



THE RENEWABLE FUEL STANDARD

15 Years of Fueling Innovation



August 2020

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THE RENEWABLE FUEL STANDARD: AN ENDURING POLICY FOUNDATION

August 8, 2020

In a watershed moment for America's ethanol industry, President George W. Bush signed into law the first ever Renewable Fuel Standard (RFS) on August 8, 2005. Surrounded by the leaders in Congress and the administration who made it possible, President Bush astutely outlined the complementary objectives of the policy as he signed the bill: "Using ethanol and biodiesel will leave our air cleaner. And every time we use a home-grown fuel, we're going to be helping our farmers, and at the same time, be less dependent on foreign sources of energy."

Cleaner Air. Boosting the Farm Economy. Energy Security. Those were the laudable goals of the original RFS program.

Fifteen years later, we can proudly proclaim that the RFS hasn't just lived up to its ambitious expectations—it has far exceeded them.

As you'll see in this report, the RFS has been a smashing success. In addition to decreasing reliance on imported petroleum, the RFS has reduced emissions of harmful tailpipe pollutants and greenhouse gases, lowered consumer fuel prices, supported hundreds of thousands of jobs in rural America, and boosted the agricultural economy by adding value to the crops produced by our nation's farmers. And far from "distorting the free market" as RFS opponents often claim, the policy has been remarkably effective in stimulating market competition and giving consumers more choices. Simply put, the RFS ensures renewable fuels are able to gain access to a fuel market that had been monopolized for nearly a century and would otherwise be closed to competition.

Because the RFS has succeeded in replacing petroleum with cleaner renewable fuels, the policy has come under fierce attack from the incumbent fossil fuel industry and its supporters. The oil industry and its allies continue to devise strategies and tactics intended to frustrate the goals of the RFS, undermine and complicate implementation, and mislead the public about the many benefits of renewable fuels. But we have met and overcome those challenges at every turn, and we will continue to protect and defend the RFS from relentless assaults.

While the 15th anniversary of the RFS provides an opportunity to pause for reflection, there's no time to rest on the policy's laurels. The RFS isn't done yet. Indeed, it's only gotten started.

Contrary to the narrative advanced by some critics of the program, the RFS does not "end" or "sunset" in 2022. Congress clearly intended for the RFS to continue driving innovation and growth in renewable fuels production and usage well beyond 2022. In its next chapter, we believe the RFS will drive accelerated decarbonization of our liquid fuel supply, stimulate increased fuel and engine efficiency, further diversify our fuel mix, expand economic opportunities for the farm sector, and catalyze even lower prices and greater competition at the pump...all because of the enduring policy foundation created 15 years ago today.

Geoff Cooper
President & CEO



ENACTMENT OF THE RFS: A PERSONAL RECOLLECTION

We've probably all seen the Schoolhouse Rock version of "How a Bill Becomes a Law." It does a great job of explaining the legislative process. But it cannot capture the circuitous adventure and machinations that occur before an idea materializes into legislative language. That is particularly true when it comes to the 2005 Energy Bill and the Renewable Fuel Standard.

Indeed, the effort to pass the RFS had been going on for more than seven years prior, with clandestine meetings with the oil industry; a long campaign to educate the public about the dangers of MTBE, a competitor oxygenate that was contaminating drinking water supplies across the country; and a sustained effort to convince farmers and ethanol producers that replacing the existing oxygen content requirement in reformulated gasoline with a national RFS would lead to significant growth.

The early work plowing the field came to a public head in February 2002, when Red Cavaney, the President of the American Petroleum Institute, came to the National Ethanol Conference to announce with me the "RFS Compromise" that would become the foundation for the 2005 bill. Working together, the RFA, National Corn Growers Association, American Farm Bureau Federation, and the API almost got the RFS passed in 2003. And again in 2004, when Senate Majority Leader Tom Daschle brought the bill to within a few votes of passage. But oil company efforts to attach MTBE liability protection to the RFS package proved too large a lift, and those early efforts failed. They did, however, set the predicate for the bill's passage in 2005 when House Energy and Commerce Committee Chairman Joe Barton grew frustrated with the oil industry's mixed messages on MTBE liability and abandoned the effort. The RFS then passed the House overwhelmingly and the Senate by an astounding 73-27 bipartisan vote.

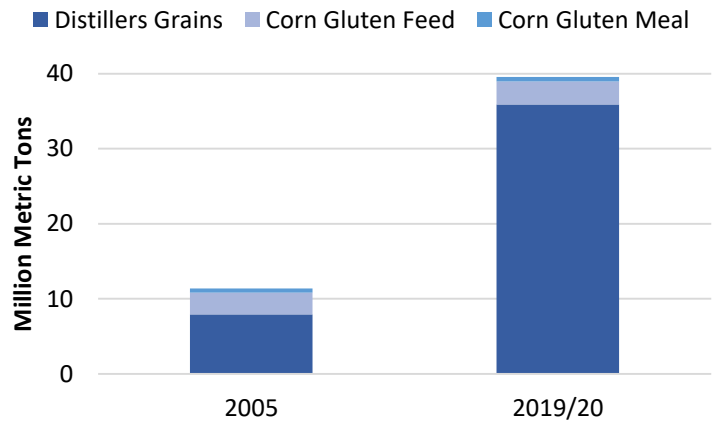
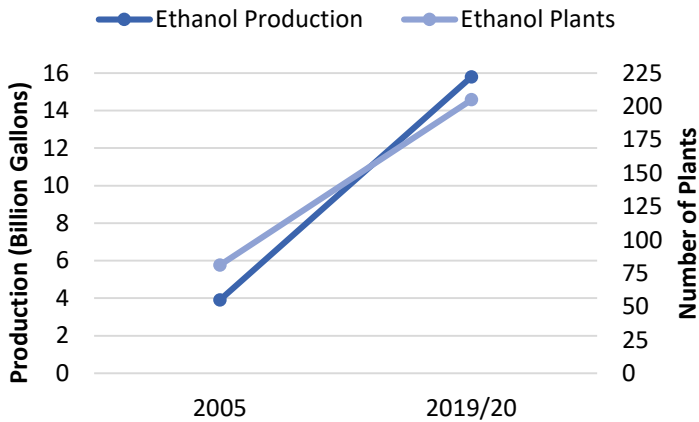


The bill passed in late July and was signed in Albuquerque, New Mexico on August 8, 2005. Despite the bill having taken at least seven years of my professional life by then, I was unwilling to sacrifice three days of my family vacation to make the trip for the signing. Instead, at the appointed hour of the signing, I paddled my canoe out to the middle of Lake Winnepesaukee, New Hampshire where in the solitude of the Green Mountains and witnessed by only a few tranquil loons, I let out a whoop in celebration because I knew U.S. energy policy had been transformed, renewable fuels would be assured a permanent and competitive place in the transportation fuels market, and the environment would benefit from the increased use of a low-carbon, low-emissions, and biodegradable fuel ethanol. As Senator Chuck Grassley would say, it was a "good, good, good" policy. Even the loons seemed to agree.

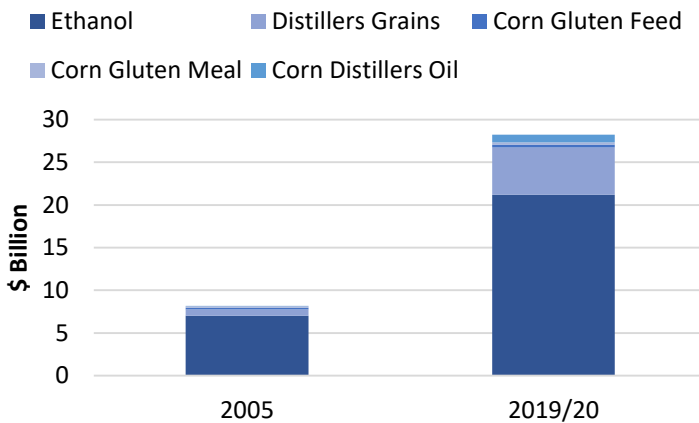
Bob Dinneen
Senior Strategic Advisor

U.S. ETHANOL INDUSTRY OUTPUT & CONTRIBUTION TO THE ECONOMY

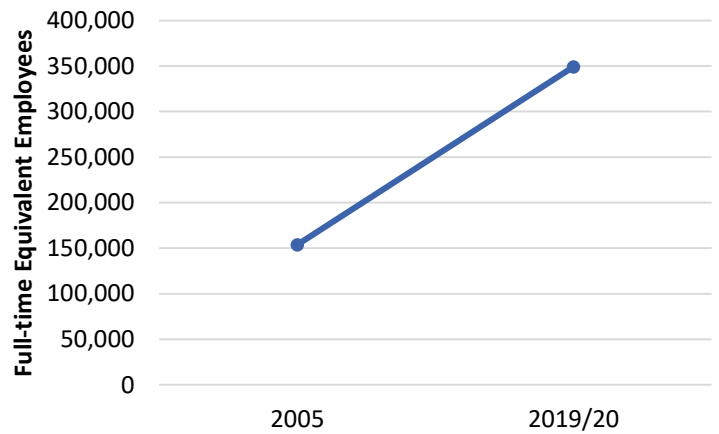
Ethanol & Co-product Output Has Quadrupled, as the Number of Plants Has More Than Doubled



The Value of Ethanol and Co-products Has Grown by More than \$20 Billion



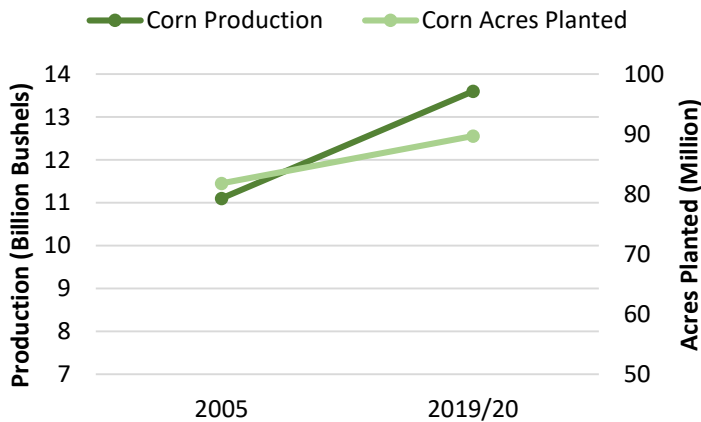
The Number of Jobs Supported by the Industry Has More than Doubled



ETHANOL INDUSTRY OUTPUT & JOBS	2005	2019/20	Change
Ethanol Plants	81	205	+153%
Ethanol Production (<i>billion gallons</i>)	3.9	15.8	+305%
Co-product Animal Feed (<i>million metric tons</i>)	11.4	39.6	+247%
Corn Distillers Oil (<i>billion pounds</i>)	0	3.7	--
Gross Value of Industry Output (<i>billion \$</i>)	\$8.1	\$28.2	+248%
Ethanol Industry Jobs (<i>direct, indirect, induced</i>)	153,725	349,010	+127%

CONTRIBUTION TO THE U.S. AGRICULTURE SECTOR

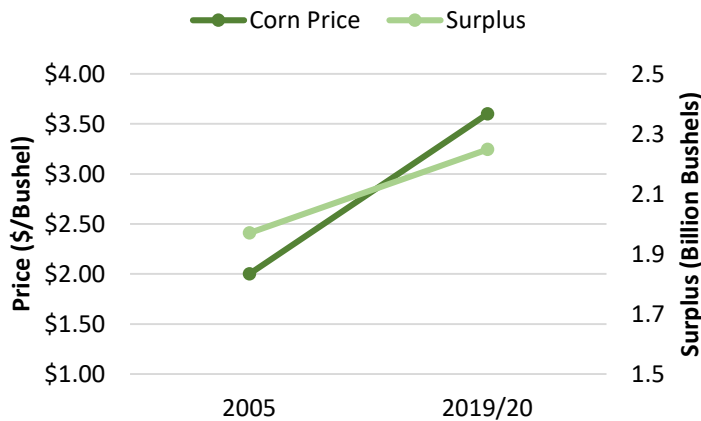
Corn Production Has Increased Nearly 25% While Planted Acreage Is up 10%...



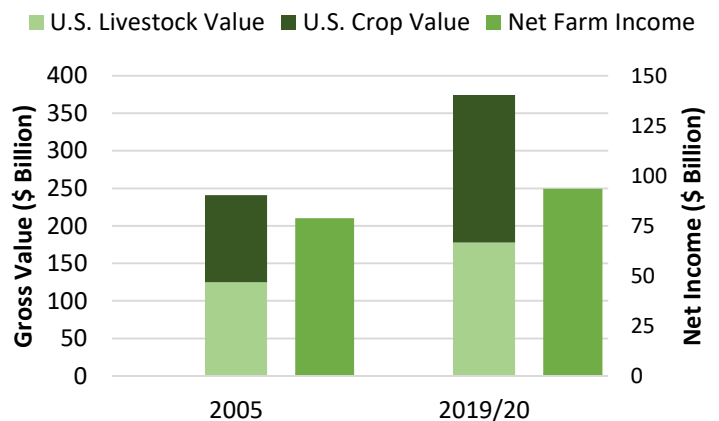
...Helping to Keep U.S. Cropland from Declining Further



Corn Prices Have Been Supported While Inventories Have Been Ample...



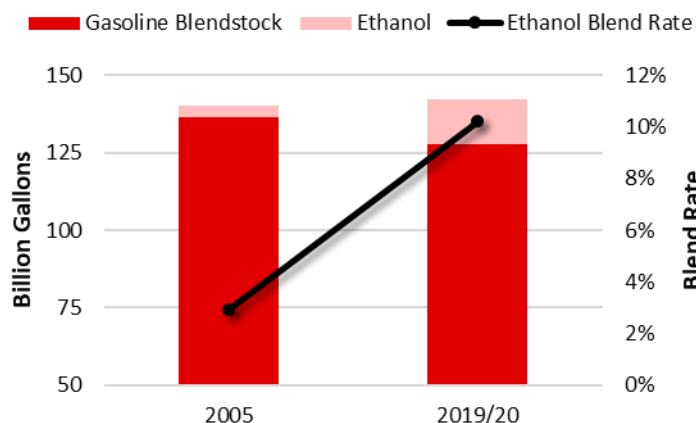
...and Ag Sector Production Value and Farm Incomes Have Increased



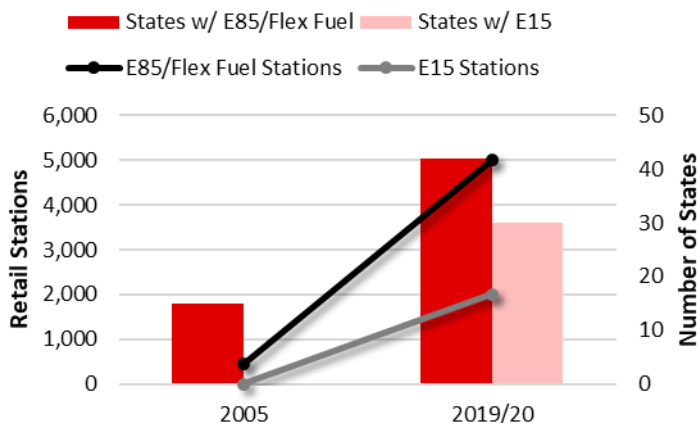
AGRICULTURAL PRODUCTION & VALUE	2005	2019/20	Change
Corn Production (<i>billion bushels</i>)	11.1	13.6	+23%
Corn Acres Planted (<i>million acres</i>)	81.8	89.7	+10%
Total Cropland (<i>million acres</i>)	418	396	-5%
Season-Average Corn Price (<i>\$/bushel</i>)	\$2.00	\$3.60	+80%
Corn Surplus (<i>billion bushels</i>)	1.97	2.25	+14%
Gross Value of U.S. Crops (<i>billion \$</i>)	\$116.0	\$196.7	+70%
Gross Value of U.S. Livestock (<i>billion \$</i>)	\$124.9	\$177.6	+42%
Net Farm Income (<i>billion \$</i>)	\$78.8	\$93.6	+19%

CONTRIBUTION TO U.S. ENERGY SECURITY & AFFORDABILITY

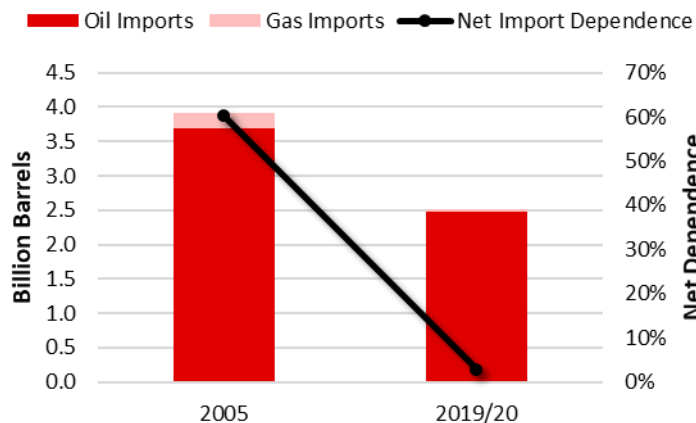
Ethanol Consumption Has More Than Tripled...



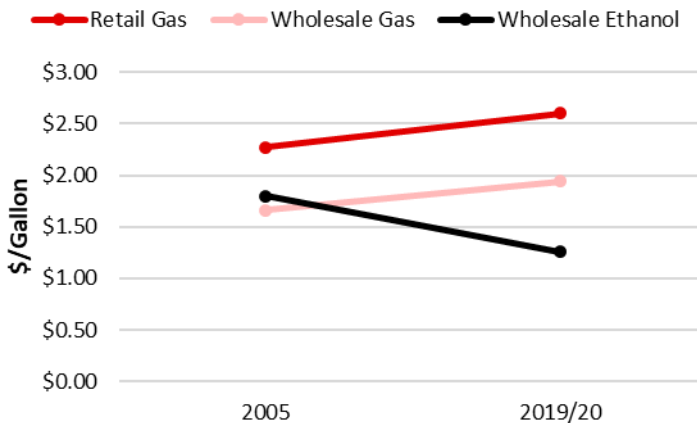
...and the Availability of Mid- and High-Level Ethanol Blends Has Expanded...



...Enhancing U.S. Energy Security...



...and Saving Consumers Money



U.S. GASOLINE MARKET	2005	2019/20	Change
Gasoline Blendstock Use (bil. gallons)	136.4	127.6	-6%
Ethanol Use (bil. gallons)	4.1	14.5	+258%
Finished Gasoline Use (bil. gallons)	140.4	142.2	+1%
Ethanol Blend Rate	2.9%	10.2%	--

U.S. PETROLEUM IMPORTS	2005	2019/20	Change
Crude Oil Imports (bil. barrels)	3.70	2.48	-33%
Crude Oil Import % of U.S. Demand	67%	41%	--
Oil Imports from OPEC (bil. barrels)	1.76	0.54	-69%
OPEC Share of U.S. Crude Oil Imports	48%	22%	--
Gasoline Imports (bil. gallons)	9.2	1.2	-87%
Petroleum Net Import Dependence*	60%	3%	--

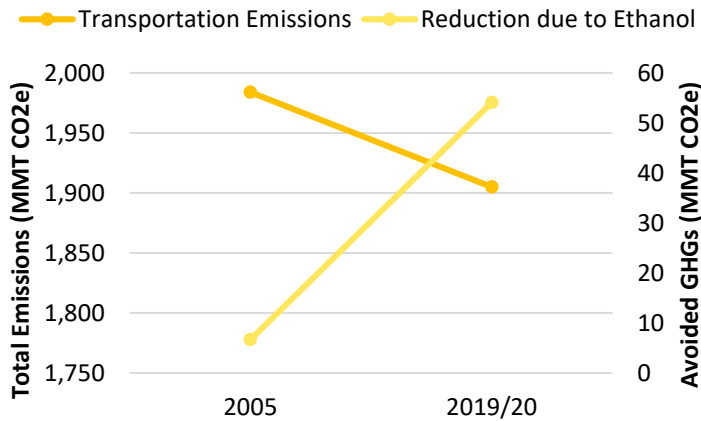
* Crude Oil & Products

E15 AND FLEX FUEL MARKET	2005	2019/20	Change
Retail Stations Selling E85/Flex Fuels	436	5,008	+1049%
States Offering E85/Flex Fuels	15	42	+180%
Flex Fuel Vehicles on the Road (mil.)	4	24	+492%
Retail Stations Selling E15	0	2,000	--
States Offering E15	0	30	--
% Vehicles Legally Approved for E15	0%	95%	--

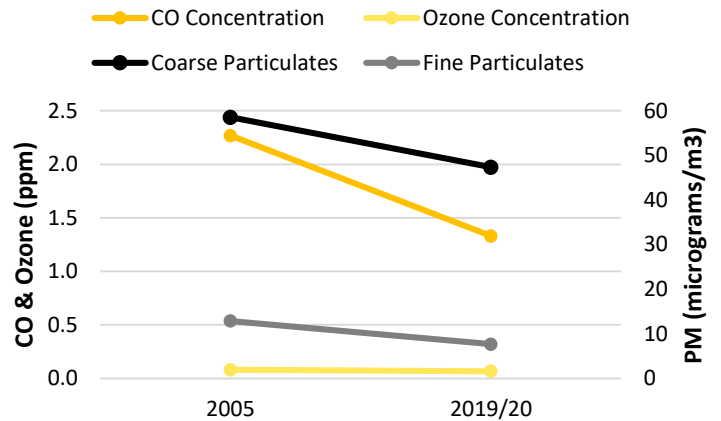
FUEL PRICES	2005	2019/20	Change
Brent Crude Oil (per barrel)	\$54.57	\$64.30	+18%
Retail Gasoline, Regular (per gallon)	\$2.27	\$2.60	+15%
Retail Diesel (per gallon)	\$2.40	\$3.06	+27%
Wholesale Gasoline, Reg. (per gallon)	\$1.66	\$1.94	+17%
Wholesale Ethanol (per gallon)	\$1.80	\$1.26	-30%

CONTRIBUTION TO THE ENVIRONMENT

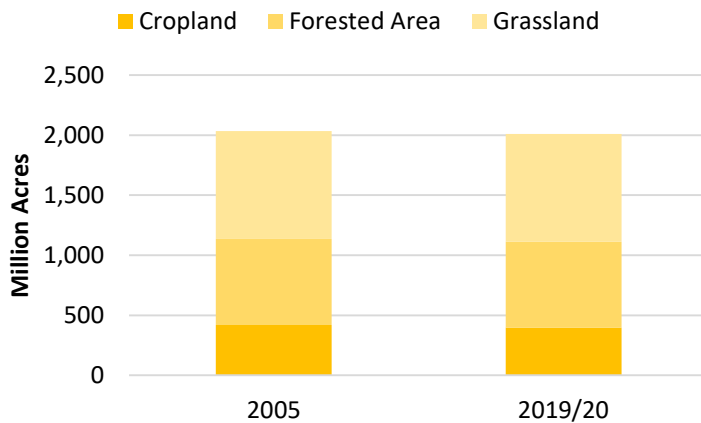
Ethanol Has Reduced Greenhouse Gas Emissions...



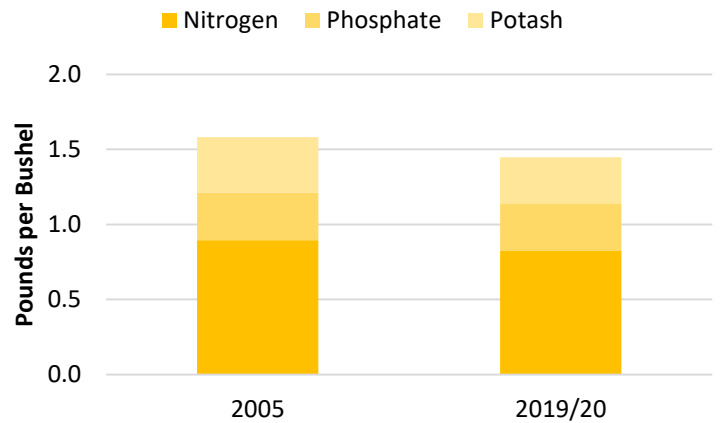
...and Cleaned up Air Pollution



Cropland, Forests and Grassland Have Been Retained...



...and Growers Have Improved Fertilizer Usage Efficiency

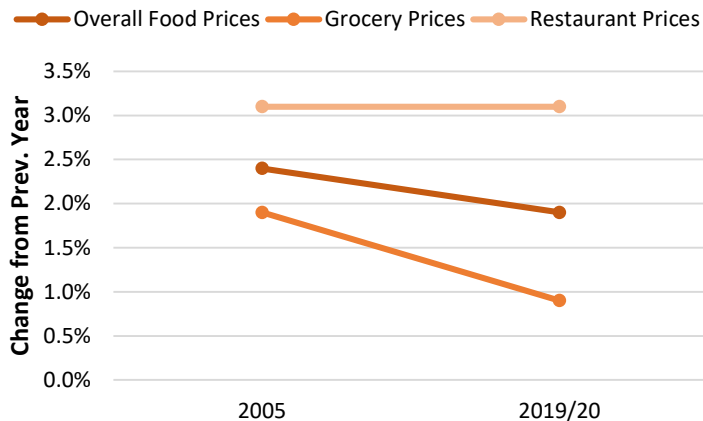


GHG EMISSIONS AND CRITERIA POLLUTANTS	2005	2019/20	Change
GHG Emissions from Transportation (<i>million metric tons CO₂e</i>)	1,984	1,905	-4%
U.S. Emissions per Mile Traveled (<i>pounds CO₂e per mile</i>)	1.46	1.29	-12%
GHG Emissions Avoided by Using Ethanol (<i>mil. metric tons CO₂e</i>)	6.7	54.1	+707%
Carbon Monoxide Concentration (<i>parts per million</i>)	2.3	1.3	-41%
Ozone Concentration (<i>parts per million</i>)	0.080	0.066	-17%
Coarse Particulate Matter Concentration (<i>micrograms per m³</i>)	58.5	47.3	-19%
Fine Particulate Matter Concentration (<i>micrograms per m³</i>)	12.9	7.7	-41%

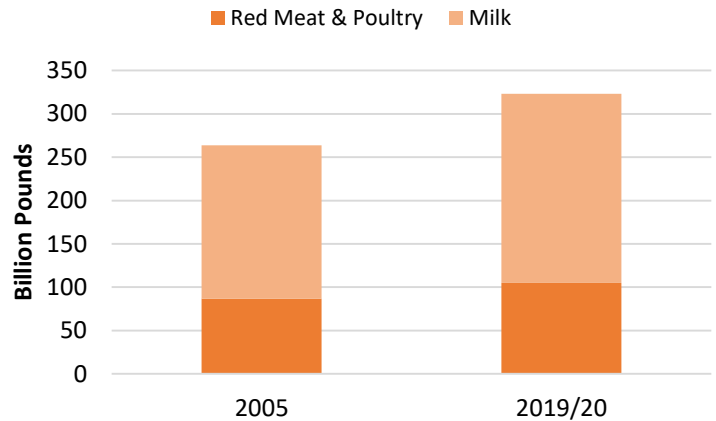
AGRICULTURE IMPACTS AND LAND USE	2005	2019/20	Change
U.S. Cropland Area (<i>million acres</i>)	418	396	-5%
U.S. Forested Area (<i>million acres</i>)	718	716	-0.3%
U.S. Grassland Area (<i>million acres</i>)	898	898	--
Nitrogen Fertilizer Use per Corn Bushel (<i>pounds</i>)	0.90	0.83	-8%
Phosphate Fertilizer Use per Corn Bushel (<i>pounds</i>)	0.32	0.31	-3%
Potash Fertilizer Use per Corn Bushel (<i>pounds</i>)	0.37	0.31	-16%

PERSPECTIVE ON FOOD PRICES & COMMODITY SUPPLIES

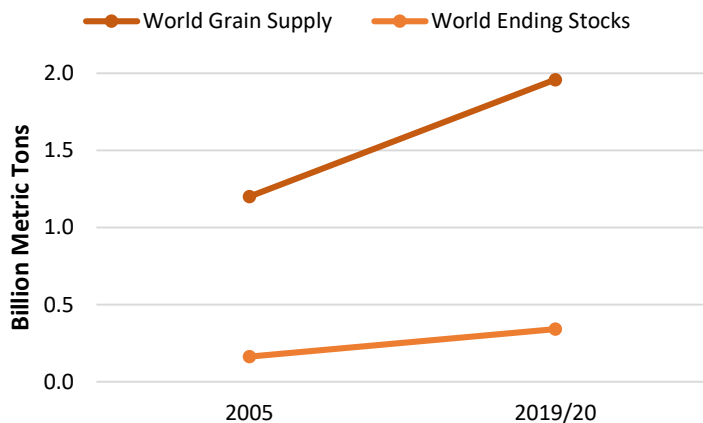
U.S. Food Price Inflation Has Declined...



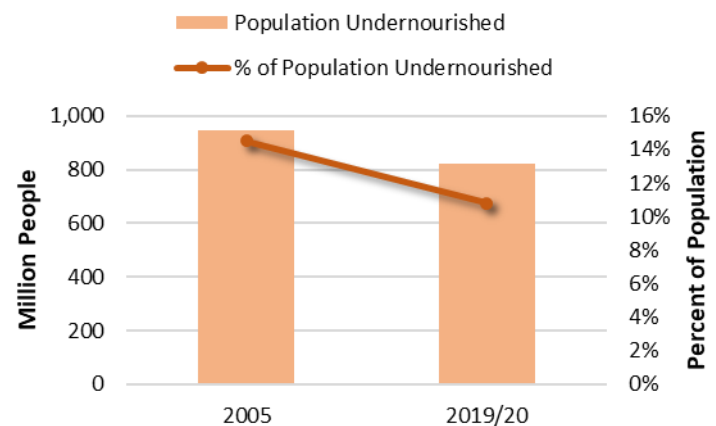
...and U.S. Production of Milk, Meat and Poultry Has Expanded



Global Grain Supplies Have Increased...



...and Fewer People Globally are Undernourished



U.S. RETAIL PRICES (Annual Chg.)	2005	2019/20	15-Yr. Avg.
Overall Food Price Inflation	2.4%	1.9%	2.2%
Grocery Price Inflation	1.9%	0.9%	1.8%
Restaurant Price Inflation	3.1%	3.1%	2.8%
Red Meat, Poultry, Fish Prices	2.4%	1.0%	2.3%
Cereals & Bakery Item Prices	1.5%	1.4%	2.0%
Dairy Prices	1.2%	1.0%	1.4%

U.S. MILK, MEAT & EGG PRODUCTION	2005	2019/20	Change
Milk Production (bil. lbs.)	176.9	218.4	+23%
Red Meat & Poultry Production (bil. lbs.)	86.7	104.9	+21%
Egg Production (bil. eggs)	90.5	113.4	+25%
Red Meat & Poultry per Capita (lbs.)	293.4	318.9	+9%

GLOBAL SITUATION	2005	2019/20	Change
Global Population Undernourished (million)	947	822	-13%
% of Global Population Undernourished	15%	11%	-4%
World Grain Supply (bil. metric tons)*	1.20	1.96	+63%
World Grain Supply per Capita (lbs./person)*	464	563	+21%
World Grain Ending Stocks (bil. metric tons)*	0.16	0.34	+109%

* Coarse Grains, Wheat, and Rice

DATA SOURCES

1. Ethanol Plants: Renewable Fuels Association (**RFA**)
2. Ethanol Production: **RFA** and U.S. Energy Information Administration (**EIA**)
3. Co-product Animal Feed and Corn Distillers Oil: **RFA** and U.S. Department of Agriculture (**USDA**)
4. Gross Value of Ethanol Industry Output: **RFA** based on **USDA** market values
5. Ethanol Industry Jobs: **ABF Economics**, **LECG Economics**
6. Corn Production and Acres Planted: **USDA**
7. Total Cropland: **USDA** (2005 is interpolated from 2002 & 2007 Censuses of Agriculture. 2017 is latest available.)
8. Corn Price: **USDA** (2005/06 crop-marketing year and 2019/20 forecast)
9. Corn Surplus: **USDA** (2005/06 crop-marketing year and 2019/20 forecast)
10. Gross Value of Crops and Livestock: **USDA**
11. Net Farm Income: **USDA**
12. U.S. Gasoline and Ethanol Consumption: **EIA**
13. Petroleum Imports: **EIA**
14. U.S. Petroleum Net Import Dependence: **RFA** based on **EIA** data
15. Brent Crude and Retail Fuel Prices: **EIA**
16. Wholesale Ethanol and Gasoline Prices (Omaha Rack): **Nebraska Energy Office**
17. Stations and States Selling E85/Flex Fuel: **RFA**, **E85Prices.com** and DOE Alternative Fuels Data Center (**AFDC**)
18. FFVs on the Road: National Renewable Energy Laboratory (**NREL**) (latest is 2018)
19. Stations and States Selling E15: **RFA** and **E85prices.com**
20. Percent of Vehicle Fleet Legally Approved for E15: **RFA**
21. GHG Emissions from U.S. Transportation: **EIA**
22. Emissions per Mile Traveled: **RFA** based on data from **EIA** and Federal Highway Administration (**FHWA**)
23. GHG Emissions Avoided: **RFA** based on Dept. of Energy (**DOE**) GREET model
24. Concentration Levels of Key Air Pollutants: U.S. Environmental Protection Agency (**EPA**)
25. Total Cropland: **USDA** (2005 is interpolated from 2002 & 2007 Censuses of Agriculture. 2017 is latest available.)
26. U.S. Forested Area and Grassland Area: **EPA** (2018 is latest available)
27. Fertilizer Use Data: **RFA** based on **USDA** data (2018 is latest available)
28. Annual Average Food Price Inflation Rates: **USDA** and U.S. Department of Labor (**DOL**)
29. U.S. Red Meat and Poultry, Milk, and Egg Production: **USDA**
30. World Hunger Statistics: UN Food & Agriculture Organization (**FAO**) (2018 is latest available)
31. World Grain Supplies and Ending Stocks: **USDA** (2005/06 crop-marketing year and 2019/20 forecast)