



Emerging Fuels

National Tanks Conference

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Fuels and Transportation are Changing

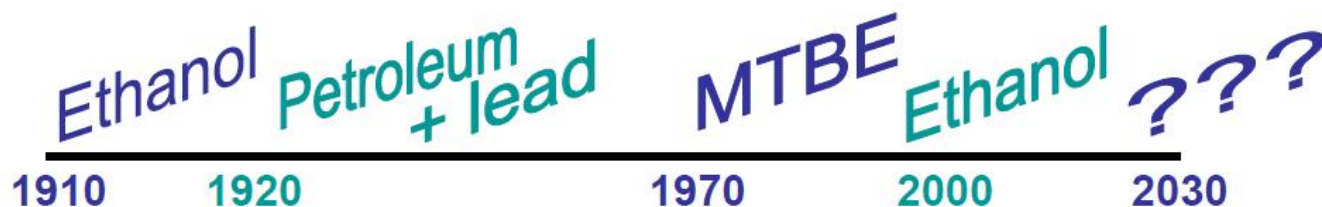
Emerging Fuels

- ULSD/ULSG
- E15/Unleaded 88
- E85
- Biodiesel
- Renewable Diesel
- Isobutanol?
- E-fuels?

Other Tech

- Electrification
- Methanol
- Hydrogen
- Natural Gas

Evolution of Fuels





Ultra-low Sulfur Diesel and Gasoline

Renewable Fuel Standard

ULSD Phase In Summary

Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014
Highway	80% 15 ppm & 20% 500 ppm				15 ppm	15 ppm	15 ppm	15 ppm	15 ppm
Non-Road		500 ppm	500 ppm	500 ppm	15 ppm	15 ppm	15 ppm	15 ppm	15 ppm
LM		500 ppm	500 ppm	500 ppm	500 ppm	500 ppm	15 ppm	15 ppm	15 ppm
NRLM w/ Credits		HS	HS	HS	500 ppm	500 ppm	500 ppm	500 ppm	15 ppm

Notes: LM – Locomotive and Marine; ppm – parts per million

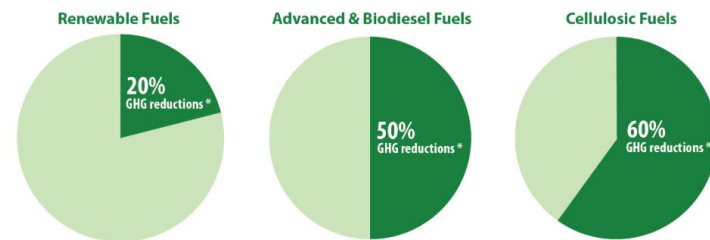
Source: EPA Presentation ULSD Workshop Nov 2004



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Lifecycle Greenhouse Gas (GHG) Emissions

GHG emissions must take into account direct and significant indirect emissions, including land use change.



* compared to a 2005 petroleum baseline

Click the image for a larger version.

[Learn more about fuel pathways under the RFS program.](#)

Incompatibility and Degradation Can Lead to Releases



Delamination



Discoloration



Fiberglass Tank Walls



Softening



Swelling



Elongation ("creep")



Compatibility Requirements

UST system must be compatible with
substance stored. (1988)

Biofuels (2015)

Notify
Demonstrate
Keep Records



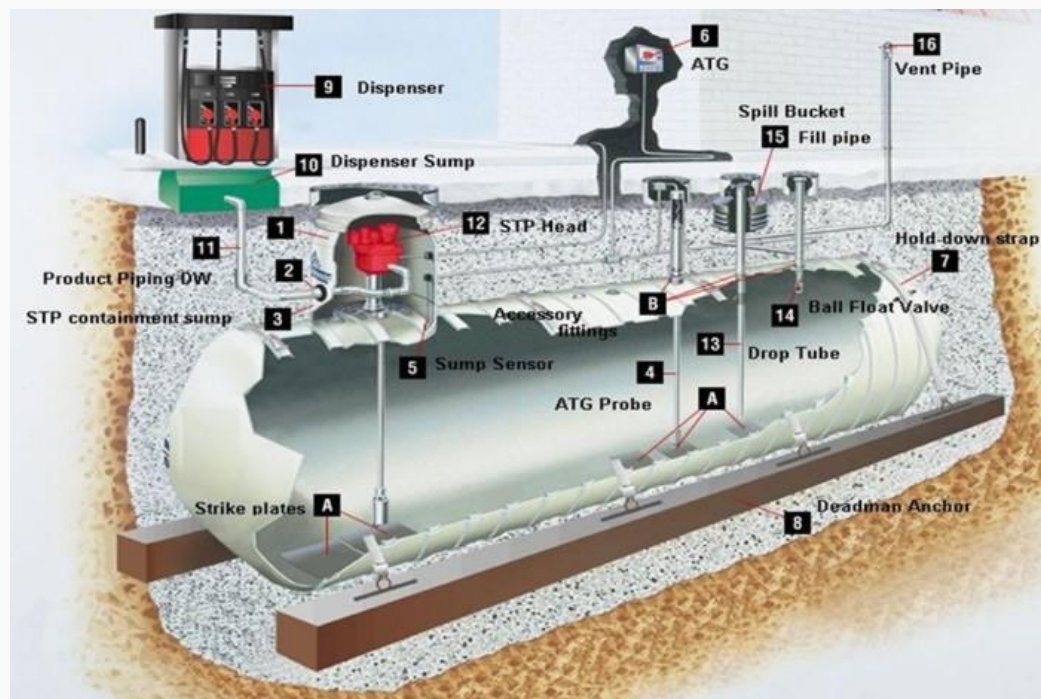
40 CFR 280.32 – Compatibility

(summary of 280.32 (b) and (c) only)

- **Notification** - Owners and operators must **notify** the implementing agency at least 30 days before switching to a regulated substance containing greater than 10 percent ethanol, 20 percent biodiesel, or any other regulated substance identified by the implementing agency
- **Meet Compatibility Requirement for a list of equipment (see next slide)**– Owners and operators must
 - **demonstrate** compatibility of the UST system through a nationally recognized testing lab listing or manufacturer approval of UST equipment or components, or
 - **use an alternative option** identified by the implementing agency that is no less protective than demonstrating compatibility of the UST system
- **Recordkeeping** - Owners and operators must **maintain records** for as long as the biofuel blend is stored to demonstrate compliance

Compatibility Requirement in 280.32(b) and (c) applies to:

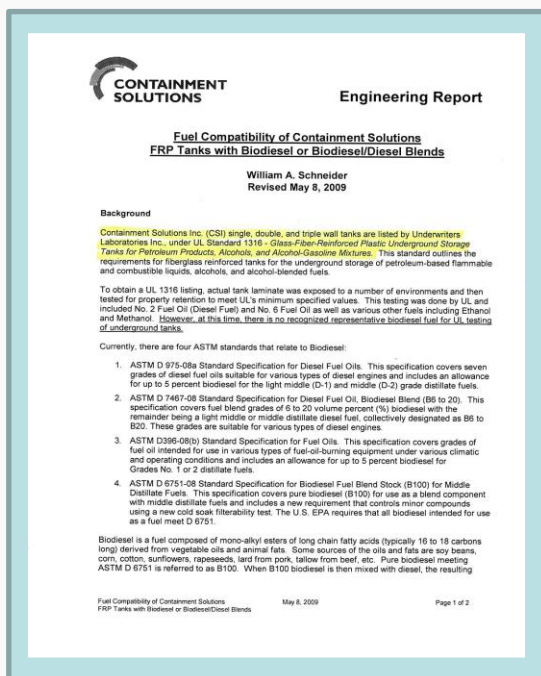
- Tanks
- Piping
- Containment sumps
- Pumping equipment
- Release detection equipment
- Spill equipment
- Overfill equipment



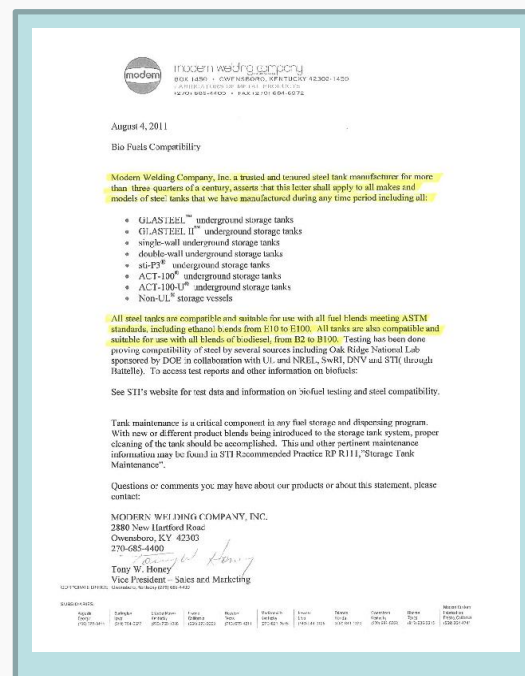


Examples for Demonstrating Compatibility

Independent Laboratory Certification or Listing for Use with the Substance



Affirmative Statement of Compatibility from Manufacturer



Aboveground Equipment



Can't demonstrate?



- Targeted retrofits
- Install a new system
- Don't store the substance



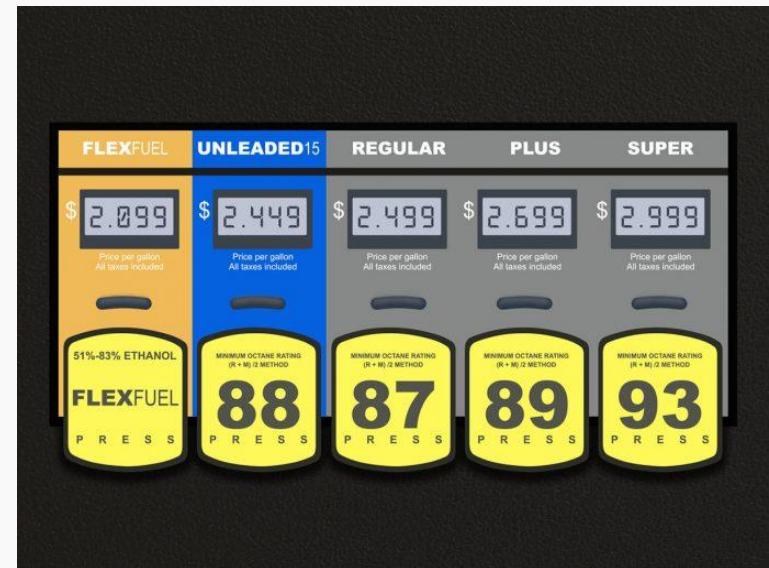
E15 and Higher Blends: Few USTs Fully Compatible



↑
~ 5000
stations

~ of 110,000 stations in US

E15, aka Unleaded 88





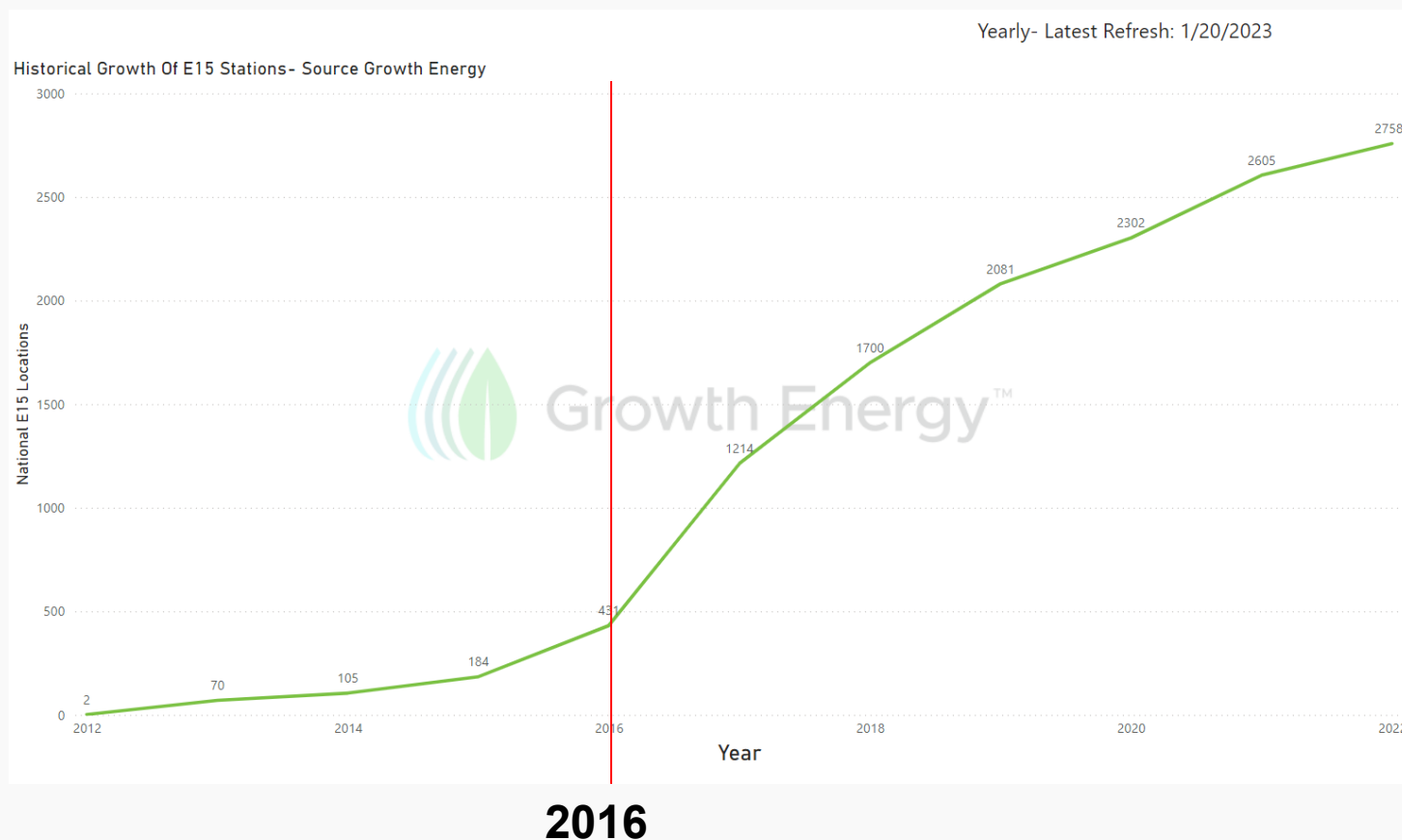
Retail Locations Offering E15 – *around 2022*





2023: E15 sold at more than 3,000 stations in 31 states

Source: DOE Alternative Fuels Data Center, 2023





Retail Locations Offering E15 – *around 2025*



4,366
STATIONS

STATION DATA
MAINTAINED BY





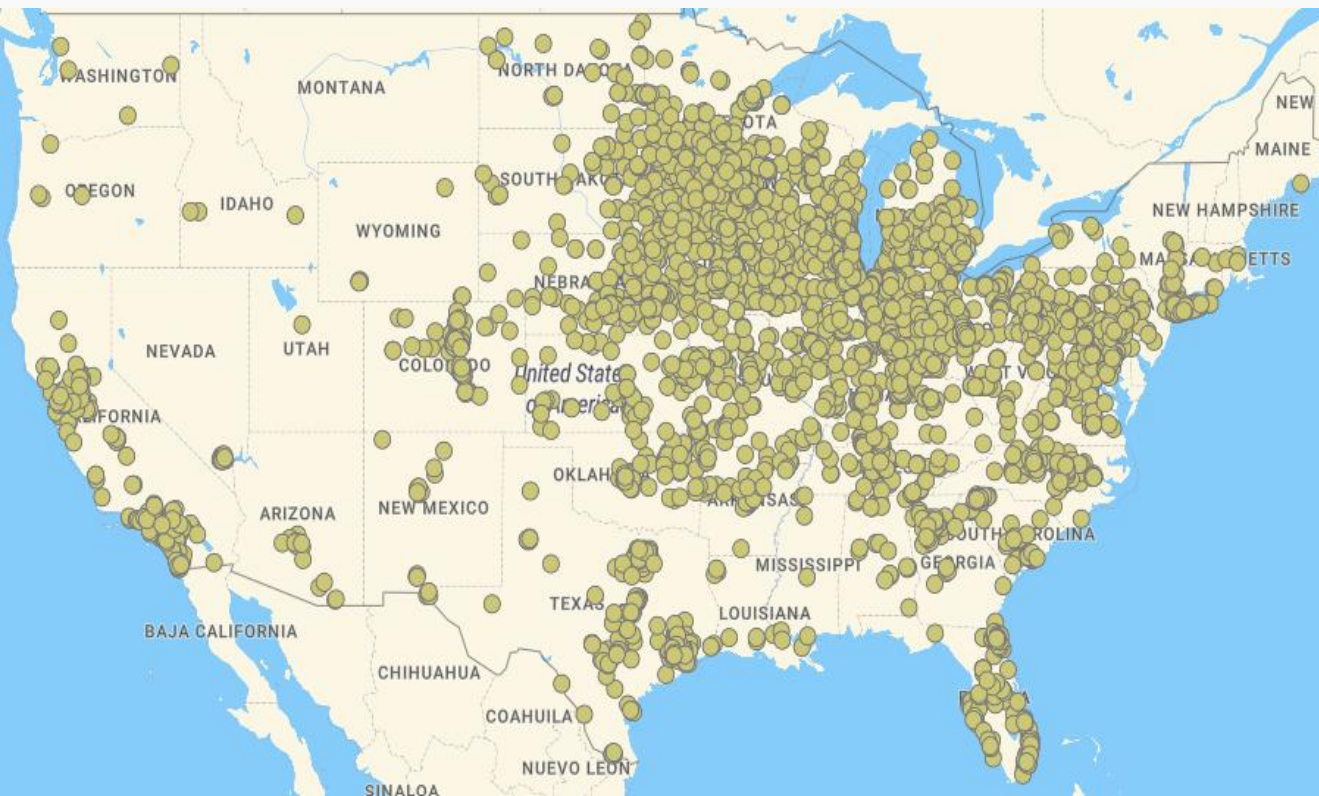
Brands with E15 Today at Retail



Source: RFA



~ 4800 Retail Locations Offer E85 – Around 2022



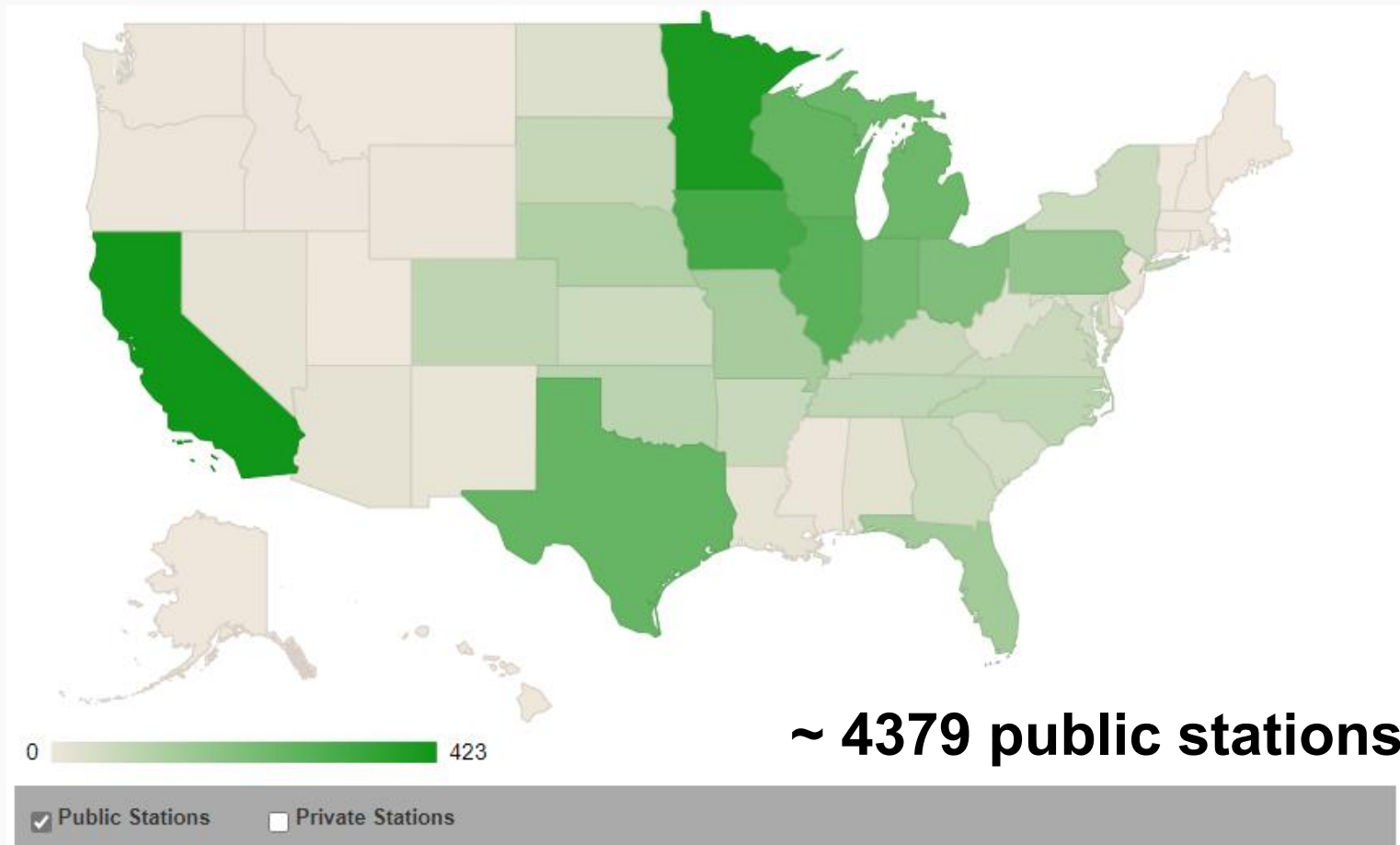
**E15 or E85
nationally**

- **35% in 4 states:
MN, WI, IL, IA**
- **75% in 14 states**



Today: E85 Fueling Station Location by State

Source: DOE Alternative Fueling Station Locator (2024)





DC Fast Chargers (Public)

Source: DOE Alternative Fueling Station Locator (2025)

12,785
station locations

57,898
EV charging ports ⓘ

Filters chosen:



United States

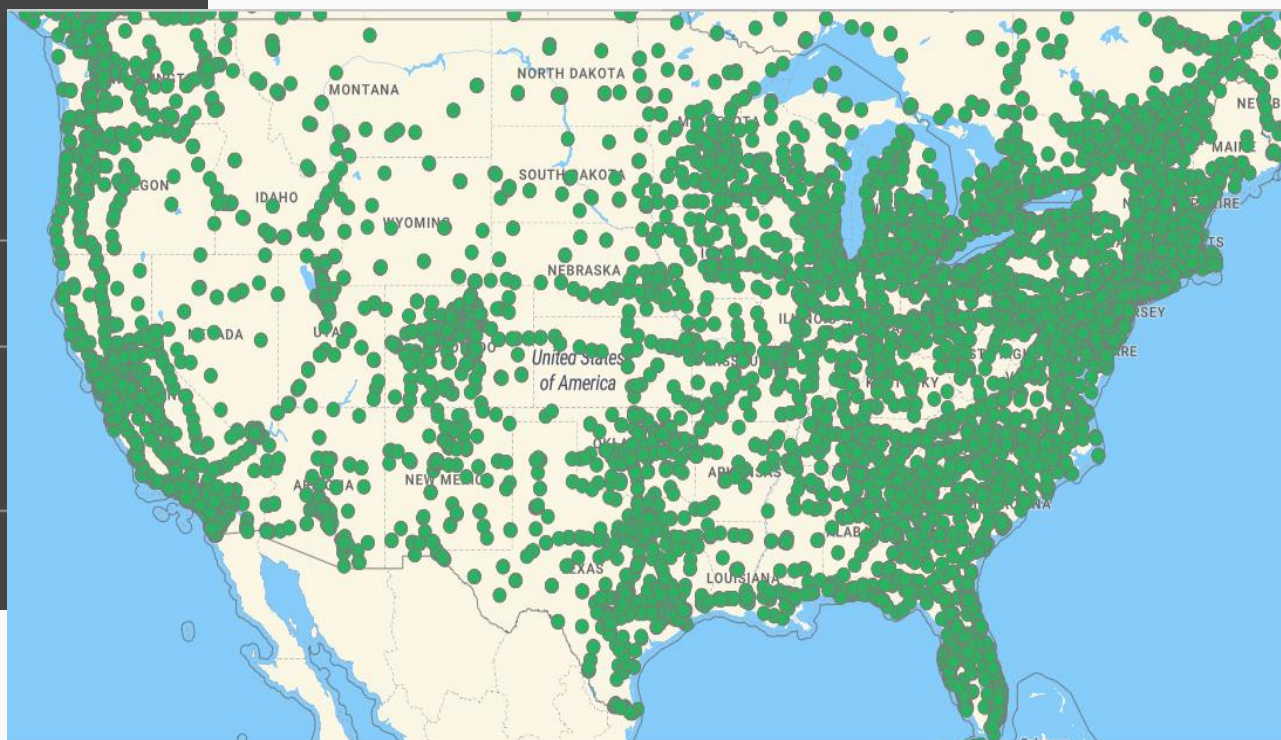


Electric

Types: DC Fast



Access: Public





Significant Federal Funding to Upgrade Fuel Infrastructure

\$100 Million
2015

\$100 Million
2020

\$100 Million
2022

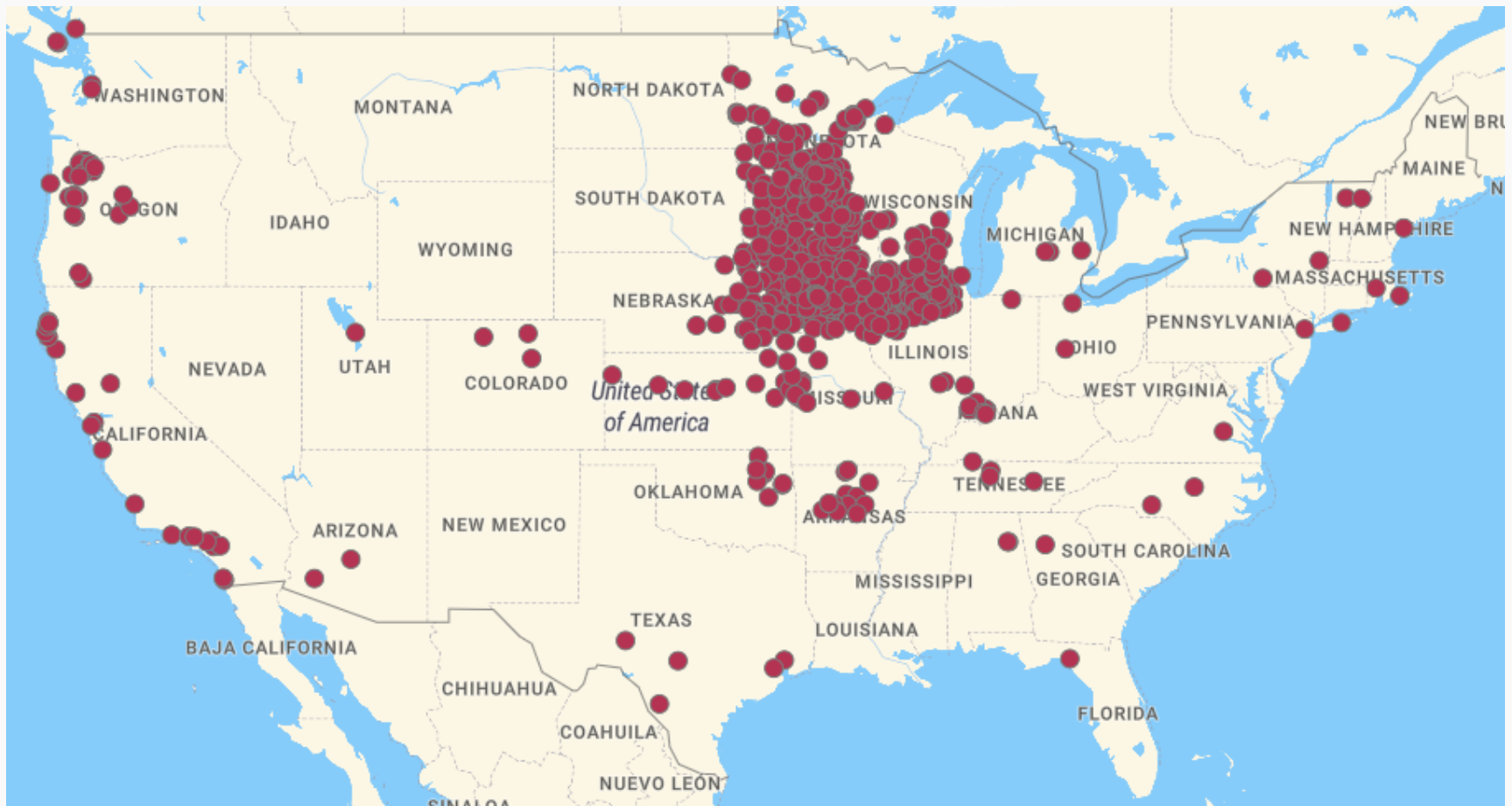
\$500 Million
2023 - 2024

USDA Higher Blends Infrastructure Incentive Program (HBIIP)

- USDA grant funds available to increase sale and use of higher blends of ethanol and biodiesel by expanding infrastructure for renewable fuels derived from U.S. agricultural products.
- Designed to share costs related to installing, retrofitting and/or upgrading fuel storage, dispenser pumps, related equipment and infrastructure.
- www.rd.usda.gov/hbiip

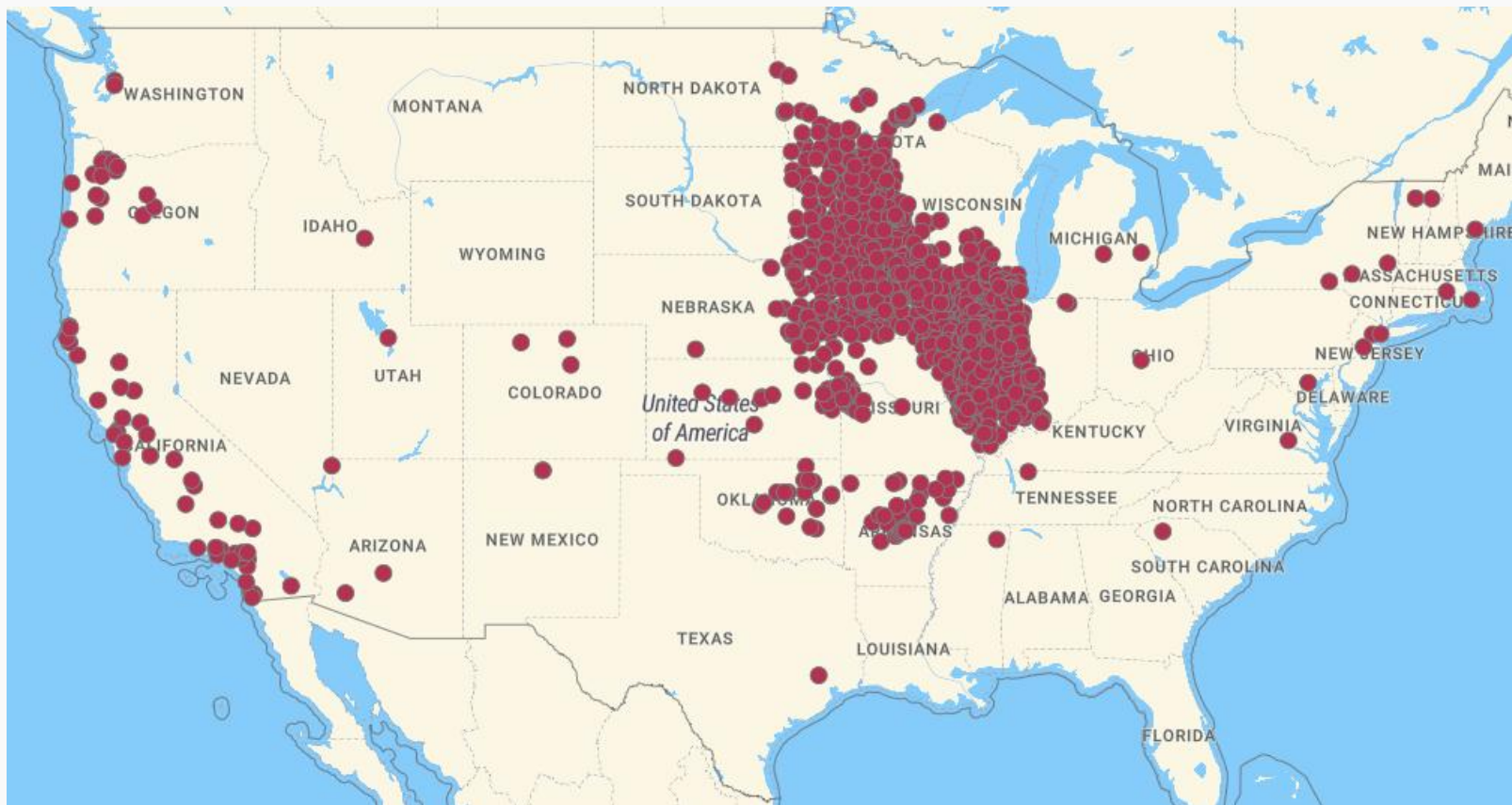


2022: ~ 827 Stations w/ Biodiesel $\geq$ B20





2024: ~ 1408 Stations Offer Biodiesel ≥ B20



The Future: Renewable diesel?

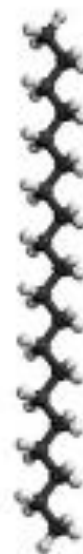
We can make low-carbon, zero-sulphur renewable diesel from waste, and it's the same molecule as conventional diesel.



Biodiesel



Diesel

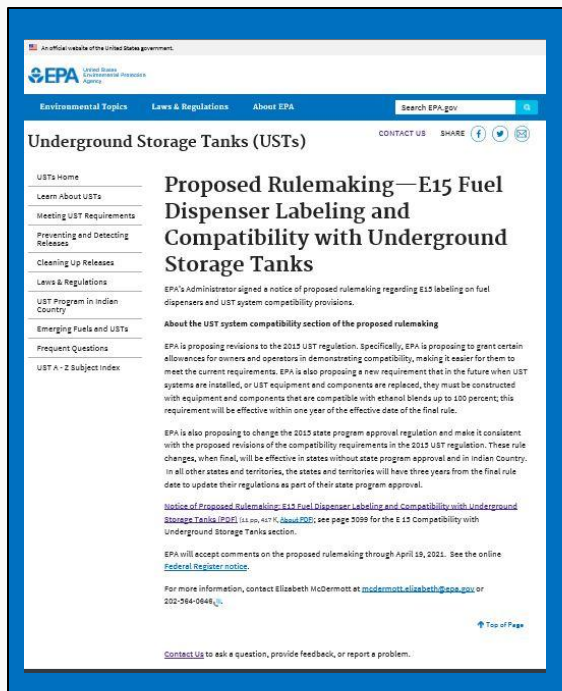


Renewable diesel





Proposed Regulation: *E15 Fuel Dispenser Labeling and Compatibility with Underground Storage Tanks*



- On January 15, 2021, EPA's Administrator signed a notice of proposed rulemaking: *E15 Fuel Dispenser Labeling and Compatibility with Underground Storage Tanks*
- Proposed to grant certain allowances for owners and operators in demonstrating compatibility.
- Proposed a new requirement that when UST systems are installed, or UST equipment and components are replaced, they must be constructed with equipment and components that are compatible with ethanol blends up to 100 percent.



Selected EPA OUST Compatibility Resources

OUST Website <https://www.epa.gov/ust>

- 2020 UST System Compatibility Biofuels Guide (printable, including updated compatibility checklist on pages A-2 through A-4) <https://www.epa.gov/ust/ust-system-compatibility-biofuels>
- 2015 UST Technical Compendium (including questions on biodiesel and renewable diesel): <https://www.epa.gov/ust/underground-storage-tank-ust-technical-compendium-about-2015-ust-regulation>
- E15 UST Compatibility Statement: <https://www.epa.gov/ust/e15-compatibility-ust-systems-statement>
- UST Compliance Advisory about Compatibility Requirements in 40 CFR 280.32: <https://www.epa.gov/ust/compliance-advisories-about-2015-underground-storage-tank-regulation>



Questions - Discussion

- More E15 and E85 is likely coming.
- EPA compatibility rules - most facilities need equipment changes to store these fuels.
- Other/misc thoughts, issues, questions?

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EPA Office of Underground Storage Tanks

<https://www.epa.gov/ust/emerging-fuels-and-underground-storage-tanks-usts>