

Products for vehicle selection and monitoring: FleetCarma TCO/ROI and Energy & Emissions Reporting.

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Measure vehicle metrics to improve fleet performance

Pick the right vehicle for each job based on total cost and benefits

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Support for this work

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Fraser Basin Council

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BRITISH COLUMBIA
Ministry of Environment

Thank you

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