Energy Exchange℠

Be Efficient And Resilient

U.S. Department of Energy

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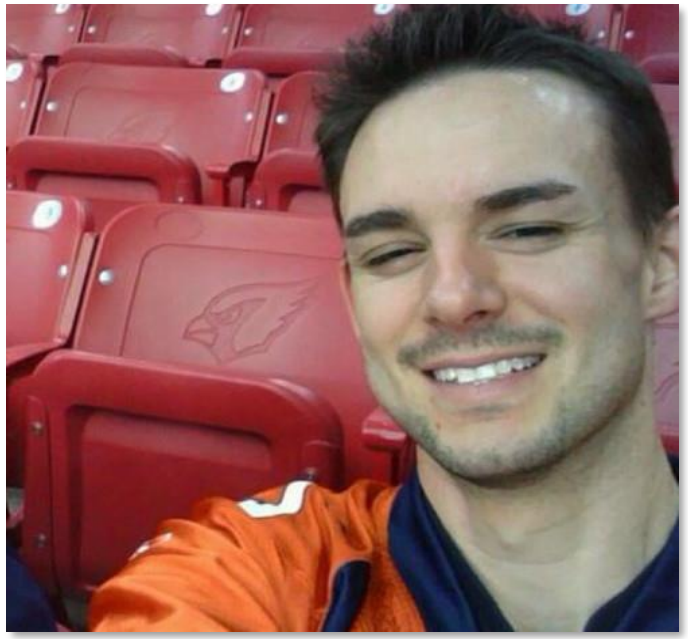


FAST: Using Federal Fleet Data for Decision-Making

New Ways of Using Vehicle-Level Data

Tim Raczek · Ron Stewart

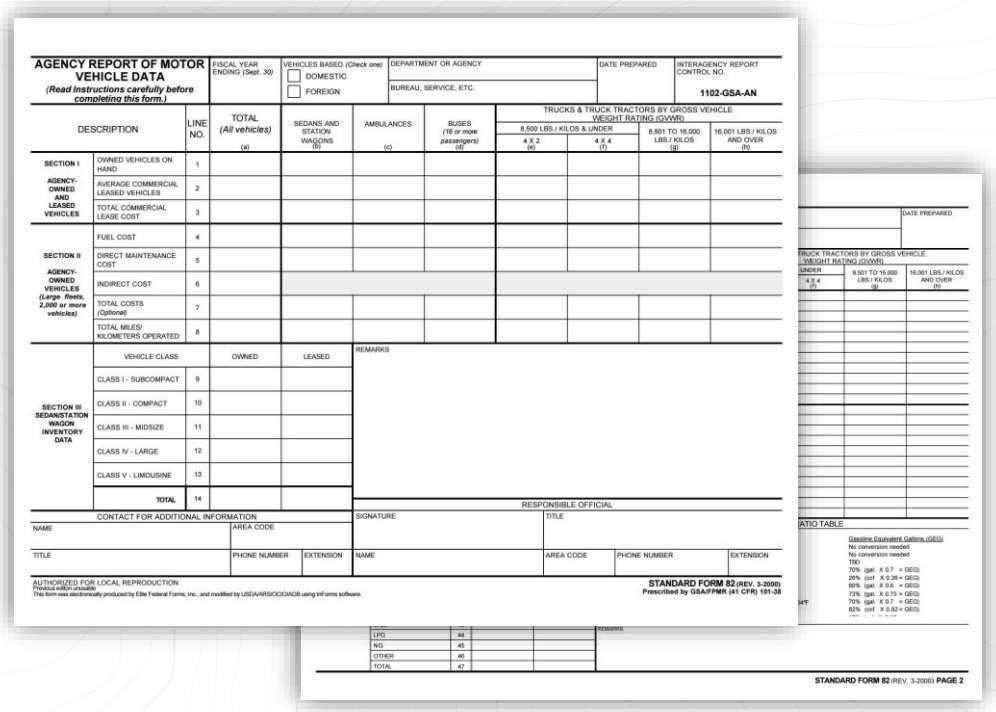
Idaho National Laboratory

We'll cover…

- A bit of background on federal vehicle fleet data
  - What we have and how we got here
- What can we do with this data?
  - A quick look at the federal vehicle fleet
- Fleet decision-making
  - Three examples of how the data can be used

Federal Fleet Data: The Early Years

- Earliest version of FAST
  - Based on GSA Standard Form 82
  - Location: foreign vs domestic
- FY 2003-2016 (ish)
  - Foreign vehicles
  - Domestic vehicles by state
- FY 2006-present
  - EPAct 2005 Section 701 waiver requests with lat+lon or street+city+state+ZIP



AGENCY REPORT OF MOTOR VEHICLE DATA
(Read Instructions carefully before completing this form.)

FISCAL YEAR ENDING (Sept. 30)

VEHICLES BASED (Check one) ☐ DOMESTIC ☐ FOREIGN

DEPARTMENT OR AGENCY

BUREAU, SERVICE, ETC.

DATE PREPARED

INTERAGENCY REPORT CONTROL NO.

1102-GSA-AN

DESCRIPTION		LINE NO.	TOTAL (All vehicles) (a)	SEDANS AND STATION WAGONS (b)	AMBULANCES (c)	BUSES (16 or more passengers) (d)	TRUCKS & TRUCK TRACTORS BY GROSS VEHICLE WEIGHT RATING (GVWR) 8,500 LBS / KILOS & UNDER 4 X 2 (e)	8,500 LBS / KILOS & UNDER 4 X 4 (f)	8,501 TO 16,000 LBS./ KILOS (g)	16,001 LBS / KILOS AND OVER (h)
SECTION I AGENCY-OWNED AND LEASED VEHICLES	OWNED VEHICLES ON HAND	1								
	AVERAGE COMMERCIAL LEASED VEHICLES	2								
	TOTAL COMMERCIAL LEASE COST	3								
SECTION II AGENCY-OWNED VEHICLES (Large fleets, 2,000 or more vehicles)	FUEL COST	4								
	DIRECT MAINTENANCE COST	5								
	INDIRECT COST	6								
	TOTAL COSTS (Optional)	7								
	TOTAL MILES/ KILOMETERS OPERATED	8								

SECTION III SEDAN/STATION WAGON INVENTORY DATA	VEHICLE CLASS	LINE NO.	OWNED	LEASED
	CLASS I - SUBCOMPACT	9		
	CLASS II - COMPACT	10		
	CLASS III - MIDSIZE	11		
	CLASS IV - LARGE	12		
	CLASS V - LIMOUSINE	13		
	TOTAL	14		

REMARKS

CONTACT FOR ADDITIONAL INFORMATION
NAME | AREA CODE | PHONE NUMBER | EXTENSION
TITLE

RESPONSIBLE OFFICIAL
SIGNATURE | TITLE | NAME | AREA CODE | PHONE NUMBER | EXTENSION

AUTHORIZED FOR LOCAL REPRODUCTION
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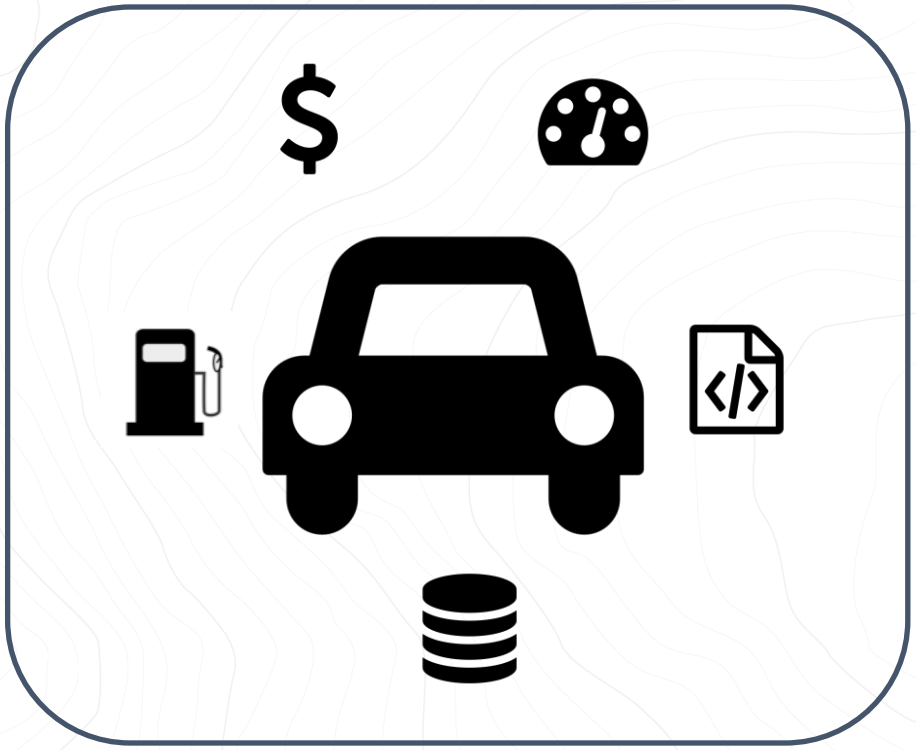
STANDARD FORM 82 (REV. 3-2000)
Prescribed by GSA/FPMR (41 CFR) 101-38

STANDARD FORM 82 (REV. 3-2000) PAGE 2

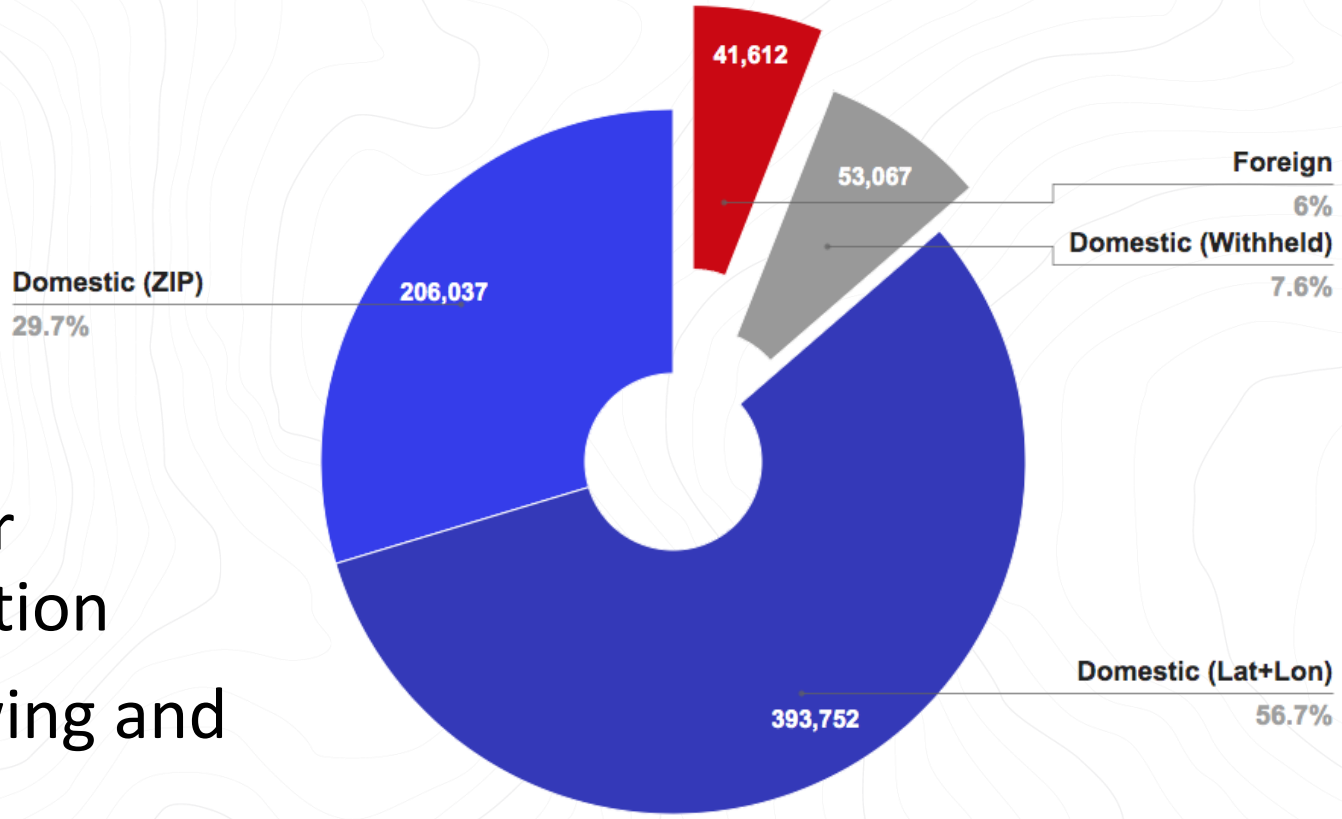
Federal Fleet Data: Per-Vehicle Information

- FY 2018 (and future)
  - All federal agencies submit per-vehicle data
- Every vehicle reported with…
  - Vehicle attributes
  - Ownership, acquisition, disposal data
  - Annual cost data and miles travelled
  - Fuel consumption data



Per-Vehicle Information: Location

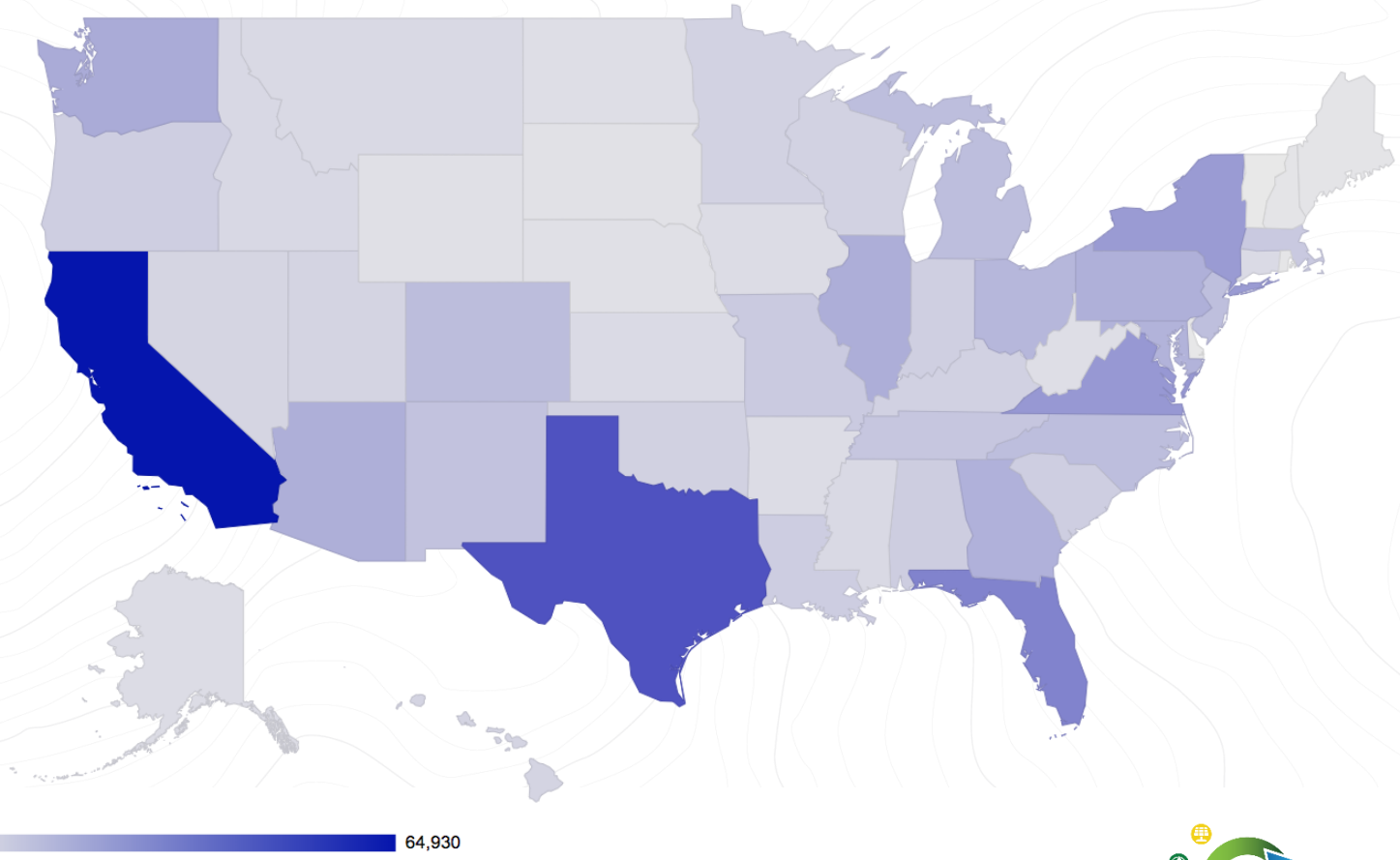
- All vehicles have location
  - Foreign
  - Domestic: Withheld
  - Domestic: Lat+Lon
  - Domestic: ZIP
- We post-process dataset for consistent location information
- Opens up new ways of viewing and analyzing fleet data



Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet Vehicle Inventory

State	Inventory
California	64,930
Texas	43,605
Florida	29,423
Virginia	23,269
New York	22,464

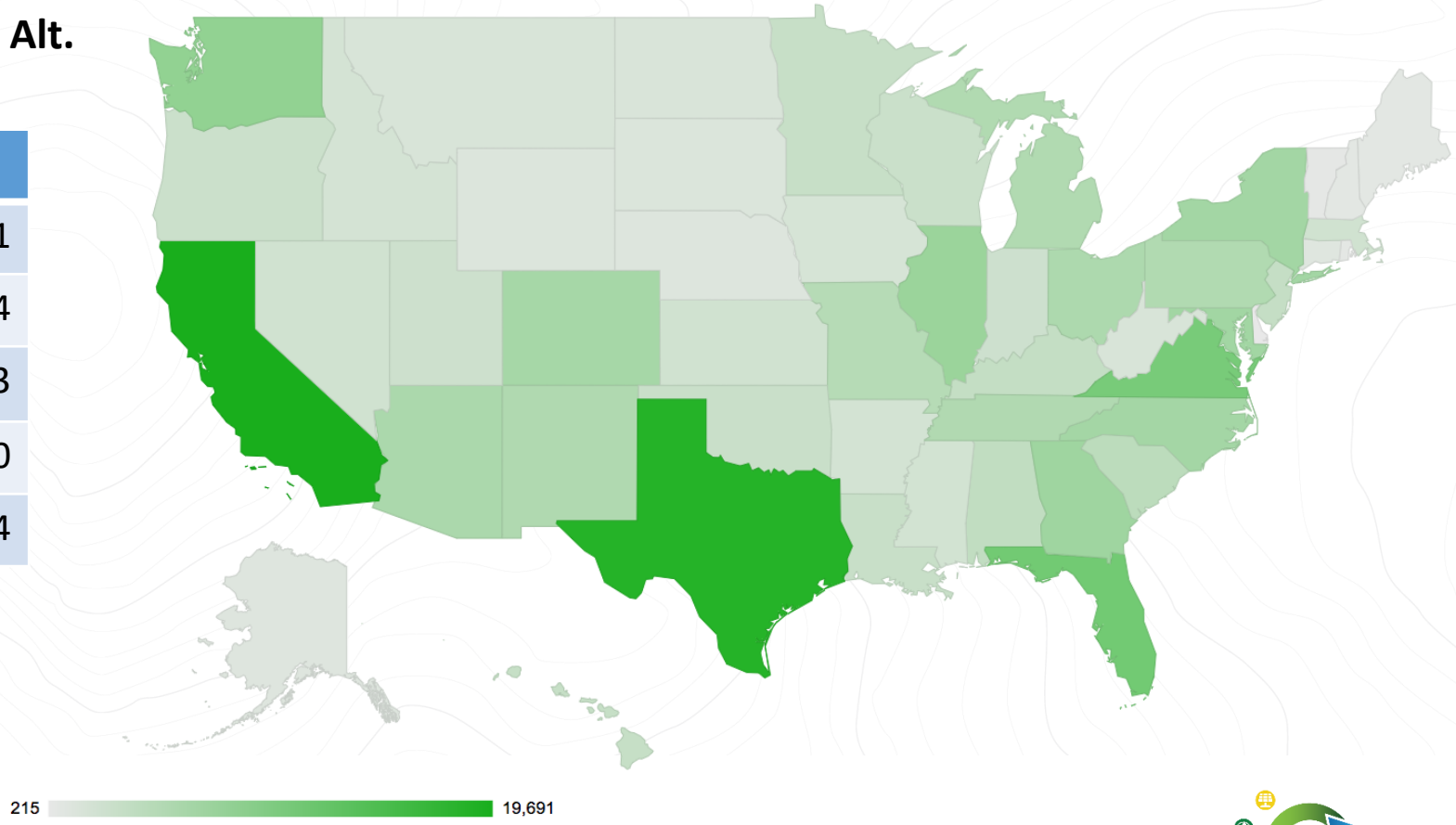


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet Alt. Fuel Vehicle (AFV) Inventory

State	AFV Inventory
California	19,691
Texas	17,794
Florida	10,363
Virginia	9,900
Washington	7,584

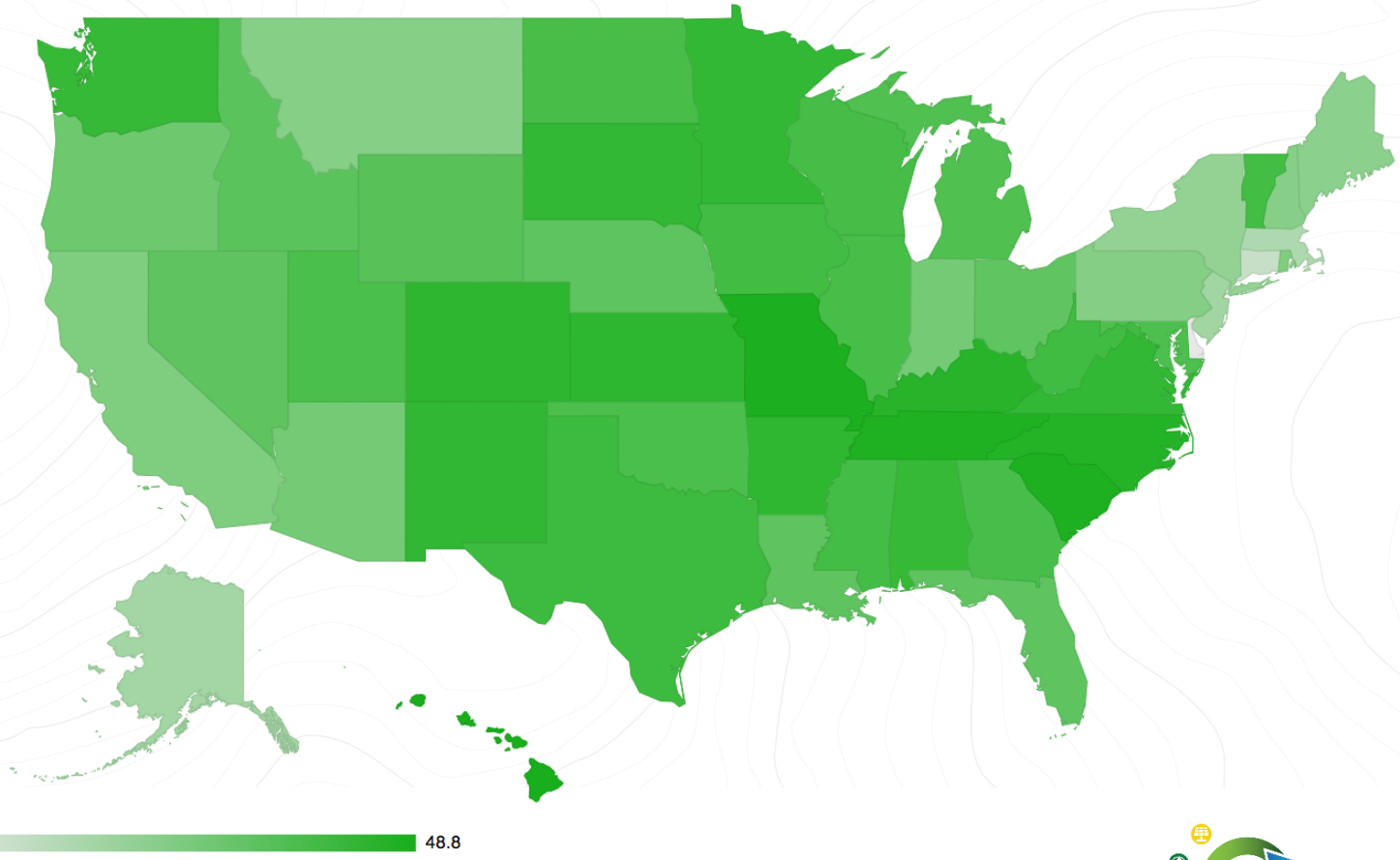


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet % Alt. Fuel Vehicle (AFV) Inventory

State	% AFV Inventory
Hawaii	48.8 %
Missouri	47.8 %
South Carolina	47.3 %
Dist. of Columbia	47.1 %
Tennessee	46.7 %

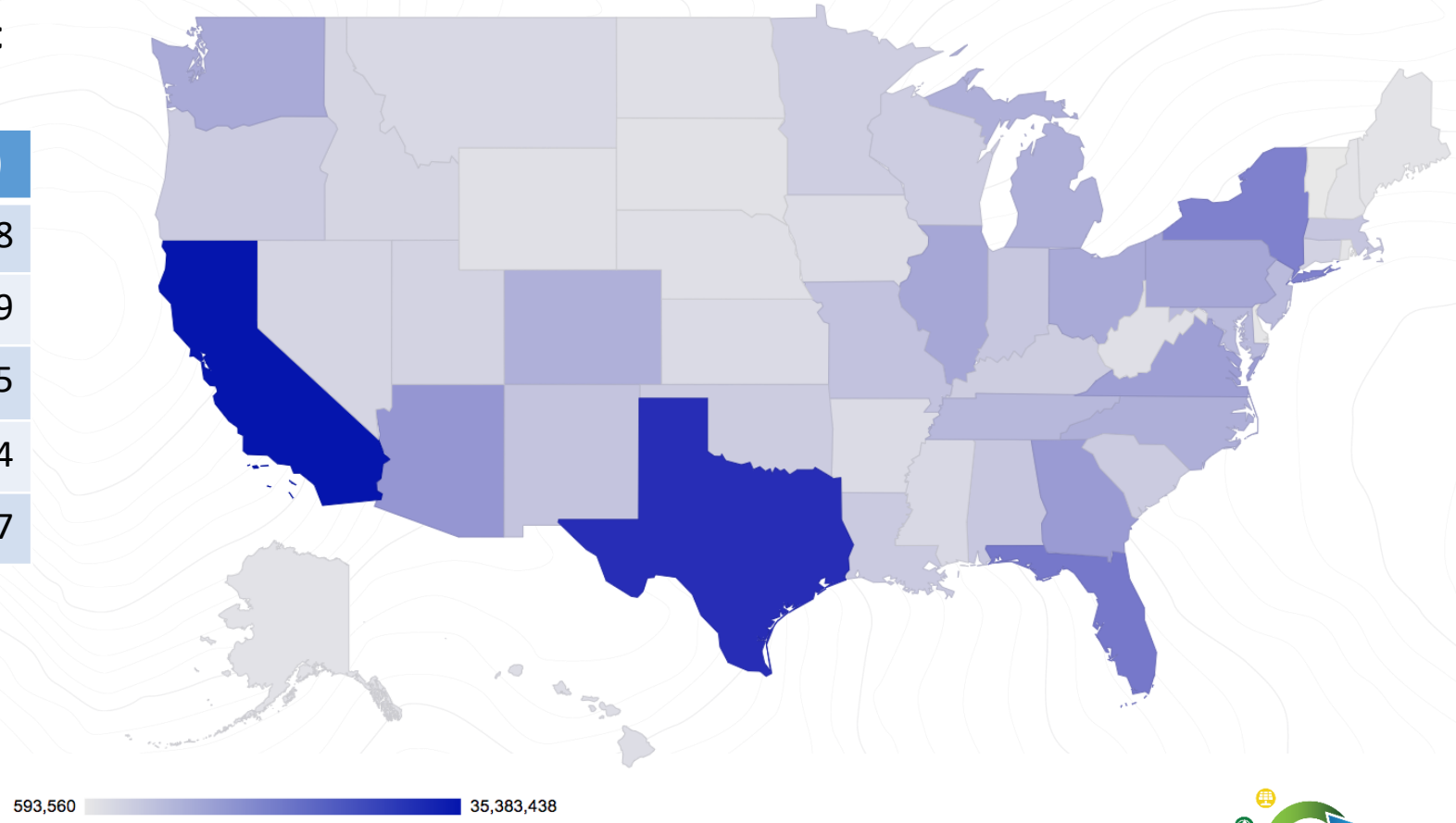


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet Fuel Consumption

State	Volume (GGE's)
California	35,383,438
Texas	29,766,679
Florida	17,673,025
New York	16,318,964
Arizona	13,035,237

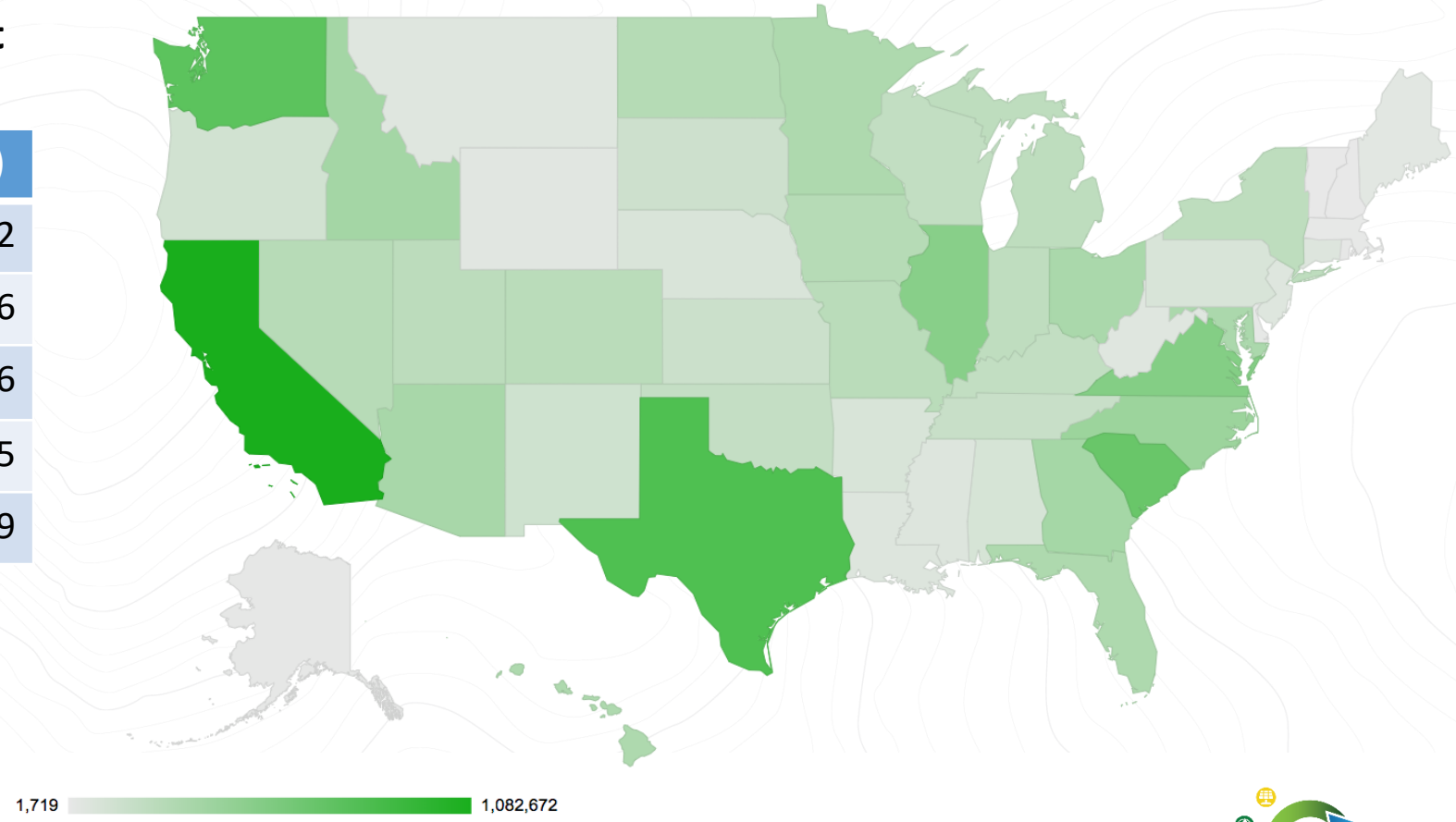


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet Alt. Fuel Consumption

State	Volume (GGE's)
California	1,082,672
Texas	736,376
Washington	672,536
South Carolina	612,465
Virginia	475,389

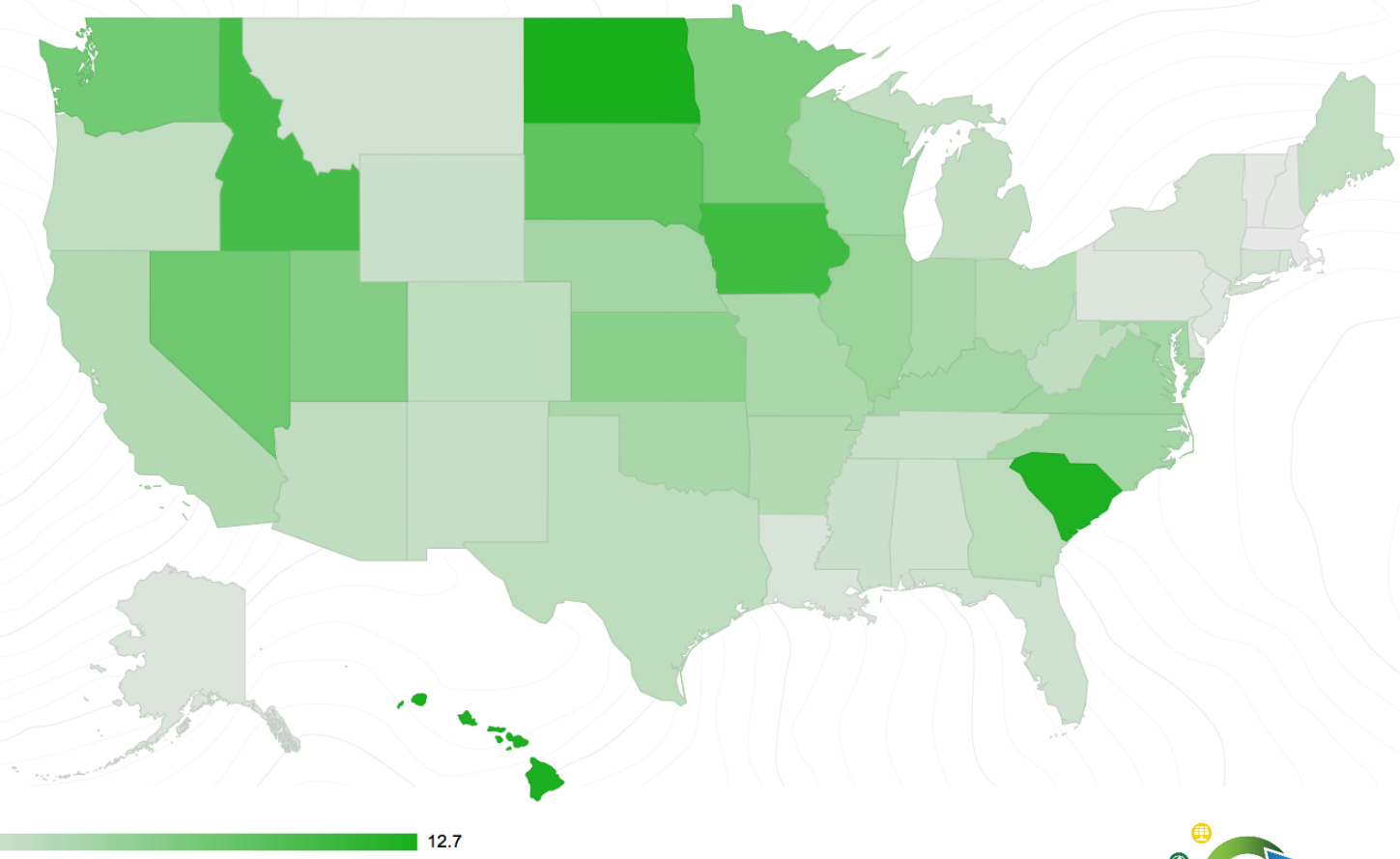


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Domestic Federal Fleet
% Alt. Fuel Consumption

State	% Alt Fuel
North Dakota	12.7 %
Hawaii	12.3 %
South Carolina	12.2 %
Iowa	9.7 %
Idaho	9.3 %

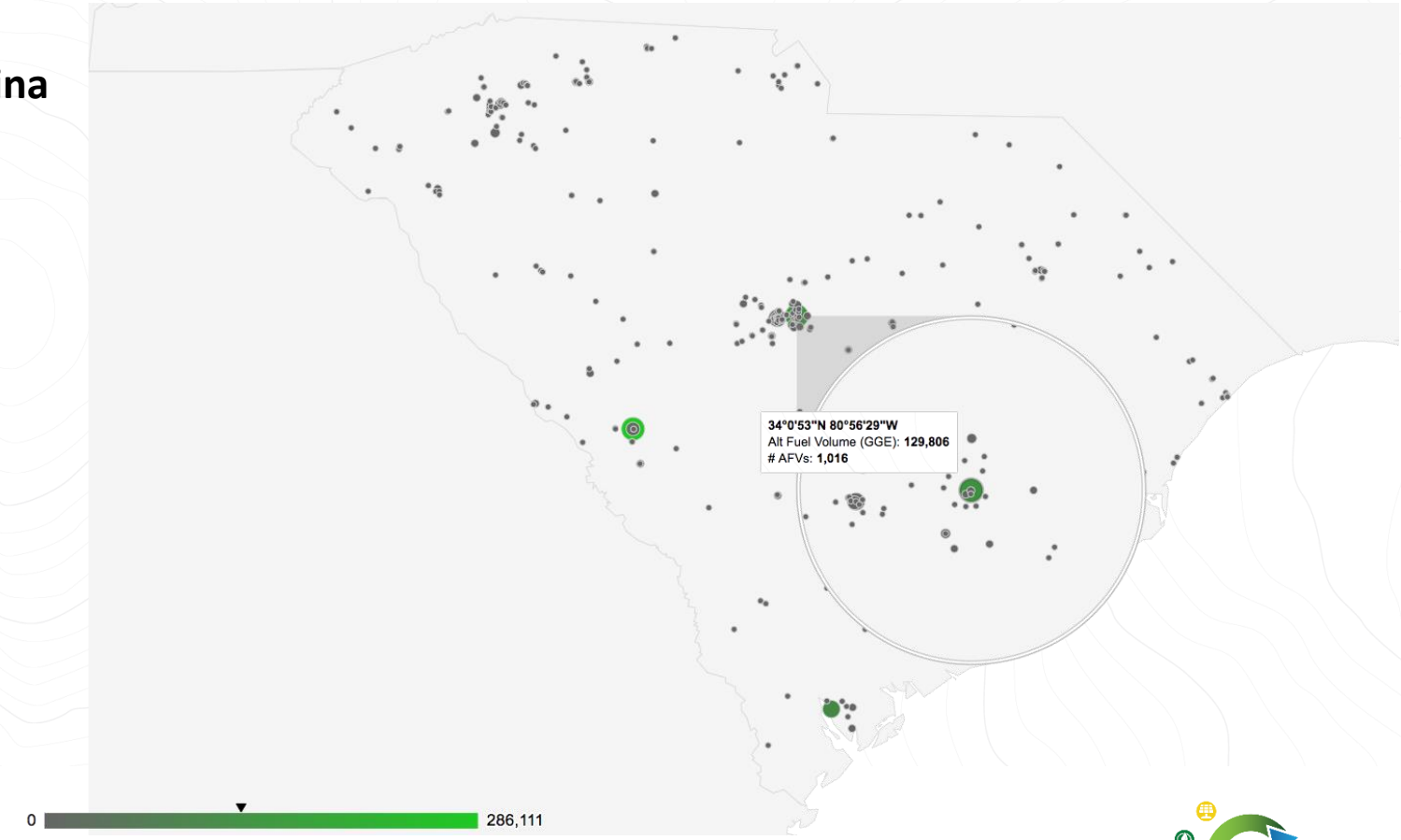


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Federal Fleet Data: Let's Take a Look

FY 2018 Federal Vehicle Alt Fuel Consumption Volume: South Carolina

- AFV's: widely distributed
- Alt fuel consumption: highly localized

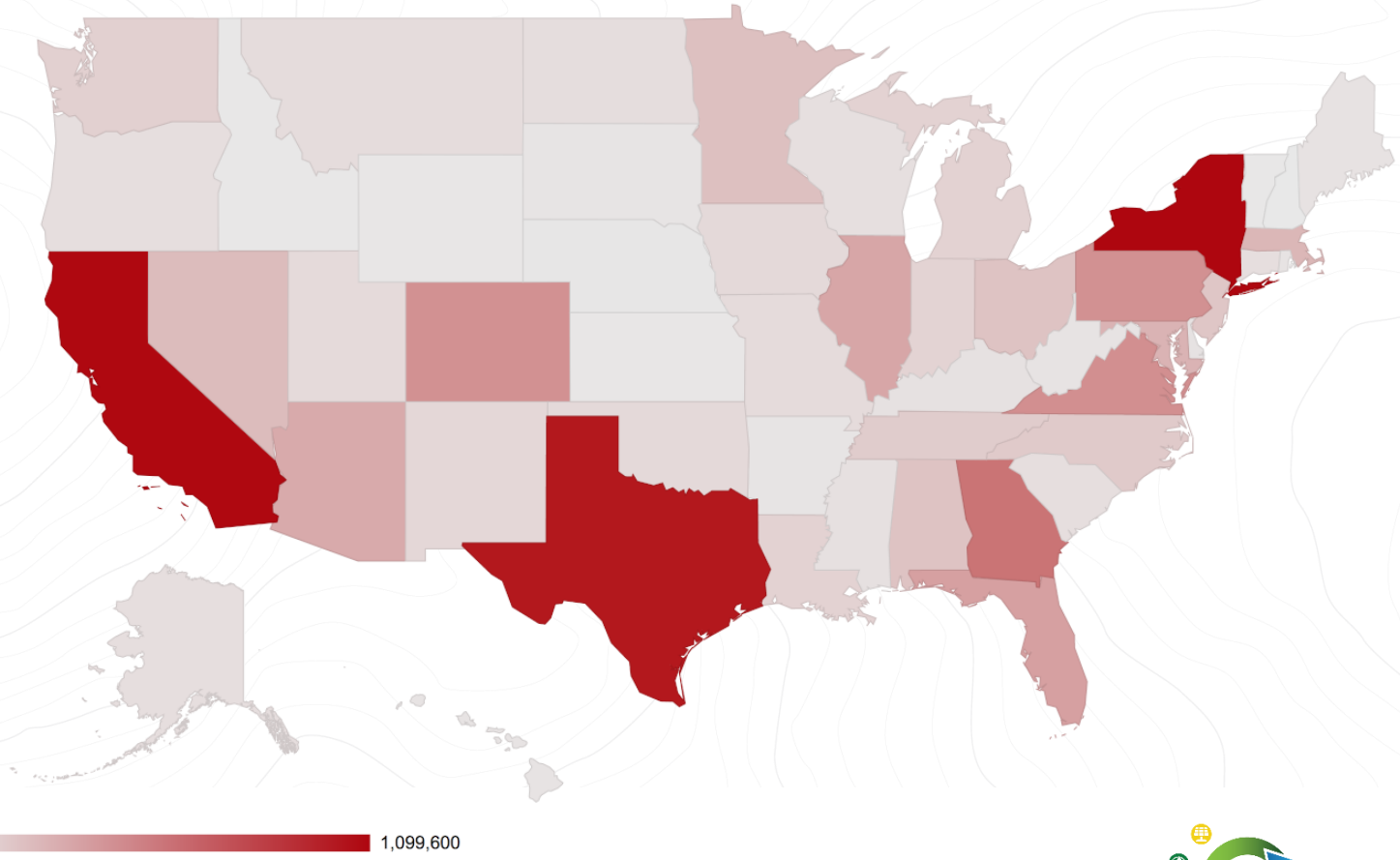


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Decision-Making: Improving Data Quality

FY 2018 Federal Fleet Invalid Fuel Volume

State	Volume (GGE's)
New York	1,099,600
California	1,088,800
Texas	1,001,238
Georgia	551,709
Virginia	425,472

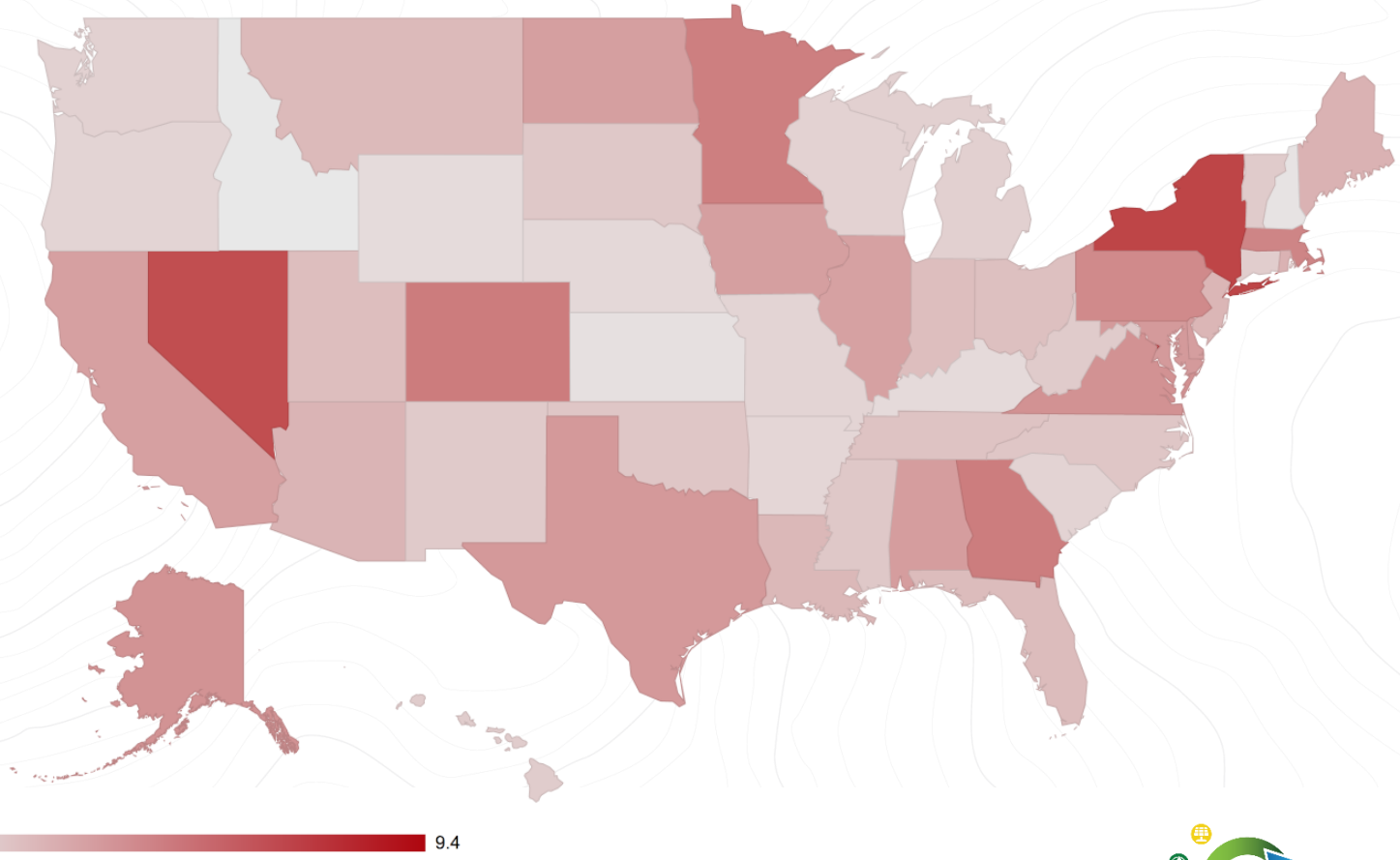


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Decision-Making: Improving Data Quality

FY 2018 Federal Fleet % Invalid Fuel Volume

State	% Invalid
Dist. of Columbia	9.4 %
New York	6.7 %
Nevada	6.4 %
Colorado	4.5 %
Georgia	4.5 %

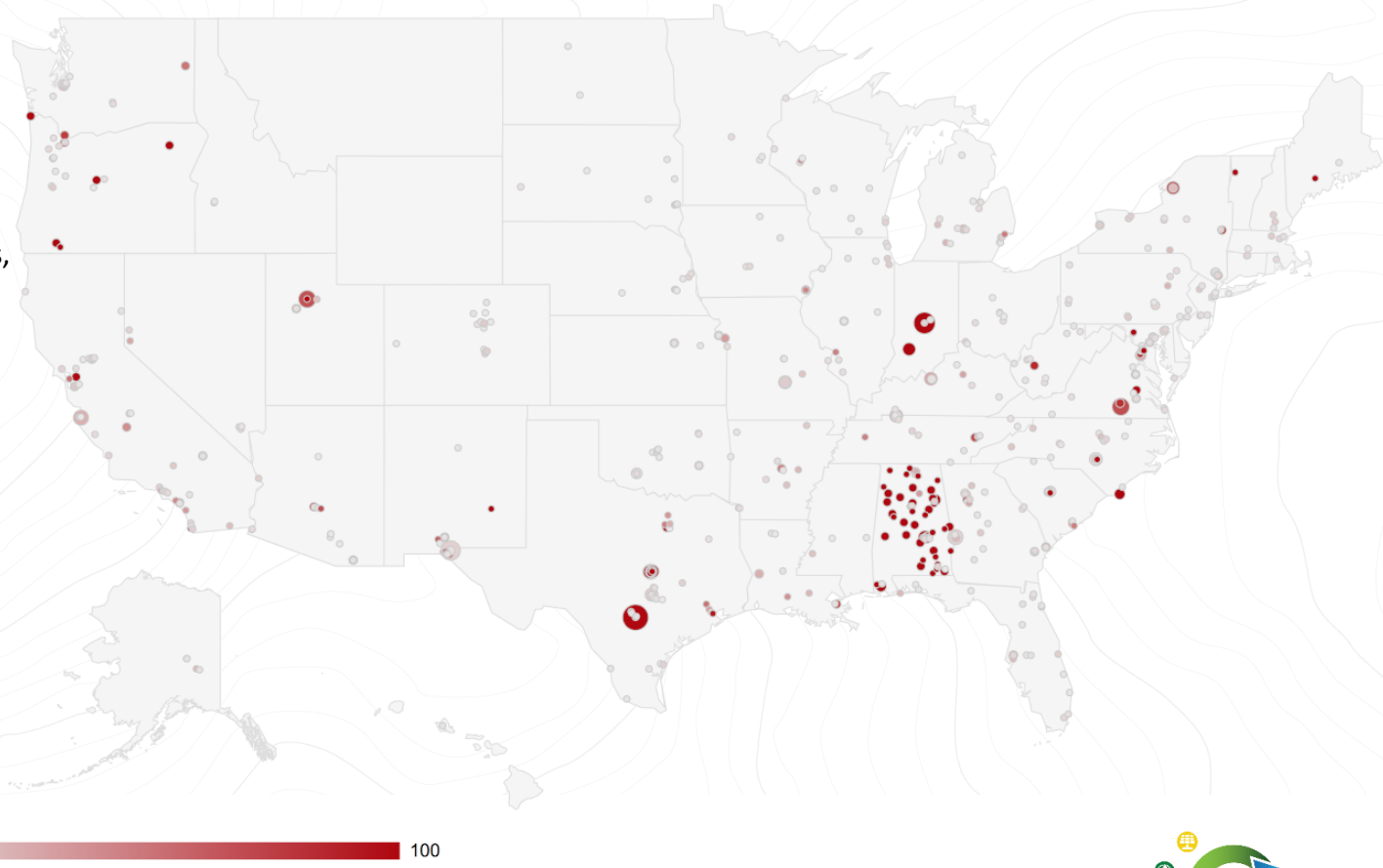


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Decision-Making: Improving Data Quality

FY 2018 Individual Agency Invalid Fuel Consumption by Vehicle

- Looking at an individual agency's vehicles shows two types of problems:
  - Specific locations with large volumes (e.g., Texas, Indiana, Utah)
  - Groups of vehicles with high percentages (e.g., Alabama)
- This type of view helps agency better understand how to approach problem



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

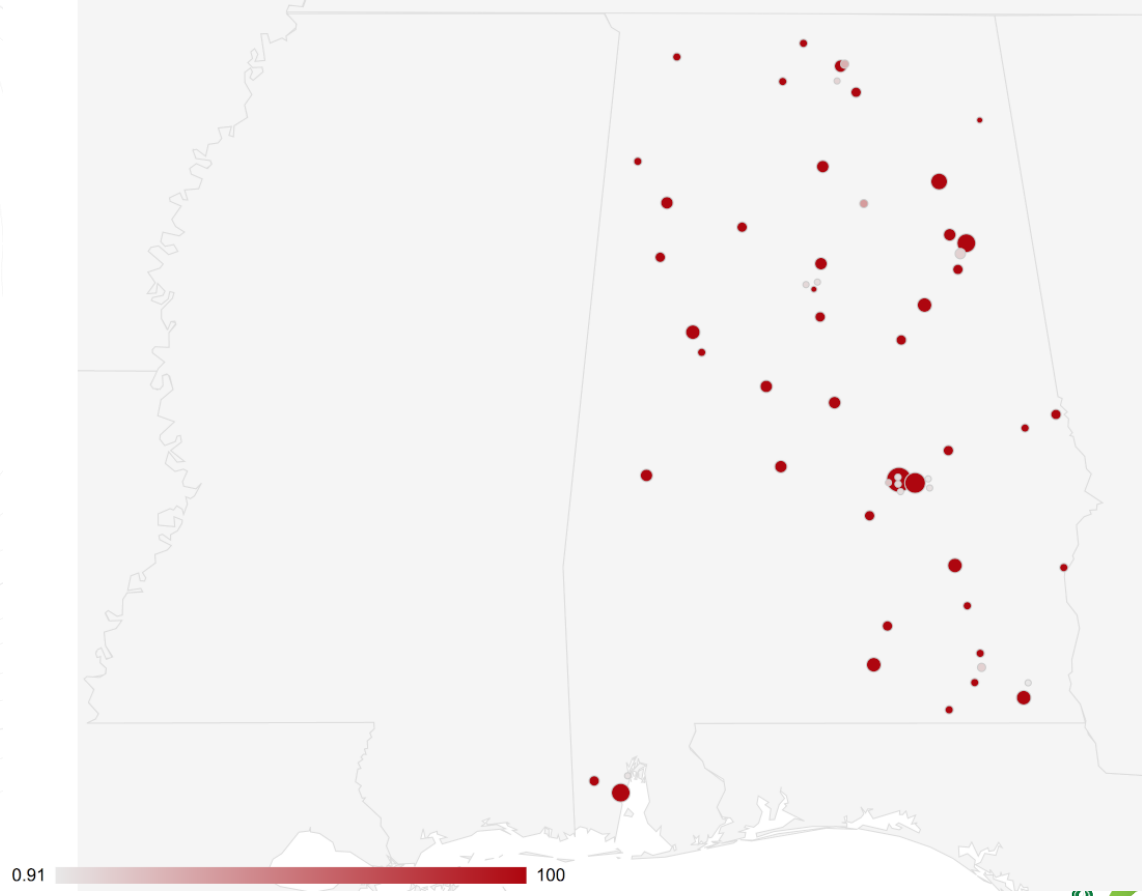
Decision-Making: Improving Data Quality

FY 2018 Individual Agency Invalid Fuel Consumption by Vehicle: Alabama

- Uniformly poor across state: any vehicle with invalid fuel consumption has all (or nearly all) invalid consumption

These types of views are easily customized to help explore:

- Filter by ownership
- Filter by fuel type or vehicle fuel type
- … or any other attribute of relevance



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Decision-Making: Looking Across Agencies

- ***Hypothetical*** **Question:** Are there locations where agencies could share vehicles?
  - *… and if so, where? What types? How many? Who?*
- Per-vehicle fleet data make answering questions like this feasible
- **Answer:** Maybe, let's look…

Decision-Making: Looking Across Agencies

- Criteria for identifying potential locations for sharing:
  - Co-location: vehicles based in same ZIP code
  - Low utilization: vehicles with < 3,000 annual miles
  - Similar vehicles: same vehicle type (e.g., LD Minivan 4x2 Passenger)
  - Grouping: 10 or more vehicles from 3 or more agencies
  - Other considerations:
    - Only look at light-duty vehicle types for initial analysis
    - Only look at vehicles already in a “pool” situation (not assigned to individuals)
    - Exclude vehicles likely to be mission-specific (LE, ER, armored)
    - Exclude USPS and DOD

Decision-Making: Looking Across Agencies

- **Answer:** 39 potential locations and vehicle types
  - If we look for locations with 2 or more agencies, it expands to 86 location+types

- Of particular interest: locations with multiple vehicle types all meeting these criteria
  - Likely more feasible based on scale and flexibility

Decision-Making: Looking Across Agencies

- Potential locations might depend on priorities:
  - Broader group of vehicle types
  - Larger groups of agencies and/or vehicles

Location	Vehicle Types	# Agencies	# Vehicles
Washington, DC 20024	LD Minivan 4x2 (Passenger) LD SUV 4x2 LD SUV 4x4 Sedan/St Wgn Subcompact	5 4 7 3	14 10 17 16
Washington, DC 20001	LD Minivan 4x2 (Passenger) LD SUV 4x4 Sedan/St Wgn Compact	9 4 5	19 15 30
Los Alamos, NM 87544	LD SUV 4x4	3	118

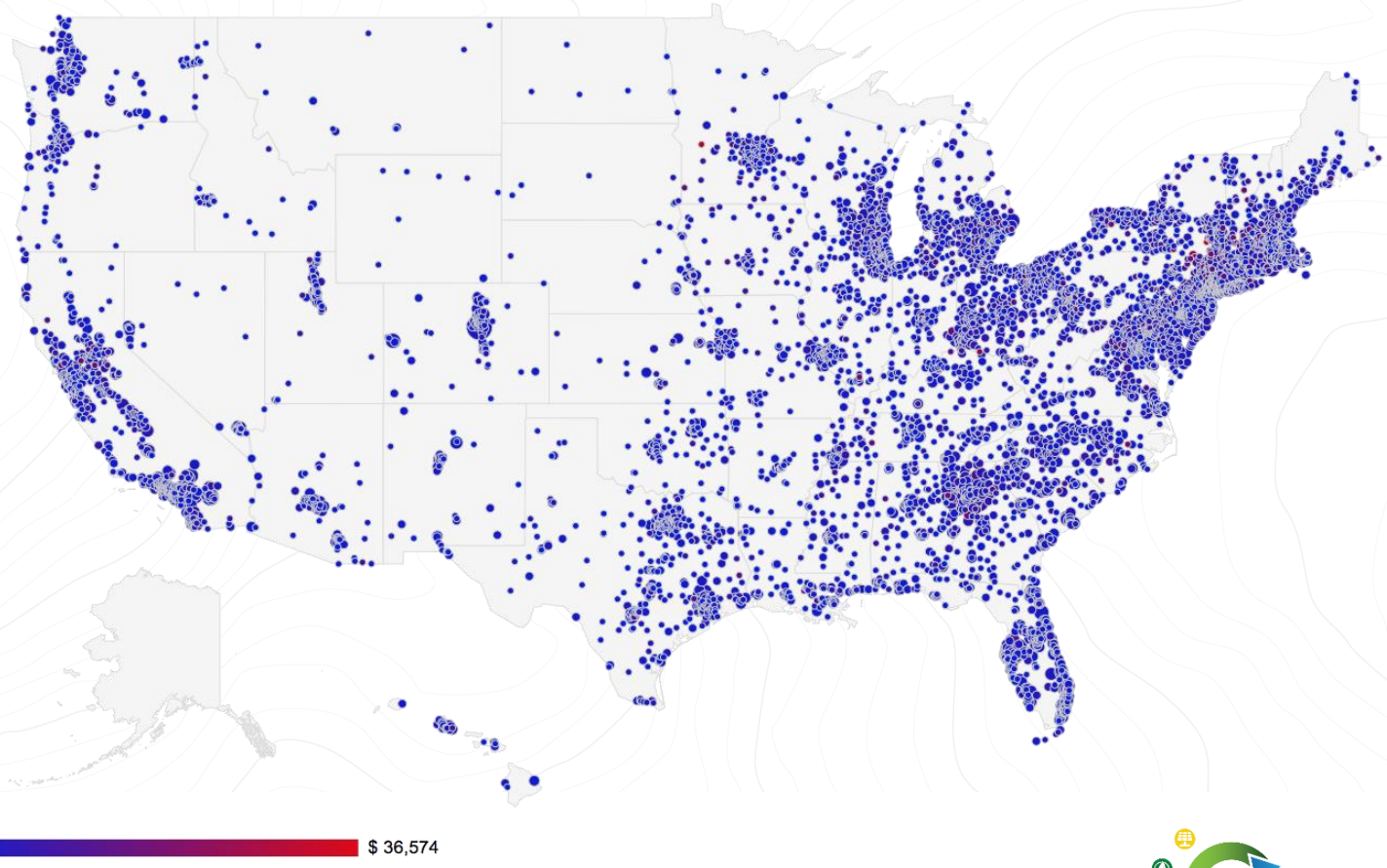
Decision-Making: Fleet Analysis

- ***Hypothetical*** fleet analysis: Pilot project to replace USPS LLV fleet
  - 160K+ vehicles of same type and age
  - Expensive to operate and maintain
  - Can we find locations with large groups of the more expensive vehicles in this set that would serve as pilot locations for a wholesale replacement?
    - Locations with groups of vehicles may have advantages based on infrastructure or personnel

Decision-Making: Fleet Analysis

Vehicle Location and Operating Cost

- Top quartile of fleet segment: annual operating cost > $8,750
- Where are they?
  - Dot size: larger = more vehicles
  - Color: Red = higher cost
- Map shows these vehicles are *widely* distributed
  - … we need a more refined view

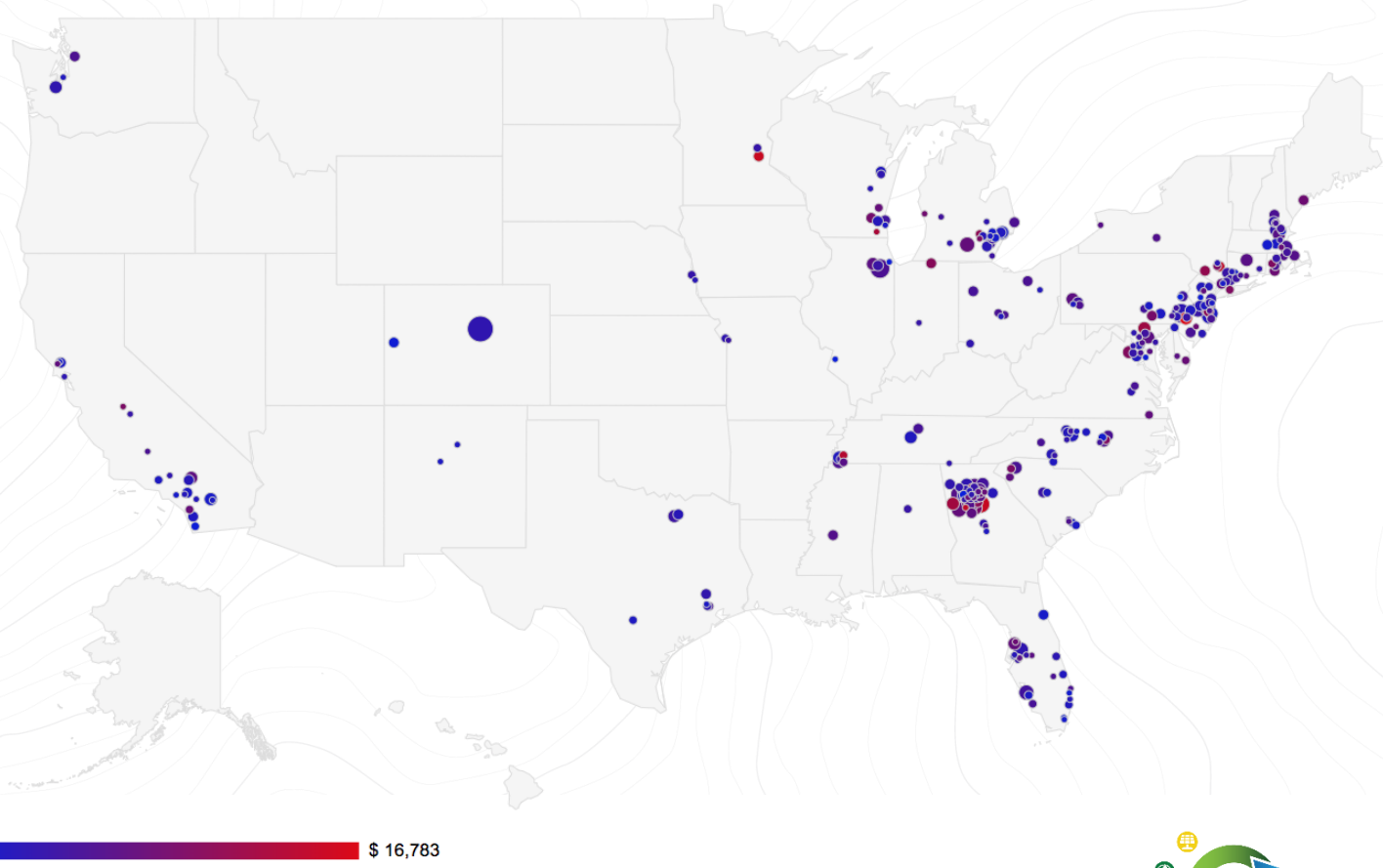


Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Decision-Making: Fleet Analysis

Vehicle Location and Operating Cost

- Top quartile of fleet segment: annual operating cost > $8,750
- Locations with 20+ vehicles
- Where are they?
  - Dot size: larger = more vehicles
  - Color: Red = higher cost
- Several potential locations
  - Southern California
  - Atlanta, GA area
  - NW Washington
  - Chicago/Wisconsin/Michigan areas
  - Several New England areas



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

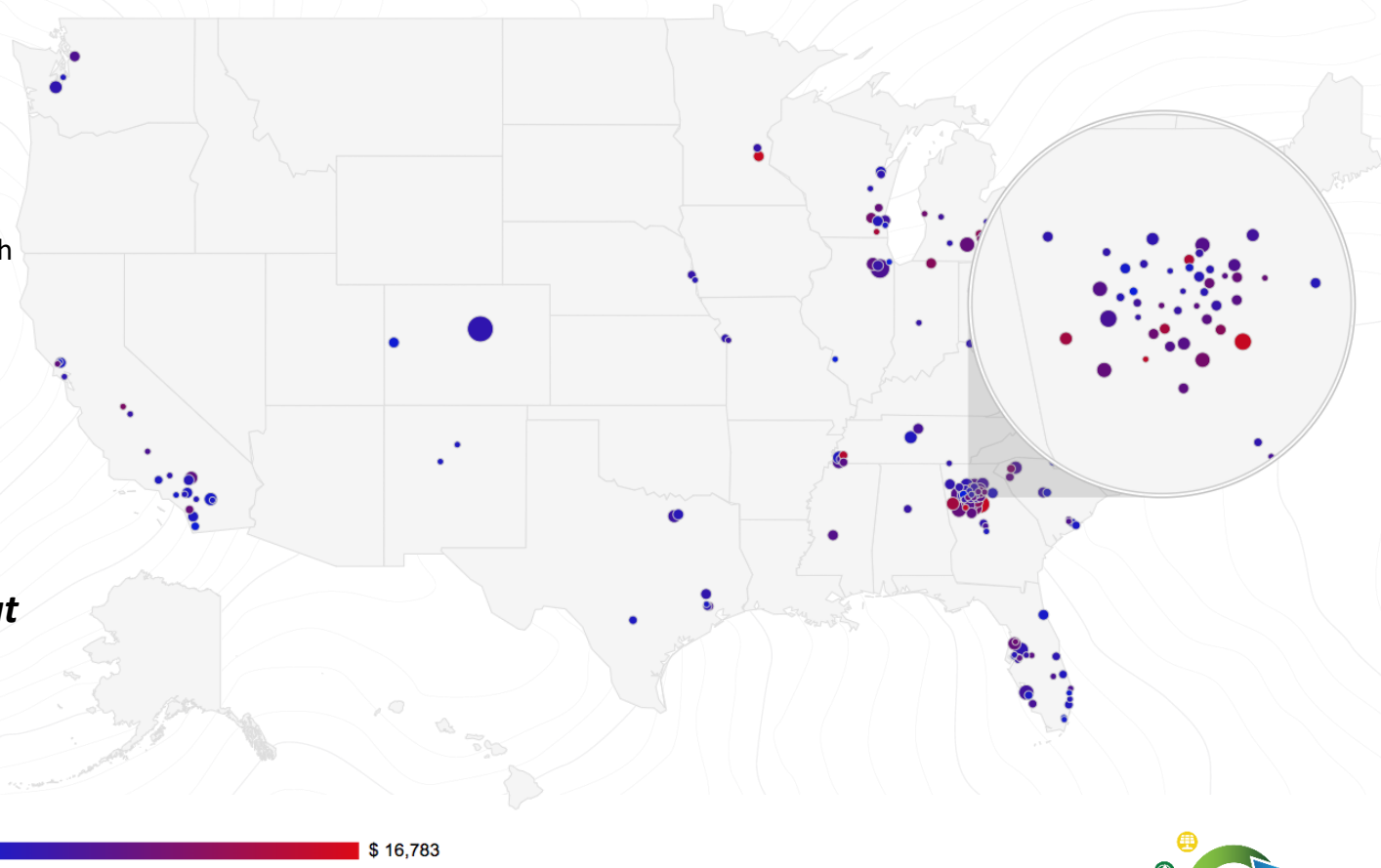
Decision-Making: Fleet Analysis

Vehicle Location and Operating Cost

- Cluster of vehicle locations around Atlanta, GA
  - Covington, GA: 57 vehicles @ $16,036
  - 7 add'l locations with 40+ high cost vehicles each
  - More than 1,400 high cost vehicles in this area, all in locations with 20+ high cost vehicles

Combination of detailed vehicle data
+ vehicle location data
+ a different way of visualizing data

… combine to support a type of analysis that was not feasible before.



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

Discussion

Questions? Ideas?

Let's talk!

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