

LSU ENERGY INSTITUTE · U.S. ASSOCIATION FOR ENERGY ECONOMICS WEBINAR · JUNE 24, 2026

The Renewable Fuel Standard

A guide to America's biofuel mandate — mechanics, market design, and the 2026–2027 reset

Tyler Gray

Energy Institute | Louisiana State University

LSU | Energy Institute

energy.lsu.edu



What this briefing is — and what it isn't

Primary legal sources — The RFS regulations at 40 CFR part 80, subpart M (§§ 80.1400–80.1479) quoted verbatim from the current CFR; program authority under Clean Air Act § 211(o), as described by EPA and the Congressional Research Service (CRS).

Current numbers — Volume requirements are from EPA's final rule for 2026–2027, signed March 27, 2026, and published April 1, 2026 — including the 70% reallocation of small refinery exemptions and the partial waiver of the 2025 cellulosic requirement.

Peer-reviewed evidence — Pass-through and environmental-effects findings come from published research (JAERE 2017; PNAS 2022) and from GAO and CRS reviews — each labeled, including where findings are contested.

Fast-moving series flagged — RIN prices, exemption decisions, and litigation move quickly; time-stamped snapshots are labeled with their as-of dates.

Not advice — Economic and policy analysis for discussion — not legal advice, investment advice, or an institutional position.

Five questions, five sections

1 The mandate machine What exactly does the RFS require, of whom, and through what legal machinery?

2 RIN economics How does a tradable compliance credit turn a quantity mandate into prices?

3 The 2026–2027 reset What did EPA just finalize — and why are the volumes record-high?

4 What the evidence shows Fuel prices, agriculture, emissions — what does published research actually find?

5 A research agenda Where are the open questions an economist could answer?

01

The mandate machine

Who must comply, what counts, and the formula that turns national volumes into firm-level obligations.

Origins: two statutes, one escalating mandate

2005

**Energy Policy Act
creates the RFS**

First federal renewable-fuel
mandate: 4 billion gallons required
in 2006.

2007

**EISA (P.L. 110-140)
supersizes it**

“RFS2”: four nested categories and
a schedule ascending to 36 billion
gallons in 2022.

2010

EPA implementing rules

40 CFR part 80, subpart M: RINs,
equivalence values, pathways,
exemptions.

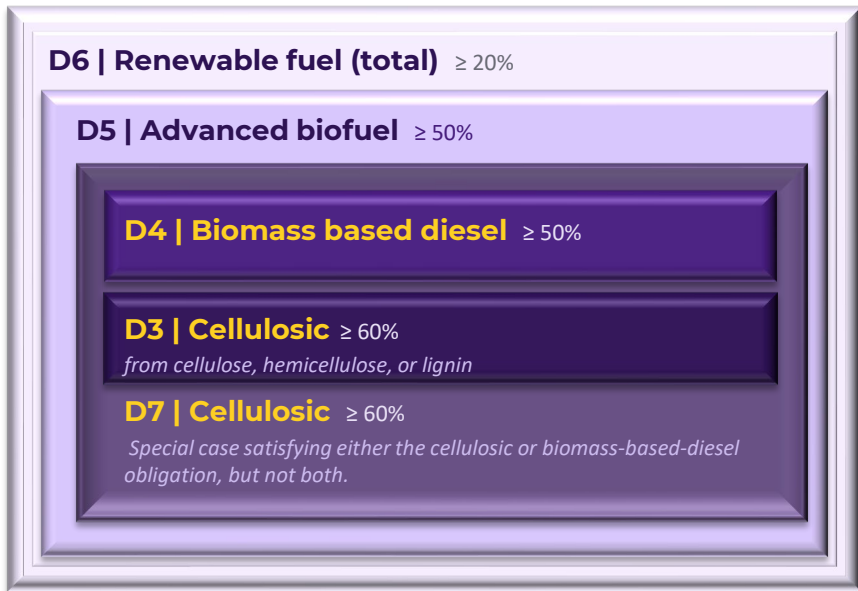
2023+

The “Set” era

Statutory tables expire after 2022;
EPA now sets volumes by rule
under CAA § 211(o)(2)(B)(ii)
criteria.

The economist's translation — Congress fixed a quantity path and delegated the prices. After 2022, even the quantities are delegated — EPA balances statutory factors (environment, energy security, costs, infrastructure) in setting each year's volumes.

Nested Categories



“Advanced biofuel means renewable fuel, other than ethanol derived from cornstarch, that has lifecycle greenhouse gas emissions that are at least 50 percent less than baseline lifecycle greenhouse gas emissions.”

— 40 CFR § 80.2 (definitions; verbatim)

Nesting — Each inner category also satisfies every outer one: a cellulosic RIN counts toward all four standards; a D4 RIN toward three; corn-starch ethanol only toward the total.

Implication — Four mandates create four linked markets — and a price ordering (inner ≥ outer) that is itself a test of the program's internal logic.

Source: 40 CFR § 80.2 (advanced biofuel, biomass-based diesel, cellulosic ≥ 60% definitions); *20% threshold per 40 CFR § 80.1403; D-codes per 40 CFR § 80.1425.

Who owes what: the Renewable Volume Obligation

$$"RVO_{CB,i} = (RFStd_{CB,i} \times (GV_i + DV_i)) + D_{CB,i-1}"$$

— 40 CFR § 80.1407(a)(1): obligation = percentage standard × (gasoline + diesel volume) + prior-year deficit

Obligated parties — Refiners and importers of gasoline and diesel (§ 80.1406). Blenders below 250,000 gal/yr and certain others are carved out — the contested “point of obligation” choice.

How it scales — EPA sets national percentage standards each year (§ 80.1405); each firm multiplies them by its own fossil gasoline-plus-diesel volume. Mandates scale with market share automatically.

What's excluded from the base — Renewable fuel itself, exports, fuel from exempt small refineries (§ 80.1441), Alaska and the territories unless opted in, and non-transportation distillate (§ 80.1407(f)).

Deficit carryover — A firm may run one year's deficit (the D term) — an intertemporal escape valve that smooths compliance shocks.

The RIN: a barcode that becomes a currency



Generated with the gallon — Producers and importers generate RINs batch-by-batch (§ 80.1426); the D digit encodes the category, and RR encodes ten times the fuel's equivalence value (§ 80.1425(f)–(g), verbatim structure).

Separate, then trade — Once fuel is blended or sold for retail, the RIN is separated (§ 80.1429) and becomes a freely tradable instrument — the compliance currency.

Cleared on EMTS — Every generation, trade, separation, and retirement is recorded in EPA's Moderated Transaction System (§ 80.1452) — a complete administrative ledger of a designed market.

Retired to comply — Obligated parties retire RINs against each year's four RVOs; invalid RINs must be replaced (§§ 80.1431, 80.1474) — buyer-beware liability that spawned a verification industry.

Equivalence values: the program's exchange rates

1.0

Denatured ethanol

1.3

Butanol

1.5

Biodiesel

1.7

Renewable diesel*

$$EqV = (R/0.972) \times (EC/77,000)$$

— 40 CFR § 80.1415(c)(1): equivalence value = renewable share × energy content, normalized to denatured ethanol (77,000 Btu/gal LHV)

Why it matters — RINs are denominated in ethanol-equivalent gallons — one physical gallon of renewable diesel mints 1.7 RINs. Mandated “gallons” are really mandated energy, and high-EqV fuels stretch further against the obligation.

A removed entry — The table once assigned 22.6 kWh of renewable electricity = 1 gallon; the 2026 final rule removed renewable electricity (eRINs) from the program before generation ever began.

02

RIN economics

How a quantity mandate becomes a price — and what that price did in 2013, and again in 2023.

One instrument, two prices: implicit tax, implicit subsidy

ON FOSSIL GALLONS: A TAX

Each gallon of gasoline or diesel an obligated party sells carries a fractional RIN obligation. At a positive RIN price, that is a per-gallon compliance cost — an implicit tax set by the market, not by Congress.

ON RENEWABLE GALLONS: A SUBSIDY

Each qualifying renewable gallon mints a sellable RIN worth its market price \times equivalence value. That revenue is an output subsidy to renewable producers and blenders — funded by the implicit tax, not by appropriations.

Self-financing transfer — The RFS moves billions per year from fossil-fuel supply chains to renewable-fuel supply chains with no federal outlays — the fiscal invisibility is a feature for legislators and a measurement challenge for economists.

The RIN price is the signal — When the mandate exceeds what blending economics would deliver anyway, RIN prices rise toward the gap-closing cost; when the mandate is slack, RINs drift toward pennies. The price series is a running referendum on whether the constraint binds.

Who pays? The pass-through evidence

“The pass-through of RIN prices to the retail E85–E10 spread is precisely estimated to be close to zero.”

— Knittel, Meiselman & Stock, *J. Assoc. Environmental & Resource Economists* 4(4): 1081–1119 (2017)

Wholesale: yes — The same study finds RIN costs reflected in wholesale fuel price spreads — obligated parties' compliance costs move wholesale margins roughly as theory predicts.

Retail E85: no (then) — But the consumer-facing discount on high-ethanol E85 didn't track RIN values in their sample — the subsidy leg leaked somewhere between the blender and the pump.

Why it matters — The program's efficiency case leans on the subsidy reaching consumers as cheaper high-blend fuel. Incomplete retail pass-through means rents accrue mid-chain — to blenders or retailers — rather than expanding renewable demand.

Open question — These estimates predate the renewable-diesel era and today's market structure — a re-estimation with current data is overdue (see Section 5).

2013: the year the constraint started binding

1–5¢

D6 RIN price, 2006 through much of 2012 —
the mandate was slack

>\$1.40

July 2013 peak as the E10 blend wall
approached

~20¢

by mid-November 2013 after EPA signaled
volume relief

The blend wall — Nearly all U.S. gasoline is sold as E10 (10% ethanol). Once mandated volumes approached 10% of projected gasoline use, the marginal compliance route stopped being “blend a cheap gallon” and became “force E85/E15 infrastructure or buy scarce RINs.”

The economics lesson — Quantity instruments are quiet until they bind — then the shadow price jumps discontinuously. A 100-fold RIN price move with no statutory change is the cleanest demonstration in U.S. policy of a constraint switching regimes.

The political economy lesson — The 2013 spike triggered a decade of relief-valve politics: volume waivers, the small-refinery exemption boom, and the point-of-obligation fight all trace to it.

Nesting as option structure — and a 2023 stress test

The no-arbitrage prediction — Because inner-category RINs satisfy outer obligations, prices should order: $D3 \geq D4 \geq D5 \geq D6$. An inner RIN = an outer RIN plus an embedded option — the premium prices the option.

Normal times — D4 biomass-based diesel RINs typically trade at a premium to D6 ethanol RINs — they can cover more obligations (EIA).

October 2023 — $D4 \approx \$0.90$ and $D6 \approx \$0.89$ — the premium collapsed to a penny. EIA's explanation: BBD/advanced volumes were set well below industry's build-out, so surging renewable-diesel supply flooded D4 generation until the option was nearly worthless.

Why economists should care — The D4–D6 spread is a market-priced measure of how binding the inner mandates are relative to the outer one — a free, daily-frequency diagnostic of rule calibration (and of EPA forecast error).

“Normally, biomass-based diesel D4 RINs trade at a premium to ethanol D6 RINs because they satisfy more RVOs. This year, the two RIN prices have moved very close together...”

— U.S. EIA, *Today in Energy* (Oct. 24, 2023)

The escape valves — priced and unpriced

“The exemption period... shall be extended by EPA for a period of not less than two additional years if a study by the Secretary of Energy determines that compliance with the requirements of this subpart would impose a disproportionate economic hardship on a small refinery.... A refiner may petition EPA for an extension of its small refinery exemption, based on disproportionate economic hardship, at any time.”

— 40 CFR § 80.1441(e)(1)–(2) (verbatim)

Cellulosic waiver credits	§ 80.1456	EPA sells compliance credits when cellulosic supply falls short, satisfying the obligation only when accompanied by an advanced RIN
General/category waivers	CAA § 211(o)(7)	EPA may reduce volumes for inadequate supply or severe harm — used for the 2025 cellulosic partial waiver.
Deficit carryover	§ 80.1407(a)	One-year compliance deferral inside the RVO formula — an intertemporal smoother.
Small refinery exemption	§ 80.1441	Hardship relief for refineries — the most litigated, most rent-contested valve (next section).

03

The 2026–2027 reset

Record volumes, a 70% exemption claw back, eRINs cancelled — and an import-RIN haircut proposed but not finalized. EPA's “Set 2” rule.

The volumes EPA finalized (billion RINs)

Standard	2026 volume	+ SRE realloc.	2026 total	2027 total
Cellulosic biofuel	1.36	0	1.36	1.43
Biomass-based diesel	8.86	+0.21	9.07	9.20
Advanced biofuel	10.82	+0.28	11.10	11.32
Total renewable fuel	25.82	+0.99	26.81	27.02



2025 note: the cellulosic requirement was partially waived down to 1.21 billion RINs in the same action.

Source: EPA, Final Renewable Fuel Standards for 2026 and 2027 (signed Mar. 27, 2026; 91 FR, Apr. 1, 2026). One RIN = one ethanol-equivalent gallon.

Four structural moves in one rule

70% SRE REALLOCATION

Exempted volumes from 2023–2025 small-refinery exemptions are 70% reallocated onto 2026–2027 obligations — non-exempt parties pick up the difference; total demand is (mostly) made whole.

eRINs REMOVED

Renewable electricity is removed as a qualifying fuel — the announced eRIN market for EV charging from biogas power is cancelled before launch.

IMPORT HAIRCUT: PROPOSED ONLY

EPA proposed cutting RIN generation for imported fuel and foreign feedstocks (the “half-RIN” proposal) but did not finalize it for 2026–2027. What did change: revised default equivalence values for RD, renewable jet, and naphtha take effect in 2027.

2025 CELLULOSIC WAIVER

The 2025 cellulosic volume is partially waived to 1.21B RINs — the program's longest-running gap between statutory ambition and realized supply, still open.

The exemption valve in practice

175

SRE petitions decided in one EPA action
(announced Aug. 22, 2025)

38

refineries covered, spanning compliance years
2016–2024

140

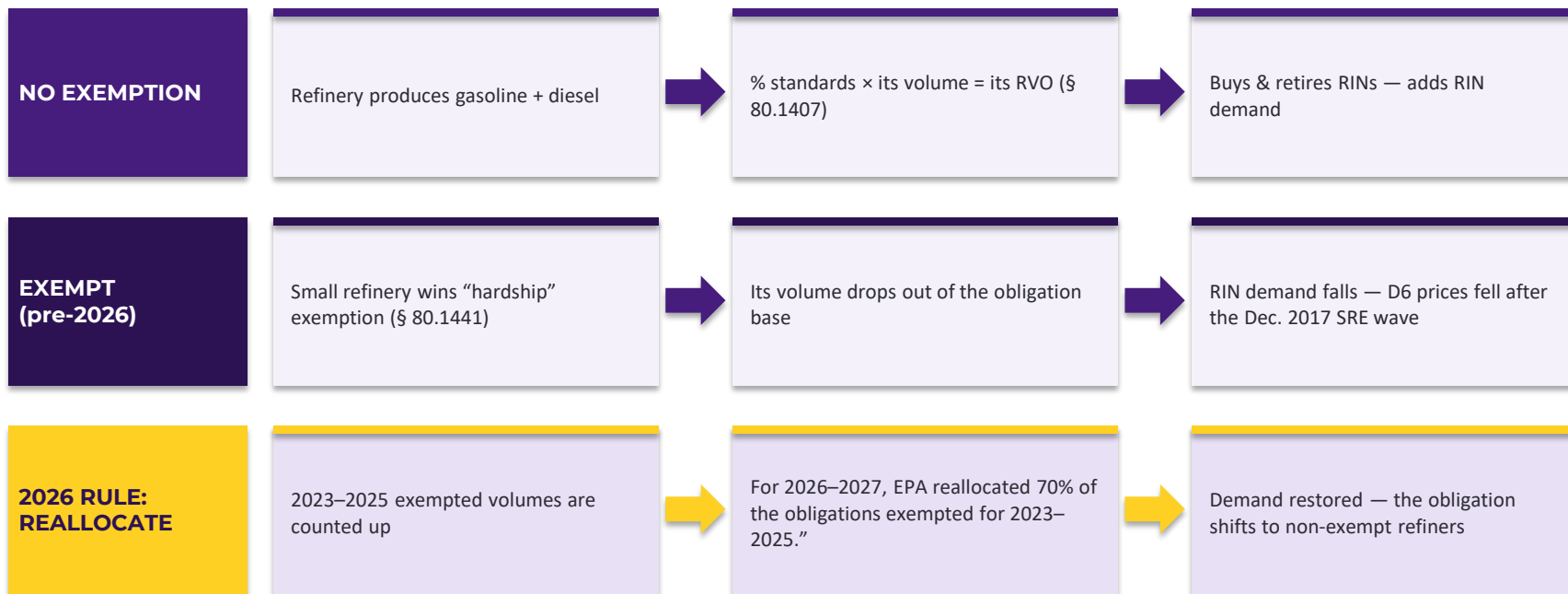
petitions granted in full or in part, per trade-
press tallies

Why it matters for prices — Each exempted gallon of refinery output erases its fractional RIN demand. Unanticipated mass exemptions have historically been RIN-bearish — the market reprices the mandate's effective size, not its nominal size.

The 2026 answer — The 70% reallocation makes future exemptions (mostly) demand-neutral in aggregate — converting an SRE from a program-wide leak into a transfer between refiners.

For researchers — A nine-year backlog resolved in one announcement, followed by a rule changing the reallocation regime — two cleanly dated shocks to the same market within seven months.

Small refinery exemptions in one picture



Pre-2026, an exemption shrank the whole program's demand; post-2026, it mostly reassigns who pays.

Do exemptions move the pump price? Evidence vs. speculation



EVIDENCE: PASS-THROUGH VIEW

RIN costs show up in wholesale fuel spreads (Knittel-Meiselman-Stock 2017), and GAO ties the RFS overall to modest gasoline-price increases outside the Midwest. If costs pass through, exemptions mostly reshuffle profits among refiners — pump effects are cents-level at most.

CLAIM: HARDSHIP VIEW

Philadelphia Energy Solutions — the largest East Coast refinery — blamed “skyrocketing” RIN costs in its 2018 bankruptcy (RINs \approx 2 \times payroll, its largest cost after crude). Skeptics: RIN prices had just fallen \sim 75%. § 80.1441 “hardship” petitions institutionalize the claim.

WHAT EPA'S OWN MATH SAYS — AND THE SPECULATION

EPA's RIA: the whole program \approx 5.1–5.2¢/gal on gasoline vs. a no-RFS world (19.5–22.3¢ on diesel); vs. the 2025 status quo, this rule adds 0.0¢ to gasoline (6.2–7.6¢ to diesel) — and the 70% SRE reallocation itself \approx 0.5¢/gal (0.4¢ D6 + 0.1¢ D4). The speculation: analysts project compliance shortfalls vs. record volumes pushing RIN prices above EPA's 12-month-average assumptions into 2027 — a hypothesis to test on the RIN tape, not a forecast.

Fixing the RFS since 2019 — the rulemaking record

Principal EPA rulemakings and small-refinery-exemption (SRE) decision actions — chronological

2019	EPA grants 31 SREs for 2018 — the surge in exemptions that collapsed RIN demand and triggered the backlash.
Feb 2021	EPA signals it will follow the Tenth Circuit's RFA decision, narrowing who qualifies for an SRE.
Dec 2021	EPA proposes to deny all pending SRE petitions and proposes revised 2020–2022 volumes.
Apr 2022	Denies 36 SRE petitions (2018 CY); offers separate compliance flexibility to those refineries.
Jun 2022	Final 2020–2022 RVO rule (sets 2021–22, cuts 2020); denies 69 SREs (EPA-420-R-22-011); biointermediates rule.
Jun 2023	“Set 1” rule — first post-statutory volumes for 2023–2025; +250M-gal remand make-up; eRINs not finalized.
Aug 2025	August 2025 SRE Decisions: 175 petitions (2016–2024) — 63 full, 77 partial, 28 denied, 7 ineligible; adopts reallocation policy.
Sep 2025	Supplemental proposal revising the Set 2 volumes to account for the August 2025 SRE decisions.
Nov 2025	November 2025 SRE Decisions: 16 petitions (2021–2024) — 2 full, 12 partial, 2 denied; 2025 CY left undecided.
Mar 2026	Final “Set 2” rule (2026–2027): record RVOs, 70% reallocation of 2023–2025 SRE volumes, eRINs removed, 2025 cellulosic partial waiver.

Fixing the SREs since 2019 — the litigation record

The appellate and Supreme Court decisions that repeatedly reset the exemption rules

Jan 2020	<p><i>Renewable Fuels Ass'n v. EPA</i> 948 F.3d 1206 (10th Cir.)</p> <p>Vacated three SRE grants: an “extension” requires continuous prior exemption — narrowing eligibility.</p>
Jun 2021	<p><i>HollyFrontier Cheyenne Refining v. Renewable Fuels Ass'n</i> 594 U.S. 382 (No. 20-472)</p> <p>SCOTUS reverses the Tenth Circuit: a refinery may seek a hardship “extension” even after a lapse.</p>
Oct 2022	<p><i>Suncor Energy v. EPA</i> (10th Cir.)</p> <p>Remands SRE denials/grants for further explanation — part of the post-HollyFrontier churn.</p>
Nov 2023	<p><i>Calumet Shreveport Refining v. EPA</i> No. 22-60266 (5th Cir.)</p> <p>Vacates EPA's 2022 denials as “impermissibly retroactive”; rejects the agency's RIN-passthrough theory.</p>
Aug 2024	<p><i>Sinclair Wyoming Refining Co. v. EPA</i> (D.C. Cir.)</p> <p>Reviews the 2022 mass denials — remands key reasoning while sustaining parts of EPA's approach.</p>
Jun 2025	<p><i>EPA v. Calumet Shreveport Refining</i> 605 U.S. ___ (No. 23-1229)</p> <p>SCOTUS (7–2): challenges to SRE denials belong in the D.C. Circuit; vacates the 5th Cir. transfer denial (with companion <i>Oklahoma v. EPA</i>).</p>

The latest RVO — and will the 2025 SREs be granted?

26.81B

RINs — 2026 total applicable volume (25.82B + 0.99B SRE reallocation)

27.02B

RINs — 2027 total applicable volume

15.0B

gal implied conventional volume required in both 2026 and 2027

FORMAL STATUS: UNDECIDED

As of its November 7, 2025 action, EPA expressly did NOT rule on the pending 2025 compliance-year SRE petitions. They remain open — a decision is expected during 2026.

EPA'S WORKING ASSUMPTION: YES

The final 2026–27 rule reallocates 70% of 2023–2025 SRE volumes — explicitly including exemptions “projected to be granted for 2025.” EPA states it “expects additional exemptions to be granted for the 2025 compliance year.”

BOTTOM LINE Formally pending, functionally presumed. The recent track record points to grants (Aug 2025: relief on 140 of 175 petitions; Nov 2025: 14 of 16), and EPA has already budgeted for 2025 exemptions by reallocating them. Because reallocated volumes are met with carryover RINs whose cost was realized in 2023–2025, granting 2025 SREs shifts the compliance burden among refiners without shrinking aggregate RIN demand. The open question is how many, not whether.

04

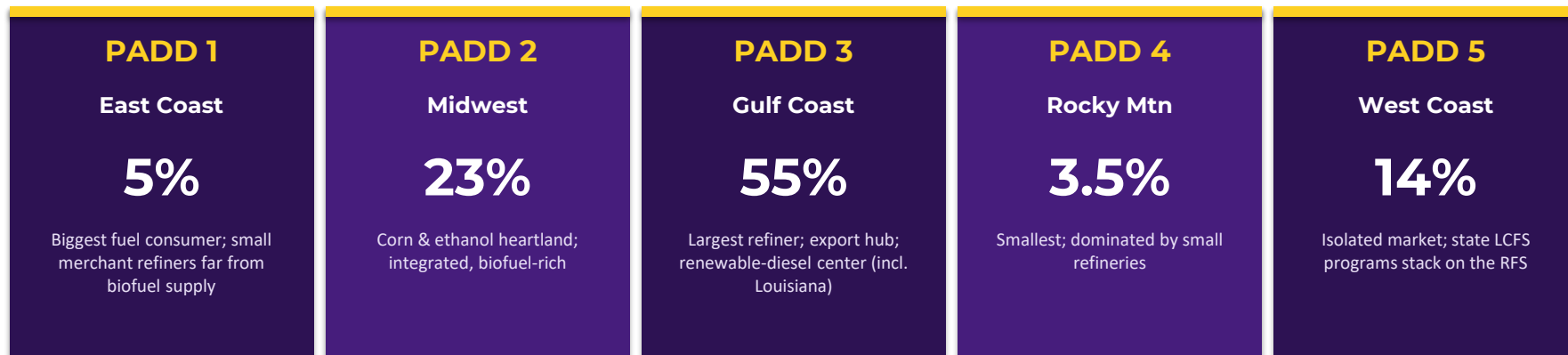
What the evidence shows

One national mandate, five regional outcomes — why the RFS lands differently across each PADD, plus prices, agriculture, and emissions.

One mandate, five regions: the PADD map

U.S. refining is geographically lopsided — so a single national mandate has five different footprints. Share = operable atmospheric crude distillation capacity.

Share of U.S. refining capacity



Source: EIA operable atmospheric crude oil distillation capacity by PADD (latest, as of Jan. 1; shares sum to U.S. total 18.42 mbpd; EIA transportation-fuels regional studies.

How the RFS hits each PADD differently

PADD	Refining role	RIN position	Key exposure under the RFS	Net posture
1 · East Coast	10% cap; merchant refiners, top consumer	Short — must buy RINs	Far from biofuel supply; PES 2018 bankruptcy (RINs ≈ 2× payroll)	Most cost-exposed
2 · Midwest	23% cap; ethanol heartland	Long — net RIN generator	Cheap local blending offsets compliance cost	Most cushioned
3 · Gulf Coast	46% cap; export hub + RD center	Mixed — big obligor & big D4 generator	Exports excluded from RVO base (§ 80.1407(f)); Diamond Green Norco	Naturally hedged
4 · Rocky Mtn	4% cap; small refineries	Short, small-scale	SRE epicenter — HollyFrontier, Sinclair, Suncor	Relief-dependent
5 · West Coast	18% cap; isolated market	Short + LCFS demand	State LCFS stacks on RFS; #2 renewable-diesel source	Highest policy load

Same rule, opposite signs: a Midwest blender banks RIN value while an East Coast merchant refiner writes a check — and a Gulf exporter largely sidesteps the obligation.

Fuel-price incidence: a Midwest-vs-coasts (PADD) story

“...the nationwide Renewable Fuel Standard (RFS) was likely associated with modest gasoline price increases outside of the Midwest...”

— U.S. Government Accountability Office, GAO-19-47 (2019)

“Outside the Midwest” = outside PADD 2 — GAO's carve-out is geographic: in PADD 2, cheap local ethanol blending cushioned (or reversed) price effects; in PADD 1 and PADD 5, distance from biofuel supply plus RIN costs pushed prices up. The mandate's incidence has a map — and the map is the PADD map.

Magnitudes are small either way — EPA's own RIA puts the whole program near 5.1–5.2¢/gal on gasoline nationally (≈0.0¢ added by the 2026 rule vs. the 2025 baseline). The regional spread sits around that average — Midwest below, coasts above — not a multi-dime swing.

Consistent with the wedge model — Modest average retail effects + measurable wholesale pass-through + leaky E85 pass-through (Slide 12): the tax leg works, the consumer-subsidy leg underdelivers — and where you sit on the PADD map sets which leg you feel.

What we still can't say precisely — Diesel-side incidence in the renewable-diesel era (a PADD 3/PADD 5 question) and the proposed import-RIN haircut, if finalized, are not yet credibly estimated by PADD.

Agriculture and land: the margin where it bites

“These changes increased annual nationwide fertilizer use by 3 to 8%, increased water quality degradants by 3 to 5%, and caused enough domestic land use change emissions such that the carbon intensity of corn ethanol produced under the RFS is no less than gasoline and likely at least 24% higher.”

— Lark et al., PNAS (2022) — findings disputed by industry and other modeling groups

Demand-side fact — The mandate hard-wired a structural, price-inelastic buyer into the corn market — roughly a third or more of the U.S. corn crop has gone to ethanol in recent years, a demand floor that reshapes acreage, rents, and crop insurance.

The contested margin — Whether ethanol's lifecycle carbon advantage survives land-use change is THE fight: PNAS (2022) says no; USDA/DOE-line modeling says yes. The answer hinges on counterfactual land use — an econometrics problem, not a chemistry one.

2008 reminder — The food-versus-fuel spike (corn near \$7/bushel) showed mandate demand colliding with bad harvests — inelastic demand meeting inelastic supply.

The GHG ledger: built for fuels that didn't show up

“...the RFS is unlikely to achieve the targeted level of greenhouse gas emissions reductions. For example, the cellulosic biofuel blended into the transportation fuel supply in 2015 was less than 5 percent of the statutory target...”

— U.S. GAO (GAO-17-94 / GAO-17-264T)

The design assumption — EISA's climate math leaned on the $\geq 60\%$ category: 16 of the statutory 36 billion gallons were supposed to be cellulosic by 2022. Actual 2026 cellulosic standard: 1.36 billion RINs — and most of that is biogas, not liquid fuel.

What filled the gap — Corn ethanol (20% tier, with contested lifecycle math) and, lately, biomass-based diesel (50% tier, feedstock-constrained). The program delivered substantial renewable-fuel volume, but not the statutory cellulosic volume or fuel mix Congress envisioned.

The economist's framing — The RFS pays per ethanol-equivalent gallon, not per ton of CO₂ avoided. Misalignment between the payment metric and the policy objective is the root design critique — and the argument for carbon-intensity-based credits (cf. state LCFS designs, the 45Z credit).

The renewable-diesel boom: stacked incentives at work

2.6B

gal/yr of U.S. renewable-diesel nameplate capacity by end-2022 — from ~16 plants (farmdoc daily)

1.7

RINs minted per physical gallon (the highest standard equivalence value)

9.07B

RINs — the 2026 biomass-based diesel total applicable volume

Why diesel won — Drop-in chemistry (no blend wall), the 1.7 equivalence value, D4 premiums, state LCFS stacking, and refinery-conversion economics pulled capital into renewable diesel at scale.

The 2025 regime change — The long-standing blender's tax credit expired and was replaced by the § 45Z Clean Fuel Production Credit (2025–2029): producer-side, carbon-intensity-scaled, domestic-production-oriented (CRS IF12502).

Feedstock is the constraint — Soybean oil, used cooking oil, tallow — BBD growth now moves vegetable-oil markets worldwide, and feedstock provenance (incl. imports) is the program's new enforcement frontier.

PADD 3 spotlight: Louisiana on both sides of the ledger

PRODUCER: NORCO

Diamond Green Diesel — a Valero/Darling Ingredients joint venture — operates one of the largest renewable-diesel plants anywhere on the St. Charles Parish riverfront: 700 million gal/yr at Norco, grown from 160M at 2013 startup; 1.2 billion gal/yr company-wide. Every gallon mints 1.7 D4 RINs.

OBLIGATED: THE REFINING BELT

Louisiana's large refineries are obligated parties — every gallon of gasoline and diesel carries fractional RIN obligations (§ 80.1407). The 2026 reallocation shifts exempted small-refinery volumes onto precisely these large non-exempt plants.

The PADD 3 export hedge — Gulf Coast refiners export the majority of their output, and exported fuel is excluded from the RVO base (§ 80.1407(f)) — so a large share of Louisiana throughput carries no obligation at all, the structural reason PADD 3 is the most naturally hedged region.

One state, both exposures — Louisiana hosts RIN generators (D4 production, river feedstock logistics) and RIN buyers (merchant refining) at once — the program's internal transfer flows through a single industrial corridor, an ideal lens for incidence work.

05

A research agenda

Public ledgers, dated shocks, and a program redesigning itself in real time — four questions worth a paper.

The data is better than you think

EPA EMTS public data — RIN generation by fuel category, month, and pathway; separation and retirement aggregates — the administrative ledger of the entire market (§ 80.1452 infrastructure).

EPA RIN trades & prices — Volume-weighted RIN price and trade-count series by D-code, published from EMTS records — the market's own tape.

Rulemaking record — Every Set-era volume decision ships with a full docket: EPA's models, cost analyses, comments from every interest — revealed preferences of all parties, time-stamped.

Decision events — SRE decision announcements (e.g., Aug. 22, 2025: 175 petitions), final-rule signing dates (Mar. 27, 2026), waiver actions — cleanly dated shocks for event-study designs.

Complements — EIA fuel volumes and Today in Energy series; USDA crop and price data; futures curves (RBOB, ULSD, corn, soybean oil) for hedging-cost and expectation measures.

Four questions someone in this room could answer

1 Does reallocation neutralize exemptions?

The 70% SRE reallocation converts exemptions from demand destruction into transfers. Test: did RIN-price sensitivity to exemption news fall after Mar. 27, 2026? (Event studies on the 2025–2026 shocks.)

2 What did cancelling eRINs reveal?

An announced market was repriced to zero by rule. Use biogas/RNG project pipelines and partner-firm valuations to estimate anticipatory investment under regulatory uncertainty.

3 Re-estimate pass-through, diesel era

KMS (2017) is gasoline-era. With D4 dominant, who bears RIN costs in diesel markets — and does the E85 result replicate for B20/renewable blends today?

4 45Z × RFS stacking incidence

A carbon-intensity producer credit now stacks on a volumetric mandate. Who captures the combined rent along the soybean-oil → RD chain — growers, crushers, producers, or blenders?

The distributional ledger — who gains, who carries

Margin	Gains accrue to...	Exposure sits with...
The mandate itself	Corn growers, ethanol & BBD producers, blenders capturing RIN value	Fossil-gasoline/diesel consumers (modest, geographically uneven — GAO)
Exemptions + reallocation	Exempt small refineries (hardship relief)	Non-exempt (large) refiners absorbing reallocated volumes
Import RIN haircut (proposed)	Domestic producers and feedstock suppliers — if finalized in a future rule	Foreign producers; import-dependent blenders — prospective, not yet binding
45Z transition	Producers (credit moved from blenders); low-CI pathways	Blenders losing the credit; high-CI producers; Treasury (explicit outlays now on-budget)

Every valve, haircut, and reallocation is a distributional choice — the annual Set rule is where the bargain is struck.

Four takeaways

- 1 The RFS is a quantity mandate executed as a market — nested standards, tradable RINs, administered exchange rates — and the RIN price is the live readout of whether it binds.
- 2 It runs the largest self-financing transfer in U.S. energy policy — an implicit tax on fossil gallons funding an implicit subsidy to renewable gallons, off-budget by design.
- 3 The 2026–2027 rule is a structural reset — record volumes, exemptions neutralized by a 70% reallocation, eRINs cancelled — each move a dated, testable shock.
- 4 Its incidence is regional, not national — the same rule cushions PADD 2 (Midwest), squeezes PADD 1 merchant refiners, hedges PADD 3 exporters, drives PADD 4's exemption fight, and stacks on PADD 5's LCFS. Effects are modest on average but contested on land-and-carbon — and the data to settle it is public.

Questions & discussion

Tyler Gray

LSU Energy Institute · tgray35@lsu.edu · energy.lsu.edu

All statutory and regulatory quotations verbatim from the current CFR; volumes per EPA's final rule of March 27, 2026.



Sources & further reading

40 CFR part 80, subpart M (current)

40 CFR §§ 80.1401–1479: standards (80.1405), RVOs (80.1407), EqV (80.1415), RINs (80.1425–29), SRE (80.1441), waiver credits (80.1456); definitions at § 80.2.

EPA, Final RFS Standards 2026–2027

Signed Mar. 27, 2026; 91 FR (Apr. 1, 2026): volumes, 70% SRE reallocation, eRIN removal, 2025 cellulosic waiver (import-RIN cut proposed, not finalized). RIA: EPA-420-R-26-011.

EPA, Aug. 2025 SRE Decisions

Announced Aug. 22, 2025; 90 FR 41829: 175 petitions, 38 refineries, 2016–2024 compliance years.

CRS R43325 (Sept. 24, 2025)

The RFS: An Overview — program history (4→36 Bgal), waiver authorities, Set-era issues.

CRS IF12502

The § 45Z Clean Fuel Production Credit — producer-side, 2025–2027, replaces blender credits.

Knittel, Meiselman & Stock (2017)

JAERE 4(4):1081–1119 — RIN pass-through: wholesale yes, retail E85 ≈ zero.

GAO-19-47 (2019); GAO-17-94

Modest gasoline-price effects outside the Midwest; GHG targets unlikely to be met (cellulosic shortfall).

Lark et al., PNAS 119(9) (2022)

RFS land-use outcomes: fertilizer +3–8%, water-quality degradants +3–5%, corn-ethanol CI ≥ gasoline (contested).

U.S. EIA, Today in Energy (Oct. 24, 2023)

D4/D6 convergence (≈\$0.90/\$0.89) and the RVO-vs-capacity mismatch.

farmdoc daily; Diamond Green Diesel

RD capacity census (2.6 Bgal/yr, end-2022); Norco plant 700M gal/yr (Valero/Darling JV).