

Should the PBC TPA actively support
the transition from internal
combustion engine vehicles to plug-
in vehicles?

PBC TPA Citizen Advisory Committee Meeting
4MAY2022

Purpose of this presentation is to
show why this issue should be
brought before the PBC TPA
Governing Board June 16th, 2022

The Problem:

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The light duty vehicles registered in Palm Beach County are spewing over **5 million *tons* of carbon dioxide** into our sky every year.

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Carbon dioxide is a very stable greenhouse gas molecule which means CO₂ created today will be trapping excess heat in the atmosphere for three to twelve centuries.

The Problem:

Every month delayed addressing this problem results in another 400,000 tons of CO₂ from Palm Beach County cars damaging the environment and people for multiple lifetimes.

The Solution:

The Solution:

Implement policy to accelerate the ongoing transition from internal combustion engine powered light duty vehicles to plug-in powered light duty vehicles.

Executive Order on Strengthening American Leadership in Clean Cars and Trucks

AUGUST 05, 2021 • PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in order to promote the interests of American workers, businesses, consumers, and communities, it is hereby ordered as follows:

Section 1. Policy. America must lead the world on clean and efficient cars and trucks. That means bolstering our domestic market by setting a goal that 50 percent of all new passenger cars and light trucks sold in 2030 be zero-emission vehicles, including battery electric, plug-in hybrid electric, or fuel cell electric vehicles. My Administration will prioritize setting clear standards, expanding key infrastructure, spurring critical innovation, and investing in the American autoworker. This will allow us to boost jobs — with good pay and benefits — across the United States along the full supply chain for the automotive sector, from parts and equipment manufacturing to final assembly.

JOSEPH R. BIDEN JR.

THE WHITE HOUSE

August 5, 2021.

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Does such a policy fall within the legislative authorization of MPO/TPAs?

From State of Florida Statutes 339.175

Metropolitan planning organization. –

- (b) In developing the long-range transportation plan and the transportation improvement program required under paragraph (a), each M.P.O. shall provide for consideration of projects and strategies that will:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety and security of the transportation system for motorized and nonmotorized users;
3. Increase the accessibility and mobility options available to people and for freight;
4. Protect and enhance the environment, promote energy conservation, and improve quality of life;
5. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
6. Promote efficient system management and operation; and
7. Emphasize the preservation of the existing transportation system.

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- Energy conservation – the average ICE car gets 22 mpg and burns 4.5 gallons of gasoline per 100 miles which converts into 160 kWhs.

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The average BEV uses 34.6 kWhs per 100.

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- Energy conservation – the average ICE car gets 22 mpg and burns 4.5 gallons of gasoline per 100 miles which converts into 160 kWhs. The average BEV uses 34.6 kWhs per 100. 460% more efficient.

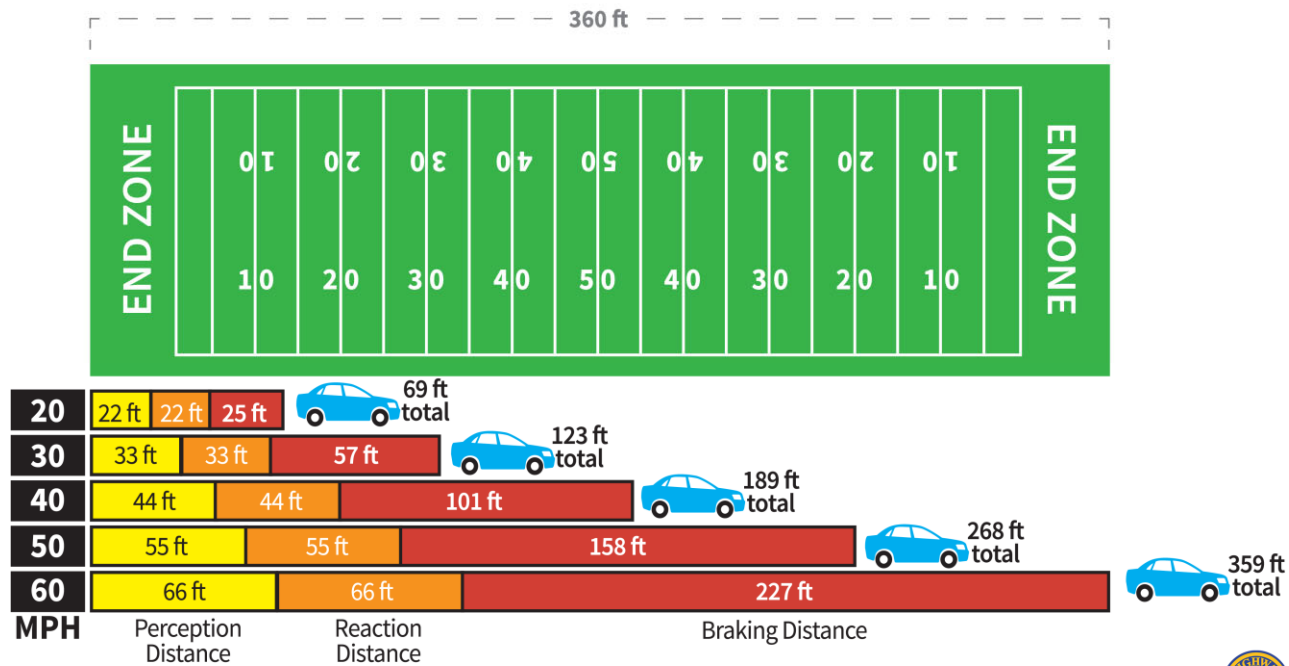
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- Improve quality of life –

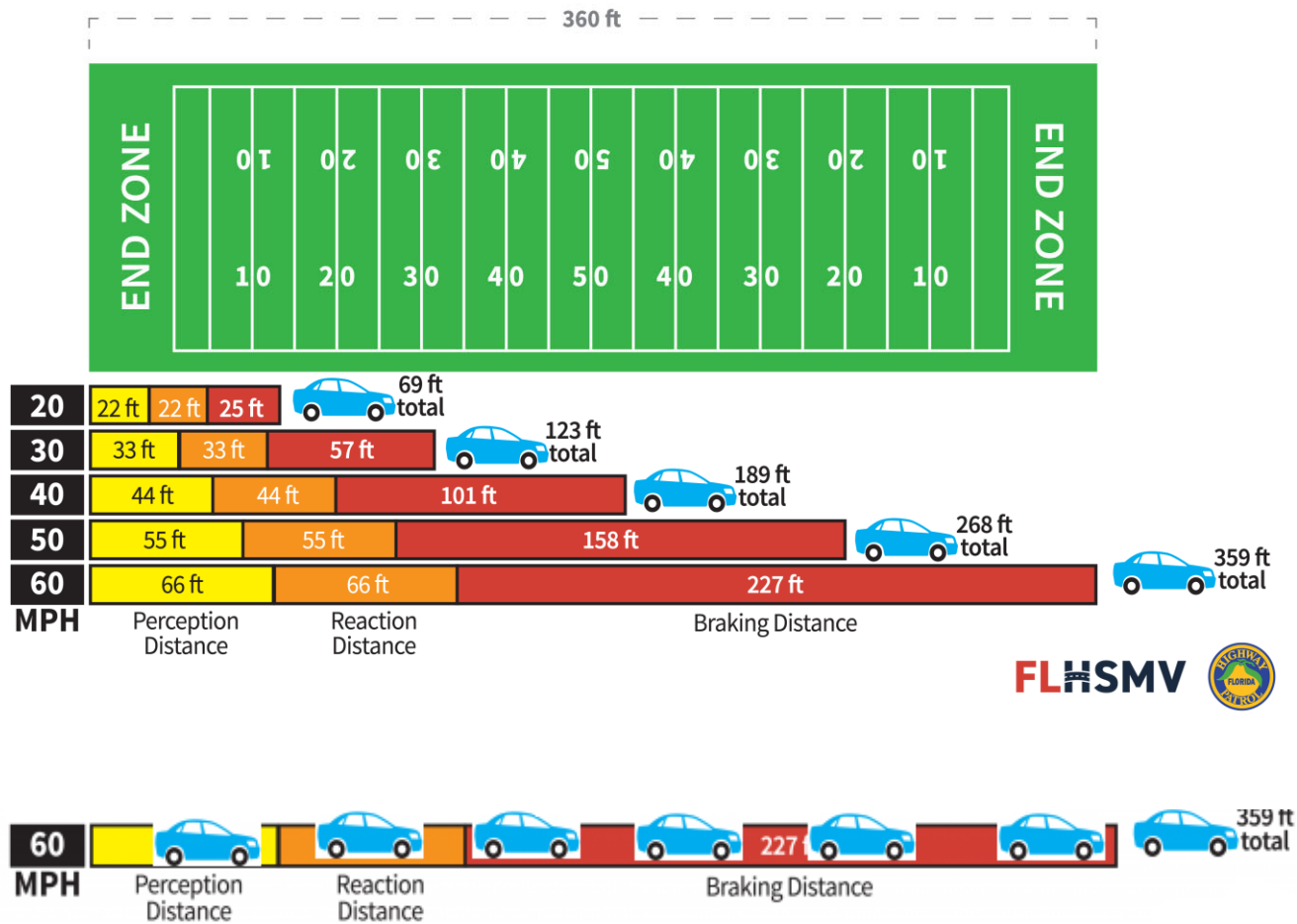
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- Improve quality of life – The American Lung Association states switching to zero-emission passenger vehicles will have nationwide public health benefits of :
 - 3 million fewer asthma attacks,
 - 110,000 fewer premature deaths,
 - over 13 million fewer lost work days

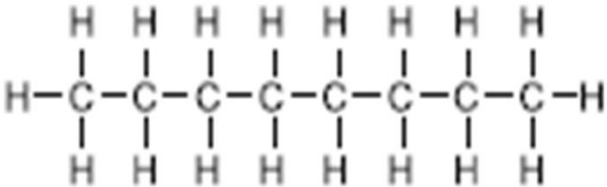
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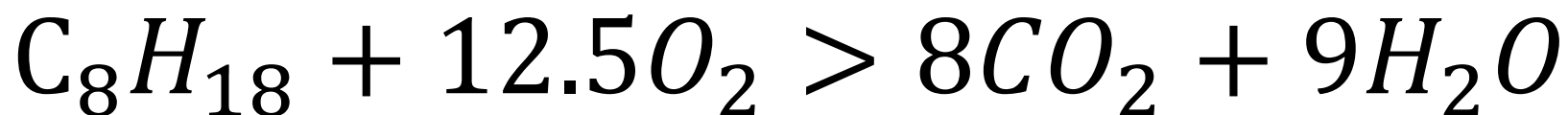


“adding every year five million tons of CO₂ into the PB County sky”

Name	Molecular Formula	Condensed Formula	Structural Formula
Octane	C ₈ H ₁₈	H ₃ C(CH ₂) ₆ CH ₃	 <pre> H H H H H H H H H - C - C - C - C - C - C - C - C - H H H H H H H H H</pre>

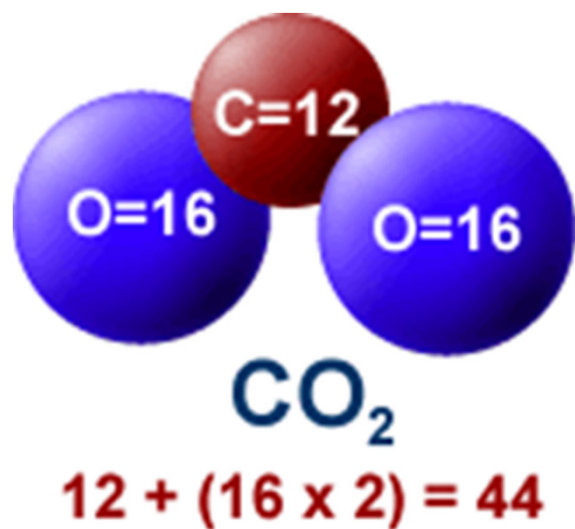
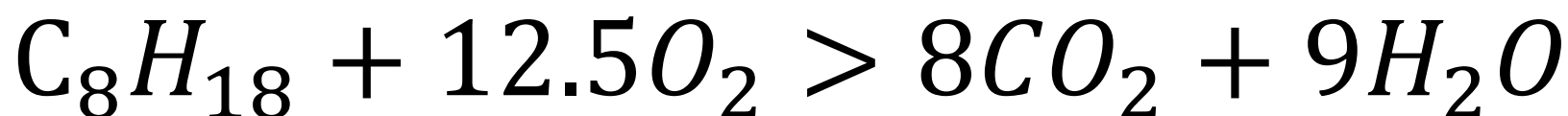
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“Therefore, to calculate the amount of CO₂ produced from a gallon of gasoline, the weight of the carbon in the gasoline is multiplied by 44/12 or 3.7.”

**“adding every year five million tons of
CO₂ into the PB County sky”**

Givens:

carbon atoms \cong 87% of the weight of gasoline

weight of a gallon of gasoline \cong 6.3 pounds

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Therefore a gallon of gasoline has 5.5 pounds of
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weight of a gallon of gasoline \cong 6.3 pounds

Therefore a gallon of gasoline has 5.5 pounds
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When a gallon of gasoline is burned the 5.5
pounds of carbon combines with 14.5 pounds of
oxygen to create 20 pounds of CO₂! (5.5 x 3.7)

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From DOE and EPA websites:

the average car is driven 11,500 miles per year

at 22.0 miles per gallon

= 523 gallons of gasoline burned per year

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523 gallons x 20 lbs of CO₂ \cong 10,460 lbs of CO₂

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at 22.0 miles per gallon

= 523 gallons of gasoline burned per year

523 gallons x 20 lbs of CO₂ \cong 10,460 lbs of CO₂

\cong 5 tons of CO₂

“adding every year five million tons of CO₂ into the PB County sky”

Current Registered Vehicles

Based on registrations having no expiration date or expiring on/after August 01, 2021

Update Frequency: Monthly

Data Refreshed: 8/8/2021

County Name	Vehicle Type Desc									Grand Total
	AUTOS & PICKUPS	HEAVY TRUCKS	MOTORCYCLE	BUS	TOOLS	VESSEL	VEHICLE TRAILER	TRAVEL TRAILER	MOBILE HOME	
Grand Total	16,212,272	1,701,797	638,883	58,423	6,483	928,153	2,032,876	218,219	1,084,929	22,882,035
ALACHUA	176,837	19,061	7,326	990	90	9,897	28,930	2,665	13,120	258,916
BAKER	18,409	4,156	688	194	7	2,102	5,970	853	4,722	37,101
PALM BEACH	1,082,257	88,725	31,974	2,968	247	38,078	78,138	6,223	19,266	1,347,876
PASCO	403,464	40,832	19,335	1,143	91	23,002	55,596	11,954	47,724	603,141
PINELLAS	712,890	60,248	31,477	2,478	321	48,230	70,421	8,473	51,821	986,359

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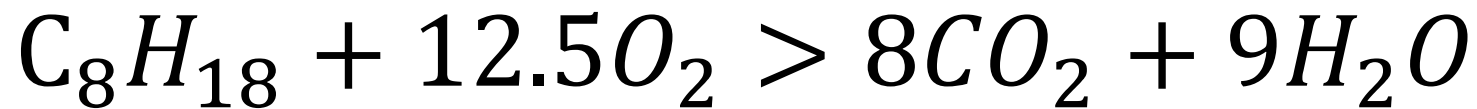
Over 1,082,257 autos and pickups each producing over 5 tons of CO₂ per year totals **over 5 million tons of CO₂ per year**

**“adding every year five million tons of
CO₂ into the PB County sky”**

The rest of the story.

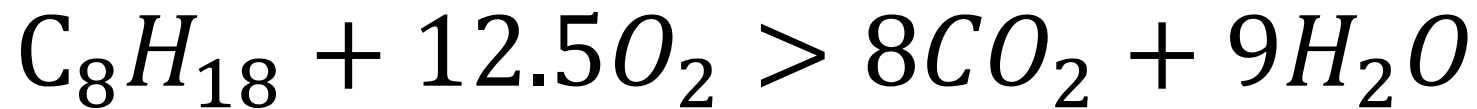
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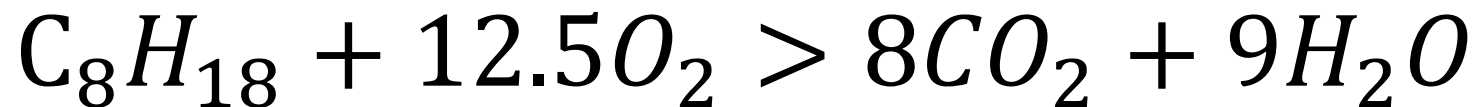
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523 million gallons of gas weighs

1.65 million tons of gasoline

+ 5.25 million tons of O₂

= 5 million tons of CO₂ +

1.9 million tons of H₂O

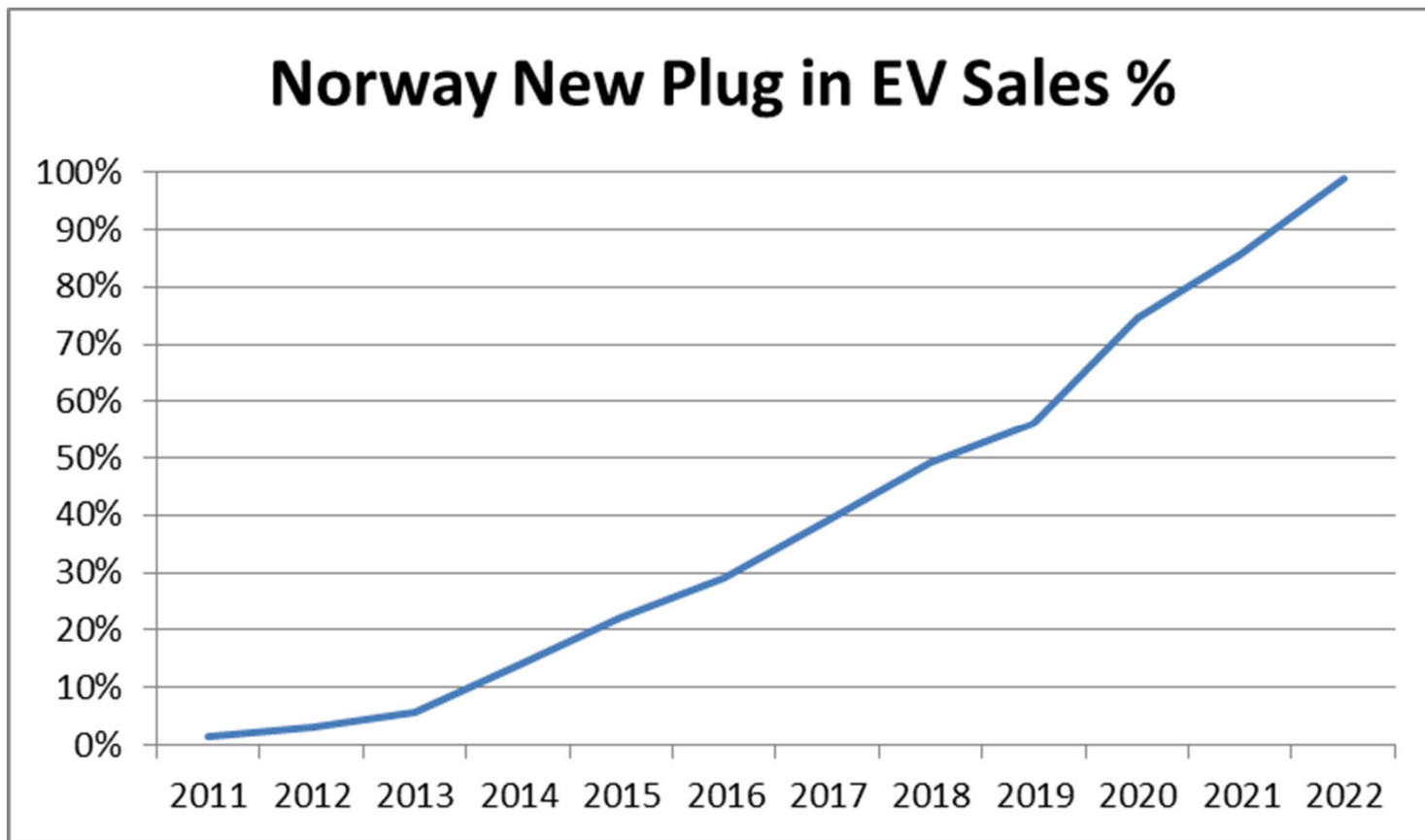
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Yes...

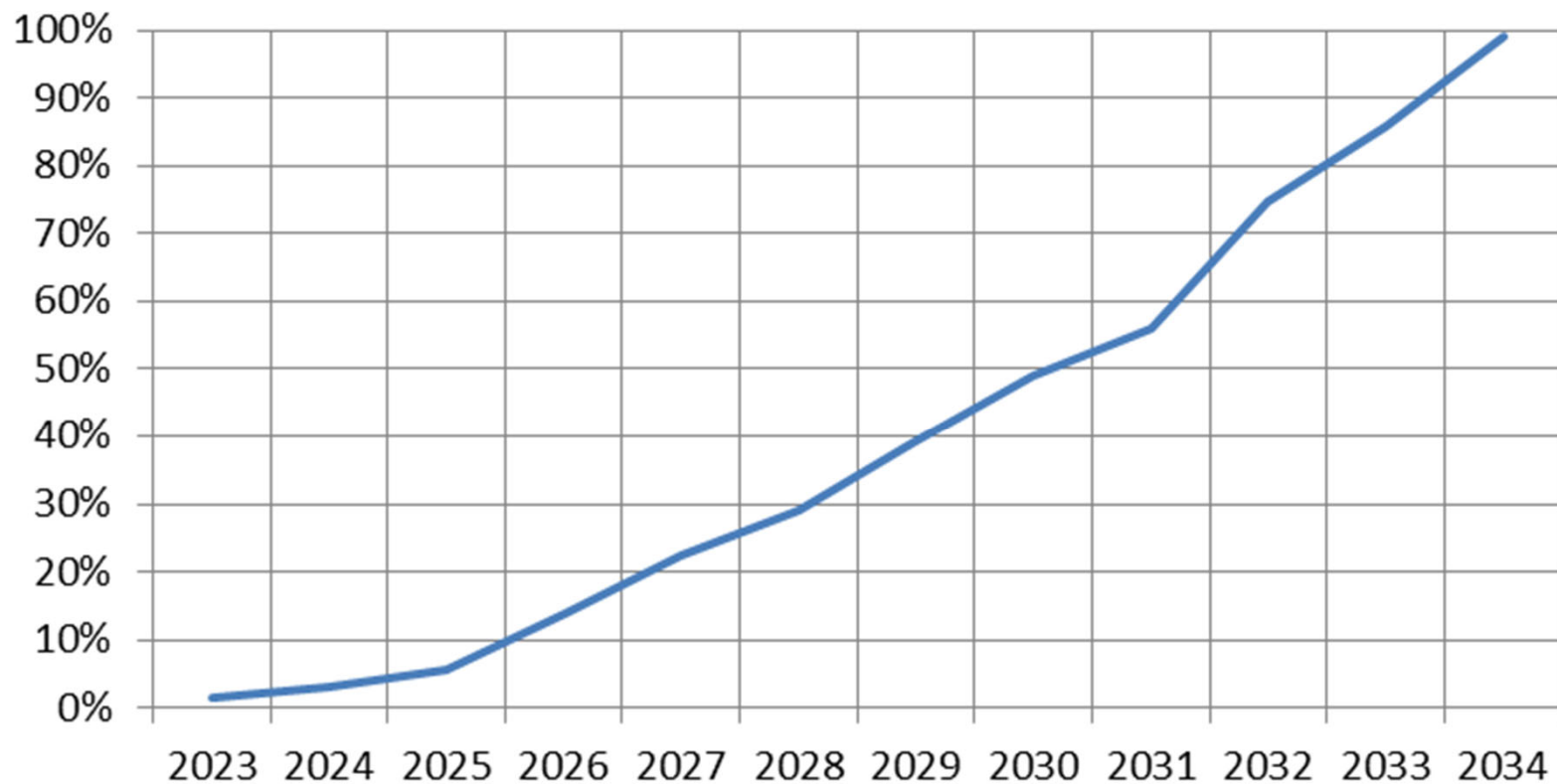
Is the goal of 50% new car sales be plug-ins in 8 years achievable?

Yes...Norway did it in 2018



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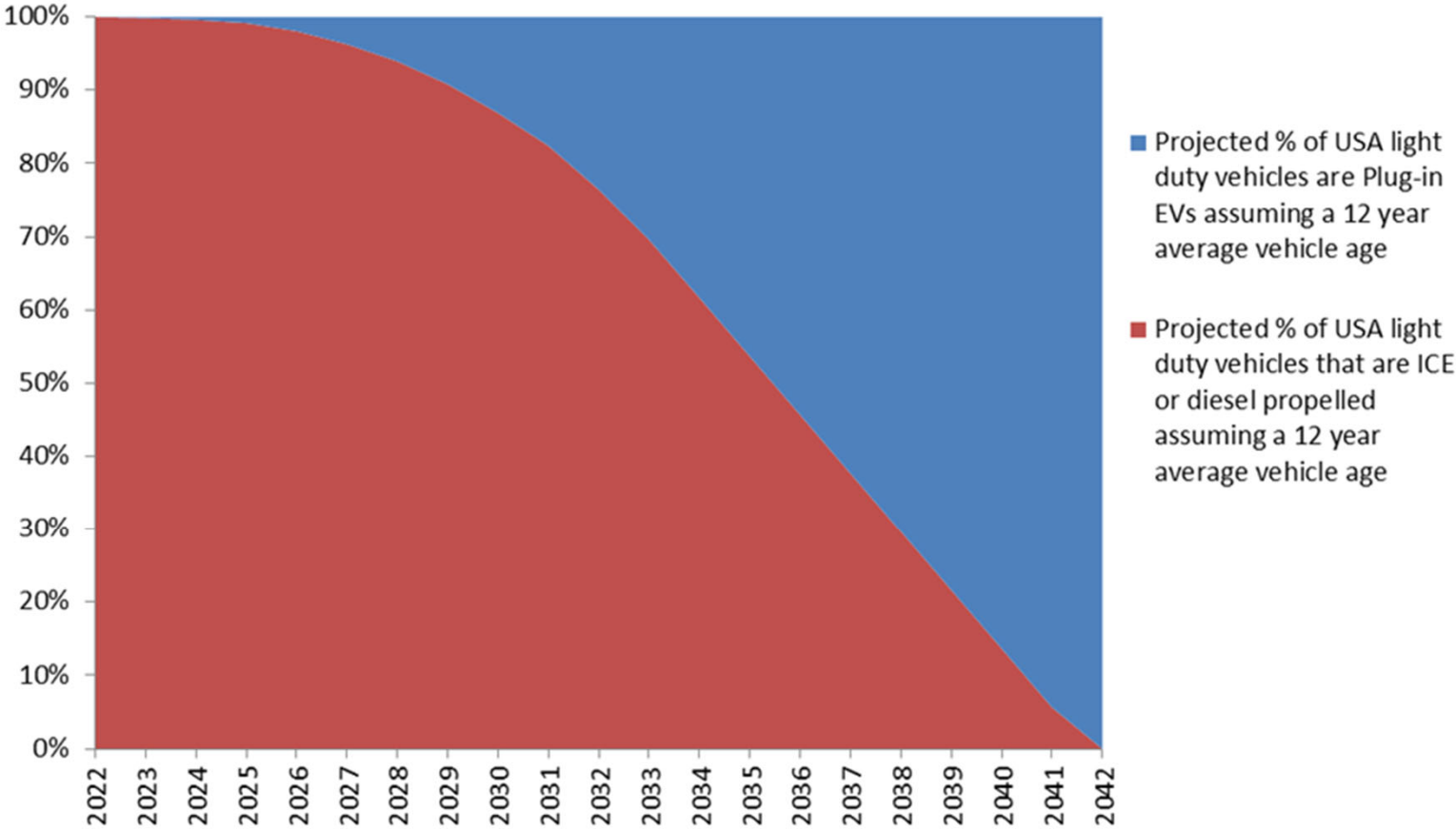
**Projecting USA New Plug in EV Sales
% using Norway historical data and
reaching 50% in 2030**



Projecting PBC New Plug -In Sales numbers using Norway historical data to reach 50% in 2030

Year	PBC Registered light duty vehicles	Total new car sales as % of registered cars	% of new light duty vehicle sales that are plug-ins	Estimated # of plug-ins vehicles sold each year
	est. increase 20,000 per year	1/12= 8.5%	Norway's curve	Col 2*Col 3*Col 4
2023	1,120,000	8.5%	1.60%	1,523
2024	1,140,000	8.5%	3.10%	3,004
2025	1,160,000	8.5%	5.60%	5,522
2026	1,180,000	8.5%	13.80%	13,841
2027	1,200,000	8.5%	22.40%	22,848
2028	1,220,000	8.5%	29.10%	30,177
2029	1,240,000	8.5%	39.20%	41,317
2030	1,260,000	8.5%	49.10%	52,586

ICE cars being replaced by plug-in cars over time



Actions requested of the PBC TPA Governing Board

- 1) Task the TPA Technical Advisory Board to verify the accuracy of data and assumptions in this report. Develop further actions and policy as needed to be brought back to the PBC TPA Governing Board.

Actions requested of the PBC TPA Governing Board

2) Form a sub committee chaired by a Governing Board member with representation from the Governing Board, TPA Agency staff, Technical and Citizen Advisory committees to consider TPA direction with regards to Global Warming.

Actions requested of the PBC TPA Governing Board

3) Request the Florida Department of Highway Safety and Motor Vehicles include in their web site PBC vehicle registration by make, model and propulsion type

What the Florida Department of Highway Safety and Motor Vehicles provides:

Current Registered Vehicles

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What is needed to measure progress:

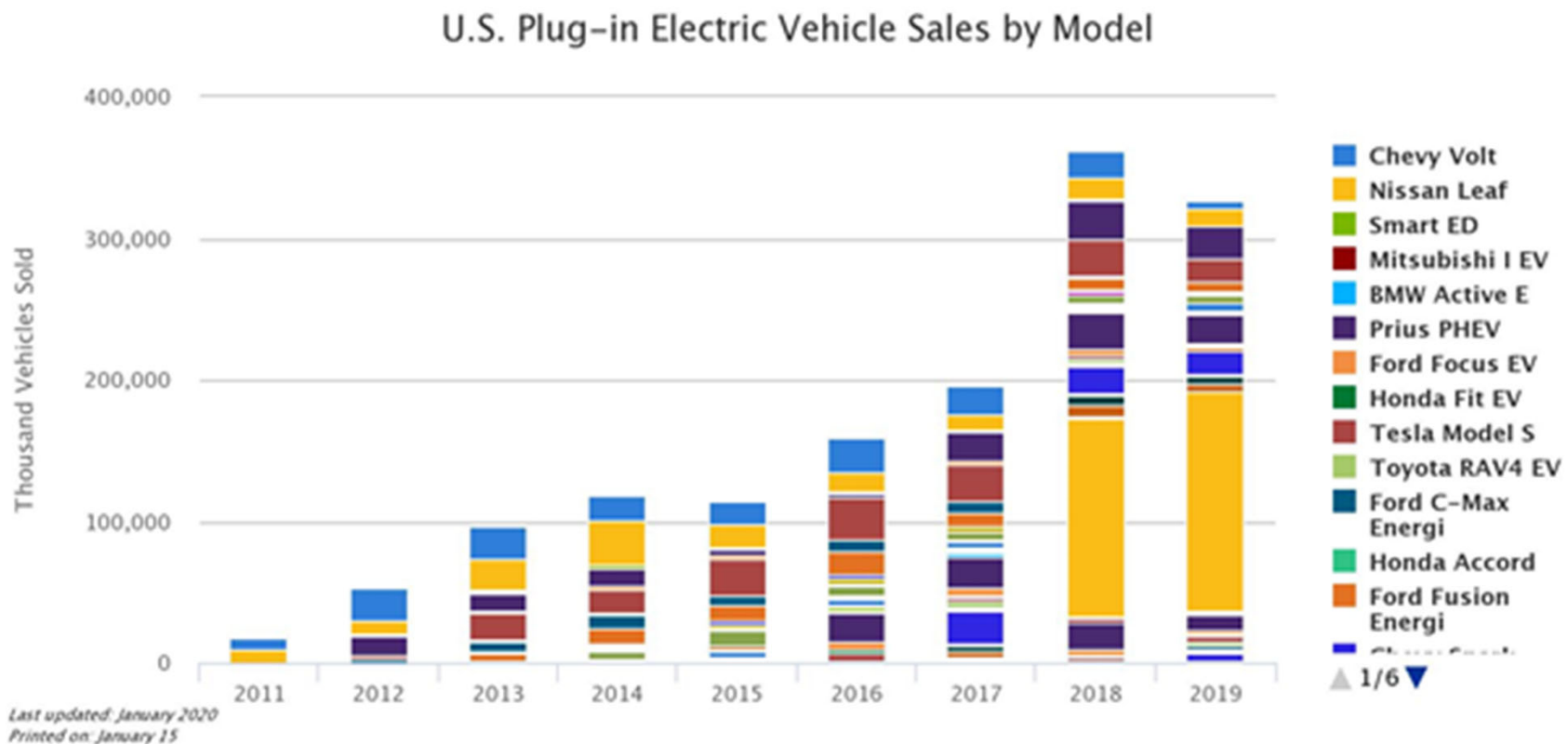
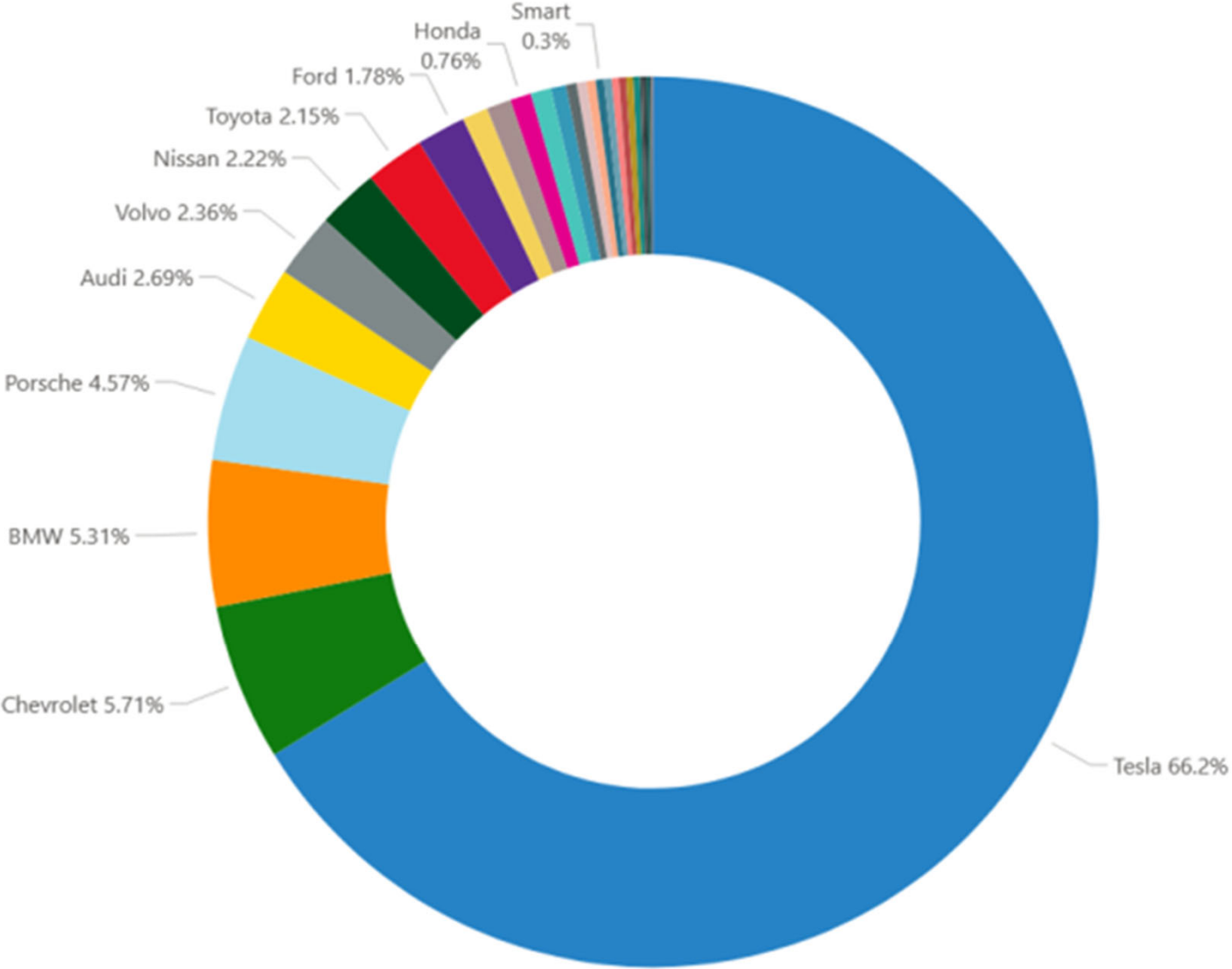


Figure 13 The type of information needed for accurate measurements in PBC. From the US Department of Energy Alternative Fuels Data Center. Last updated two years ago. <https://afdc.energy.gov/data/> The big yellow segment causing the 85% total sales jump in 2018 is 139,782 Tesla Model 3s.

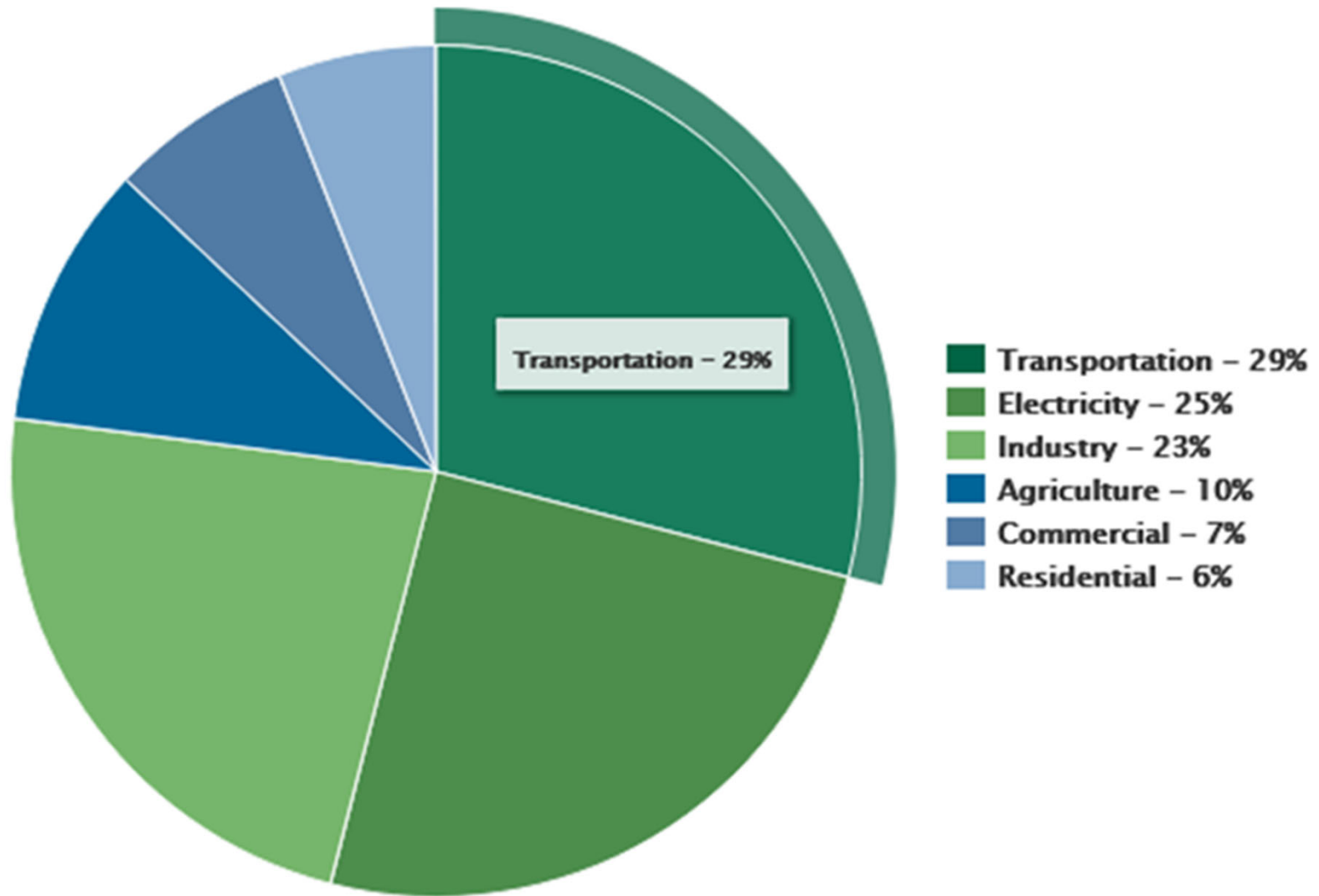
Best guess of number of plug in vehicles currently registered in PBC is about 10,000



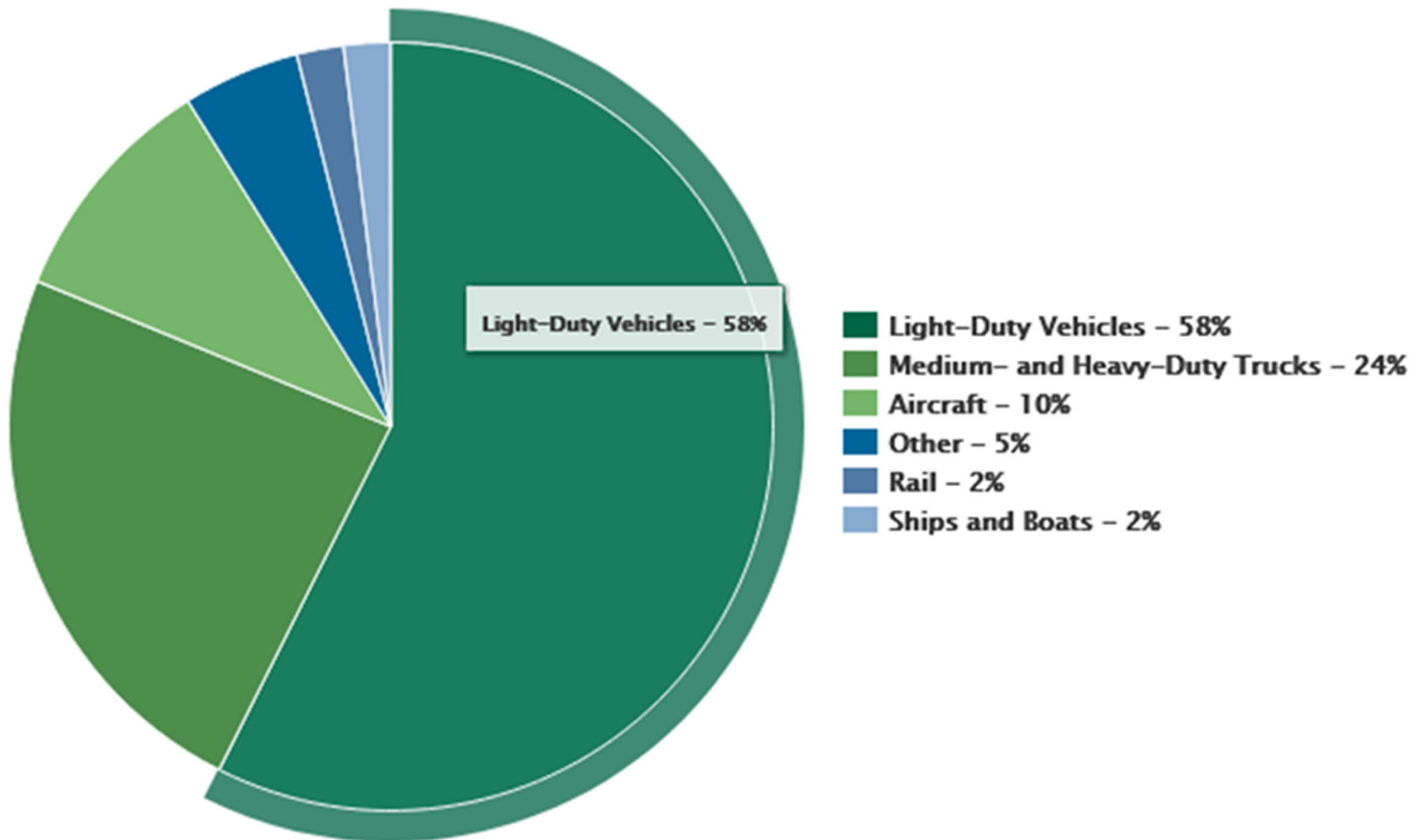
Actions requested of the PBC TPA Governing Board

4) Authorize the TPA staff to assemble information useful to assist municipalities in Fleet conversions to BEVs. Individually, the Governing Board members ensure PBC develops a comprehensive energy audit to accurately measure yearly greenhouse gases emissions.

2019 U.S. GHG Emissions by Sector



2019 U.S. Transportation Sector GHG Emissions by Source



**A motion to bring
this issue before
the TPA
Governing Board
June 16th**