Food and Agricultural
Policy Research Institute

MU FAPRI

University of Missouri

June 2011

US Biofuels Baseline
and impact of extending the
$0.45 ethanol blenders credit

FAPRI-MU Report #07-11

Summary

Earlier this year, the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) released baseline projections for agricultural and biofuel markets.[1] That baseline assumed current biofuel policy, including provisions of the Renewable Fuel Standard (RFS2). Consistent with the law at that time, the $0.45 per gallon ethanol tax credit, the $0.54 specific tariff on ethanol imports, and the $1.00 per gallon credit for biodiesel were all assumed to expire at the end of 2011, and the additional credit for cellulosic biofuels was assumed to expire at the end of 2012.

This report compares a slightly modified version of that baseline[2] to an alternative scenario where the $0.45 per gallon ethanol tax credit and the $0.54 per gallon tariff are both extended indefinitely. Other biofuel policy assumptions are kept the same as in the 2011 FAPRI-MU baseline A stochastic approach is used to explore these policy options under a range of market contexts.

The results depend on assumptions about macroeconomic conditions based on information available in January 2011 as well as assumptions about policy implementation and market development in the biofuels sector. The baseline assumes annual waivers of the cellulosic biofuel mandate (with total and advanced mandates reduced in concert) and subsequent issuance of waiver credits which set the price for cellulosic RINs. In addition, the majority of advanced biofuel not included in the cellulosic biofuel and biobased diesel mandates is assumed to be imported sugarcane ethanol.

A number of conclusions can be drawn from the analysis.

1. **Extending the $0.45 ethanol tax credit and ethanol tariff expands domestic ethanol production and increases corn prices.** Extending the blenders credit increases domestic production of ethanol from corn starch by 1.2 billion gallons a year, using an additional 440 million bushels of corn. Corn prices exceed baseline levels by an average of $0.18 per bushel.

2. **Increased demand for corn as an ethanol feedstock expands corn acreage and increases area competition.** When the blenders credit is extended, corn area expands by an average of 1.7 million acres, while soybean area falls by 800,000 acres. Note that the scenario assumes an extension of the ethanol tax credit, but not the biodiesel credit.

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[1] See http://www.fapri.missouri.edu/outreach/publications/2011/FAPRI_MU_Report_02_11.pdf.
[2] The main modification to the 2011 FAPRI-MU baseline was to modify the equation that determine the potential size of the E-15 market to make it more responsive to changes in the prices of ethanol and regular gasoline. Small changes were also made to crop supply equations.

3. **Ethanol rack prices rise and retail ethanol equivalent prices fall with extension of the blenders credit.** A portion of the blenders credit is passed back to biofuel producers, while a share of it is passed on to consumers. Some of the decline in retail prices, however, is a result of saturation of the low-level blends market. Retail equivalent ethanol prices, what consumers pay for ethanol in blended fuels, must move below energy equivalence at least for a short while to expand the market for E-85.

4. **Extension of the import tariff increases the advanced and cellulosic RIN prices and the cost of meeting the advanced biofuel portion of the EISA mandate.** Extension of the ethanol tariff increases the price of advanced RINs given the assumption that imports of sugarcane-based ethanol provide the majority of non-cellulosic, non-biodiesel advanced RINs. Once the cellulosic mandate is waived, the EPA must offer cellulosic waiver credits. These waiver credits, along with an additional advance RIN, can be used for compliance in lieu of a cellulosic RIN and thus cellulosic RIN prices increase with advanced RIN prices.[3]

5. **The response of cellulosic biofuel producers has an important effect on ethanol prices and significant effect on the costs to consumers associated with extension of the blenders credits.** The blenders credit is also available to cellulosic ethanol production. Combined with the market effects of the ethanol tariff, this increases the production of cellulosic ethanol. Given higher production and the higher cellulosic RIN price noted above, the cost of mandate compliance increases significantly. We assume this cost is passed on to consumers of unleaded gasoline. The increase in cellulosic mandate costs accounts for the vast majority of the increase in total mandate costs. If cellulosic biofuel production response to the credit extension and increase in cellulosic RIN prices were smaller, mandate costs would rise less and the effects on unleaded gasoline prices would also be smaller. The evolution of cellulosic biofuel markets remains a key uncertainty.

6. **Biodiesel market effects are modest.** The biodiesel blenders credit expires in both the baseline and scenario. The mandate remains binding in most outcomes. Increasing feedstock prices result in higher biodiesel RIN prices and compliance costs.

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[3] We assume that the EPA sets the reduced cellulosic biofuel mandate to be the level at which the price of cellulosic RINs and the waiver credit plus advanced RIN price are equal but no waiver credits are issued.

7. **These results are sensitive to the market context.** If average petroleum prices are significantly higher, the blenders credit may lead to greater increases in ethanol production, increasing corn fuel use and prices. If average petroleum prices are significantly lower, extension of the blenders credit may have little effect on ethanol produced from corn due to binding mandates. Extension of the blenders credit in this case transfers costs to taxpayers from motorfuel consumers by reducing RIN prices, reducing and perhaps even reversing the impact on compliance costs.

8. **The majority of advanced fuel beyond the cellulosic and biodiesel sub-mandates, comes from imported sugarcane ethanol.** The extended tariff in the scenario increases the cost of imported advanced biofuel, so it consequently drives up advanced and cellulosic RIN prices and compliance costs. If domestically produced advanced fuels were to be produced in significant quantities, the effect on advanced RIN prices from tariff extension would be reduced.

9. **Mandate compliance costs shown are only one portion of consumer costs or savings from changes in biofuels policy.** The costs of compliance with EISA through submission of RINs are calculated and these costs are passed on to consumers in the form of a higher retail price of unleaded gasoline. However, the underlying petroleum price is held unchanged in the outcomes and thus any potential effects on markets through petroleum price changes are not accounted for.

10. **The EPA is assumed to waive the total and advanced mandate by the same amount as the cellulosic mandate is reduced.** The baseline assumption that the EPA reduces the total and advanced mandate along with the cellulosic mandate means that no more than 15 billion gallons of corn starch-based ethanol can be used to satisfy the RFS2 in 2015 and later years. To date the EPA has not reduced the total and advanced mandate while reducing the cellulosic ethanol mandate. Alternative assumptions about EPA actions, when waiving the cellulosic mandate, could have important impacts on demand for biodiesel, other advanced biofuels and corn starch-based ethanol.

Ethanol credit and tariff expire (baseline)

Crop markets

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
CORN											
Area					(Million acres)						
Planted area	88.2	91.0	89.4	88.7	88.8	89.3	89.3	89.4	89.5	89.3	89.2
Harvested area	81.4	83.8	82.3	81.7	81.7	82.2	82.3	82.3	82.5	82.2	82.2
					(Bushels per harvested acre)						
Yield	152.8	162.6	165.1	167.5	170.0	172.6	175.0	177.5	179.5	181.9	184.5
					(Million bushels)						
Supply	14,175	14,395	14,853	15,153	15,380	15,682	15,916	16,120	16,321	16,499	16,729
Beginning stocks	1,708	745	1,241	1,441	1,468	1,466	1,489	1,495	1,491	1,522	1,535
Production	12,447	13,630	13,592	13,692	13,892	14,196	14,406	14,605	14,810	14,957	15,174
Imports	20	20	20	20	20	20	20	20	20	20	20
Domestic use	11,480	11,329	11,553	11,791	11,965	12,178	12,305	12,436	12,515	12,593	12,692
Fuel alcohol	4,902	4,654	4,854	5,082	5,249	5,402	5,504	5,588	5,583	5,607	5,634
Exports	1,950	1,826	1,858	1,895	1,949	2,016	2,115	2,193	2,285	2,371	2,460
Ending stocks	745	1,241	1,441	1,468	1,466	1,489	1,495	1,491	1,522	1,535	1,576
					(Dollars per bushel)						
Farm price	5.32	5.05	4.71	4.68	4.73	4.73	4.75	4.79	4.76	4.76	4.70
					(Dollars)						
Market net return/a.	529.70	517.77	463.07	459.23	474.31	482.54	490.44	504.20	502.01	509.81	509.02
SOYBEANS											
Area					(Million acres)						
Planted area	77.4	78.0	79.2	78.4	78.7	78.1	77.9	77.9	77.8	78.0	77.9
Harvested area	76.6	77.0	78.2	77.4	77.7	77.1	76.9	76.9	76.8	77.0	76.9
					(Bushels per harvested acre)						
Yield	43.5	43.5	44.1	44.6	45.1	45.7	46.3	46.8	47.3	47.8	48.3
					(Million bushels)						
Supply	3,495	3,504	3,606	3,631	3,688	3,709	3,738	3,783	3,813	3,859	3,897
Beginning stocks	151	140	141	159	165	170	166	166	169	166	169
Production	3,329	3,350	3,450	3,458	3,508	3,524	3,558	3,603	3,630	3,679	3,713
Imports	15	15	15	15	15	15	15	15	15	15	15
Domestic use	1,766	1,797	1,846	1,870	1,900	1,918	1,940	1,965	1,989	2,016	2,041
Crush	1,655	1,688	1,728	1,749	1,776	1,794	1,815	1,838	1,860	1,885	1,908
Exports	1,590	1,566	1,601	1,597	1,618	1,625	1,632	1,650	1,658	1,675	1,687
Ending stocks	140	141	159	165	170	166	166	169	166	169	168
					(Dollars per bushel)						
Farm price	11.70	12.53	11.59	11.60	11.36	11.45	11.56	11.66	11.76	11.78	11.76
					(Dollars)						
Market net return/a.	372.99	402.17	361.99	363.70	356.92	364.34	372.47	379.96	388.21	392.79	395.94

Note: This baseline was prepared based on information available in January 2011, so does not reflect more recent market and policy developments.

Ethanol credit and tariff extended (change from baseline)

Crop markets

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
CORN											
Area					(Million acres)						
Planted area	0.0	0.0	1.6	1.8	1.3	1.7	2.1	2.0	1.9	1.8	1.5
Harvested area	0.0	0.0	1.5	1.7	1.2	1.6	2.0	1.9	1.7	1.6	1.4
					(Bushels per harvested acre)						
Yield	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5
					(Million bushels)						
Supply	0	0	174	242	199	240	302	306	293	284	257
Beginning stocks	0	0	-70	-41	-14	-47	-59	-50	-50	-49	-44
Production	0	0	244	283	213	287	361	356	343	333	301
Imports	0	0	0	0	0	0	0	0	0	0	0
Domestic use	0	130	274	304	314	376	428	432	412	389	364
Fuel alcohol	0	246	351	366	423	490	534	535	511	478	455
Exports	0	-60	-59	-48	-68	-78	-76	-76	-70	-61	-59
Ending stocks	0	-70	-41	-14	-47	-59	-50	-50	-49	-44	-48
					(Dollars per bushel)						
Farm price	0.00	0.19	0.16	0.12	0.18	0.21	0.20	0.20	0.19	0.17	0.18
					(Dollars)						
Market net return/a.	0.00	30.81	25.41	19.62	31.47	36.29	36.25	37.94	36.69	33.98	35.62
SOYBEANS											
Area					(Million acres)						
Planted area	0.0	0.0	-0.9	-0.7	-0.3	-0.9	-1.0	-0.9	-0.9	-0.9	-0.8
Harvested area	0.0	0.0	-0.9	-0.7	-0.3	-0.8	-1.0	-0.8	-0.9	-0.9	-0.8
					(Bushels per harvested acre)						
Yield	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
					(Million bushels)						
Supply	0	0	-35	-32	-14	-35	-44	-38	-41	-41	-37
Beginning stocks	0	0	4	-2	-2	2	0	-3	-2	-3	-3
Production	0	0	-39	-30	-12	-37	-43	-36	-39	-38	-34
Imports	0	0	0	0	0	0	0	0	0	0	0
Domestic use	0	-3	-13	-11	-8	-14	-16	-15	-15	-15	-14
Crush	0	-1	-9	-9	-6	-10	-12	-11	-11	-11	-10
Exports	0	-1	-21	-18	-8	-21	-25	-22	-23	-23	-21
Ending stocks	0	4	-2	-2	2	0	-3	-2	-3	-3	-2
					(Dollars per bushel)						
Farm price	0.00	0.02	0.28	0.21	0.11	0.27	0.33	0.31	0.34	0.32	0.30
					(Dollars)						
Market net return/a.	0.00	0.88	12.09	9.59	5.21	12.74	15.46	14.92	16.77	16.47	15.64

Ethanol supply and use

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
Petroleum fuel prices					(Dollars per barrel)						
Petroleum, W. Texas interm.	86.40	92.97	96.76	99.92	102.41	105.40	109.45	111.15	110.29	109.58	108.59
Petroleum, refiners acquis.	82.05	86.97	90.44	93.35	95.56	98.26	102.09	103.62	102.71	102.02	101.05
					(Dollars per gallon)						
Unl. gasoline, FOB Omaha	2.43	2.56	2.64	2.71	2.77	2.84	2.92	2.96	2.95	2.93	2.92
Unleaded gasoline, retail	3.06	3.19	3.28	3.35	3.43	3.50	3.59	3.64	3.64	3.62	3.62
Ethanol supply and use					(Million gallons)						
Production	13,605	13,016	13,677	14,446	15,105	15,809	16,456	17,119	17,570	18,124	18,698
From corn	13,387	12,773	13,393	14,095	14,634	15,139	15,506	15,821	15,887	16,038	16,198
Other conventional	216	219	226	238	254	263	262	255	247	242	238
Cellulosic	2	24	58	113	217	406	688	1,043	1,436	1,844	2,263
Imports (ethyl alcohol)	134	158	355	709	1,200	1,518	1,868	2,305	2,797	2,966	2,993
Domestic disappearance	13,294	12,791	13,617	14,754	15,906	16,907	17,851	18,861	19,715	20,415	21,063
In 15% and lower blends	13,131	12,615	13,420	14,510	15,601	16,503	17,223	17,961	18,530	19,036	19,560
In higher level blends	163	176	197	244	305	404	629	900	1,185	1,379	1,504
Exports (ethyl alcohol)	403	402	378	362	367	381	436	525	625	645	596
Ending stocks	771	752	789	828	859	897	934	973	1,000	1,030	1,062
Ethanol prices					(Dollars per gallon)						
Conventional rack, Omaha	2.23	2.10	2.08	2.11	2.17	2.17	2.13	2.09	2.05	2.05	2.03
AMS spot plant price, Iowa	2.02	1.90	1.88	1.91	1.96	1.96	1.93	1.89	1.85	1.85	1.83
Cellulosic rack	n.a.	3.64	3.14	2.90	2.99	3.02	3.09	3.16	3.23	3.32	3.32
Other advanced rack	2.24	2.10	2.13	2.20	2.27	2.32	2.38	2.44	2.48	2.48	2.45
Effective retail	2.39	2.46	2.49	2.50	2.53	2.55	2.52	2.51	2.50	2.52	2.53
Ethanol/gasoline retail	78%	77%	76%	74%	74%	73%	70%	69%	69%	70%	70%
RIN values											
Conventional ethanol	0.02	0.12	0.22	0.26	0.30	0.29	0.28	0.25	0.24	0.22	0.19
Advanced ethanol	0.02	0.12	0.27	0.35	0.40	0.44	0.53	0.60	0.66	0.65	0.62
Cellulosic ethanol	0.65	0.80	0.95	1.06	1.11	1.14	1.23	1.32	1.42	1.49	1.49

Note: This baseline was prepared based on information available in January 2011, so does not reflect more recent market and policy developments.

Ethanol credit and tariff extended (change from baseline)

Ethanol supply and use

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
Petroleum fuel prices					(Dollars per barrel)						
Petroleum, W. Texas interm.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum, refiners acquis.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					(Dollars per gallon)						
Unl. gasoline, FOB Omaha	0.00	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03
Unleaded gasoline, retail	0.00	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.02	-0.01	0.01	0.02
Ethanol supply and use					(Million gallons)						
Production	0	689	1,003	1,059	1,258	1,636	2,219	2,961	3,779	4,625	5,500
From corn	0	675	969	1,017	1,180	1,375	1,505	1,515	1,455	1,367	1,308
Other conventional	0	14	34	42	40	29	20	13	8	5	2
Cellulosic	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Imports (ethyl alcohol)	0	22	-89	-308	-394	-242	-122	-83	-87	-142	-174
Domestic disappearance	0	733	944	778	886	1,404	2,128	2,944	3,775	4,566	5,389
In 15% and lower blends	0	719	932	731	711	953	1,153	1,145	1,069	941	675
In higher level blends	0	14	12	46	175	451	975	1,799	2,705	3,624	4,714
Exports (ethyl alcohol)	0	-46	-39	-33	-35	-34	-62	-103	-125	-126	-107
Ending stocks	0	24	33	39	52	76	107	144	186	229	273
Ethanol prices					(Dollars per gallon)						
Conventional rack, Omaha	0.00	0.15	0.25	0.21	0.17	0.09	0.07	0.06	0.05	0.05	0.04
AMS spot plant price, Iowa	0.00	0.14	0.23	0.19	0.15	0.08	0.06	0.06	0.05	0.04	0.04
Cellulosic rack	n.a.	-0.15	0.12	0.39	0.47	0.50	0.53	0.54	0.55	0.54	0.54
Other advanced rack	0.00	0.15	0.27	0.39	0.46	0.50	0.52	0.53	0.53	0.52	0.51
Effective retail	0.00	-0.09	-0.05	-0.06	-0.09	-0.15	-0.17	-0.18	-0.19	-0.21	-0.24
Ethanol/gasoline retail	0%	-2%	-1%	-1%	-2%	-4%	-4%	-5%	-5%	-6%	-7%
RIN values											
Conventional ethanol	0.00	-0.07	-0.16	-0.19	-0.22	-0.23	-0.23	-0.21	-0.19	-0.16	-0.12
Advanced ethanol	0.00	-0.07	-0.14	-0.01	0.08	0.18	0.22	0.26	0.29	0.32	0.35
Cellulosic ethanol	0.00	-0.07	-0.14	-0.01	0.08	0.18	0.23	0.27	0.30	0.33	0.38

Ethanol credit and tariff expire (baseline)

Biodiesel sector

October-September year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
Biodiesel supply and use					(Million gallons)						
Production	820	968	961	955	959	959	970	974	969	983	972
From soybean oil	380	444	426	416	416	406	405	399	387	389	374
From corn oil	28	41	60	80	99	118	136	154	170	187	203
From other fats and oils	413	481	475	459	445	435	430	422	413	407	396
Net exports	-46	-19	-41	-52	-50	-52	-53	-54	-57	-59	-60
Domestic disappearance	866	987	1,002	1,006	1,009	1,011	1,022	1,029	1,026	1,042	1,031
Fuel prices and tax credit					(Dollars per gallon)						
Biodiesel, rack	4.66	5.06	4.88	4.80	4.72	4.74	4.77	4.80	4.82	4.83	4.82
#2 Diesel, refiner sales	2.35	2.51	2.59	2.65	2.72	2.79	2.87	2.91	2.90	2.88	2.88
#2 Diesel, retail	3.15	3.32	3.39	3.46	3.53	3.59	3.68	3.73	3.72	3.70	3.70
Biodiesel tax credit	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Biofuel policies

Calendar year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
					(Million gallons)						
Renewable Fuel Standard	11,100	13,950	15,200	16,550	18,150	20,500	22,250	24,000	26,000	28,000	30,000
Advanced biofuels	600	1,350	2,000	2,750	3,750	5,500	7,250	9,000	11,000	13,000	15,000
Cellulosic ethanol	0	250	500	1,000	1,750	3,000	4,250	5,500	7,000	8,500	10,500
Biodiesel	500	800	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Tax credits and tariffs					(Dollars per gallon)						
Conventional ethanol credit	0.45	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biodiesel credit	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol specific tariff	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
					(Percent)						
Ethanol ad-valorem tariff	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Note: This baseline was prepared based on information available in January 2011, so does not reflect more recent market and policy developments.

Ethanol credit and tariff extended (change from baseline)

Biodiesel sector

October-September year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
Biodiesel supply and use					(Million gallons)						
Production	0	-2	-6	-6	-2	2	11	24	30	31	31
From soybean oil	0	-2	-11	-13	-10	-12	-10	-3	0	-1	-1
From corn oil	0	2	5	7	9	13	16	18	20	21	22
From other fats and oils	0	0	0	0	-1	1	4	7	9	9	9
Net exports	0	0	-5	-6	-4	-7	-10	-12	-14	-15	-14
Domestic disappearance	0	0	-1	0	2	9	20	35	43	44	44
Fuel prices and tax credit					(Dollars per gallon)						
Biodiesel, rack	0.00	0.00	0.05	0.05	0.03	0.07	0.10	0.12	0.13	0.13	0.12
#2 Diesel, refiner sales	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02
#2 Diesel, retail	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03
Biodiesel tax credit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Biofuel policies

Calendar year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
					(Million gallons)						
Renewable Fuel Standard	0	0	0	0	0	0	0	0	0	0	0
Advanced biofuels	0	0	0	0	0	0	0	0	0	0	0
Cellulosic ethanol	0	0	0	0	0	0	0	0	0	0	0
Biodiesel	0	0	0	0	0	0	0	0	0	0	0
Tax credits and tariffs					(Dollars per gallon)						
Conventional ethanol credit	0.00	0.00	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Biodiesel credit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol specific tariff	0.00	0.00	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
					(Percent)						
Ethanol ad-valorem tariff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Biofuel RIN supply and Utilization: Crop Year

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
						(Million gallons)					
Renewable Fuel Standard	13,418	14,391	15,324	16,228	17,388	18,472	19,716	21,309	23,085	24,597	25,953
Advanced biofuels	1,018	1,391	1,724	2,028	2,588	3,472	4,716	6,309	8,085	9,597	10,953
Cellulosic ethanol (waived)	2	24	58	112	255	639	1,383	2,476	3,752	5,097	6,453
Biodiesel	750	933	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Biodiesel RFS RINs											
Production	46	19	46	58	55	59	63	67	71	74	73
Carry In	-162	0	0	0	0	0	0	0	0	0	0
Use for biodiesel compliance	750	933	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unused for this mandate	-867	-914	-954	-942	-945	-941	-937	-933	-929	-926	-927
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, demoted	-867	-914	-954	-942	-945	-941	-937	-933	-929	-926	-927
Advanced RFS RINs											
Production	205	233	392	599	1,143	2,003	3,224	4,798	6,567	8,032	9,382
Biodiesel (in ethanol gallons)	68	29	68	86	82	89	95	100	106	111	110
Cellulosic	2	24	58	112	255	639	1,383	2,476	3,752	5,097	6,453
Other Advanced	134	180	266	401	806	1,275	1,746	2,222	2,709	2,824	2,819
Carry In	-70	0	0	0	0	0	0	0	0	0	0
Use for advanced compliance	1,018	1,391	1,724	2,028	2,588	3,472	4,716	6,309	8,085	9,597	10,953
Unused for this mandate	-883	-1,157	-1,332	-1,429	-1,445	-1,469	-1,492	-1,511	-1,518	-1,565	-1,571
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, demoted	-883	-1,157	-1,332	-1,429	-1,445	-1,469	-1,492	-1,511	-1,518	-1,565	-1,571
Total RFS RINs											
Production	13,363	13,553	14,630	15,618	16,874	18,401	20,074	21,905	23,596	25,092	26,562
Biodiesel (in ethanol gallons)	68	29	68	86	82	89	95	100	106	111	110
Cellulosic	2	24	58	112	255	639	1,383	2,476	3,752	5,097	6,453
Other Advanced	134	180	266	401	806	1,275	1,746	2,222	2,709	2,824	2,819
Conventional	13,158	13,320	14,238	15,018	15,731	16,398	16,850	17,107	17,028	17,060	17,181
Carry In	1,610	0	0	0	0	0	0	0	0	0	0
Use for total compliance	13,418	14,391	15,324	16,228	17,388	18,472	19,716	21,309	23,085	24,597	25,953
Unused for this mandate	1,554	-838	-695	-611	-514	-71	357	596	511	495	610
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, expired	1,554	-838	-695	-611	-514	-71	357	596	511	495	610
RIN value						(Dollars per gallon)					
Biodiesel RIN	0.84	1.53	1.57	1.47	1.36	1.36	1.35	1.35	1.38	1.41	1.38
Cellulosic RIN allowance val.	0.65	0.73	0.81	1.05	1.19	1.32	1.47	1.59	1.72	1.83	1.86
Advanced RIN	0.02	0.05	0.13	0.33	0.48	0.62	0.75	0.86	0.95	0.97	0.97
Conventional RIN	0.02	0.05	0.06	0.07	0.08	0.06	0.05	0.04	0.04	0.06	0.07
RIN compliance expend.						(Million dollars)					
Total	1,393	2,858	3,243	3,379	3,810	4,544	6,093	8,673	11,940	15,216	18,157

Note: This baseline was prepared based on information available in January 2011, so does not reflect more recent market and policy developments.

Ethanol credit and tariff extended (change from baseline)

Biofuel RIN supply and Utilization: Crop Year

September-August year	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21
					(Million gallons)						
Renewable Fuel Standard	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Advanced biofuels	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Cellulosic ethanol (waived)	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Biodiesel	0	0	0	0	0	0	0	0	0	0	0
Biodiesel RFS RINs											
Production	0	0	5	6	4	7	10	12	14	15	14
Carry In	0	0	0	0	0	0	0	0	0	0	0
Use for biodiesel compliance	0	0	0	0	0	0	0	0	0	0	0
Unused for this mandate	0	0	5	6	4	7	10	12	14	15	14
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, demoted	0	0	5	6	4	7	10	12	14	15	14
Advanced RFS RINs											
Production	0	23	-81	-300	-350	1	588	1,369	2,250	3,133	4,037
Biodiesel (in ethanol gallons)	0	1	8	9	6	11	16	19	21	22	21
Cellulosic	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Other Advanced	0	22	-89	-308	-394	-242	-122	-83	-87	-142	-174
Carry In	0	0	0	0	0	0	0	0	0	0	0
Use for advanced compliance	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Unused for this mandate	0	23	-81	-299	-388	-232	-106	-64	-66	-120	-154
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, demoted	0	23	-81	-299	-388	-232	-106	-64	-66	-120	-154
Total RFS RINs											
Production	0	734	952	787	893	1,415	2,144	2,963	3,796	4,587	5,410
Biodiesel (in ethanol gallons)	0	1	8	9	6	11	16	19	21	22	21
Cellulosic	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Other Advanced	0	22	-89	-308	-394	-242	-122	-83	-87	-142	-174
Conventional	0	711	1,033	1,087	1,242	1,414	1,555	1,594	1,546	1,455	1,373
Carry In	0	0	0	0	0	0	0	0	0	0	0
Use for total compliance	0	0	0	-1	38	232	695	1,433	2,316	3,253	4,190
Unused for this mandate	0	734	952	788	854	1,183	1,449	1,530	1,480	1,335	1,219
of which, carry out	0	0	0	0	0	0	0	0	0	0	0
of which, expired	0	734	952	788	854	1,183	1,449	1,530	1,480	1,335	1,219
RIN value					(Dollars per gallon)						
Biodiesel RIN	0.00	0.00	0.03	0.03	0.02	0.05	0.07	0.09	0.10	0.10	0.09
Cellulosic RIN allowance val.	0.00	-0.07	-0.14	-0.01	0.08	0.18	0.23	0.27	0.30	0.33	0.38
Advanced RIN	0.00	-0.07	-0.14	-0.01	0.08	0.18	0.22	0.26	0.29	0.32	0.35
Conventional RIN	0.00	-0.07	-0.16	-0.19	-0.22	-0.23	-0.23	-0.21	-0.19	-0.16	-0.12
RIN compliance expend.					(Million dollars)						
Total	0	-790	-1,957	-2,638	-3,067	-2,760	-1,817	154	2,458	5,154	7,987

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