

AVs must be EVs

Joe MacDougald





A Story of Three Cars





1 East

CLEVELAND

America Innovates

...the difference between invention and
...process. Invention is the development of
...and convincing society to adopt it.





ZERO
EMISSIONS

TESLA

TESLA

TESLA

TESLA

TESLA
SUPERCHARGER
STATION

Some News....



Self-Driving-Car Research Has Cost \$16 Billion. What Do We Have to Show for It?

“The point is that it's very expensive to make self-driving a reality, and when it does happen, these companies are going to spend years trying to pay off the research and development that's needed for a robot to chauffeur you around town. If you look at Uber and Lyft right now, their ride-share business plans don't actually produce a profit. Robo-taxis could reduce the cost of each ride in the future.”



Business

House panel to address autonomous vehicles

By **David Shepardson**

Feb. 9, 2020 at 12:01 p.m. EST

A House panel will hold a hearing Tuesday on autonomous vehicles as lawmakers try to hammer out legislation to advance self-driving cars.

An Energy and Commerce subcommittee overseeing automotive issues will hear from officials of trade groups representing automakers and tech companies, as well as safety advocates and a San Francisco transit official.



Learn more
LetsTalkAboutCost.org

PRMA
RESEARCH • PROGRESS • HOPE



Home



Share



8

U.S. Lawmakers Hear Arguments for New Safeguards for Self-Driving Cars

By Reuters

Feb. 11, 2020



WASHINGTON — A U.S. House panel on Tuesday heard from advocates of imposing stricter safeguards for self-driving cars as part of any effort to speed the adoption of the vehicles on U.S. roads.

At the same subcommittee hearing, groups representing automakers and tech companies touted benefits of autonomous vehicles and warned the United States risks falling behind China and other countries without new legal backing.

U.S. lawmakers have been divided for years over what consumer and legal protections should be added to any self-driving legislation. Significant divisions emerged at Tuesday's hearing and officials say the effort faces tough odds to win approval before the end of 2020, even as aides plan to release additional discussion drafts of self-driving legislative proposals.

A Race....

- ““The U.S. has fallen behind, and we will continue to fall behind if we fail to act,” [Representative Cathy McMorris] Rodgers said. “If we fail, this transformative technology will go abroad.”

(<https://www.consumerreports.org/autonomous-driving/congress-debates-autonomous-vehicles-car-safety/>)



...And Caution

- ““Troubling safety incidents, regulatory black holes, and lax oversight threaten to disrupt this critical balance and the future of this technology itself,”[Rep. Frank Pallone, chairman of the House Energy and Commerce Committee], said. “Regulators must have the expertise to understand self-driving technology and not just rely on the assurances of technology companies.”
- (<https://www.consumerreports.org/autonomous-driving/congress-debates-autonomous-vehicles-car-safety/>)



U.S. lets autonomous vehicle bypass human-driver safety rules



- “For the first time, the U.S. government’s highway safety agency has approved a company’s request to deploy a self-driving vehicle that doesn’t meet federal safety standards that apply to cars and trucks driven by humans”.

BUT NO EV REQUIREMENT?

- The National Highway Traffic Safety Administration granted temporary approval for Silicon Valley robotics company Nuro to run low-speed autonomous delivery vehicles that were designed so they can't carry humans.
- Nuro's vehicles won't be required to have side and rear-view mirrors and other safety provisions. Also not on the safety feature list; windshield wipers, steering wheels or brake pedals.



Issues of our Research

- 1. State Structures
- 2. Legal Liability
- 3. Insurance Issues
- 4. Broader Policy Issues



1. State Structures



AV Laws

- Each year, the number of states considering legislation related to autonomous vehicles has gradually increased.
- In 2018, 15 states enacted 18 AV related bills.
- In 2017, 33 states have introduced legislation. In 2016, 20 states introduced legislation.
- Sixteen states introduced legislation in 2015, up from 12 states in 2014, nine states and D.C. in 2013, and six states in 2012.



NCSL

NATIONAL CONFERENCE OF STATE LEGISLATURES

AV Laws

- Since 2012, at least 41 states and D.C. have considered legislation related to autonomous vehicles.
- Twenty-nine states—Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Michigan, Mississippi, Nebraska, New York, Nevada, North Carolina, North Dakota, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Vermont, Washington and Wisconsin—and Washington D.C. have enacted legislation related to autonomous vehicles.



NCSL

NATIONAL CONFERENCE OF STATE LEGISLATURES

IIHS

State	What type of driving automation on public roads does the law/provision permit?	Require an operator to be licensed?	Require an operator to be in the vehicle?	Require liability insurance?
Alabama	deployment — commercial motor vehicles only	no	no	yes; \$2,000,000
Arizona	deployment	yes	depends on level of vehicle automation ¹	yes
Arkansas	testing ²	not addressed	depends on level of vehicle automation ³	yes
California	deployment	not addressed	no	yes; \$5,000,000
Colorado	deployment	no	not addressed	no
Connecticut	testing	yes	yes	yes; \$5,000,000
District of Columbia	deployment	yes	yes	no
Florida	deployment	depends on level of vehicle automation ⁴	depends on level of vehicle automation ⁵	yes
Georgia	deployment	depends on level of vehicle automation ⁶	depends on level of vehicle automation ⁷	yes ⁸
Hawaii	testing	not addressed	not addressed	not addressed
Illinois	testing	yes	yes	yes
Iowa	deployment	yes	depends on level of vehicle automation ⁹	yes
Louisiana	deployment — commercial motor vehicles only	no	no	yes; \$2,000,000
Maine	testing	not addressed	not addressed	yes
Massachusetts	testing	no	yes	no
Michigan	depends on vehicle ¹⁰	yes	no	yes
Nebraska	deployment	depends on level of vehicle automation ¹¹	depends on level of vehicle automation ¹²	yes
Nevada	deployment	depends on level of vehicle automation ¹³	depends on level of vehicle automation ¹⁴	yes ¹⁵
New Hampshire	deployment	yes ¹⁶	yes, except for testing ¹⁷	yes; \$5,000,000 ¹⁸

State Authorization

- No Federal Response of note – yet!
- 30 States have some regulations or executive orders.



Connecticut

- Connecticut, for instance, has a law calling for a study committee on AVs.



Arizona

- Positive Law encouraging Avs.



Other States

- Prohibit towns or cities from passing laws interfering with AVs. .



Michigan

- Senate Bill 995 – Aves are allowed on the roads!
- Other states, allowing in specific area.



Liability





Popular

Latest

The Atlantic

Sign In

Subscribe

TECHNOLOGY

Can You Sue a Robocar?

A pedestrian killed by a self-driving Uber in Tempe shows that the legal implications of autonomous cars are as important, if not more so, than the technology.

IAN BOGOST MARCH 20, 2018



 Confluence

One place
to create,
collaborate,
and connect

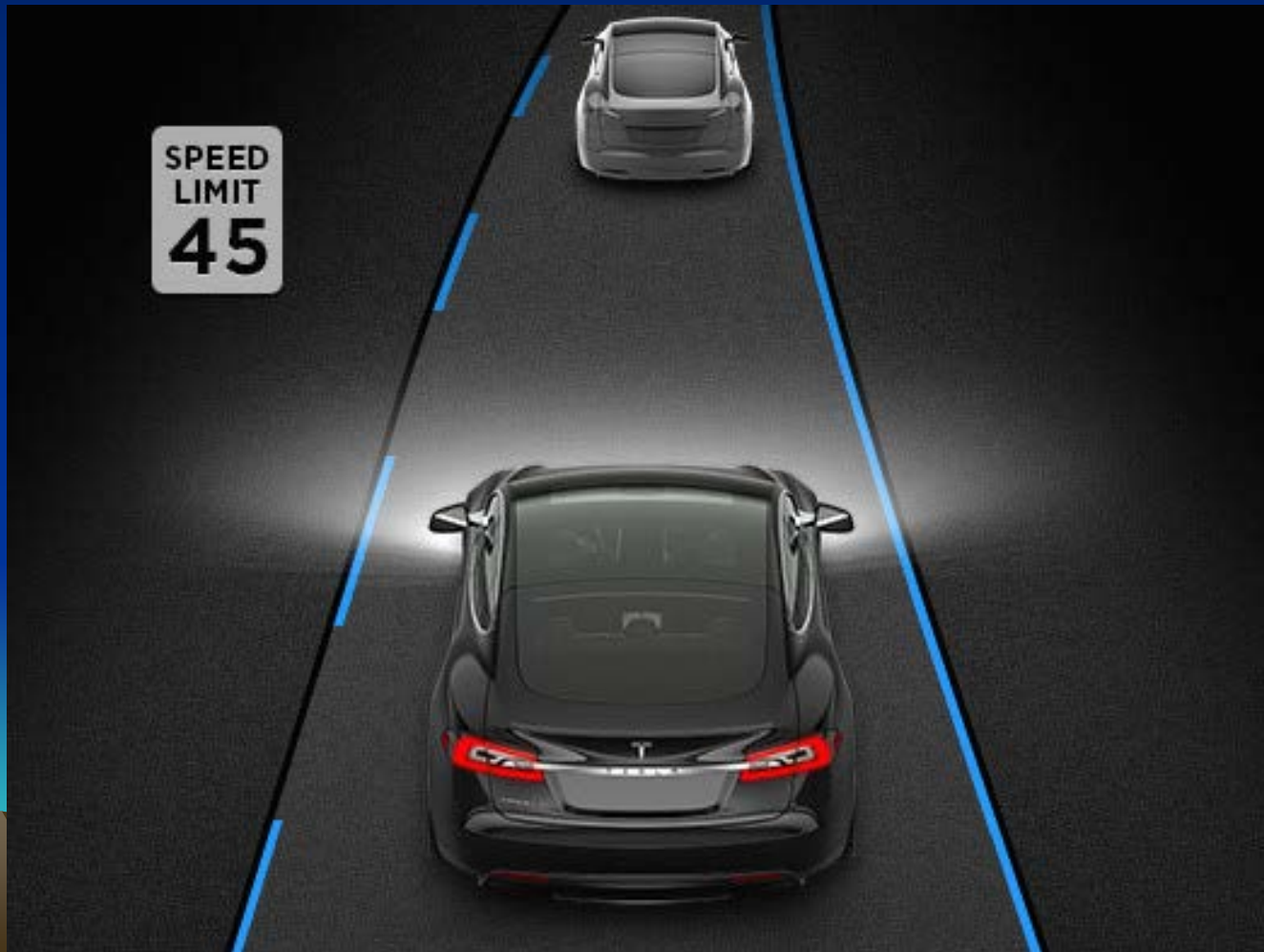
Municipal Liability

- Municipalities will gain a lot from autonomous vehicles in terms of new planning options. But what are their liabilities?



Simple Question

What if the lines are mis-painted?



Other assumptions

- New forms of vehicles as electrification spreads?
- Bikes – Motorcycles – Electrocified bikes –
New Truck Designs



Justice Issues

- Who will be driving the non-autonomous, less safe cars?
- Who will be in the cars around you?
- Eventually, people of reduced means.



Traffic Pattern Innovation

- Connected Vehicles – No Stoplights?
- Faster speeds in town.
- Self-parking – Land Use Issue?



3. Insurance Issues



Insurance

- A recent meeting w/insurance executives confirmed an industry report – insurance premium drop due to autonomous vehicles:

80%!



Tesla is building up in-house insurance as Model S tops list of most expensive cars to insure

Fred Lambert - May. 29th 2018 8:37 am ET [🐦 @FredericLambert](#)

Insure MyTesla



Tesla = iPhone?

- Tesla and Volvo have separately discussed providing insurance as part of the “service” of owning the car. Absorbing all liability.
- Does this create disparity in an accident?
- Will connected cars always have a clearer picture of the accident?



Tesla Insurance Available NOW!

Tesla Insurance

Tesla Insurance is a competitively priced insurance offering designed to provide Tesla vehicle owners with up to 20% lower rates, and in some cases, as much as 30%. Tesla Insurance offers comprehensive coverage and claims management to support Tesla owners in California and will expand to additional U.S. states in the future. Tesla Insurance offers a convenient monthly payment with no hidden fees or charges. Customers may cancel or change their Tesla Insurance policy at any time via the call center at [1-844-34-tesla](tel:1-844-34-tesla).

If you are a Tesla vehicle owner in California, you can now **purchase a policy in as little as one minute.**

If you are purchasing a new vehicle in California, request a quote before delivery once an assigned VIN is available in your **Tesla Account.**



Roundtable

- NAIC Roundtable.
- Issues of Education.
- Municipal Education.



4. Broader Policy Issues



Other Group: Policy

- Traffic Policy
- Geography
- Psychology
- Law
- Insurance



How to Think of Policies?

- **Inside the car:** Expectations between the driver and the manufacturer.
- **Around the Car:** Expectations between the car and the world around.
- **Away from the Car:** Policies driven to work through liability and management.



Inside the Car



MAX
65

61
mph



ESPN Radio



Ron Magill, Zoo Miami
The Dan LeBarard Show - OTHER

 Hold Steering Wheel

10:11 AM P R N D

 194 mi 71°F

- The Car “Assumes a world”.
- It models, but those models are based on assumptions as to what it “sees”.



Who is in charge?

- The NHTSA is doing individualized investigations of Tesla autopilot accidents.
- Who is responsible for the accident?
- What is your responsibility for running autopilot.



Open issues

- 1. Training. Personal experience, minimal despite manual having limitations.
- 2. Operation on non-divided highways.
- 3. More per-clearance of the road?



Psychological Factors

- Some studies seem to imply that there is a fixed time limit for humans to react from dis-engaged to engaged mode. Studies are from manufacturing floor supervision. Perhaps as long as 6 seconds – assuming attention.



Finally

AVs must be EVs



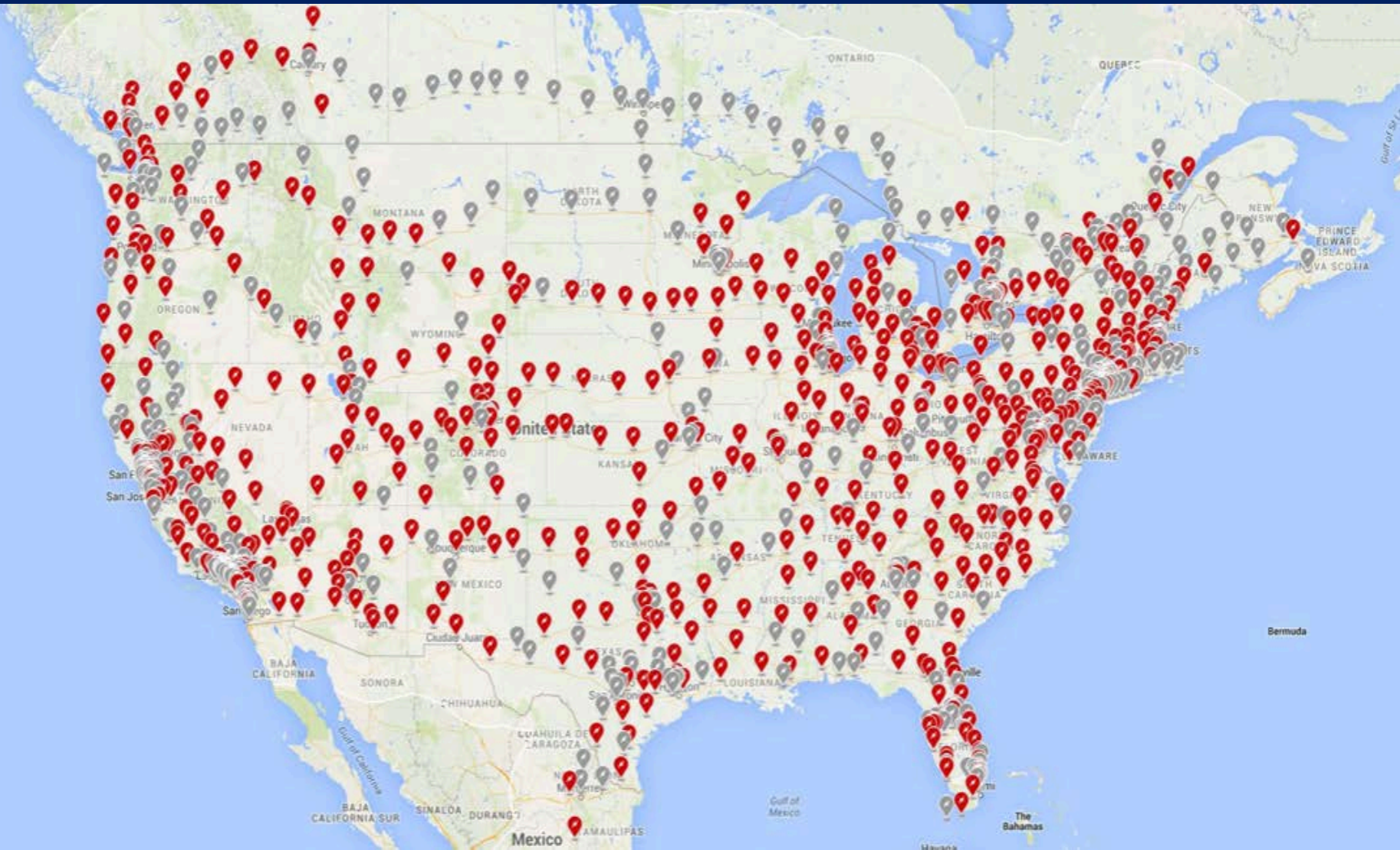
From Tesla.com

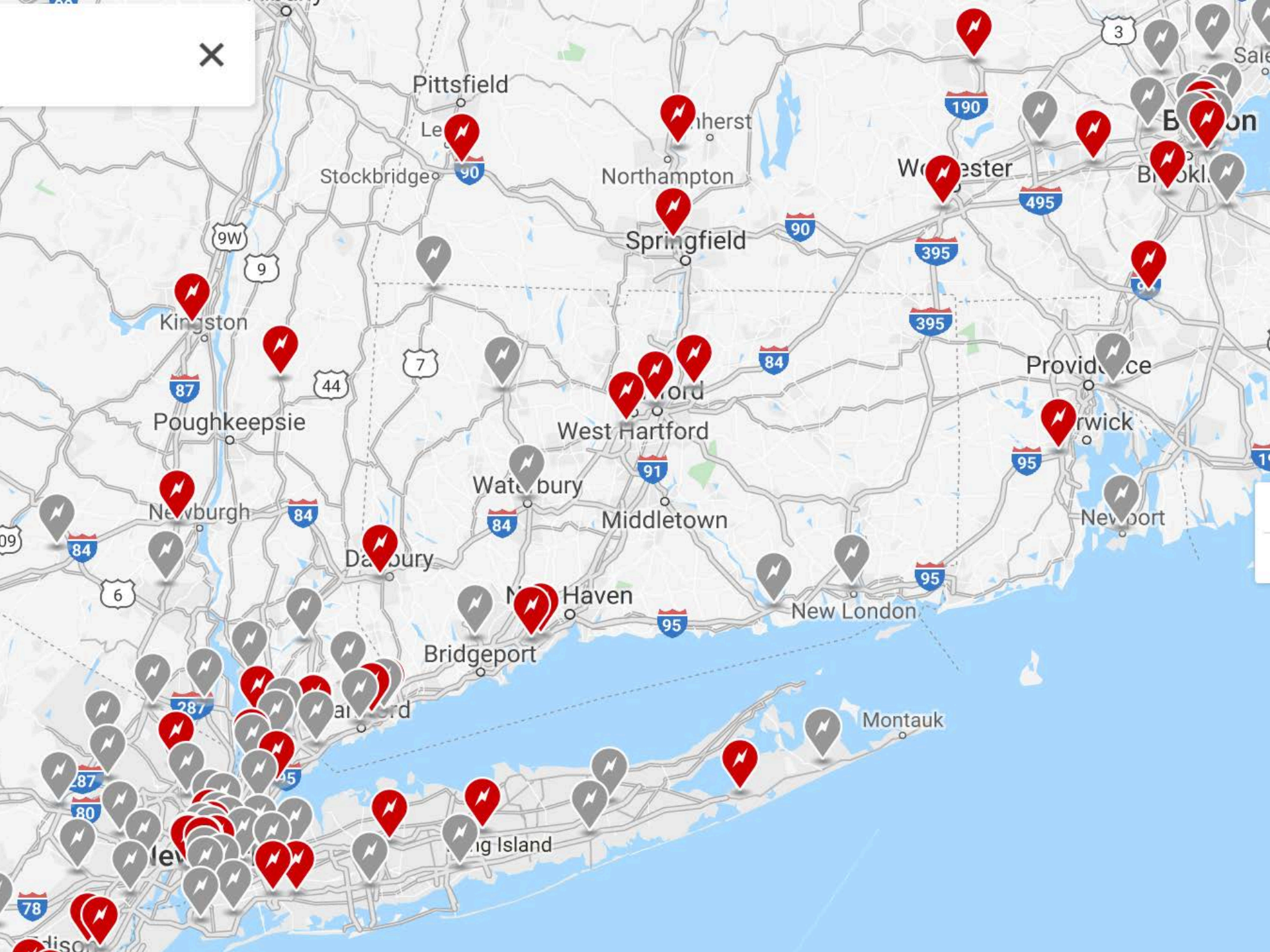
All states	\$7,500 income tax credit (subject to phase out schedule above)
Arizona	Reduced Vehicle License Tax, Carpool lane access and reduced rates for electric vehicle charging
California	\$2,500 rebate (based on income eligibility)
Connecticut	\$3,000 rebate for new vehicles with a base price under \$60,000
Colorado	\$5,000 tax credit for purchase of a new vehicle \$2,500 tax credit for lease of a new vehicle
Delaware	\$1,000 rebate for new vehicles with a base price over \$60,000 \$3,500 rebate for new vehicles with a base price under \$60,000
Hawaii	Carpool lane access and reduced rates for electric vehicle charging
Louisiana	\$2,500 income tax credit
Maryland	\$3,000 Excise Tax Credit for new vehicles with a total price under \$60,000 \$700 rebate on wall connectors and installation
Massachusetts	\$1,000 rebate for new vehicles with a base price over \$60,000 \$2,500 rebate for new vehicles with a base price under \$60,000
Nevada	Reduced rates for electric vehicle charging
New Jersey	Sales tax exempt
New York	\$500 rebate for new vehicles with a base price over \$60,000 \$2,000 rebate for new vehicles with a base price under \$60,000

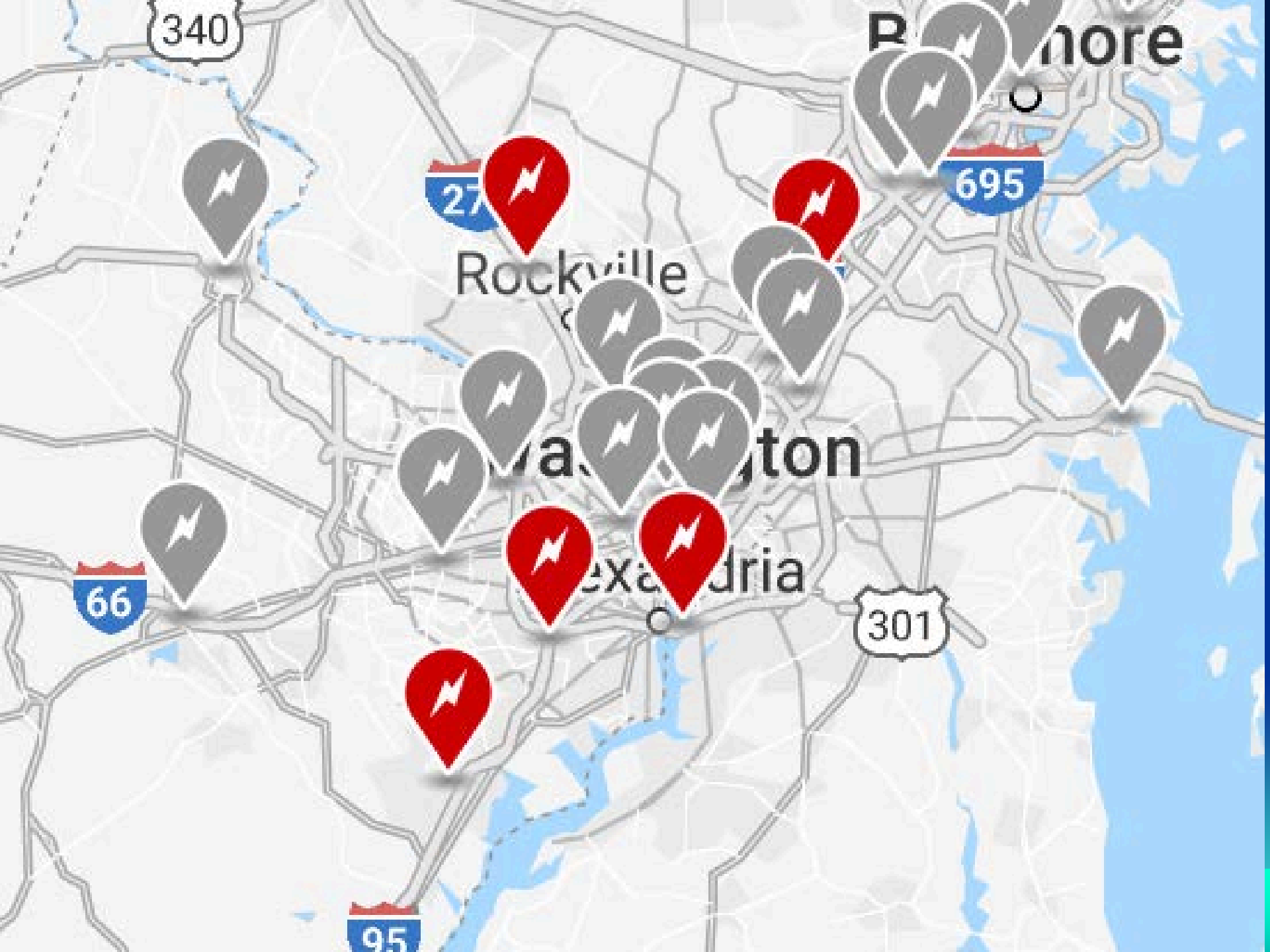
But What About Charging
Networks?

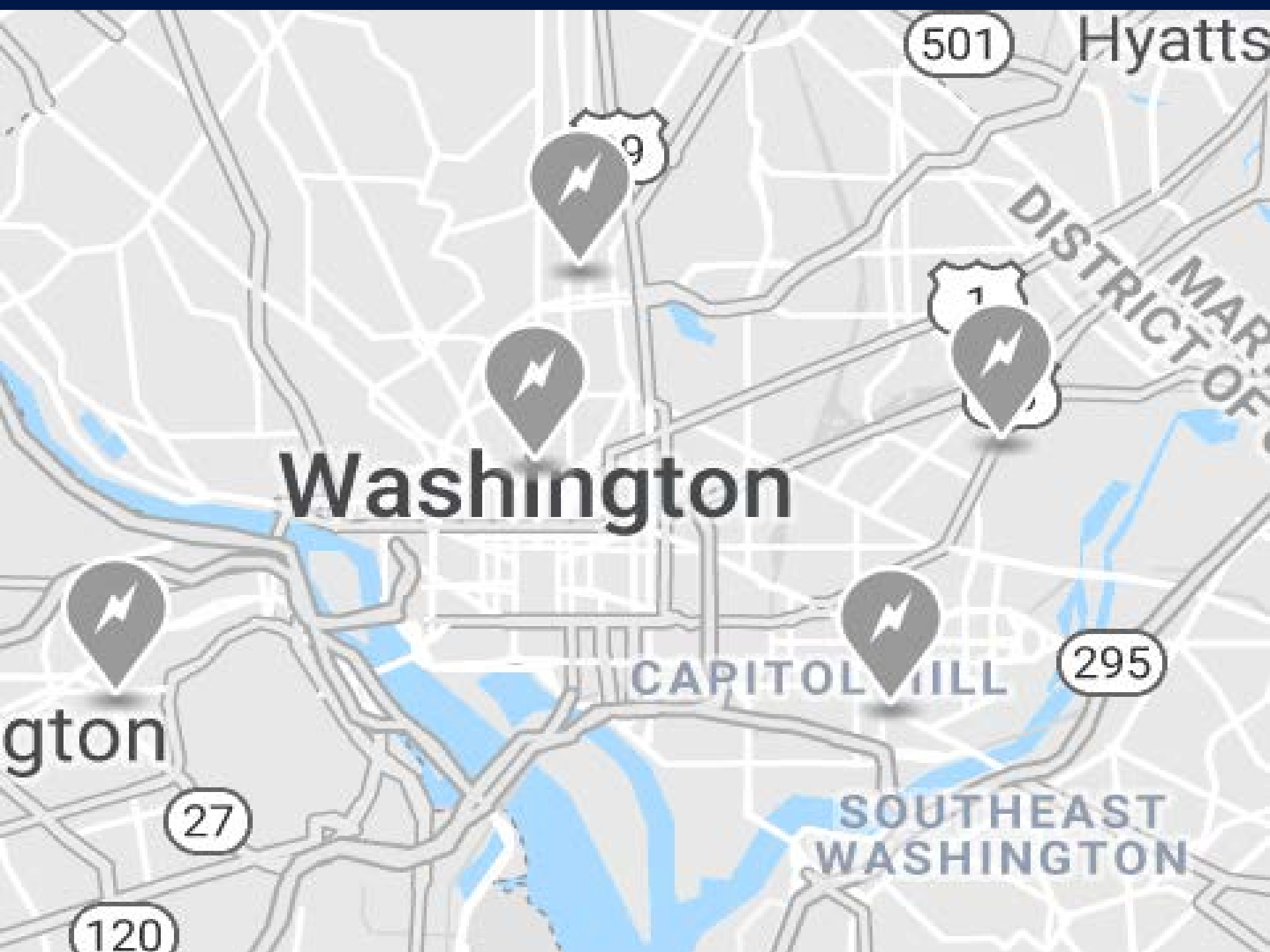


Tesla Network - USA









501

Hyatts

9

1

DISTRICT OF MARYLAND

Washington

CAPITOL HILL

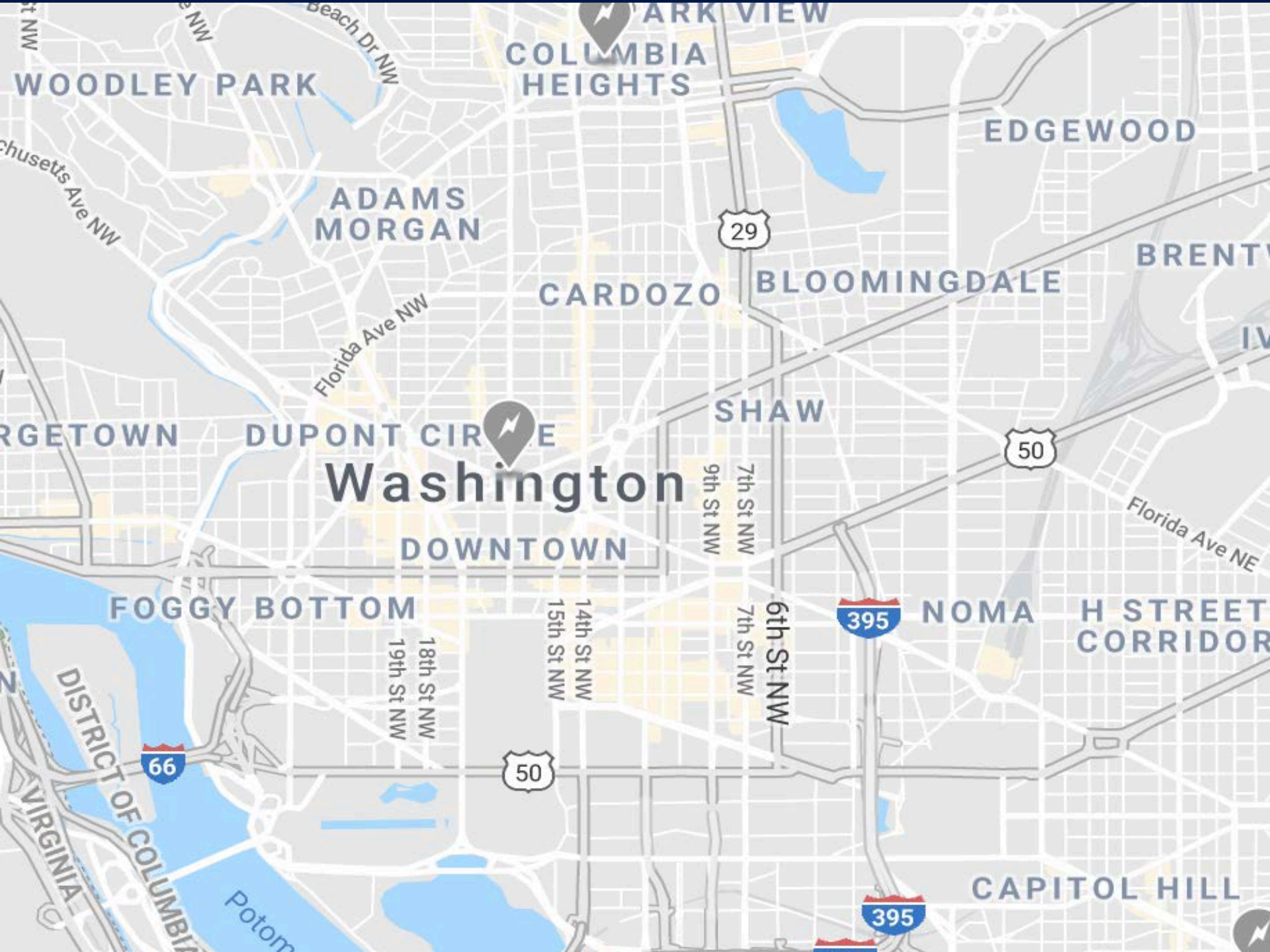
295

gton

27

120

SOUTHEAST WASHINGTON



Washington

DOWNTOWN

WOODLEY PARK

ADAMS MORGAN

COLUMBIA HEIGHTS

EDGEWOOD

CARDOZO

BLOOMINGDALE

BRENTWOOD

DUPONT CIRCLE

SHAW

FOGGY BOTTOM

NOMA

H STREET CORRIDOR

CAPITOL HILL

DISTRICT OF COLUMBIA

Potomac

VIRGINIA

11 NW

12 NW

Beach Dr NW

Massachusetts Ave NW

Florida Ave NW

29

50

Florida Ave NE

9th St NW

7th St NW

7th St NW

6th St NW

15th St NW

14th St NW

19th St NW

18th St NW

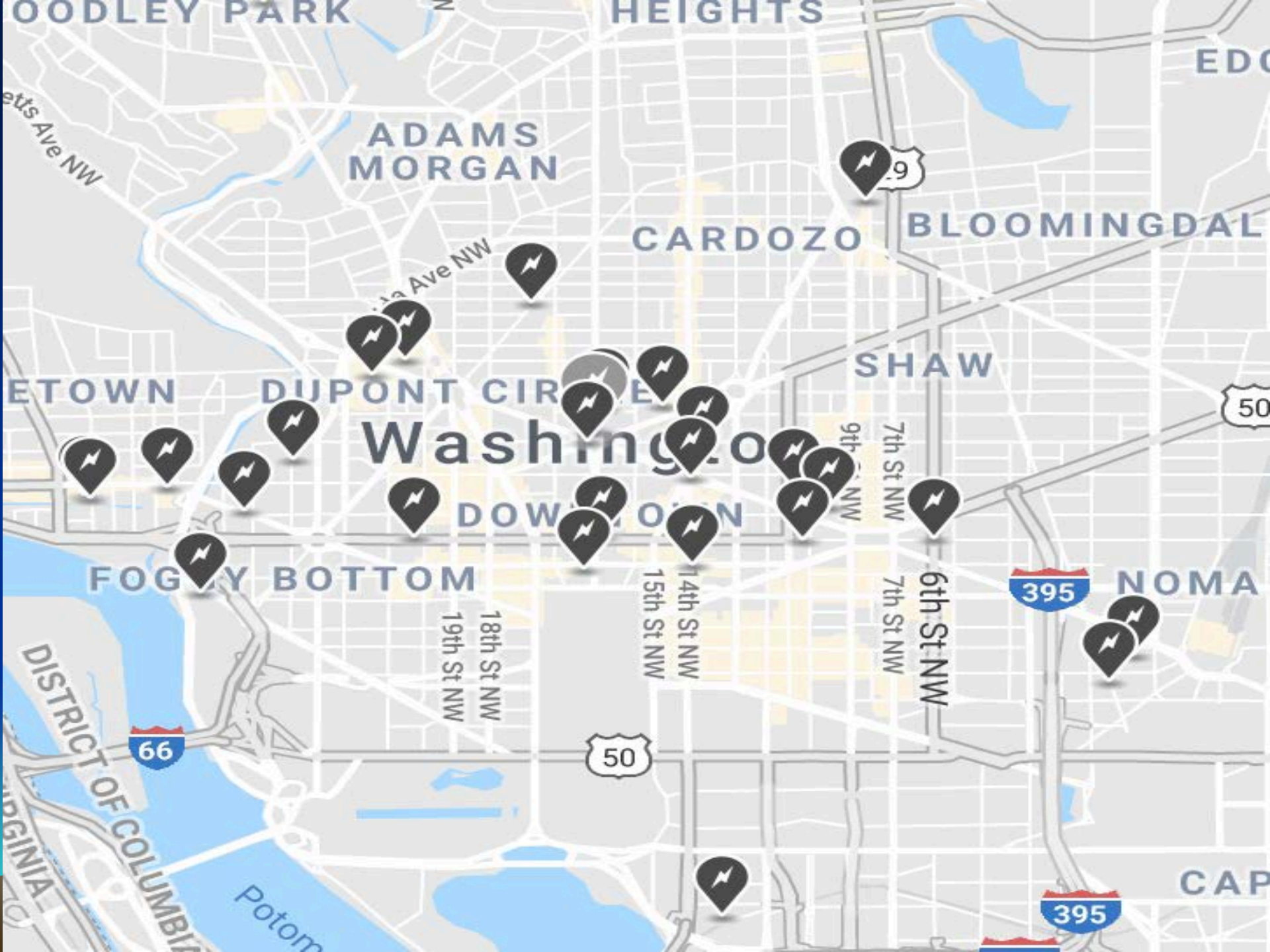
50

395

395

66





ADAMS MORGAN

CARDZO

BLOOMINGDAL

SHAW

DUPONT CIRCLE

Washington

DOWNTOWN

FOGY BOTTOM

NOMA

66

50

395

395

DISTRICT OF COLUMBIA

Potomac

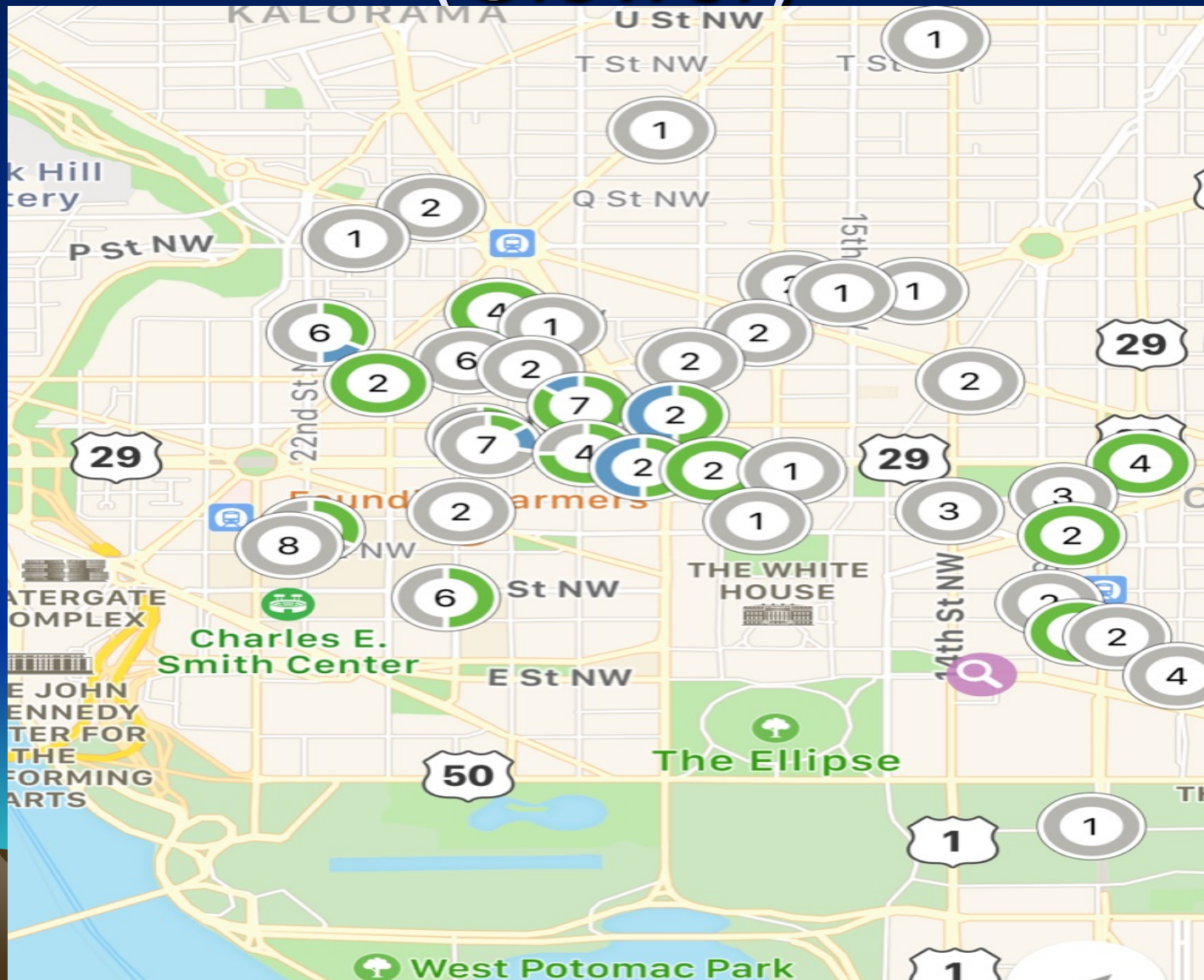
CAP

18th St NW
19th St NW

14th St NW
15th St NW

9th St NW
7th St NW
7th St NW
6th St NW

Charge Point – Same Area! (Slower)



Ex. Chargepoint.com

- Aggregating Private Networks – encouraged by groups like Chargepoint.
- 21 States have some form of state program.

The Chargepoint logo is displayed on a white rectangular background. The word "chargepoint" is written in a lowercase, sans-serif font. The "charge" portion is in orange, and the "point" portion is in a greyish-blue. A registered trademark symbol (®) is located at the end of the word. To the left of the white box, there is a stylized graphic of brown mountains against a blue sky.

State Incentives: Charging Stations (SliChargepoint)

- California: Alameda Municipal Power:
- up to \$500 for a ChargePoint Home.
- \$15/month utility bill rebate for agreeing to charge overnight only.

Texas

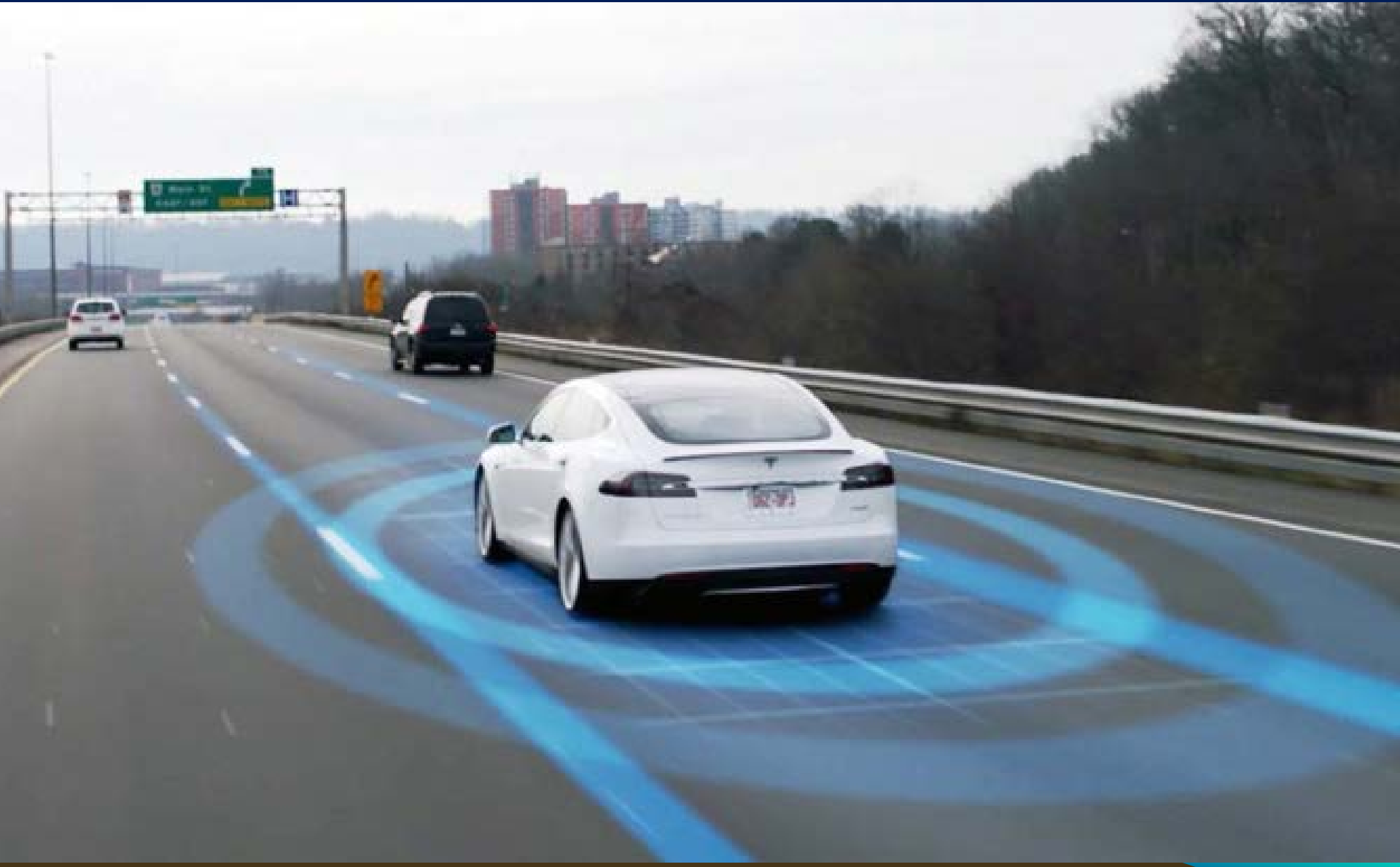
- [Austin Energy](#) : rebate of 50% of the purchase and installation cost of a ChargePoint Home station. The maximum rebate amount is \$1,200 for Wi-Fi-enabled charging stations.

One Federal Program Exists

- It is a 2.8 Billion dollar program to expand the charging networks.



Around the Car

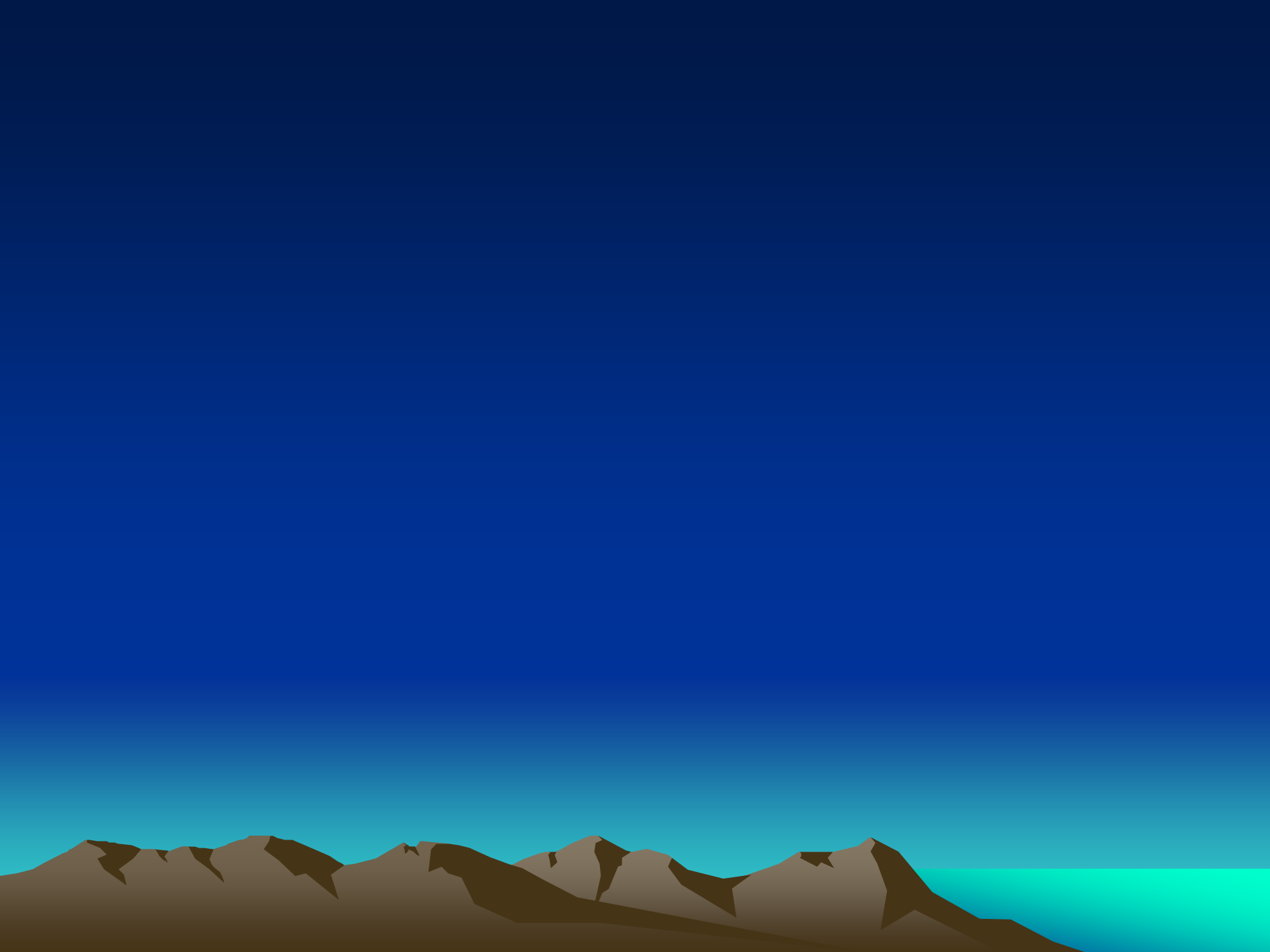


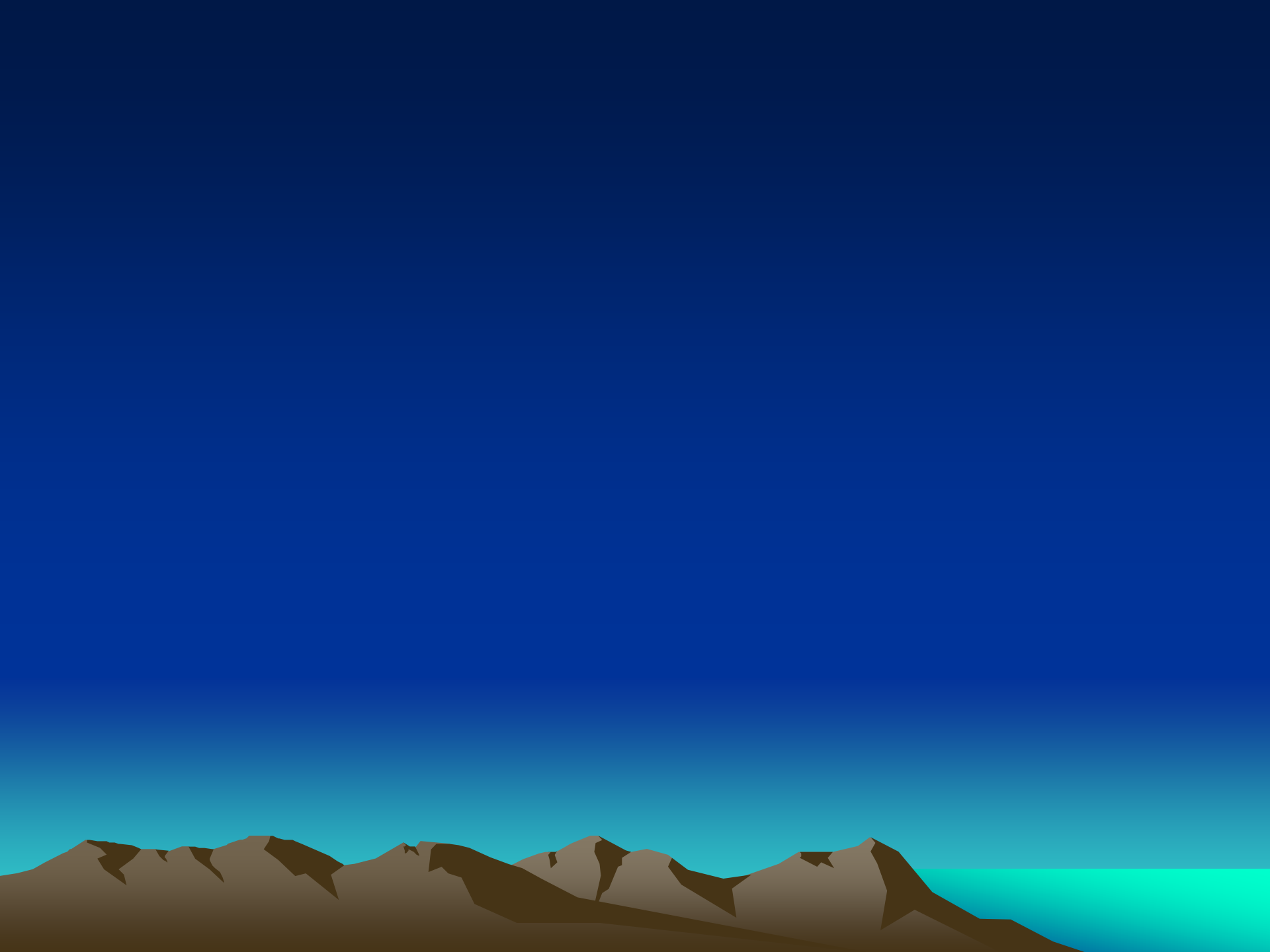
What are the issues
surrounding these new form of
vehicles?



Questions







First Car : EV 1





1 East

America Innovates

CLEVELAND
THE CITY OF INNOVATION

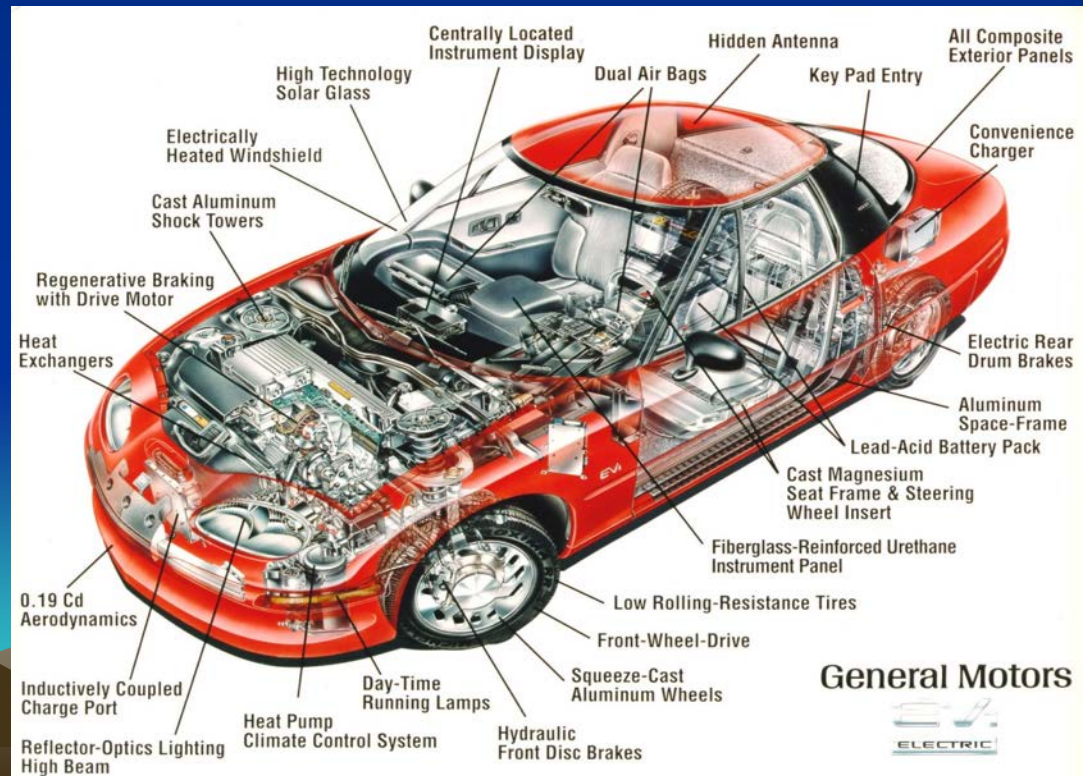
...demonstrated the difference between invention and
...process. Invention is the development of a new
...and convincing society to adopt it.

In the USA, cars have two sources of emissions regulation. The Federal Government and California.



State Regs can Move Industry

- California created a Zero Emmissions Vehicle Standard.
- GM makes EV1
- 1996-1999
- ZEV Change
- Revived?!



Today

- Car incentives for electric vehicles continue - \$ 7,500 up to 200,000 vehicles.
- State incentives continue.
- Note: From Tesla! Companies very savvy.

Federal Tax Credit	For Vehicles Delivered
\$7,500	On or before December 31, 2018
\$3,750	January 1 to June 30, 2019
\$1,875	July 1 to December 31, 2019



1974 412 4-Door Sedan

History of Defeat Devices

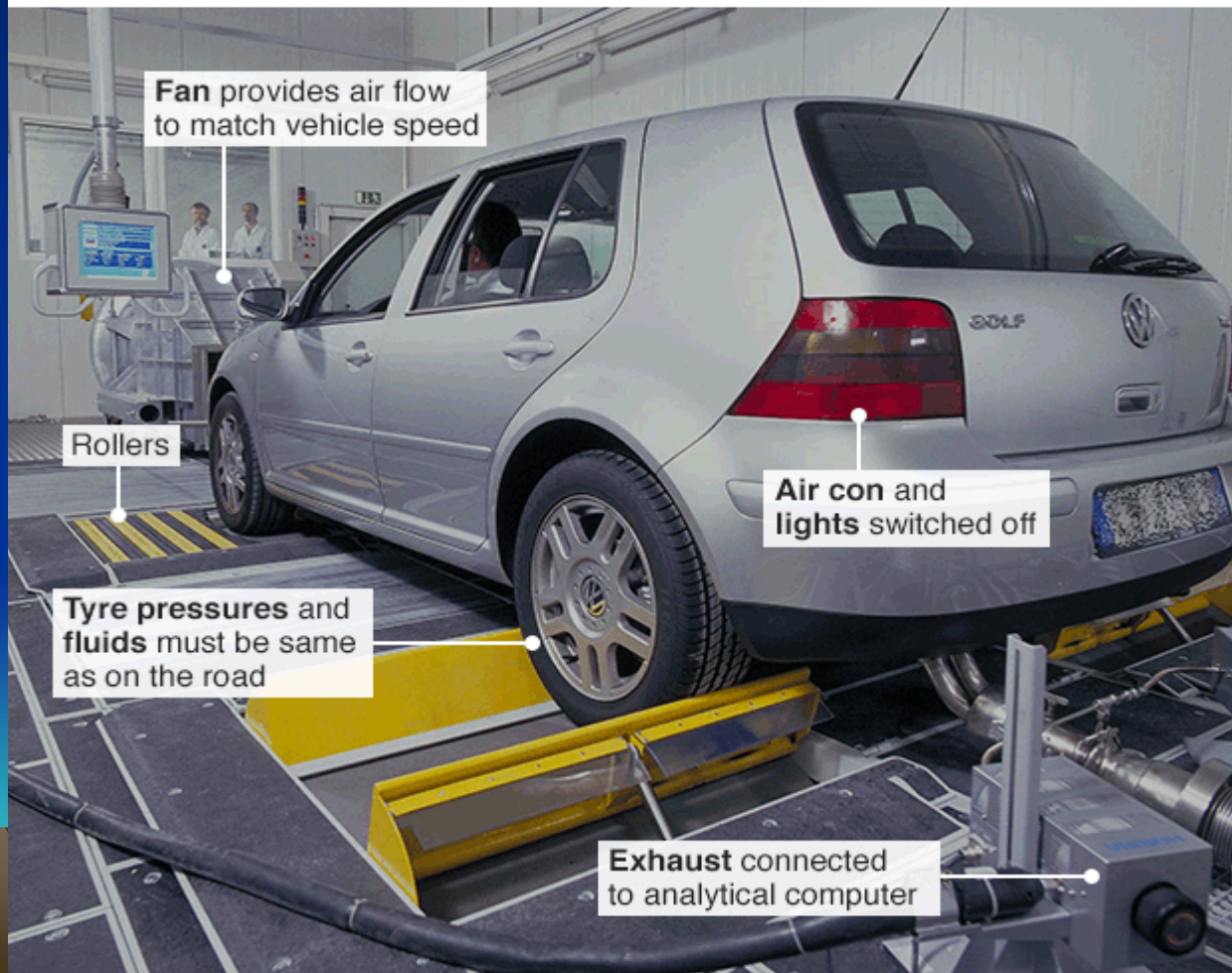
- 1974: VW !! (Settled – WSJ)
- 1991: GM using computer chip.
- 1998: Diesel industry.
- Now - VW



Emissions Testing

How European emissions testing works

Test temperature Typically 25 degrees Celsius (can be between 20-30 degs)



Real World Testing



Not New! California in 1960s

(www.kcet.org)



Defeat Device Cars

40 CFR 89.107

- § 89.107 Defeat devices.
- **(a)** An engine may not be equipped with a defeat device.
- **(b)** For purposes of this section, “defeat device” means any device, system, or element of design which senses operation outside normal emission test conditions and reduces emission control effectiveness.....



VW Settlement

- Includes \$ 2 Billion for an electric vehicle charger to the Federal Government.
- \$800 million for work in California.
- They have formed a company Electrify America, just for this purpose.



Electrify America

“Over a ten year period ending in 2027, Electrify America will invest \$2 billion in Zero Emission Vehicle (ZEV) infrastructure and education programs in the United States.”



Electrify America

“Of this \$2 billion, \$1.2 billion will be invested nationwide (in states other than California), while \$800 million will be invested in California, the largest single ZEV market in the world.”





Seattle

Portland

Sacramento

San Francisco

San Jose

Fresno

Los Angeles

San Diego

Denver

Chicago

Houston

Miami

Boston

New York

Philadelphia

Washington

Raleigh



ZERO
EMISSIONS

TESLA

TESLA

TESLA

TESLA

TESLA
SUPERCHARGER