

Electric Vehicle Strategy (draft for discussion)



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Melbourne, Australia



Million Cars and Old Cars

- “The total number of registered vehicles in Georgia **almost doubled** since 2007 to more than **1 million in 2015**, about 90% of which are 11 years and older.”

- 45%: 11-20 years old
- **45%** older than **20** years



- *(400,000 cars more than 20+ years)*

Problem?

In 2014:

- 80% vehicles were passenger cars and SUVs
- Almost **90% of all vehicles older than 11** years
- **2% were less than three years** old.
- most common car brands:
 - **Mercedes Benz and Opel**
 - Nissan and Subaru vehicles (becoming common)

Other data – vehicle registration

In 2013, **83,000** vehicles were registered:

- 71,000 left-hand drive (**85%**)
- 12,000 right-hand drive

In 2014: **101,000**

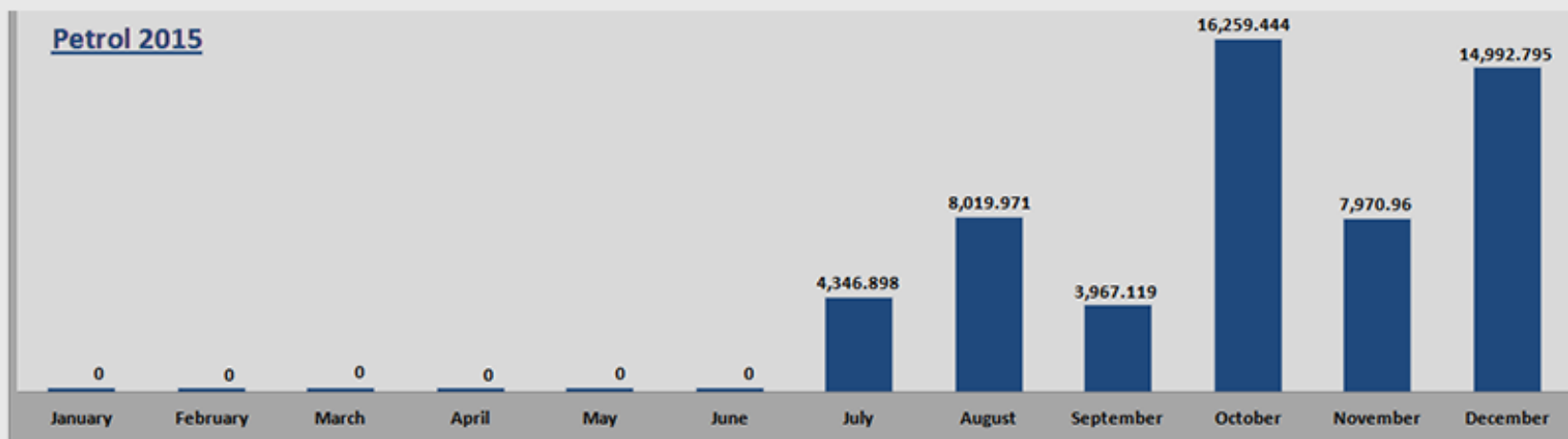
- 67,515 left-hand drive (**66%**)
- 34,000 right-hand drive

In 2015: **80,000**

- 47,672 left-hand drive (**58%**)
- 32,025 right-hand drive

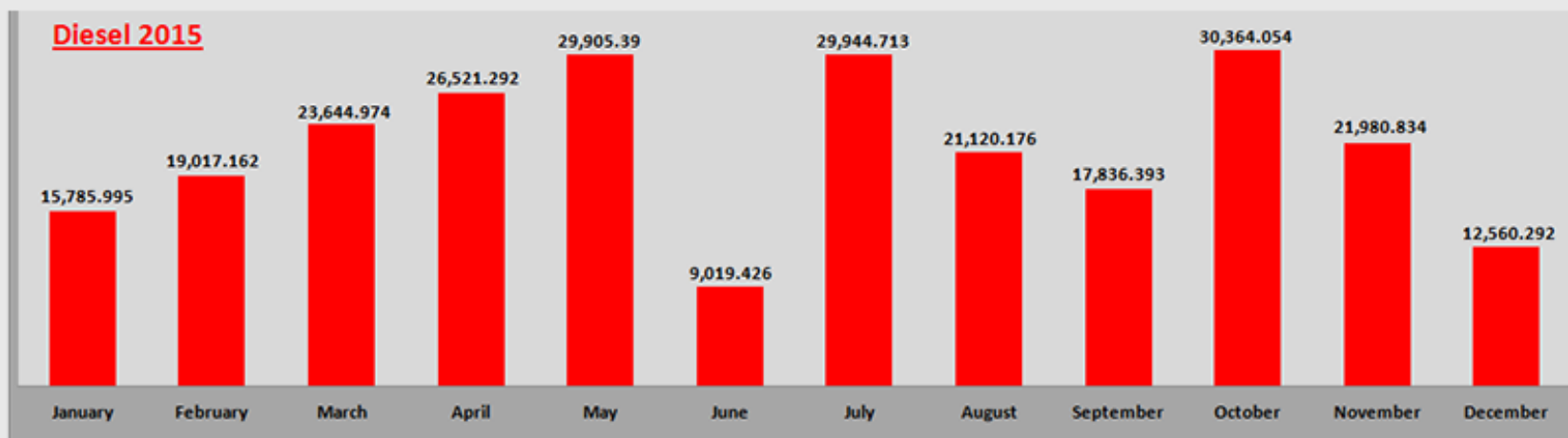
PETROL

In 2015 "SOCAR Georgia Petroleum" LTD imported into Georgia 55 557.187 tones of the following types of petrol.
On this diagram is shown the quantity of imported petrol by "SOCAR Georgia Petroleum" LTD in tones per months.



DIESEL FUEL

In 2015 "SOCAR Georgia Petroleum" LTD imported into Georgia 257 700.701 tons of diesel fuel.
On this diagram is shown the quantity of imported diesel fuel by "SOCAR Georgia Petroleum" LTD in tones per months.



Historical Data

<u>Transportation Means</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
Vehicles	389,752	428,028	476,086	523,451
Trucks	47,874	50,909	54,137	57,372
Buses	10,658	10,916	10,942	11,138
Attachable	4,704	5,370	5,978	6,629
Agricultural	4,173	5,092	5,795	6,547
Motorcycles	2,207	2,642	3,074	3,593
Special Transport Equipment	1,376	1,707	2,175	2,523
Total	460,744	504,664	558,187	611,253

Simple Regression Forecast

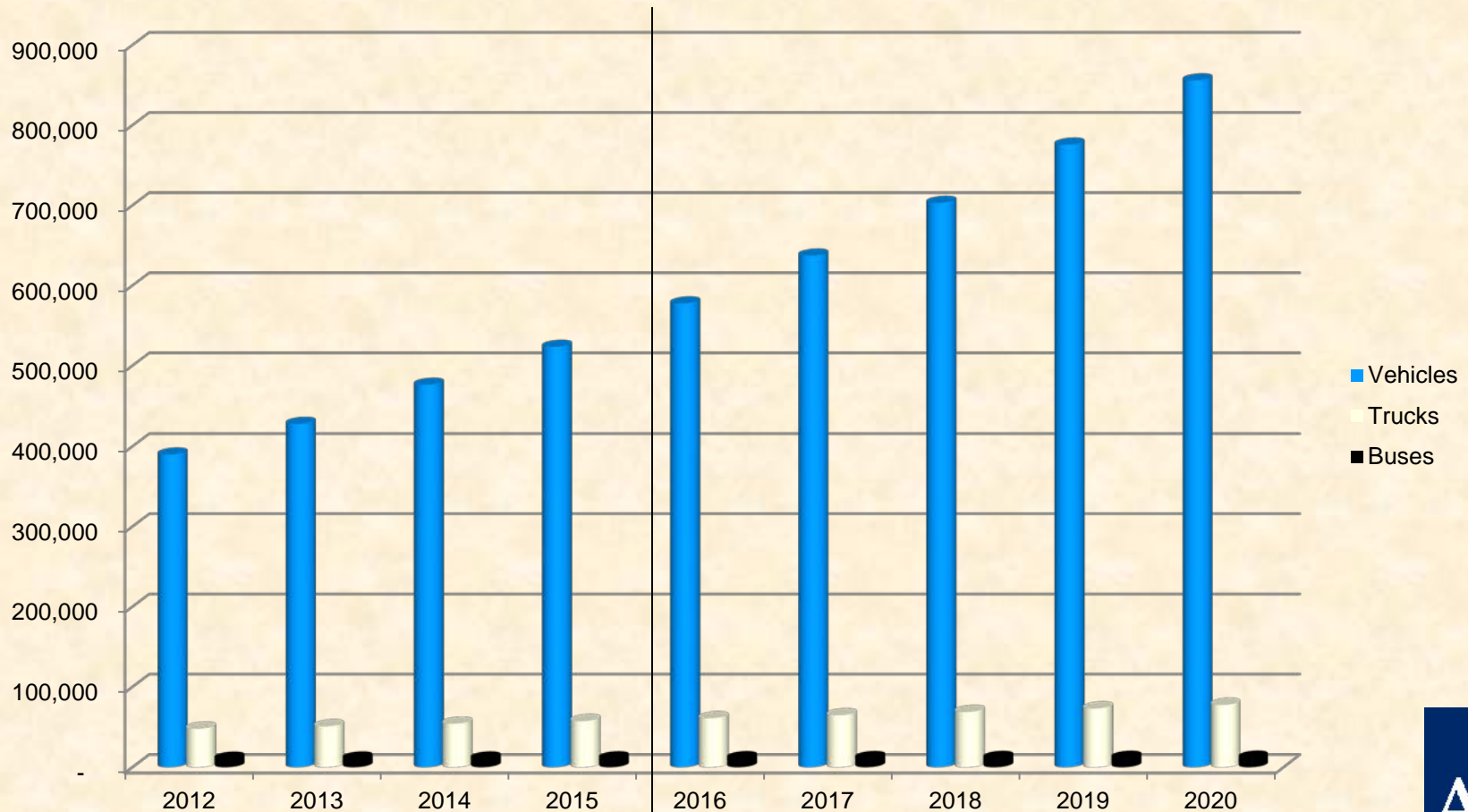
Transportation Means	2016	2017	2018	2019	2020
Vehicles	577,536	637,209	703,048	775,690	855,838
Trucks	60,940	64,729	68,755	73,030	77,572
Buses	11,303	11,471	11,641	11,814	11,989
Attachable	7,433	8,334	9,344	10,477	11,747
Agricultural	7,612	8,850	10,290	11,964	13,911
Motorcycles	4,227	4,973	5,851	6,883	8,098
Special Transport Equipment	3,090	3,785	4,637	5,680	6,957
Total	672,141	739,352	813,566	895,539	986,111

1 million cars in Tbilisi by 2020!!



Car Volumes – current and forecast

Vehicle Volume, Tbilisi, Georgia
(actual and forecast)



Oil Import

- **\$600** million (seems to low!)
- Annual oil import

** data from a certain news source: needs confirmation



2020 – snapshot **

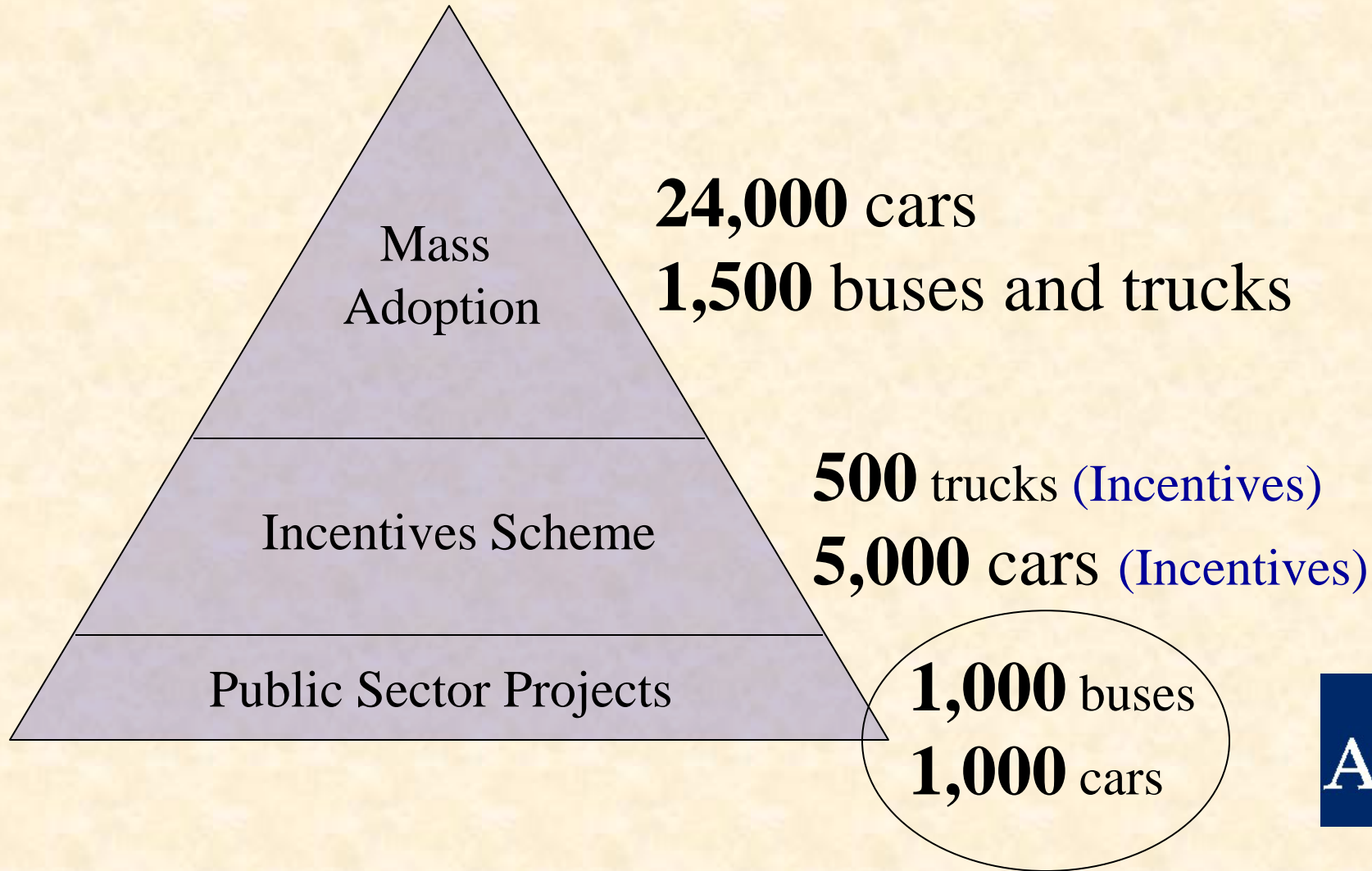
- Business as usual scenario:
 - 1 million gasoline vehicles
 - \$1.0+ billion oil import
- Alternative scenario:
 - worst 5% vehicles replaced by electric
 - At least \$100 million annual fuel savings

Scenario: 5% electric vehicle

• Cars:	30,000	OR	30,000
• Trucks:	3,000		2,000
• Buses:	500		1,000

** (400,000 cars more than 20+ years) **

How to achieve 5%?



Switch to electric car preliminary assumptions

- “A typical car on the road is a 10 year old Mercedes Benz”

(Mercedes C280 from 2006 (\$15,000))

- Electric Car options (average \$37,000)

2016 - Nissan Leaf

2016 - Chevrolet Volt

2015 - BMW i3 BEV

Typical car
A 10 year old Mercedes

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy | Office of Transportation & Air Quality | U.S. ENVIRONMENTAL PROTECTION AGENCY

www.fueleconomy.gov
the official U.S. government source for fuel economy information

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Fuel Economy Energy and Environment Safety Specs

	2006 Mercedes-Benz C280	2016 Nissan Leaf (30 kW-hr battery pack)	2015 BMW i3 BEV	2015 Volkswagen e-Golf
	Gasoline Vehicle	Electric Vehicle	Electric Vehicle	Electric Vehicle
	3.0 L, 6 cyl, Automatic 7-spd	Automatic (A1) MSRP: \$34,200	Automatic (A1) MSRP: \$42,400	Automatic (A1) MSRP: \$33,450 - \$35,445
EPA Fuel Economy 1 gallon of gasoline=33.7 kWh	21 MPG combined city/highway 4.8 gal/100mi	112 MPGe combined city/highway 36 kWh/100 mi	124 MPGe combined city/highway 27 kWh/100 mi	116 MPGe combined city/highway 29 kWh/100 mi
Show electric charging stations near me	 344 miles Total Range	 107 miles Total Range	 81 miles Total Range	 83 miles Total Range
MPG estimates for 2007 and older vehicles have been revised View Original EPA MPG		About All-Electric Cars	About All-Electric Cars	About All-Electric Cars
Unofficial MPG Estimates from Vehicle Owners Learn more about "My MPG" Disclaimer	User MPG estimates are not yet available for this vehicle	User MPG estimates are not yet available for this vehicle	User MPG estimates are not yet available for this vehicle	Average based on 1 vehicle 171.5 MPG View Individual Estimates
You save or spend* Note: The average 2016 vehicle gets 25 MPG	You SPEND \$2,750 more in fuel costs over 5 years compared to the average new vehicle	You SAVE \$2,250 in fuel costs over 5 years compared to the average new vehicle	You SAVE \$2,500 in fuel costs over 5 years compared to the average new vehicle	You SAVE \$2,500 in fuel costs over 5 years compared to the average new vehicle

Some EV options
(medium sized cars)



Move to electric scenario / assumptions

- **30,000** Average km driven each year
- 20.8 miles per gallon (US EPA)
- about 9 km per liter (gasoline: \$1 per liter)
- 8.8 kWh per 100 km (electric car)
- **\$2,500** savings per car per year

- Current payback **9** year

Market Intervention Options

- **\$7,500** subsidy per car less than **6** years
- **free electricity** for 5 years about **7** years
- **bulk discounts** (large procurement) **5.5** years
- **All three combined** less than **4** years

Cost of Market Interventions

	Cost of program in millions			
Number of cars	1,000	2,000	5,000	10,000
\$7,500 subsidy per car	\$7.5	\$15.0	\$37.5	\$75.0
Free electricity for 5 years	\$2.2	\$4.4	\$11.0	\$22.0
	\$9.7	\$19.4	\$48.5	\$97.0

Cost between **\$10 million** to **\$100 million**

\$50 million



Direct Benefits of Market Interventions

(purchase of 1,000 to 5,000 fleet cars)

	Benefits n millions			
Number of cars	1,000	2,000	5,000	10,000
avoided fuel Import per year	\$34	\$68	\$170	\$340

Direct cost of program	\$35	\$70	\$165	\$315
Overall	\$1	\$2	-\$5	-\$25

Infrastructure Investments and benefits

- PPP partnership for charging infrastructure
- Hire purchase schemes
- Leasing of facilities

How to achieve 5%?

