



Sustainability Performance Indicators

To amplify the industry’s voice on issues that impact fertilizer, TFI developed a State of the Industry report in 2015. This report is a mechanism for gather data on the social, economic, and environmental impacts of members within the fertilizer industry. The aggregated data summarized in the annual report is then used to support TFI’s various advocacy and outreach programs.

Metric Development

TFI contracted Environmental Resources Management (ERM) to facilitate development and identification of metrics to include in the report, define the metrics, and establish rules for reporting to the various metrics. ERM maintains third-party confidentiality while collecting, reviewing, and aggregating the data collected from participating companies.

Participation

Participation in the report is voluntary, meaning the fertilizer companies participating in this report volunteer their time to provide data to as many of the metrics as they have data available.

Boundary

The State of the Industry Report includes data provided by TFI member companies surrounding the fertilizer industry in the United States. Meaning, fertilizers manufactured in the United States and imported into the United States. This report represents the entire U.S. value chain of the fertilizer industry from fertilizer manufacturing sites, crop nutrient wholesalers, agricultural retail facilities, and the transport of fertilizer materials throughout the value chain in the United States.

Participation					
	2014	2015	2016	2017	2018
Participating companies	13	20	33	28	34
Participation as a percent of the total U.S. fertilizer nutrient production capacity ^{1/}	87%	93%	94%	89%	91%
Participating companies as a percent of the total number of U.S. fertilizer retail locations ^{2/}	15%	27%	33%	30%	32%

1. Calculated using participants annual U.S. production capacity as reported to TFI's Fertilizer RECORD as of December 2017.

2. Industry experts estimate a total of 6,000 manned retail facilities.

Agronomic Professionals						
	2013	2014	2015	2016	2017	2018
Participating companies	8	8	13	21	17	19
Participation as a percent of the total U.S. fertilizer nutrient production capacity	59%	59%	87%	88%	87%	79%
Participating companies as a percent of the total number of U.S. fertilizer retail locations	15%	15%	27%	33%	30%	32%
Agronomic Professionals at Retail Facilities						
Number of employees within the company who provide agronomic services and information as part of their regular job duties	2,568	2,573	3,438	4,414	4,153	4,731
Number of employees with Certified Crop Advisor (CCA) certification	576	578	910	1,153	1,020	1,018
Number of employees with Certified Professional Agronomist (CPAg) certification	10	10	27	28	19	19
Total number of retail locations served by the total number of agronomists identified	875	875	1,618	1,996	1,789	1,941
Agronomists per location	2.93	2.94	2.12	2.21	2.32	2.44
Individuals certified (CCA/CPAg) per location	0.67	0.67	0.58	0.64	0.58	0.53
Agronomic Professionals at Non-Retail Facilities						
Number of employees within the company who provide agronomic services and information as part of their regular job duties	47	48	321	405	394	407
Number of employees with Certified Crop Advisor (CCA) certification	18	18	217	265	263	257
Number of employees with Certified Professional Agronomist (CPAg) certification	3	3	37	46	51	48
Total number of non-retail locations served by the total number of agronomists identified	5	5	89	188	226	276
Agronomists per location	9.40	9.30	3.61	2.15	1.74	1.47
Individuals certified (CCA/CPAg) per location	4.20	4.20	2.85	1.67	1.39	1.11
Retail & Non-Retail Facilities Combined						
Number of employees within the company who provide agronomic services and information as part of their regular job duties	2,615	2,621	3,759	4,819	4,551	5,138
Number of employees with Certified Crop Advisor (CCA) certification	594	596	1,127	1,418	1,285	1,275
Number of employees with Certified Professional Agronomist (CPAg) certification	13	13	64	74	70	67
Percentage of agronomic employees with professional certifications	23%	23%	32%	31%	30%	26%

Enhanced Efficiency Fertilizers (EEFs)				
	2015	2016	2017	2018
Participating companies	4	9	8	9
Number of treated nutrient tons of nitrogen sold (treated by an inhibitor, polymer, or other controlled release mechanism)				
Manufacturer: Nitrogen	704,902	765,621	487,516	436,952
Retail: Nitrogen	640,004	631,181	996,001	1,232,776
Retail: Phosphate	n/a	n/a	148,642	157,917
Retail: Total number of nutrient tons sold, treated and untreated with EEF				
Nitrogen	5,600,426	4,758,954	4,135,533	5,170,049
Phosphate	n/a	n/a	1,240,136	1,381,456
Percent of total nutrient tons sold by retailers treated with EEF	11%	13%	21%	24%

Employee Safety						
	2013	2014	2015	2016	2017	2018
Participating companies	11	11	13	25	21	23
Fertilizer manufacturing participating companies				13	11	14
Fertilizer wholesale, retail, and distribution companies				12	9	9
Participation as a percent of the total U.S. fertilizer nutrient production capacity	87%	87%	93%	94%	82%	90%
Participation as a percent of the total U.S. nitrogen production capacity			93%	98%	73%	90%
Participation as a percent of the total U.S. phosphate & potash production capacity			93%	100%	100%	88%
Recordable rate	2.10	1.96	1.76	1.98	1.45	1.69
Lost-time incident rate	1.05	1.18	1.04	0.79	0.65	0.55
Internal Safety - breakdown by industry segment						
212391 and 212392 – Mining – Employees						
Recordable rate			0.99	1.50	1.39	0.71
Lost-time incident rate			0.40	0.65	0.58	0.27
325311 and 325312 – Fertilizer Manufacturing – Employees						
Recordable rate			1.27	1.31	1.29	1.08
Lost-time incident rate			0.64	0.64	0.68	0.48
325314 and 424910 – Blenders and Wholesalers – Employees						
Recordable rate			2.23	2.59	1.58	2.25
Lost-time incident rate			1.43	0.95	0.66	0.65

212391 and 212392 – Mining – Contractors						
Recordable rate						0.56
Lost-time incident rate						0.33
325311 and 325312 – Fertilizer Manufacturing – Contractors						
Recordable rate						0.56
Lost-time incident rate						0.13
325314 and 424910 – Blenders and Wholesalers – Contractors						
Recordable rate						0.21
Lost-time incident rate						0.00

External Safety						
	2013	2014	2015	2016	2017	2018
Participating companies	5	5	8	25	6	8
Participation as a percent of the total U.S. fertilizer nutrient production capacity	16%	16%	17%	94%	7%	75%
Number of people trained outside the organization	11,970	11,761	13,422	14,806	13,943	13,375
Number of hours of emergency responder training provided to community members	3,475	1,567	2,645	2,826	2,401	773

ResponsibleAg						
(figures provided as a cumulative total through the end of the calendar year)	2015	2016	2017	2018	2019	
Facilities registered	1,850	2,260	2,600	2,534	2,591	
Facilities registered as a percent of the total number of fertilizer retail locations	31%	38%	43%	42%	43%	
Audits performed		1,330	1,880	2,516	3,266	
Facilities certified		475	876	1,257	1,310	

Capital Investment						
	2013	2014	2015	2016	2017	2018
Participating companies	10	10	14	23	18	20
Participation as a percent of the total U.S. fertilizer nutrient production capacity	84%	84%	84%	88%	82%	75%
Fertilizer manufacturing participating companies	7	7	7	10	10	9
Fertilizer wholesale, retail, and distribution companies	3	3	7	13	8	11
Capital investments (in \$ billions)	1.99	3.07	5.57	4.25	1.66	1.08
R&D Investment (in \$ millions)*					5.49	27.30
Investments in Partnerships that Support 4Rs (in \$ millions)						3.2
Number of Employees (15 companies)*					21,167	25,016

Wages paid (11 companies, in \$ billions)*					1.04	1.38
Average wage per employee (11 companies)*					\$67,500	\$74,800

*New metric in 2017

Water						
Water use for nitrogen production						
	2013	2014	2015	2016	2017	2018
Participating companies	6	6	7	11	10	13
Participation as a percent of the total U.S. nitrogen production capacity			52%	53%	73%	85%
Surface water (million gallons)	25,296	22,308	20,621	21,696	31,966	32,126
Well water (million gallons)	2,165	2,142	2,323	4,333	6,903	10,035
Purchased water (million gallons)	3,343	3,671	3,313	4,973	10,487	8,900
Total use per ton (gallons per nutrient ton)	8,549	7,363	6,341	5,331	4,631	4,113
Water use for phosphate and potash production						
Participating companies	4	4	4	4	3	2018
Participation as a percent of the total U.S. phosphate & potash production capacity			84%	88%	88%	3
Surface water (million gallons)	69,127	67,385	62,090	61,585	66,427	88%
Well water (million gallons)	31,160	27,886	28,006	31,496	31,338	67,500
Purchased water (million gallons)	688	636	792	1,153	1,406	25,925
Total use per ton (gallons per nutrient ton)	13,266	12,523	12,285	12,095	12,586	1,604
Water reclaimed and recycled/reused for all nitrogen, phosphate, and potash production						
Participating companies				5	4	4
Water recycling/reuse (billion gallons)				462	516	282

Greenhouse Gas Emissions						
	2013	2014	2015	2016	2017	2018
Participating companies	8	8	10	14	10	13
Participation as a percent of the total U.S. fertilizer nutrient production capacity	-	-	91%	94%	82%	88%
Participation as a percent of the total U.S. nitrogen production capacity	49%	49%	90%	98%	73%	87%

Participation as a percent of the total U.S. phosphate & potash production capacity	75%	75%	93%	100%	100%	88%
Greenhouse gas emissions reported to US EPA (in metric tons CO₂ equivalents)						
GHGs actually emitted	23,764,734	24,104,982	25,987,743	23,666,634	23,324,161	26,067,541
GHGs reported but not emitted (i.e., captured)	2,315,274	2,639,017	4,090,710	8,105,299	7,541,342	10,730,892
Percentage of GHG emissions that were captured (not emitted)	9%	10%	14%	26%	24%	29%
GHGs emitted normalized (metric ton CO₂ equivalent per metric ton produced)						
Nitrogen	1.20	1.24	2.27	1.80	2.11	1.79
Phosphate	0.28	0.29	0.24	0.25	0.24	0.28
Combined (nitrogen and phosphate)	0.84	0.87	1.55	1.36	1.53	1.43

Energy						
	2013	2014	2015	2016	2017	2018
Participating companies	8	8	9	13	10	15
Participation as a percent of the total U.S. fertilizer nutrient production capacity	64%	64%	65%	68%	82%	87%
Participation as a percent of the total U.S. nitrogen production capacity			52%	53%	73%	85%
Participation as a percent of the total U.S. phosphate & potash production capacity			84%	100%	100%	88%
Total energy use (in gigajoules)						
Direct (million GJ)	103.4	105.3	112.6	114.1	203.1	224.9
Indirect (million GJ)	17.5	18.7	24.2	27.6	30.1	20.9
Total (million GJ)	120.9	124.0	136.8	141.7	233.2	245.8

Normalized						
Direct (GJ per nutrient short ton produced)	8.36	8.33	8.73	8.03	10.70	10.93
Indirect (GJ per nutrient short ton produced)	1.42	1.48	1.88	1.94	1.59	1.01
Total (GJ per nutrient short ton produced)	9.78	9.80	10.61	9.98	12.29	11.94
Natural gas as a feedstock (not for energy production) (billion GJ)			1.54	1.33	1.37	1.47
Normalized (GJ per short nutrient ton of nitrogen produced)			209	110	152	140
Waste heat captured (million GJ)			107.0	111.2	104.8	101.0
Ratio of waste heat captured to total energy use (waste heat captured / total energy use)			78%	79%	51%	41%
Electricity generated onsite (cogeneration) (in billion kWh)				2.30	2.27	2.04

Recycled Materials*						
	2013	2014	2015	2016	2017	2018
Participating companies						5
Total amount of recycled material in end product (tons)						5,984,972
Recycled product as a percentage of total product						2%

*New metric in 2018

Land						
	2013	2014	2015	2016	2017	2018
Participating companies			3	3	3	n/a
Acres reclaimed / released			5,581	6,641	2,895	n/a

Transportation				
	2015	2016	2017	2018
Participating companies	13	21	19	24
Fertilizer Manufacturing Participating companies	8	11	10	12
Fertilizer Wholesale and Retail Participating companies	5	10	9	12
Participation as a percent of the total U.S. fertilizer nutrient production capacity	51%	50%	61%	64%
Participation as a percent of the total U.S. nitrogen production capacity	37%	39%	42%	53%
Participation as a percent of the total U.S. phosphate & potash production capacity	71%	71%	88%	88%
Annual Percentage of Mode Used (per ton, per mile)				
Anhydrous Ammonia				
Marine Vessel	16%	0%	26%	34%
Rail	44%	69%	43%	16%
Motor Vehicle	17%	19%	11%	45%
Pipeline (Ammonia Only)	24%	11%	20%	5%
Other Nitrogen Fertilizer Materials				
Marine Vessel	44%	9%	33%	54%
Rail	49%	78%	54%	32%
Motor Vehicle	7%	12%	13%	14%
Phosphatic Fertilizers				
Marine Vessel	58%	23%	46%	70%
Rail	37%	64%	47%	21%
Motor Vehicle	5%	13%	7%	9%
Potassium Fertilizers				
Marine Vessel	16%	21%	14%	37%
Rail	79%	76%	83%	42%
Motor Vehicle	4%	3%	3%	20%
Other NPK Fertilizers (not included in other categories)				
Marine Vessel	1%	0%	0%	63%
Rail	56%	62%	62%	14%
Motor Vehicle	43%	38%	38%	23%

Average Distance per Shipment by Mode (miles)				
Anhydrous Ammonia				
Marine Vessel	615	-	1,100	1,200
Rail	1,209	1,176	1,164	846
Motor Vehicle	156	159	117	156
Pipeline (Ammonia Only)	480	605	283	522
Other Nitrogen Fertilizer Materials				
Marine Vessel	1,074	963	723	4,299
Rail	806	1,210	641	1,101
Motor Vehicle	121	240	177	242
Phosphatic Fertilizers				
Marine Vessel	1,095	930	1,621	10,785
Rail	1,027	1,917	754	1,961
Motor Vehicle	191	389	185	316
Potassium Fertilizers				
Marine Vessel	738	1,396	585	1,330
Rail	1,374	2,387	1,155	1,458
Motor Vehicle	168	185	104	176
Other NPK Fertilizers (not included in other categories)				
Marine Vessel	-	-	-	8,856
Rail	1,053	1,966	909	1,961
Motor Vehicle	125	208	122	229

Transportation: Tons of Finished Material Shipped (thousand tons of material transported)	2016				2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Anhydrous Ammonia												
Total Short Tons Shipped	1,876	2,407	1,661	2,358	2,947	3,196	2,297	2,230	1,960	2,989	2,209	2,450
% fertilizer use	91%	93%	85%	91%	78%	80%	71%	87%	67%	70%	57%	61%
% non-fertilizer use	9%	7%	15%	9%	22%	20%	29%	13%	33%	30%	43%	39%
Marine Vessel	136	180	159	170	613	600	411	465	574	607	641	559
Rail	323	290	296	297	180	169	123	184	120	95	93	96
Motor Vehicle	708	1,191	465	1,188	779	1,051	471	1,054	578	1,369	476	754
Pipeline	535	573	500	480	730	747	657	676	484	464	466	544
Other Nitrogen Fertilizer Materials												
Total Short Tons Shipped	4,000	5,758	2,963	3,667	6,117	6,651	4,329	3,116	6,581	8,736	5,677	6,443

% fertilizer use	94%	96%	93%	94%	86%	86%	81%	87%	86%	86%	80%	83%
% non-fertilizer use	6%	4%	7%	6%	14%	14%	19%	13%	14%	14%	20%	17%
Marine Vessel	945	1,027	591	772	1,305	845	761	941	793	952	824	842
Rail	1,542	1,749	1,186	1,344	1,750	1,828	1,201	1,402	1,989	2,225	1,545	1,936
Motor Vehicle	1,287	2,751	983	1,314	2,175	3,039	1,555	1,677	2,909	4,365	2,152	2,555
Phosphatic Fertilizers												
Total Short Tons Shipped	2,554	1,971	2,212	2,367	4,466	3,811	4,125	2,280	3,585	3,583	3,991	3,660
% fertilizer use	96%	94%	96%	96%	92%	91%	92%	97%	77%	79%	80%	79%
% non-fertilizer use	4%	6%	4%	4%	8%	9%	8%	3%	23%	21%	20%	21%
Marine Vessel	1,882	1,338	1,495	1,754	1,910	1,888	1,986	1,754	1,422	1,513	1,426	1,439
Rail	1,771	1,581	1,818	1,633	2,359	2,324	2,328	2,501	1,778	1,691	1,777	1,459
Motor Vehicle	1,044	1,018	1,068	1,349	1,795	1,886	1,551	1,704	1,580	1,746	1,853	1,783
Potassium Fertilizers												
Total Short Tons Shipped	1,771	2,054	1,394	1,756	2,505	2,477	2,091	1,269	2,321	2,776	2,437	2,561
% fertilizer use	91%	92%	89%	92%	94%	93%	92%	89%	74%	82%	84%	82%
% non-fertilizer use	9%	8%	11%	8%	6%	7%	8%	11%	26%	18%	16%	18%
Marine Vessel	597	513	405	422	572	915	504	597	434	645	543	488
Rail	1,646	1,283	999	1,436	2,081	2,152	1,836	2,279	1,083	1,177	1,231	1,147
Motor Vehicle	472	698	438	588	803	504	697	836	903	1,264	1,056	1,167
Other NPK Fertilizers (not included in other categories)												
Total Short Tons Shipped	282	389	165	235	506	739	379	154	494	606	355	315
% fertilizer use	100%	100%	100%	100%	100%	100%	98%	100%	84%	78%	69%	74%
% non-fertilizer use	0%	0%	0%	0%	0%	0%	2%	0%	16%	22%	31%	26%
Marine Vessel	-	-	-	-	49	40	49	62	41	12	26	21
Rail	41	51	34	65	90	124	64	59	33	34	18	16
Motor Vehicle	240	338	131	171	366	573	257	322	343	425	202	197