Electric Transportation

CCRE 2014

Matt Stevens

1 *The EV outlook*

2 *Where insignificant is significant*

3 *Technology Visa*

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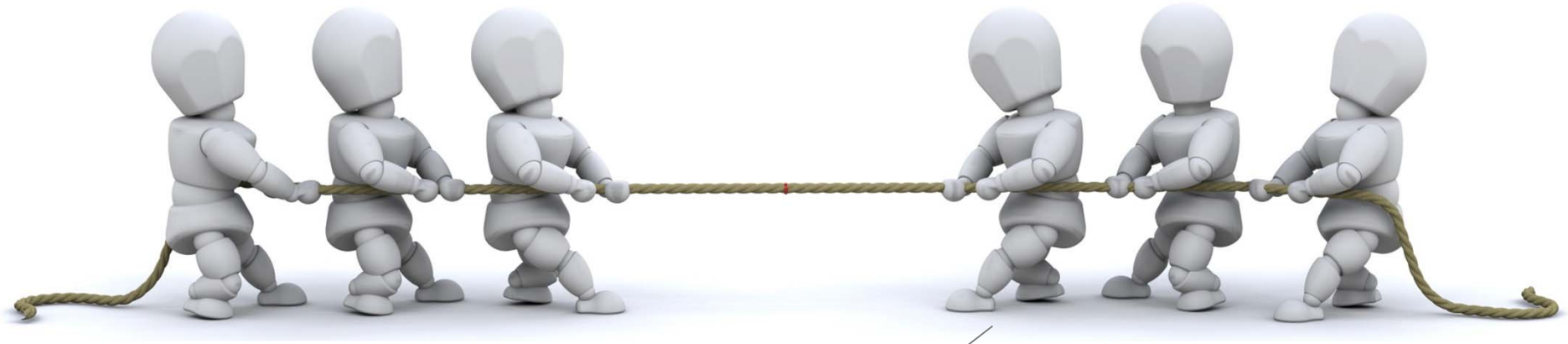
“Economies that are able to compete with high energy prices will thrive.

Japan and Germany are examples.”

David Hay, CCRE 2014

The EV Tug-of-War

Team EV

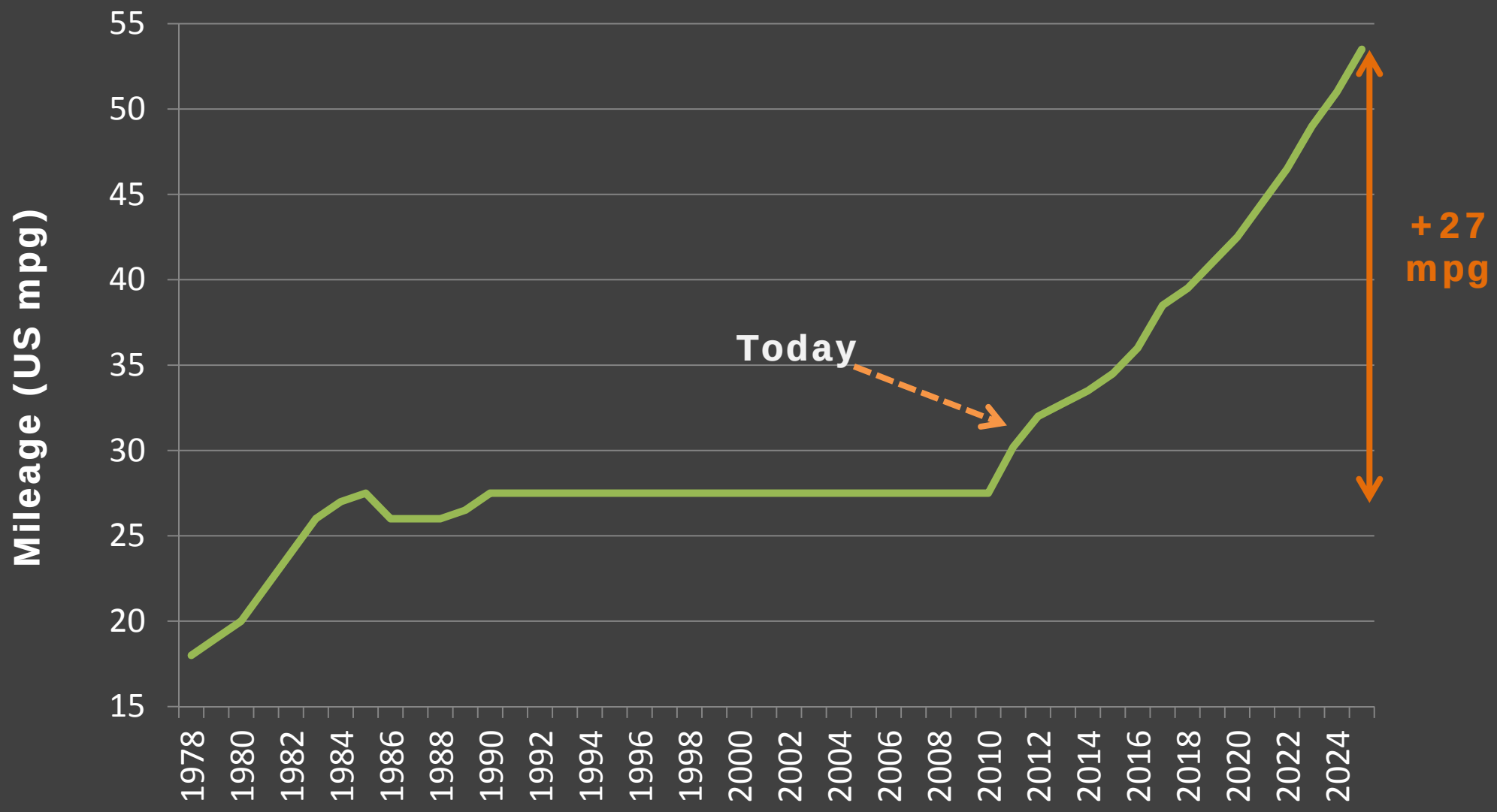


CAFE Standards

Energy Price

Energy Security

Fuel Economy Standards



Includes a transition to a credit-based system instead of fines.

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CAFE IS

NOT

AN ENVIRONMENTAL POLICY.

CAFE IS AN ENERGY SECURITY AND COMPETITIVENESS POLICY

(THAT HAS STRONG ENVIRONMENTAL BENEFITS)

“Economies that are able to compete with high energy prices will thrive.

Japan and Germany are examples.”

David Hay, CCRE 2014

2006 2014 2022

Last Vehicle

First Fill-Up
$26.05

Last Fill-Up
$61.85

New Vehicle

First Fill-Up
$61.85

Last Fill-Up
$??

BUT WHAT IF:
ELECTRICITY PRICES RISE BY 40%
GAS PRICES ONLY RISE BY 10%

Rising Energy Price Impact

The EV advantage

1.9¢/km | 8.7¢/km | 6.8¢/km

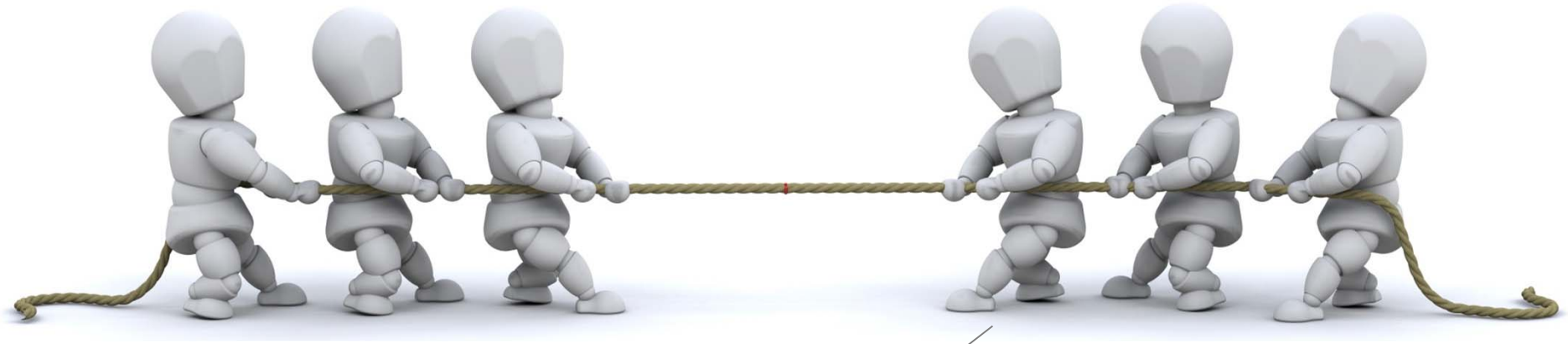
+40% | +10%

2.6¢/km | 9.6¢/km | 7.0¢/km

Because of the 5x efficiency benefit, there is a 5x multiplier on price increases.

The EV Tug-of-War

Team EV



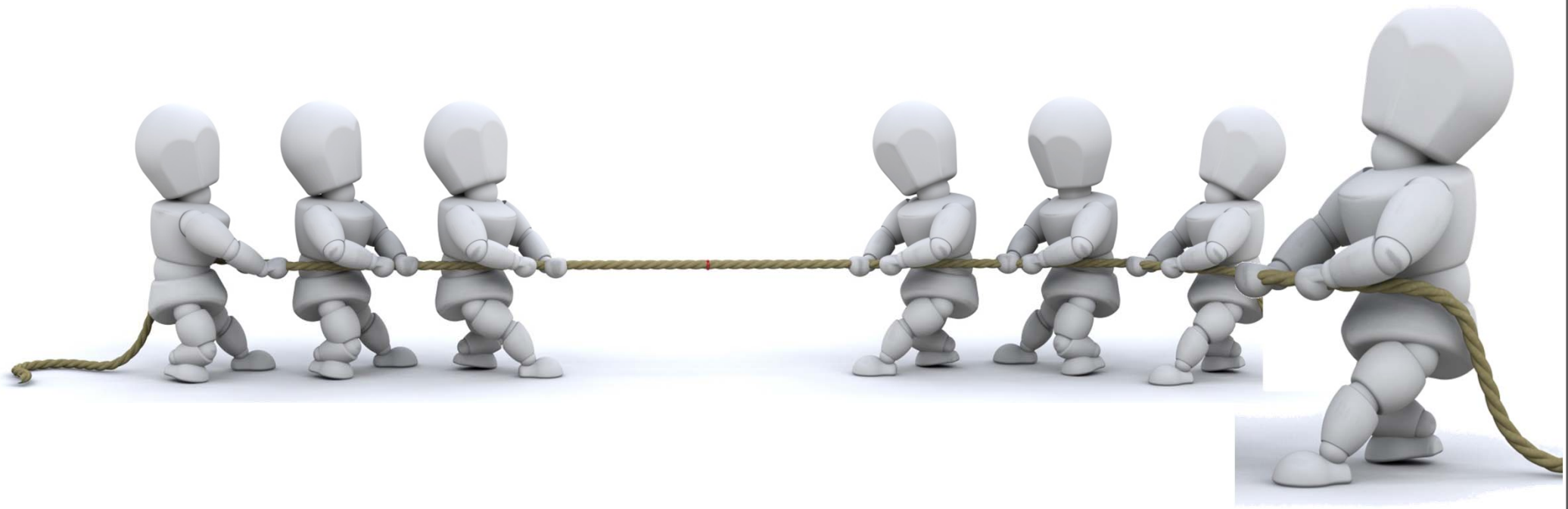
CAFE Standards

Energy Price

Energy Security

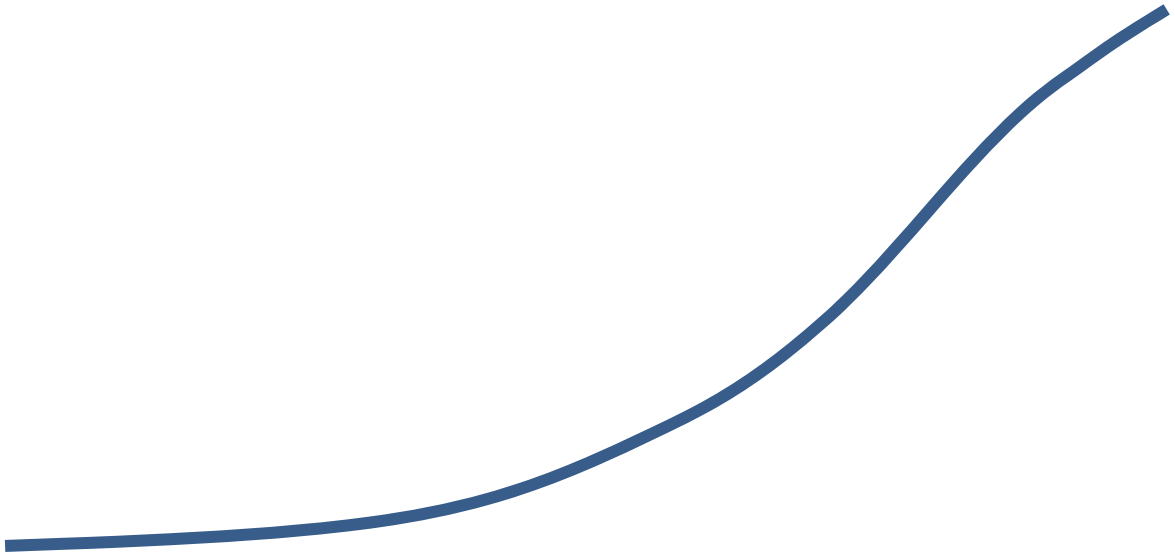
The EV Tug-of-War

The Real EV Team

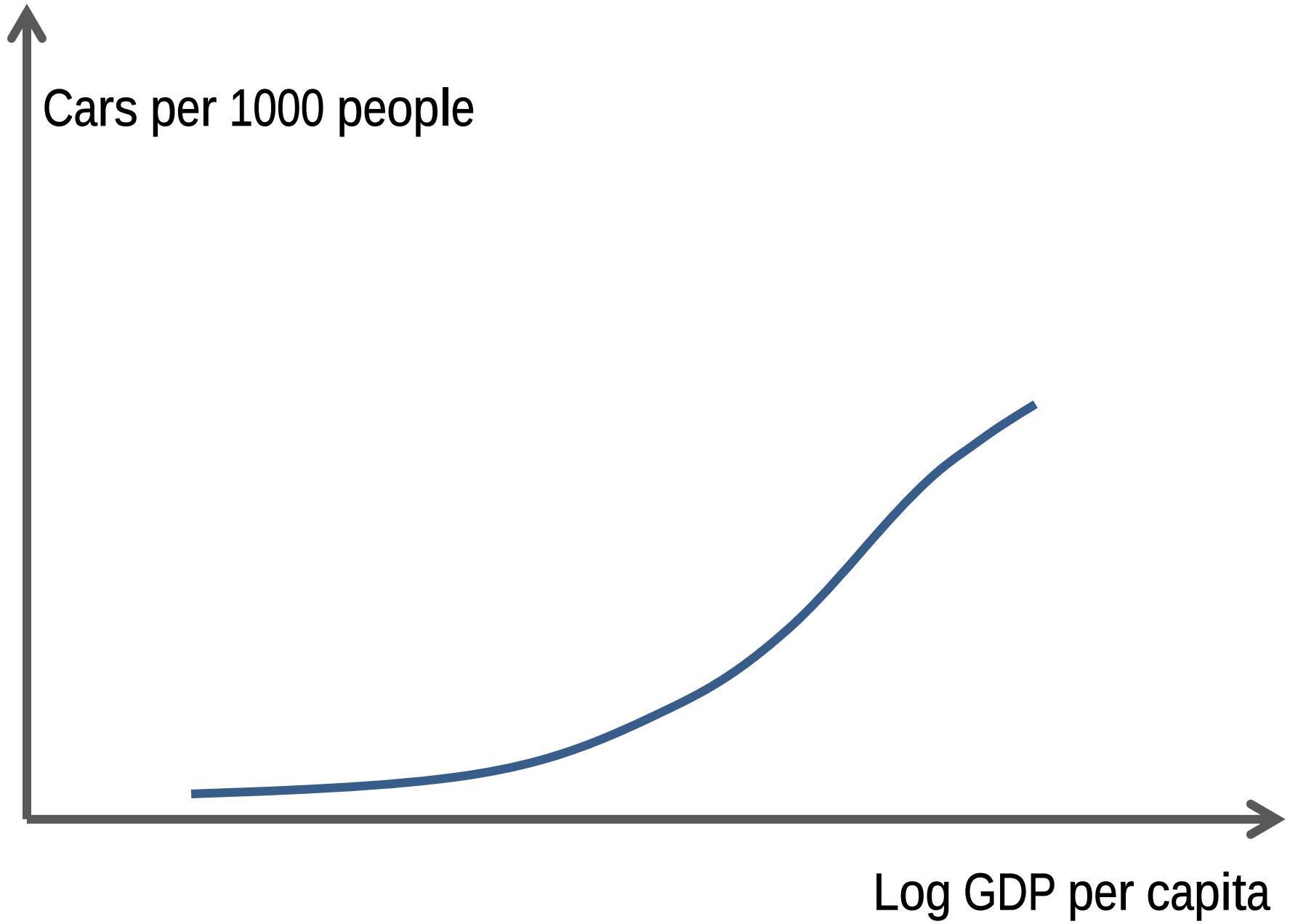


Why I’m actually bullish on EVs.

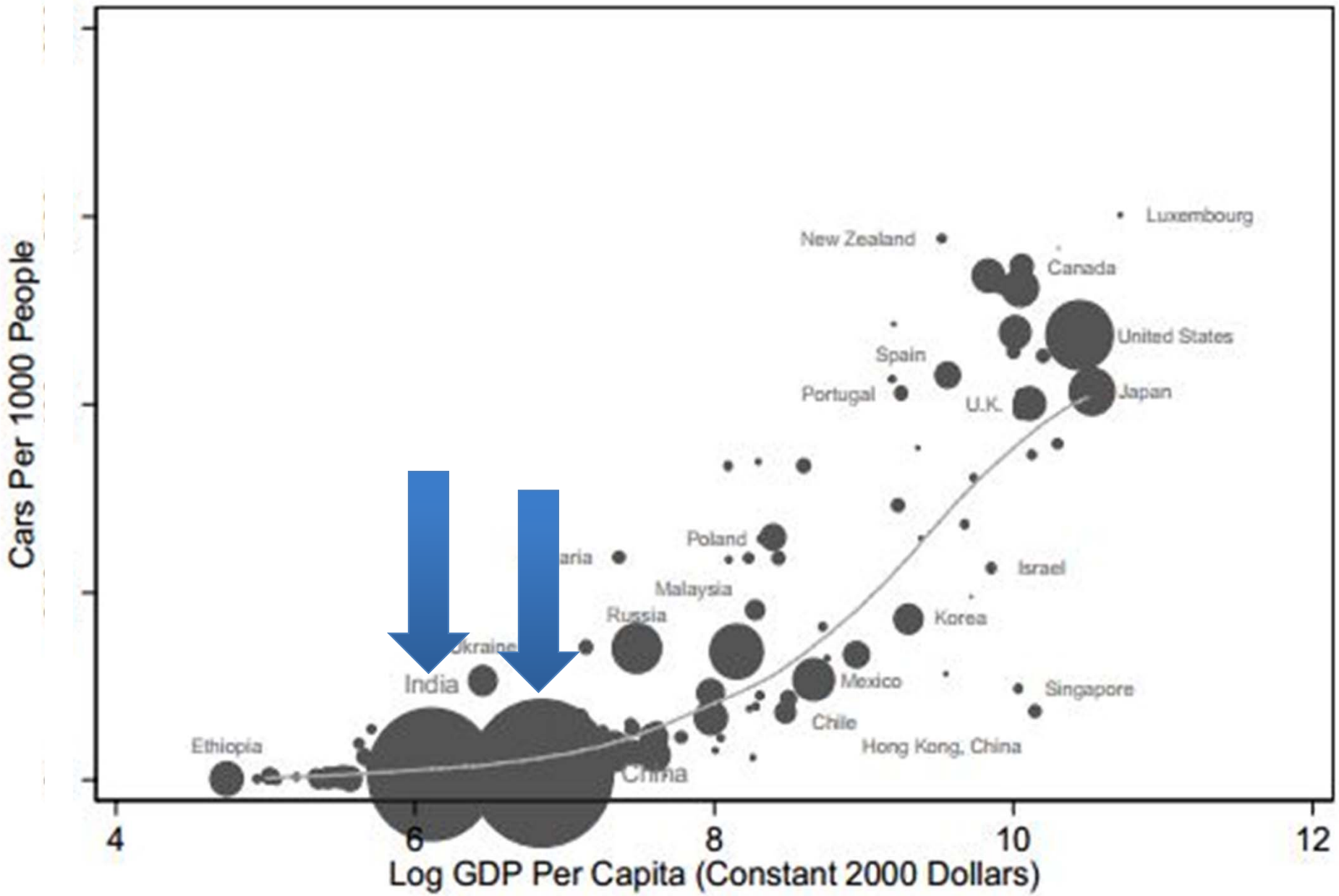
The juggernaut.



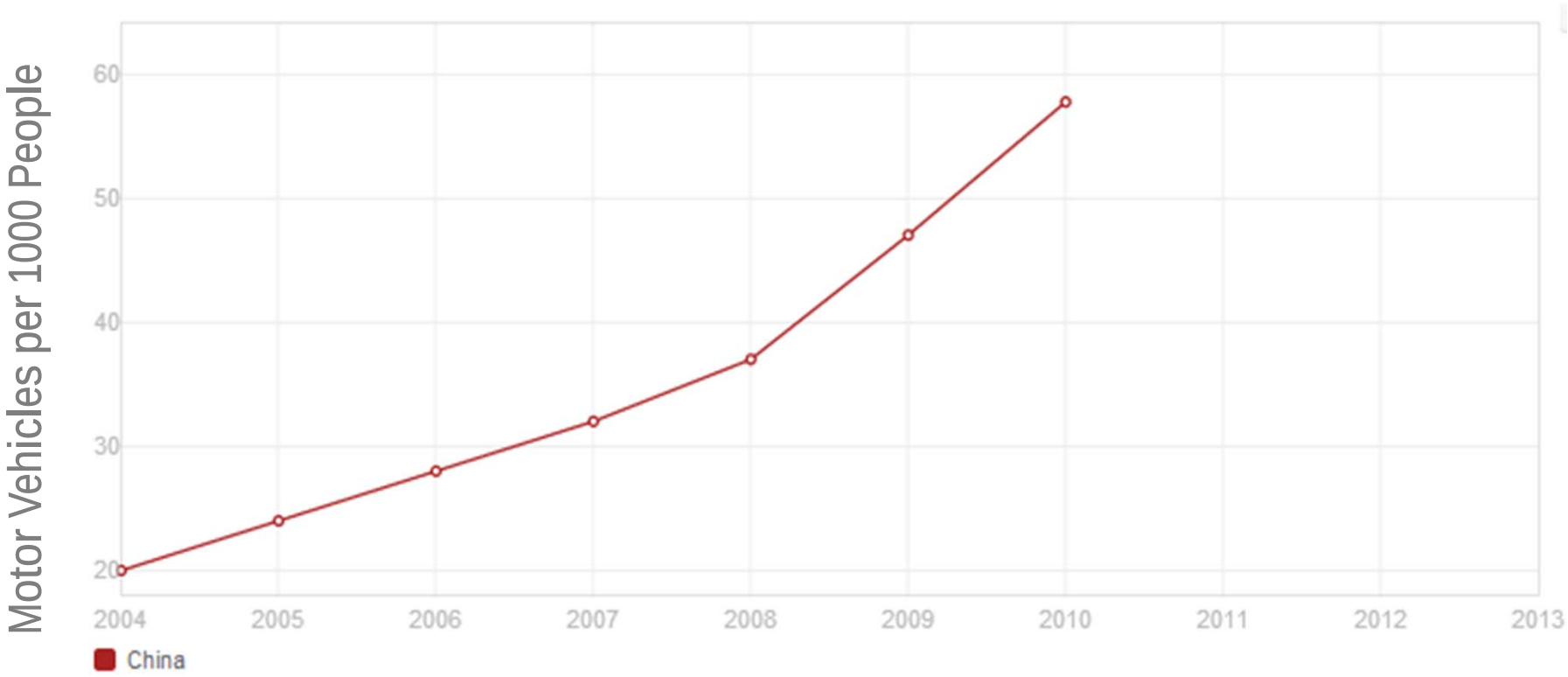
The juggernaut.



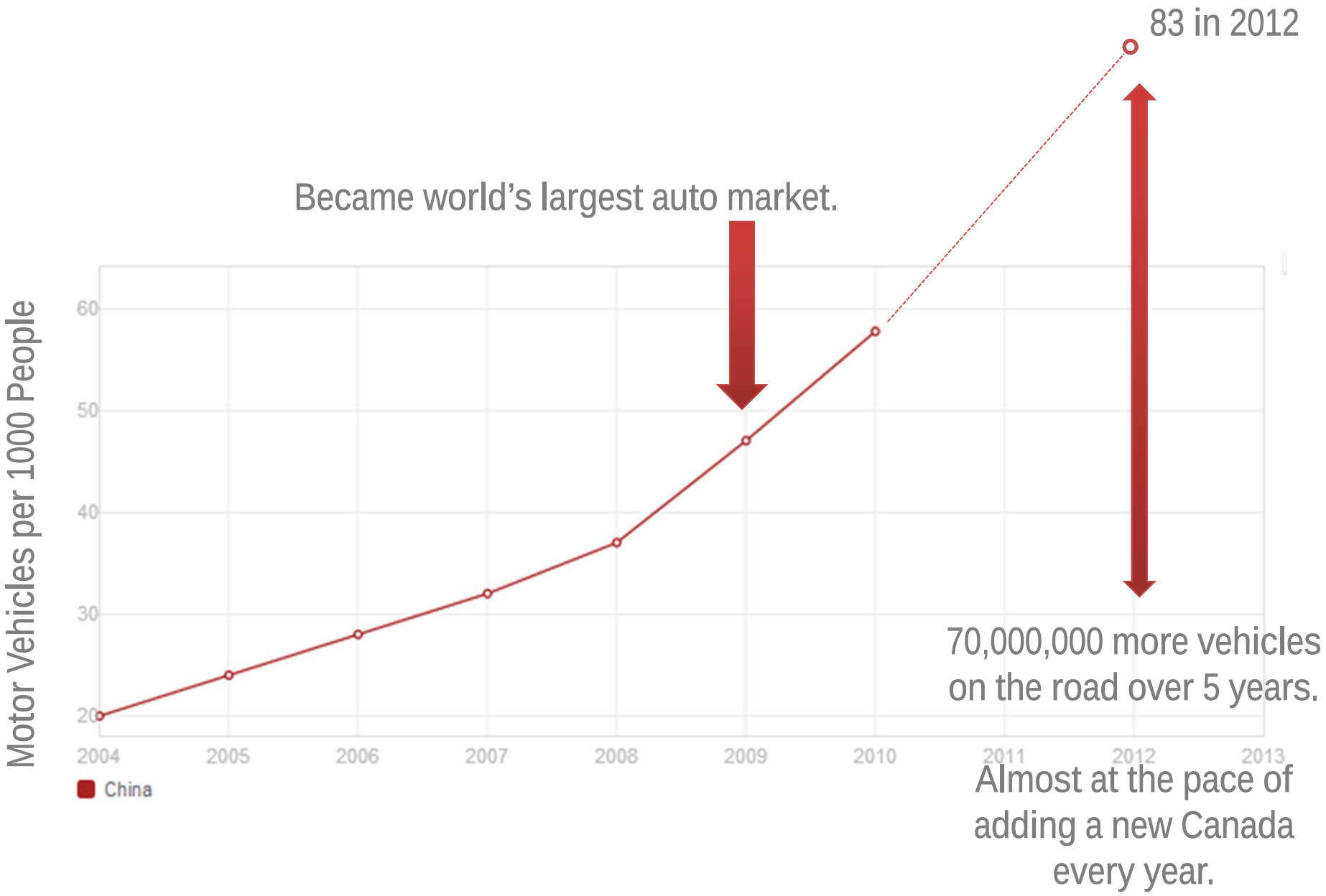
Car ownership and income: 2000



Source: Chamon et al.



Source: The World Bank
http://data.worldbank.org/indicator/IS.VEH.NVEH.P3/countries/CN?display=graph



Source: The World Bank
http://data.worldbank.org/indicator/IS.VEH.NVEH.P3/countries/CN?display=graph

WE HIT 1 BILLION VEHICLES IN 2010.

WE ARE IN A GLOBAL RACE TO 3 BILLION.

EFFICIENCY

IS THE FIRST LINE OF DEFENCE.

ELECTRIC VEHICLES ARE THE

KING

OF EFFICIENCY

“Economies that are able to compete with high energy prices will thrive.

Japan and Germany are examples.”

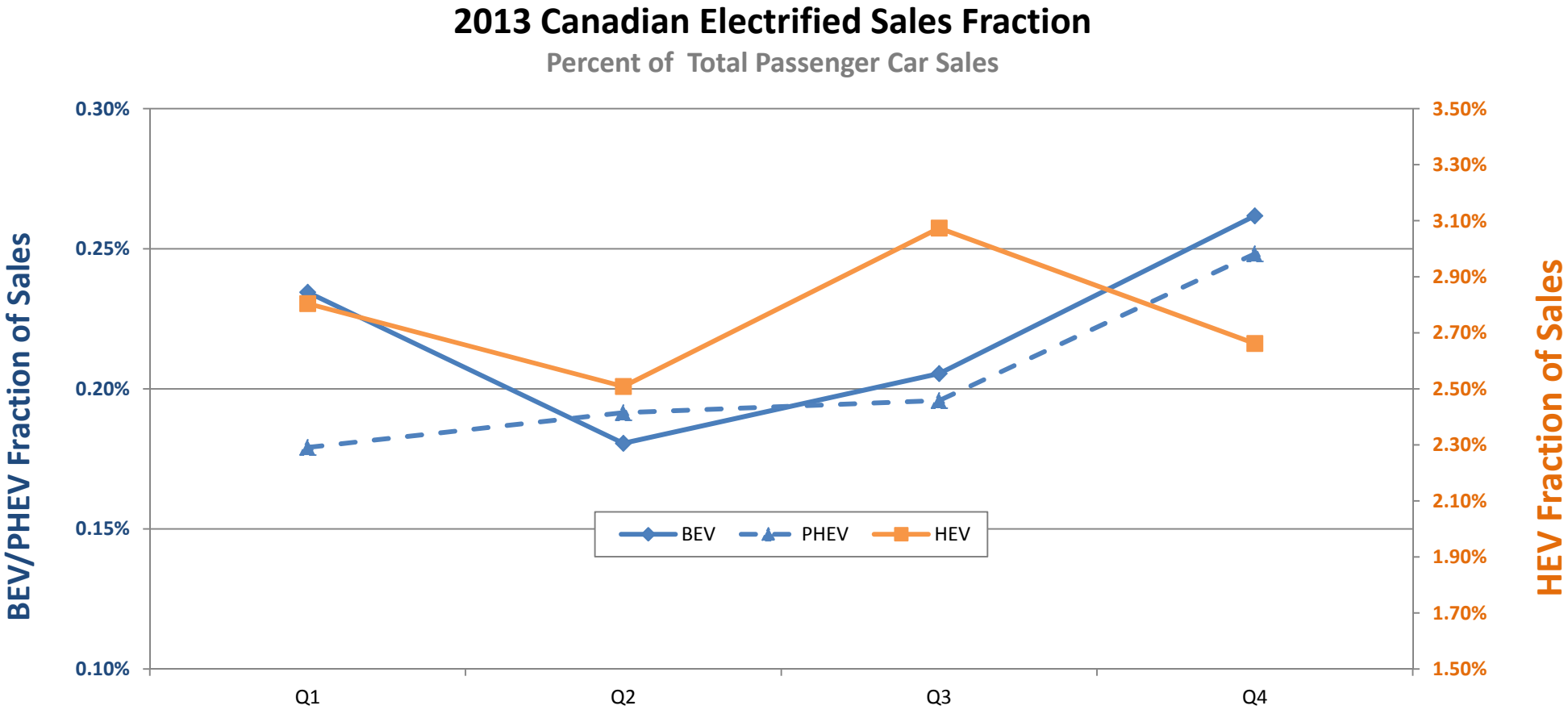
David Hay, CCRE 2014

2.

WHERE INSIGNIFICANT IS SIGNIFICANT

Monthly Sales: Fraction of Passenger Vehicle Sales

CY2013



2012 Canadian Sales

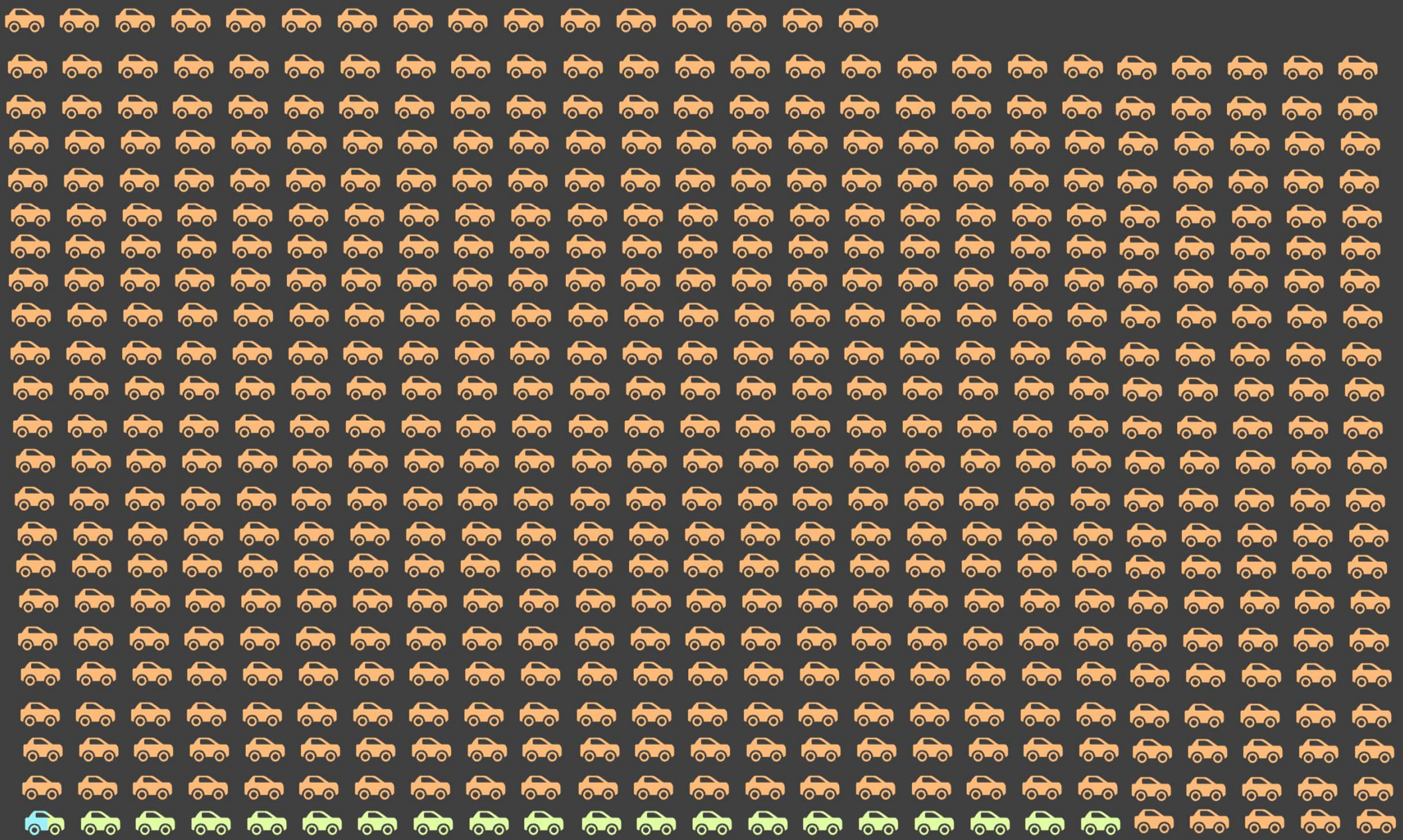
New-Vehicle

= 3000 vehicles

= Plug-In (BEV/PHEV)

= Hybrids

= Conventional



Electric Transportation

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Insignificant Fraction – Significant Capacity

<1%

of new car sales

<0.08%

of the light-duty fleet

3.2 GWh

of storage capacity

800 MW

of potential load

…and yes, these numbers are misleading without clarification…

Insignificant Fraction – Significant Capacity

Only a fraction of that capacity is available at any point in time: **True**

These are North American totals: **True**

But at 20% plug-in vehicle market share:

100% availability	1,000 GWh	200 GW
10% availability	100 GWh	20 GW
5% availability	50 GWh	10 GW

For Ontario, what would be the benefit for 0.5GW of demand response that leverages pre-paid assets. Peaksaver® is ~0.23GW.

The two-sided coin

Smart-charging both:

ENABLES A GOOD

MITIGATES A BAD

50kVA Transformers

50kVA

50kVA

Volt or iMiEV

Leaf or Focus EV

Model S

Model S with Twin Charger

Electric Transportation

CCRE 2014

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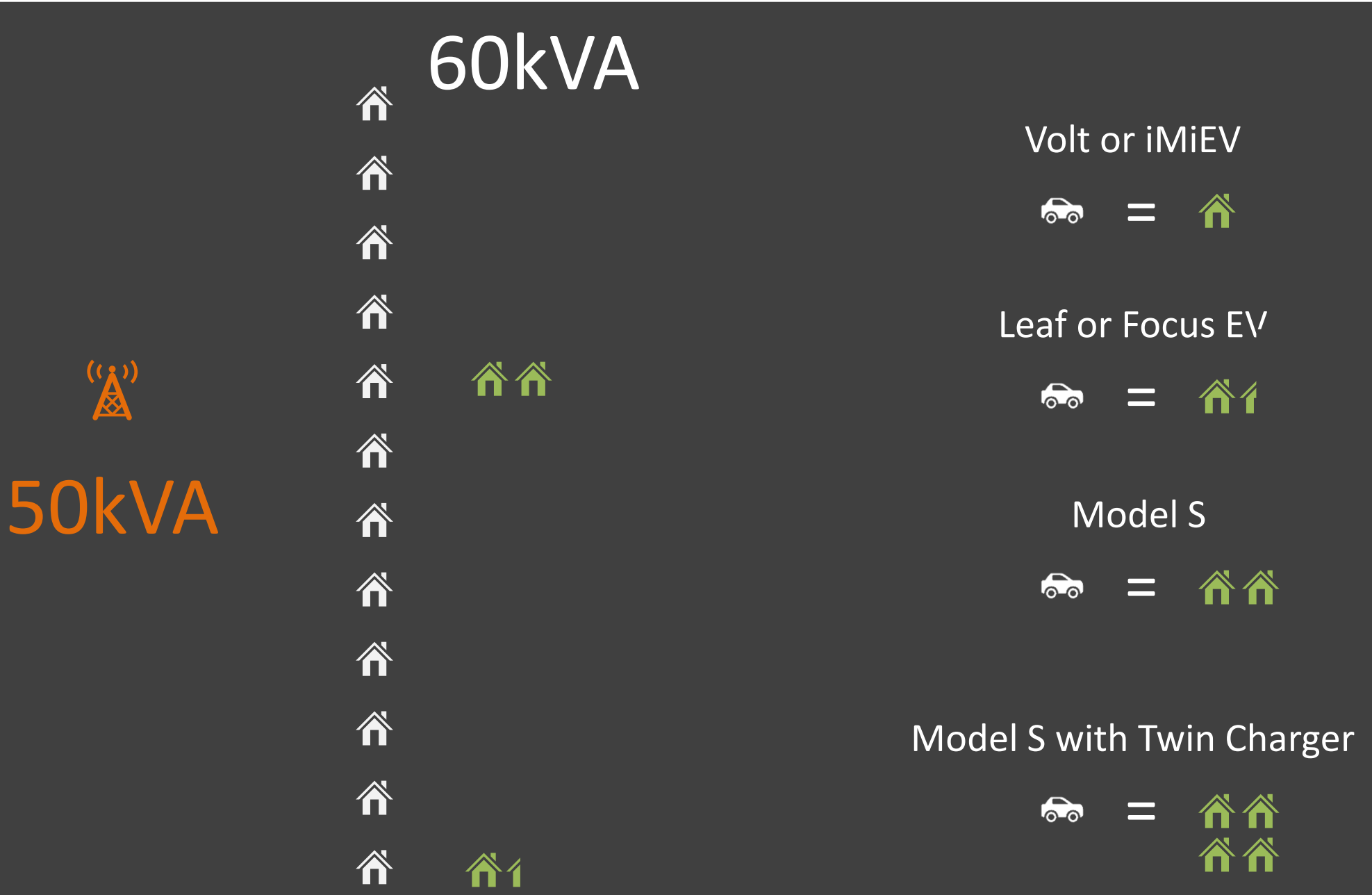
EVs have house-equivalents



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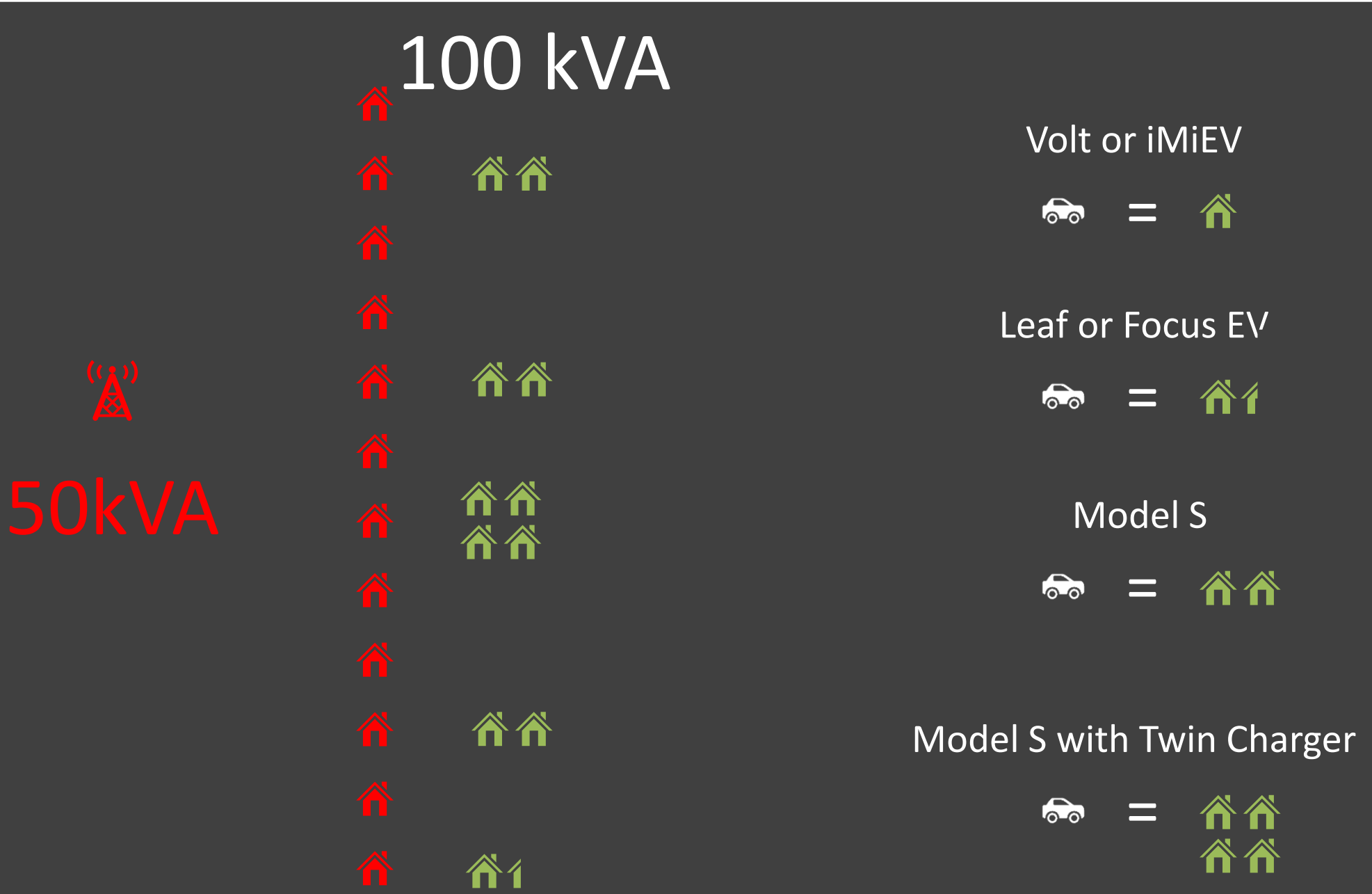
EVs can dwarf house loads



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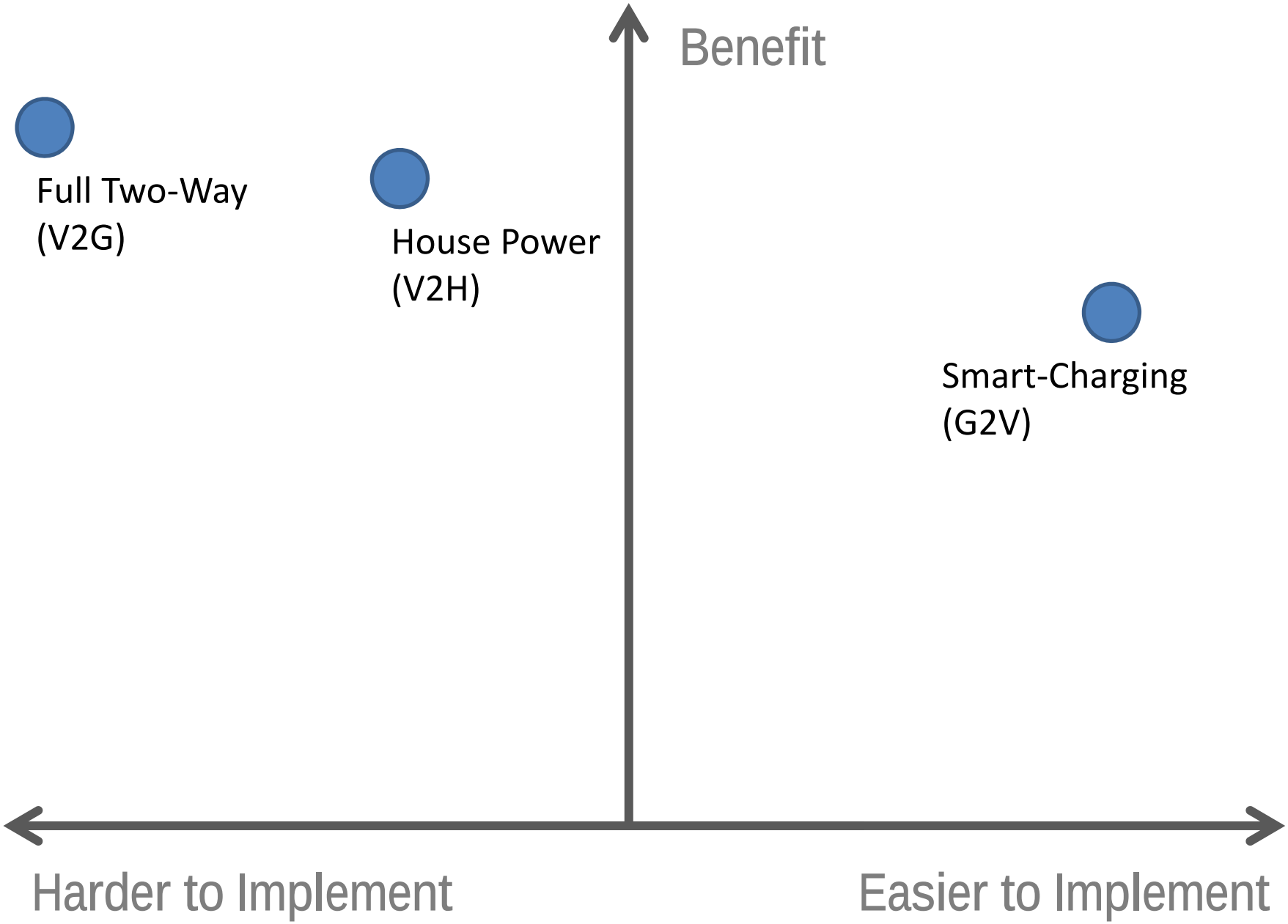
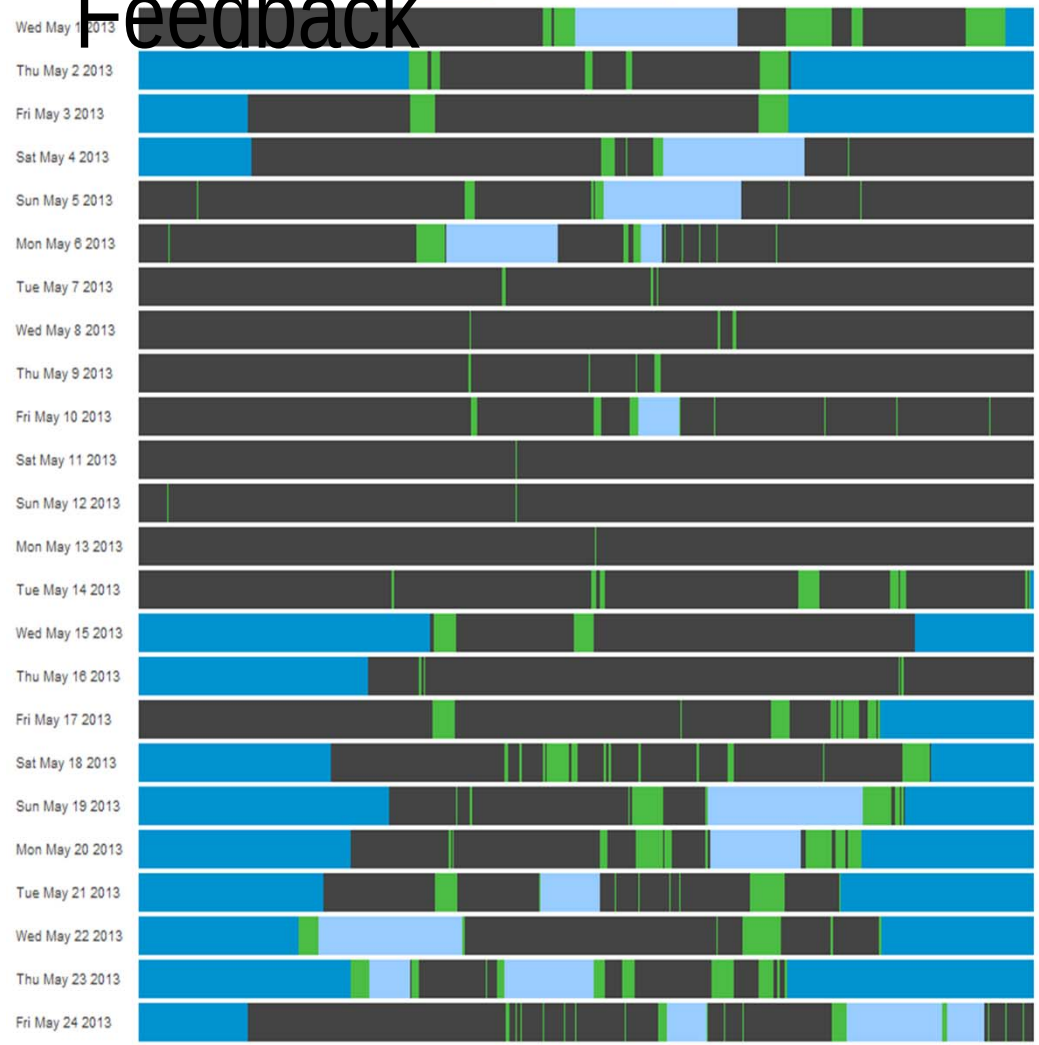
Smart-Charging: High-benefit, easy-implementation

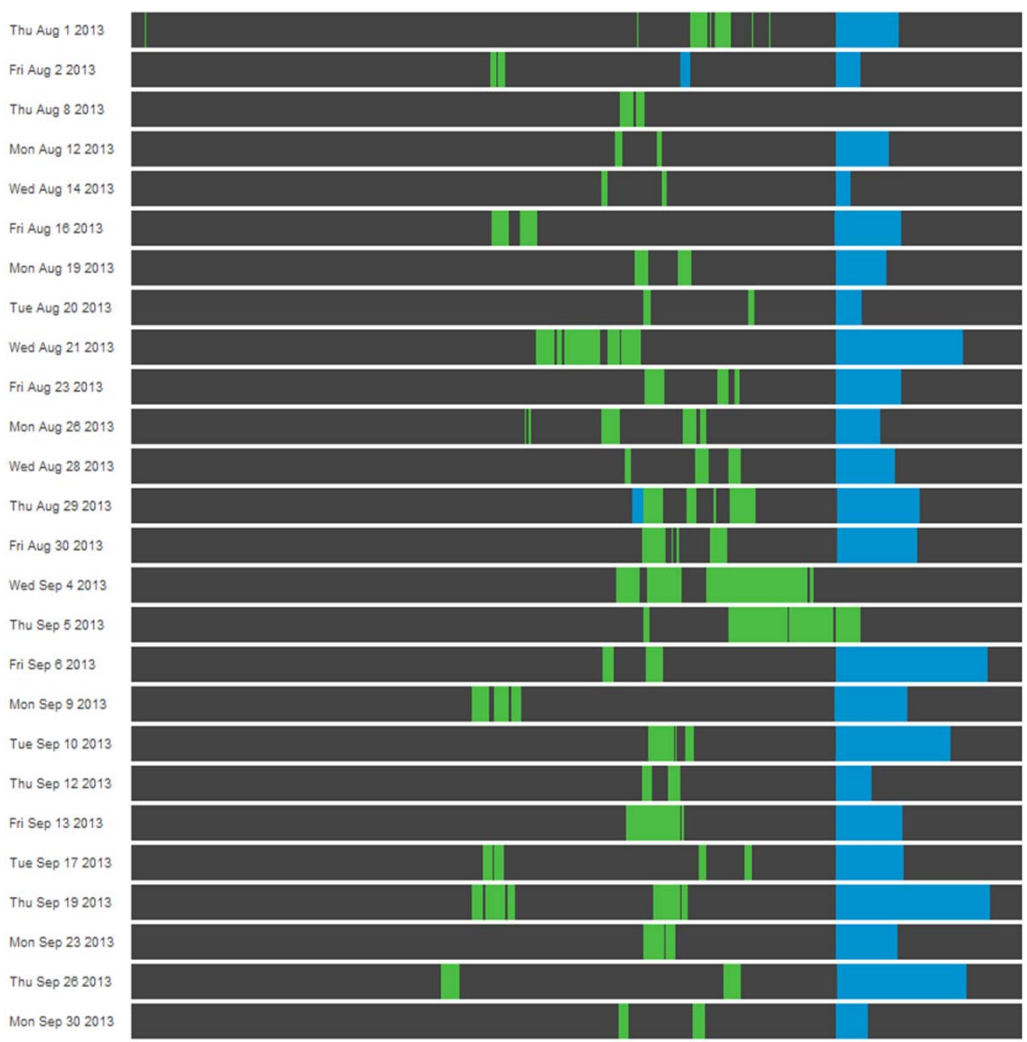


Compact vehicle data logging system from FleetCarma

Creating Night-Time Nick at an Ontario Utility

Before Driver Feedback ⟶ After Driver Feedback



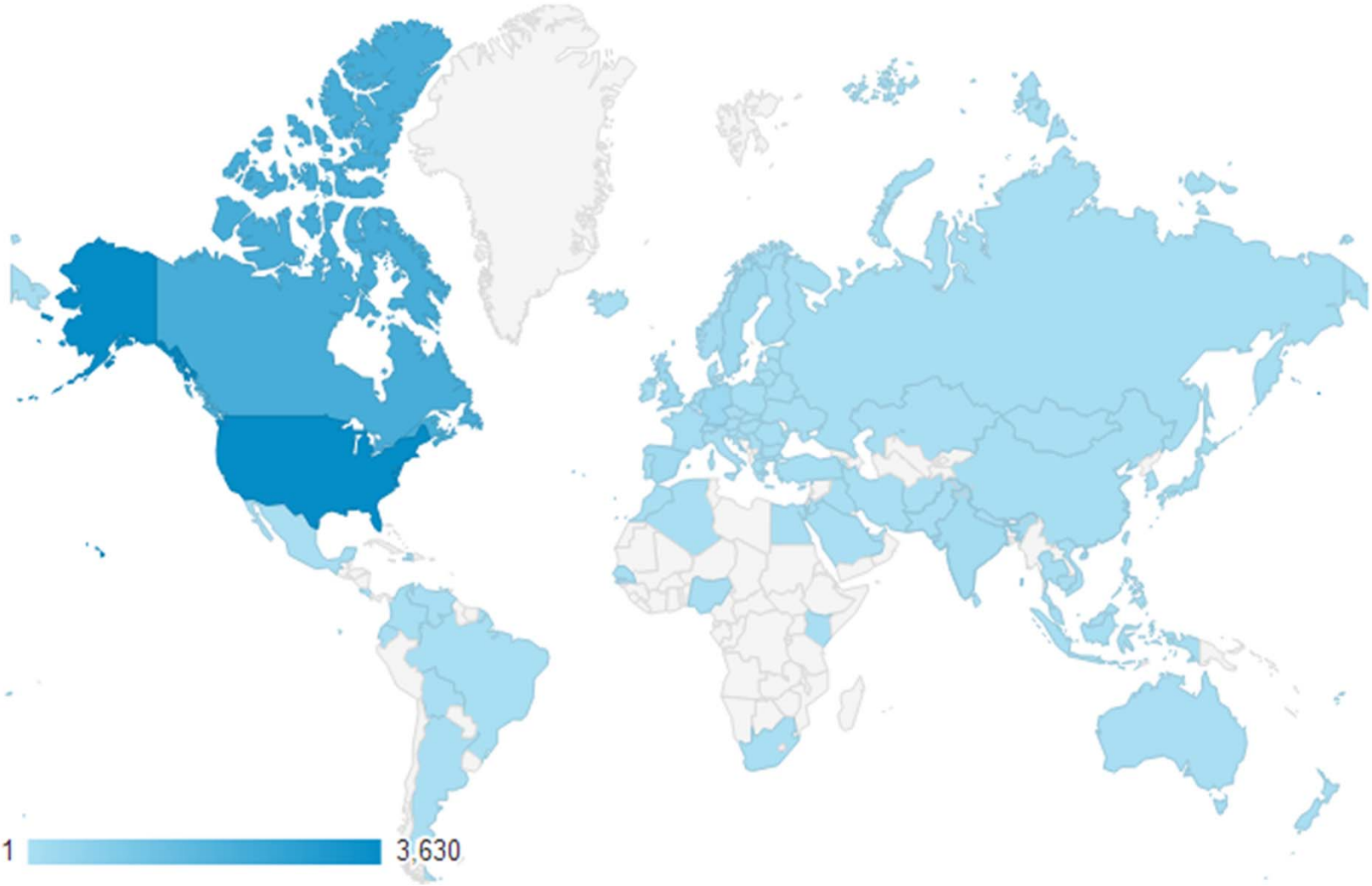


EVEN AT SMALL SALES NUMBERS,
THE POTENTIAL GRID BENEFITS ARE BIG.

3.
TECHNOLOGY VISA

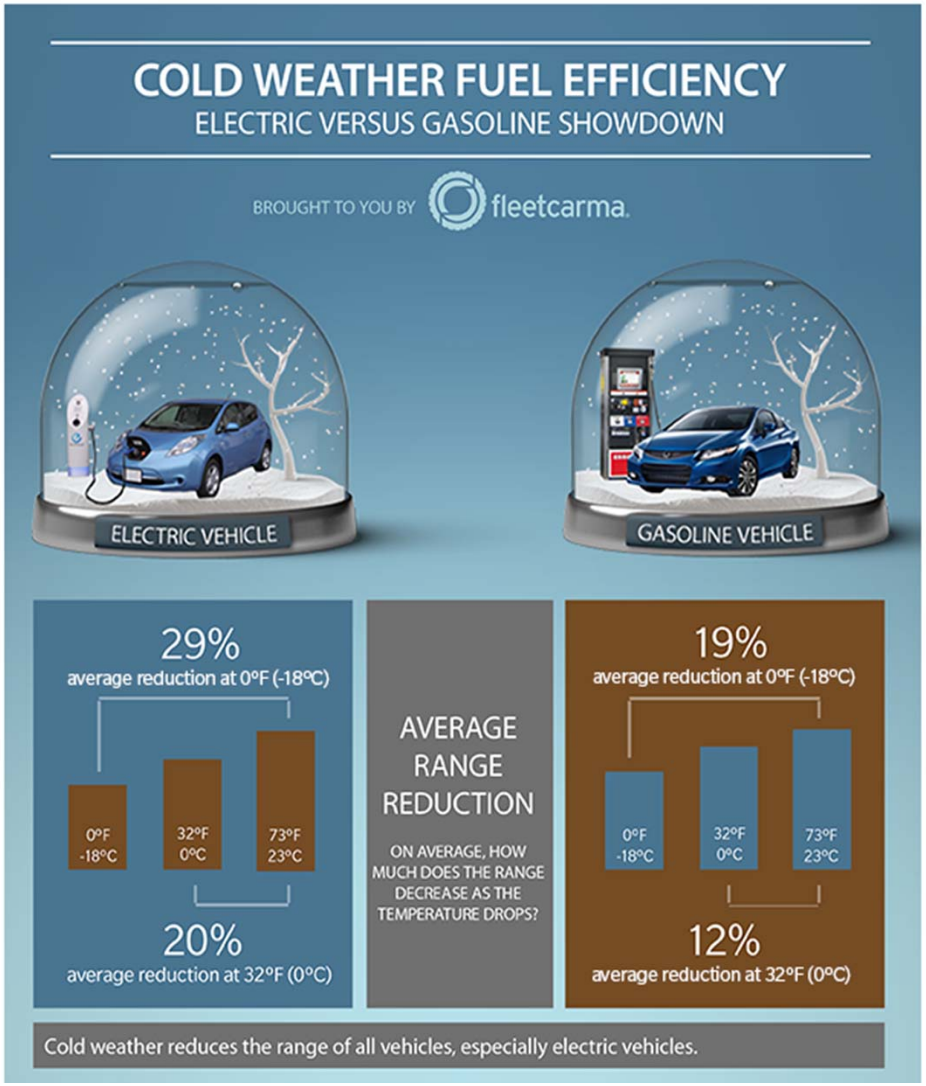

skype™

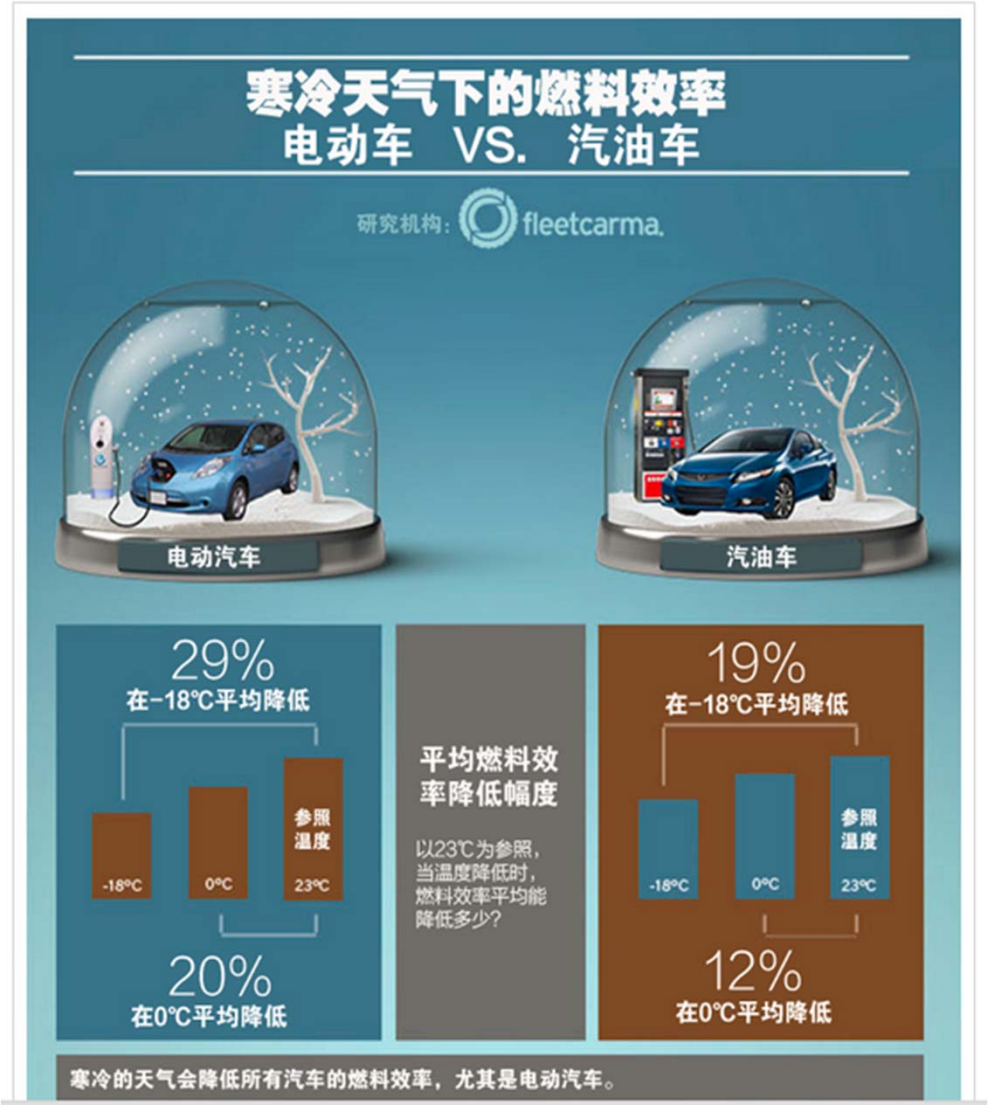
A Global Market



FleetCarma.com traffic over a period in January. Small team in Waterloo, Ontario.

A Global Market





Infographic on EVs in Cold Weather hacked and translated. Impressive!

The Company & Divisions

CrossChasm

CrossChasm

Hybrid & Electric Vehicles:
Faster, Better, Cheaper

Design services & prototypes sold to vehicle OEM/ manufacturers.

GM MAGNA

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Energy & Emissions Made Easy.
Save dollars, litres, and tons.

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

AutoShare TORONTO Québec

mycarma

Car-Buying, Based on You.
Save dollars, litres, and tons.

Dealership product for customer engagement and conversion. Decision-support for consumers.

DON VALLEY NORTH TOYOTA Forbes Waterloo Mazda Schlueter HYUNDAI

technology green15™ | Deloitte.

The Company & Divisions

The EV Products

EV Suitability Assessments
Identify where EVs can be deployed with a positive ROI.

Electric Vehicle Monitoring
The World's only turn-key logger for electric vehicles.

Smart-Charging
Enable demand response charging for electric vehicles.

The Company & Divisions

The EV Products

fleetcarma

EV Suitability Assessments
Identify where EVs can be deployed with a positive ROI.

1. Get EVs out there. (pragmatically)

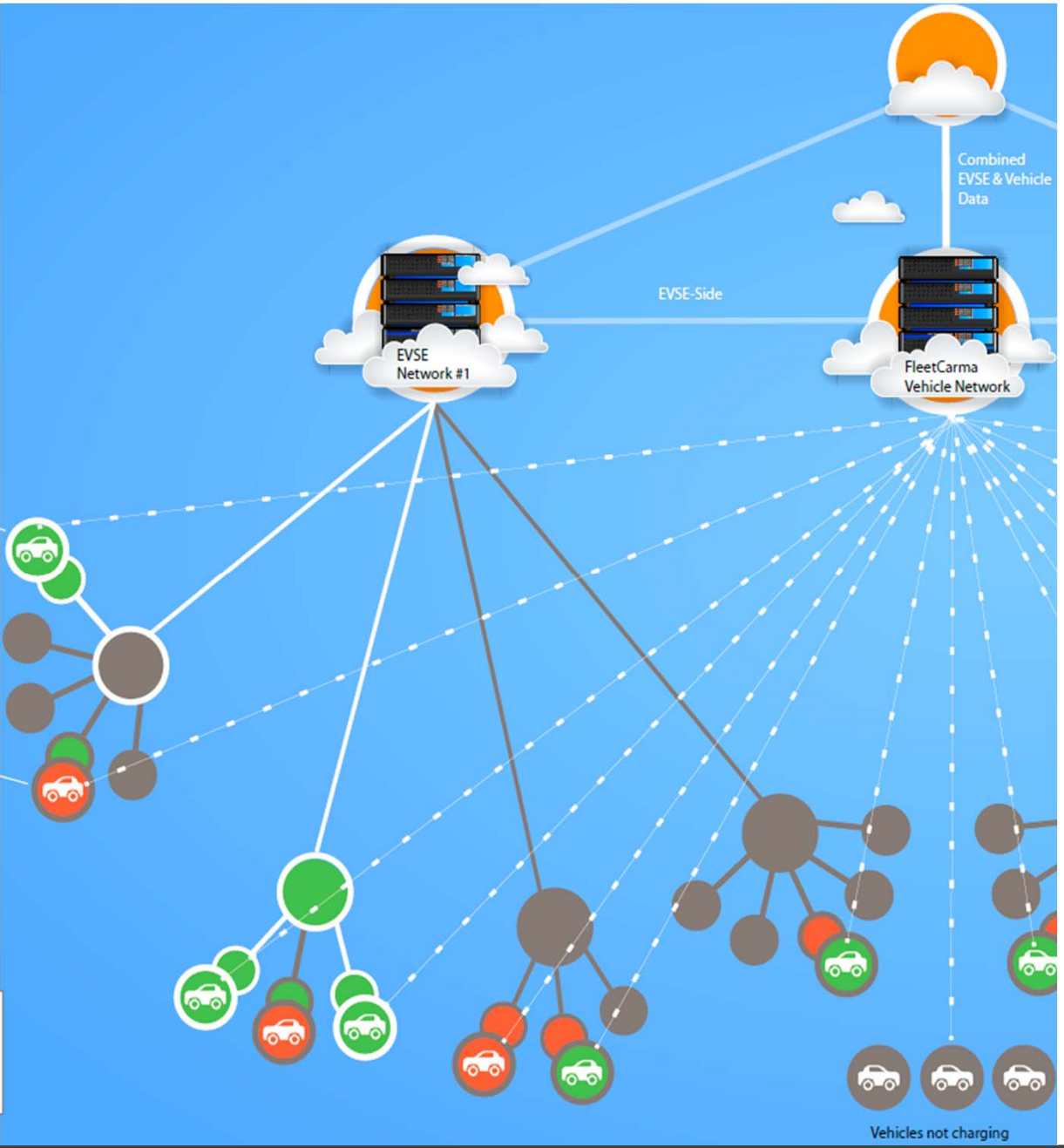
Electric Vehicle Monitoring
The World's only turn-key logger for electric vehicles.

2. Build a data pipe

Smart-Charging
Enable demand response charging for electric vehicles.

3. Leverage the data pipe

FleetCarma enabled Smart-Charging

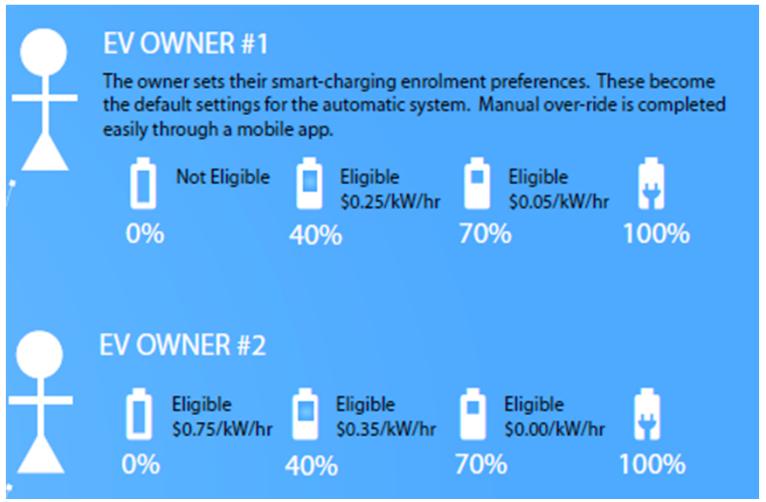


Smart-Charging with FleetCarma

Known:

-location
-charging power
-vehicle ID
-vehicle type
-vehicle state-of-charge
-time left to charge
-driver preferences

This system enables scale and dramatically reduces the risk to the EV owner. It also gives the owner an easy and automated method to opt-in/opt-out on a charge-by-charge basis.



Using the technology visa.

Logger design: Ontario
Firmware design: Ontario
Manufacturing: Ontario
Software development: Ontario

EV Suitability Locations:

1. Ontario
2. Ontario
3. Quebec
4. New Brunswick
5. BC
6. **Colorado**
7. **California**
8. Many more…

Vehicle Monitoring:

1. Ontario
2. Quebec
3. **California**
4. BC
5. **South Africa**
6. **France**
7. **Maine**
8. Many More…

Smart-Charging Locations:

1. **California**
2. **England**
3. **New York**
4. **Second spot in England**
5. **Germany**

6. …and now potentially Ontario

COMPETE LIKE IT'S 10¢/KWH

INNOVATE LIKE ITS 40¢/KWH

ELECTRIC VEHICLES ARE ENVIRONMENTALLY FRIENDLY.

BUT IF YOU THINK THAT'S THE KEY DRIVER,

YOU'RE MISSING THE POINT.

Thank you for your time!

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519.404.5987 (cell)

CrossChasm

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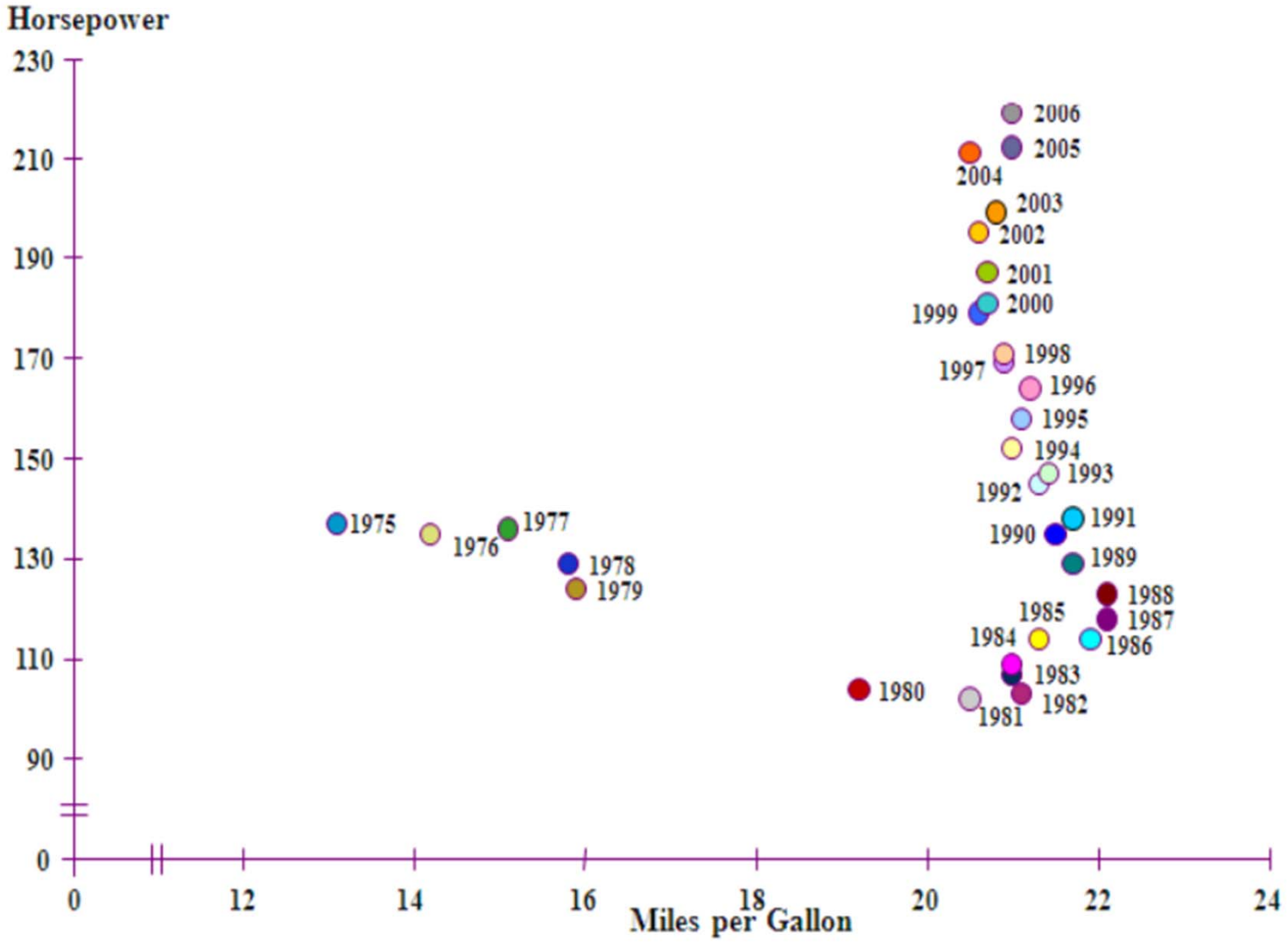
DON VALLEY NORTH TOYOTA Forbes Waterloo Mazda Schlueter HYUNDAI

Sales-weighted horsepower and MPG for LDV



Sales-weighted horsepower and MPG for LDV