

Next Generation Fuels Act of 2020 – A Low Carbon Octane Standard

Section-By-Section Summary

Purpose

To promote low carbon, high octane fuels that will improve vehicle efficiency and performance, while protecting public health and the environment.

Benefits

Increasing gasoline octane to a minimum standard of 98 Research Octane Number (RON) through low-carbon, renewable fuels would:

- 1) Reduce greenhouse gas (GHG) emissions.
- 2) Improve air quality for better health outcomes.
- 3) Increase vehicle fuel efficiency.
- 4) Support long-term biofuel and corn demand.

High octane fuel such as 98 RON enables automakers to use advanced engine design features that increase performance and fuel economy, resulting in efficiency gains of five percent or more. This increased fuel efficiency, in turn, reduces GHG emissions.

Using petroleum-based sources to increase fuel octane would produce more carbon emissions, erasing the GHG reduction benefits from improved fuel economy, and result in more emissions of harmful hydrocarbon aromatics, which degrade air quality and respiratory health. Requiring octane boosters that result in lower GHG emissions than gasoline and capping harmful gasoline aromatic content reduces GHG emissions and improves air quality.

Due to ethanol's high octane rating, a low carbon, high octane ethanol blend results in both additional fuel efficiency *and* significant GHG reduction benefits. Greater ethanol content would boost the GHG reductions and replace more aromatics in this new 98 RON fuel, a cost-effective win for consumers and the environment. Removing regulatory barriers to higher ethanol blends enables these benefits.

Background on RON

RON is a measurement of gasoline properties related to how the fuel combusts in engines. Today's regular gasoline, labeled as 87 Anti-Knock Index or AKI at the pump, is approximately 91 RON. The RON measurement is becoming the preferred method for measuring these fuel properties in modern engines and is used in Europe and other areas.

Advanced engine design features that increase fuel efficiency are limited by current gasoline in the marketplace because low octane fuels cannot mitigate engine "knock," or self-combustion of the fuel that limits engine power and causes damage. These advanced engine technologies require higher octane fuels to deliver the fuel efficiency benefits they are designed for. High

octane fuel such as 98 RON limits knock, enabling automakers to build affordable new vehicles with greater fuel efficiency that meet stricter vehicle emission standards.

Title I: Low Carbon High Octane Fuels

- **Section 101: High Octane Certification Fuel**

Section 101 requires the Environmental Protection Agency (EPA) allow automakers to use a new 98 RON fuel to certify new vehicles for emissions and fuel economy, making 98 RON fuel available no later than January 1, 2022.

Section 101 requires sources of octane value for the new 98 RON gasoline to result in at least 30 percent lower GHG emissions than baseline gasoline. By requiring octane sources to result in at least 30 percent lower GHG emissions than gasoline, the legislation will further decrease GHG emissions and prevent backsliding from the use of more fossil fuel octane sources.

In contrast to ethanol, with a declining carbon intensity, gasoline's carbon intensity is increasing. Emissions for both the low carbon octane sources and unblended gasoline will be measured by the Department of Energy's Argonne National Laboratory Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) model, which is regularly reviewed and updated, making it the gold standard globally for lifecycle GHG accounting. Updating the gasoline baseline ensures low carbon octane sources are accurately compared to current market gasoline.

- **Section 102: Clean Octane Standard**

Section 102 limits the aromatic hydrocarbon content of gasoline, including both current market gasoline and new 98 RON gasoline, to an annual average of 17.5 percent by volume; current average aromatics volume in gasoline is around 19 percent. In addition, Section 102 requires clean sources of octane value, defined as having average lifecycle GHG emissions of at least 30 percent less than baseline gasoline, be used in high octane fuel with an octane rating of 98 RON or higher. The limitation on aromatics content and requirement for clean octane would take effect January 1, 2023.

EPA's Fuel Trends Report shows that as ethanol blending has increased from around one percent in 2000 to today's standard 10 percent, the volume of harmful aromatic compounds in gasoline has dropped from nearly 25 percent to 19 percent. These compounds include benzene, toluene, ethylbenzene, and xylene. Currently, with the exception of benzene, there is no federal limit on aromatic content. Limiting total aromatic content of finished gasoline to 17.5 percent by volume would reduce negative health outcomes from exposure to fine particulate matter (PM_{2.5}) resulting from aromatic hydrocarbon emissions.

Just like the low carbon requirement for sources of octane value for the 98 RON certification fuel in Section 101, the low carbon requirement for clean sources of octane value for 98 RON

gasoline in the marketplace decreases GHG emissions from fuel and prevents backsliding from the use of more fossil fuel and petrochemical octane sources.

Title II: Regulatory Harmonization

- **Section 201: Reid Vapor Pressure (RVP)**

Section 201 ensures all ethanol blends greater than 10 percent receive the same RVP treatment as 10 and 15 percent blends currently receive.

RVP is the measurement in pounds per square inch of evaporative emissions from vehicle fuel; evaporative emissions refers to emissions from fuel vapors when fuel evaporates. Despite ethanol's low RVP, blending low levels of ethanol with gasoline increases fuel RVP, but RVP begins to decrease after about 12 percent ethanol blending. Therefore, blends such as E15 and mid-level blends such as E25 have lower evaporative emissions than E10. These blends should be allowed to enter the market on the same terms as E10, and EPA already recognized this parity for 15 percent blends in a 2019 final rule. Codifying RVP parity for all blends greater than 10 percent removes an unnecessary and outdated regulatory barrier preventing more high octane, low carbon blends from entering the market.

- **Section 202: Revision to R-Factor**

Section 202 requires EPA to update the R-factor in the fuel economy formula to 1.0, reflecting modern engines.

The R-Factor is part of the formula EPA uses to calculate vehicle fuel efficiency and is intended to adjust the formula for the energy content of the fuel. EPA's current factor is outdated and does not reflect modern engines. Department of Energy and EPA research supports updating the R-factor in the fuel economy formula from the current value of 0.6 to 1.0. An R factor of 1.0 in the fuel economy formula supports low carbon fuel use, providing automakers with greater options for innovation in meeting more stringent vehicle standards, including building high octane vehicles that require higher octane, low carbon fuels.

- **Section 203: E30**

Section 203 enables EPA to approve fuel blends up to 30 percent ethanol through current Clean Air Act procedures by January 1, 2022.

Streamlining approval of higher blends ensures fuel blenders have the flexibility to use low-cost higher blends of ethanol to meet the 98 RON fuel octane standard but without creating a mandate.

- **Section 204: Replacement of Motor Vehicle Emissions Simulator (MOVES) Model**

Section 204 requires EPA to develop and use new emission modeling that relies on commercially available fuel and accurately reflects the profile of higher ethanol blends.

EPA currently uses the Motor Vehicle Emissions Simulator, or MOVES model, for vehicle emissions modeling, but MOVES is based on a flawed fuel effects study that did not use standard fuels available in the marketplace. As a result, the MOVES model incorrectly characterizes the air pollution effects of blending ethanol in gasoline, effectively penalizing higher blends of ethanol. For proper emissions modeling, EPA must replace the current model with one that accurately represents real-world fuels and vehicles in the market.

Title III: Infrastructure

- **Section 301: High Efficiency Vehicles**

Section 301 requires automakers design light-duty vehicles to operate on 98 RON gasoline and improve fuel economy. Beginning with the 2024 model year, automakers would be required to warrant vehicles for use on 98 RON gasoline and ethanol blends up to and including 30 percent. EPA is required to consult with automakers in developing regulations to carry out these requirements.

A transition to high octane fuel requires vehicles in the marketplace be designed and warranted to use high octane fuel such as 98 RON. Nearly all vehicles are currently warranted for ethanol blends up to 15 percent, with some vehicles warranted for blends up to E25. The legislation allows automakers until 2024 to design and warrant vehicles for 98 RON gasoline and up to E30 blends, recognizing the lead time required for new vehicles.

- **Section 302: Infrastructure**

Section 302 requires all new refueling infrastructure to be compatible with higher ethanol blends of at least 30 percent to support the transition to high octane fuels, effective January 1, 2024.

Fuel dispensers from major manufacturers are already designed and certified for ethanol blends up to 25 percent, with certifications pending for blends up to 40 percent. A recent U.S. Department Agriculture grant program for infrastructure to dispense higher blends of biofuels required infrastructure in all funded projects be compatible with at least 25 percent ethanol blends. This infrastructure requirement applies to new infrastructure and does not require retailers to change existing infrastructure.

- **Section 303: Corporate Average Fuel Economy (CAFE) and GHG Credit Generation**

Section 303 reestablishes CAFE/GHG credits for flex fuel, providing meaningful credits to automakers for production of vehicles that run on flex fuels like E85, a low carbon fuel.

Automakers are required to meet standards for fuel efficiency, measured in miles per gallon, through the federal CAFE regulations and meet standards for carbon emissions through the GHG regulations. Each automaker tests and certifies its vehicles through EPA procedures to ensure its fleet of vehicles, on average, meets the standards. Automakers receive credits when their fleet's average fuel economy and/or GHG emissions are better than the standards require.

Reestablishing these credits also encourages production of vehicles that could also use high octane, low carbon fuel, supporting the transition to new high octane vehicles and fuel.