

AN INDEX OF PRICES PAID BY GROWERS IN THE GREEN INDUSTRY 2007–2019

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Contents

Executive Summary	2
An Index of Prices Paid by Growers in the Green Industry	3
Implications	7
APPENDIX A Labor Situation & Outlook	8
APPENDIX B Energy Situation & Outlook	11
APPENDIX D Freight & Trucking Situation & Outlook	13



Executive Summary

The green industry is currently in the mature stage of the industry life cycle. As such, there are numerous pressures on existing firms in the industry, particularly one that is often referred to as the price-cost squeeze (or margin compression), where the prices obtained for products offered by green industry firms are held constant from *real and perceived* competitive forces while, at the same time, the costs of the inputs used to produce these products are increasing. Thus, margins for green industry firms are being “squeezed” relative to what they used to be during other stages of the life cycle.

In an age of tight margins, it is essential for growers to have full and accurate information about inflationary trends so that they can better understand the cost of operating their business for managerial decision-making such as SKU rationalization, customer profitability analyses, and determining the need for price increases. The use of the standard *Producers Price Index* (PPI) and *Consumer Price Index* (CPI) for this purpose is insufficient because wholesale growers purchase different goods and services from those used for calculating these indexes. The National Agricultural Statistics Service (within USDA) also calculates an *Index of Prices Received by Farmers* for their crops and livestock and an *Index of Prices Paid by Farmers* for the inputs they use during production. However, these indices also fall short in that they contain (or exclude) many items that are not applicable to nursery and greenhouse growers.

To overcome this issue, an ***Index of Prices Paid by Growers*** was developed that reflects inflationary pressures on the most important inputs used by green industry growers. This index reflects the differences in the prices of goods and services purchased by growers during the last several years. Each cost-related line item is weighted by its relative share of the total of the typical assortment of goods and services purchased by growers for producing, marketing, and shipping plants. Using this methodology, a weighted average rate of inflation in the prices of these grower inputs is estimated, where the weights used to aggregate these individual inputs are the average proportions of grower budgets allocated to each input category.

The purpose of this white paper is to document the costs of inputs used to produce plants. Armed with such information, growers will be in a much better position to understand the inflationary pressures on their relative costs of production and use these data in making more informed pricing decisions (since total costs represent the price floor and willingness-to-pay on the part of the customer represents the price ceiling).

Results from this analysis indicate that the summary weighted Index of Prices Paid by Growers ranges from 100 in 2007 to a high of 129.6 in 2019. This means that the overall cost of producing nursery and greenhouse crops is almost 30% higher in 2019 than it was in 2007, with labor experiencing the largest increase (41.6% higher in 2019). The year-over-year (YOY) increases are also presented, reflecting the inflationary pressures of costs over time. YOY costs associated with the tracked expenses in 2019 increased about 2.5% over what they were in 2018.



An Index of Prices Paid by Growers in the Green Industry

Introduction

Although the green industry has been an historically-important economic sector, the industry has been in the mature stage of the industry cycle for some time now and profitability has declined significantly due to margin compression. In such conditions, it is imperative that firms at all stages of the supply chain be cognizant of their respective costs of doing business. This white paper focuses on the grower sector of the green industry and the costs incurred in the propagation, production, and shipping of plants to retail and landscape customers.

Index of Prices Paid by Growers

The Index of Prices Paid by Growers includes major production inputs (e.g. containers, soil mixes, propagation stock, agrichemicals, fertilizers, and fuel), along with the costs of labor, machinery and equipment operation and maintenance, packaging and shipping supplies, labels and other signage, and freight and other shipping-related costs. All other costs were designated as overhead costs.

In calculating the index, the relative importance of each of the aforementioned costs were determined by collecting secondary data (e.g. income statements) from leading growers in the industry for multiple years and using the averages of these data to calculate a weight for each line item based on the collective total. The weighting scheme for each of the line items is found in the following table.

Altogether, the production-related line items included in the calculation of the index represented 63.5% of sales. The remaining 36.5% were either G&A expenses or non-allocable expenses that could not be attributed to specific production-related categories. Thus, these were not included in the calculation of the index.



Relative weighting of items included in the Index of Prices Paid by Growers in the Green Industry.

COST CATEGORY	% OF SALES	% OF TRACKED EXPENSES
Containers	4.50%	7.09%
Media (peat-based)	2.50%	3.94%
Propagation stock	15.00%	23.62%
Plant protection products	1.00%	1.57%
Fertilizers	1.00%	1.57%
Labor (wages)	22.00%	34.65%
Fuel/Energy	2.50%	3.94%
Maintenance	2.00%	3.15%
Freight and trucking	11.00%	17.32%
POP, tags, labels, etc.	2.00%	3.15%
TOTAL	63.50%	---
Other expenses	36.50%	---
	100.0%	100.00%

Once the weights were established, then an index for each cost line item was developed that reflected the relative changes in price for these expense line items through time. The base year for calculation of the index was 2007, reflecting a pre-Great Recession time frame. These are presented in the following table and graph, with the year 2007=100. This means that the costs of each line item are compared to the same line item costs in 2007 to determine how much the cost has increased since then.

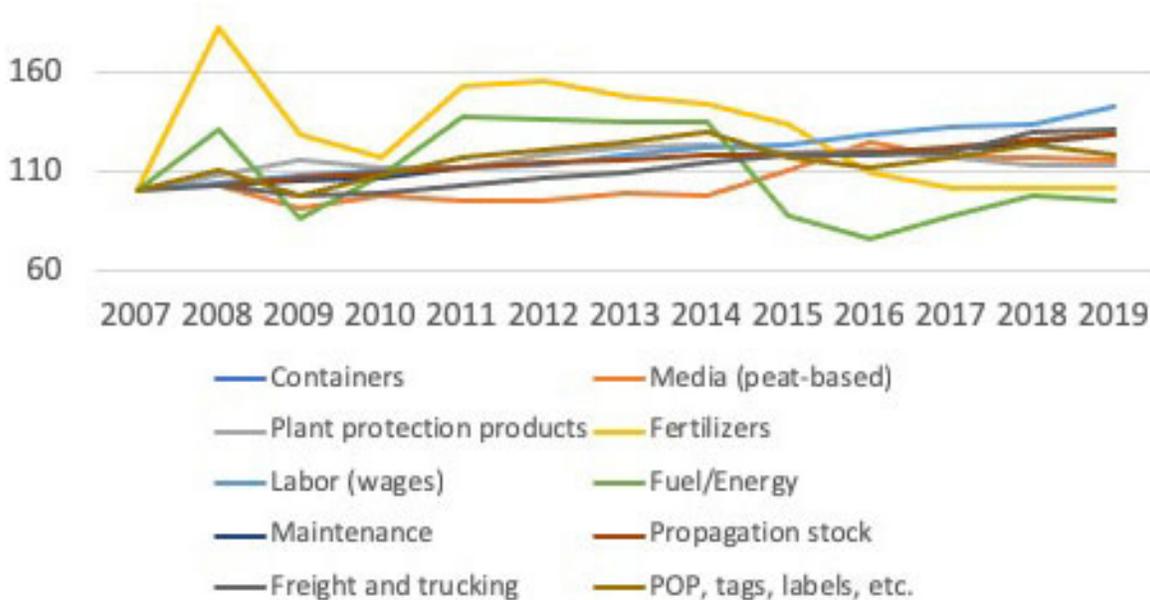
Index of Prices Paid by Growers in the Green Industry, 2007-2019 (2007=100).

COST CATEGORY	WEIGHT	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Containers	7.09%	100	109.8	98.0	107.9	117.2	119.9	124.1	129.3	116.7	111.2	117.0	122.7	117.8
Media (peat-based)	3.94%	100	103.2	90.8	96.9	95.3	95.5	99.1	97.6	110.9	124.9	117.2	120.8	115.3
Propagation stock	23.62%	100	102.8	106.7	108.4	111.9	114.2	115.9	117.8	117.9	119.5	122.0	125.0	128.1
Plant protection products	1.57%	100	107.3	114.9	111.5	112.1	118.2	121.6	122.8	119.4	120.7	113.0	114.2	112.7
Fertilizers	1.57%	100	181.7	127.7	117.1	152.4	154.6	147.4	144.1	132.9	109.5	106.2	104.0	101.7
Labor (wages)	34.65%	100	103.7	108.1	110.5	111.7	113.2	118.0	121.3	123.4	128.3	131.4	133.3	141.6
Fuel/Energy	3.94%	100	130.2	86.6	107.4	137.2	136.2	135.0	134.3	87.1	76.3	91.1	98.8	94.7
Maintenance	3.15%	100	102.9	104.9	106.9	111.2	114.5	115.5	117.6	117.7	117.9	120.8	126.1	127.6
Freight and trucking	17.32%	100	101.4	97.1	98.2	103.2	105.8	107.7	114.0	118.3	116.7	119.5	129.6	130.5
POP, tags, labels, etc.	3.15%	100	109.8	98.0	107.9	117.2	119.9	124.1	129.3	116.7	111.2	117.0	122.7	117.8
Weighted index (2007=100)		100	106.0	103.6	107.0	111.8	113.8	116.7	119.9	118.5	119.5	122.5	126.8	129.6
YOY increase/decrease		---	6.00%	-2.25%	3.22%	4.55%	1.80%	2.55%	2.69%	-1.13%	0.85%	2.46%	3.53%	2.49%



Multiplying the weight of each line item times the index for that line item each year yields the summary weighted index. This means that the overall cost of producing nursery and greenhouse crops is about 29.6% higher in 2019 than it was in 2007, with labor experiencing the largest increase at 41.6% higher. The year-over-year (YOY) increase is also presented, reflecting the annual inflationary pressures of costs over time. For example, the tracked costs in 2019 have increased about 2.5% over what they were in 2018. The YOY increases in the immediate post-recession time frame (2009-2011) were particularly difficult for growers given their costs were rising significantly but selling prices were stagnant due to the recession's impact on demand. While selling prices have increased since then, the question is whether they have outpaced the increase in input prices. Anecdotally the answer would be not entirely, however there are currently no historic indices of selling prices across the industry to answer this definitively.

Index of Prices Paid by Growers, 2007-2019
(2007=100)



The only line item that was less expensive in 2019 than it was during the index year of 2007 was fuel/energy costs. Given the rapid expansion of shale oil production sector over the last several years, this was not too much of a surprise. This line item reflects changes in petroleum prices, including gasoline and diesel, as well as LP and natural gas. Growers got some relief due to lower fuel/energy prices in 2015-2016, but these are now trending higher given the pressure on supplies because of weather events and demand-side pressures on processing capacity.



One will notice, however, that freight and trucking-related costs did not follow the trend in fuel prices. This is because of the added costs resulting from increased regulatory pressures on that sector (e.g. electronic logging devices). Other factors, such as mandatory safety-related CAPEX expenditures for trucks and a current shortage of drivers, also contribute to higher trucking costs. Appendix C provides more detail about the future cost structure of the trucking industry.

The two individual components of the index that increased the most included labor and the cost of freight and trucking, which are 41.6% and 30.5% more expensive, respectively, than they were in 2007. The cost of propagation stock is also 28.1% higher than in 2007. Consolidation in the breeding sector will likely lead to economies of scale in the long run, though such upheaval and structural change, as well as increased phytosanitary restrictions, has increased costs in the short run. Labor has been a two-fold dilemma for growers with the cost and availability of labor being a severe limitation for nursery and greenhouse growers alike. Several growers have anecdotally indicated that they often have to hire as many as 5 workers just to end up with 1 full-time worker. The others quit after realizing that jobs in the green industry are quite labor-intensive. This has obviously increased search and acquisition costs of labor, but the other limiting factor is the increased full cost of labor (wages plus burden).

Several employee-related expenses have increased dramatically including the wages themselves (stemming from increases in the minimum wage and/or increases in the adverse effect wage rate for H2A workers), as well as overhead costs such as those incurred for additional training due to high turnover and also those associated with health care insurance costs resulting from the Affordable Health Care Act. These factors combined lead to labor costs being almost a third more expensive than they were prior to the great recession. A more detailed discussion of the labor situation and outlook is included in Appendix A, but the implication is that labor-related costs will continue to increase for growers over time.

All other categories of costs have experienced increases since 2007 (with the exception of fuel/energy as discussed previously). These range from 1.7% for fertilizers to 27.6% for maintenance (which also includes repairs and some installation costs associated with CAPEX expansion and improvements). Grower investment in facilities (on a per-store or per-customer basis) has escalated substantially over the last decade given the shrinking vendor lists on the part of most box-store buyers, particularly on the greenhouse side of the industry.



Implications

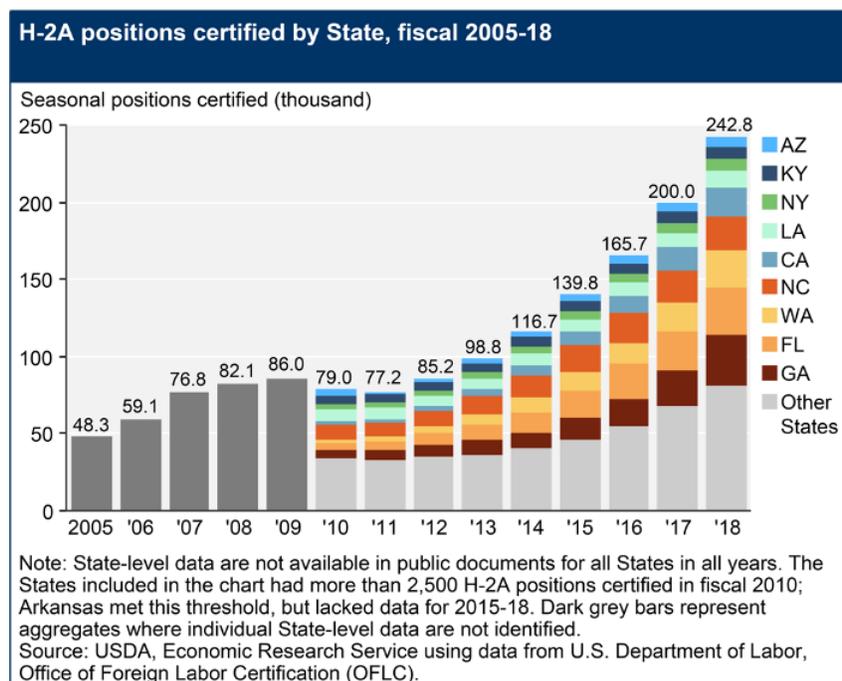
The purpose of this white paper was to introduce an Index of Prices Paid by Growers that documents the historical costs incurred by growers for the major inputs used during the production of nursery and greenhouse crops. It is important to note that **this is a national index** and certain factors of production (e.g. labor) may vary depending on the region of the country. This index also serves to document the **cost-price squeeze** for the green industry, specifically the rising costs of inputs. Armed with such information, growers will be in a much better position to understand the inflationary pressures on their relative costs of production and use these data in making more informed pricing decisions (since total costs represent the price floor and willingness to pay on the part of the customer represents the price ceiling). Given the findings of the Index of Prices Paid by Growers, it is clear that inflationary pressures have the potential to erode margins for green industry growers and that there will continue to be increases in the costs of major inputs they utilize during production, particularly labor. Though outside the scope of this analysis, the industry will need to adjust prices levels over time to not only keep up with these inflationary pressures, but to ensure the financial sustainability of growers over the long run.



APPENDIX A Labor Situation & Outlook

Nurseries and greenhouses still report labor shortages, sometimes having to hire 5 people to end up with 1 full-time equivalent worker. This severe labor shortage has contributed to the increase in input costs for green industry businesses. One of the clearest indicators of the scarcity of farm labor is the fact that the number of H-2A positions requested and approved has increased fivefold in the past 13 years, from just over 48,000 positions certified in fiscal 2005 to nearly 243,000 in fiscal 2018. The average duration of an H-2A certification in fiscal 2018 was 5.3 months, implying that the 243,000 positions certified represented approximately 108,000 full-year equivalents.

In the broader agricultural labor market, higher minimum wages are likely to contribute to higher average wages for crop workers more broadly. Farmers trying to attract crop workers farther east may expect the prevailing wage to continue rising. However, only looking at minimum wage gives a false interpretation of the wage levels across the green industry since minimum wage rates are also affected by the Adverse Effect Wage Rate.

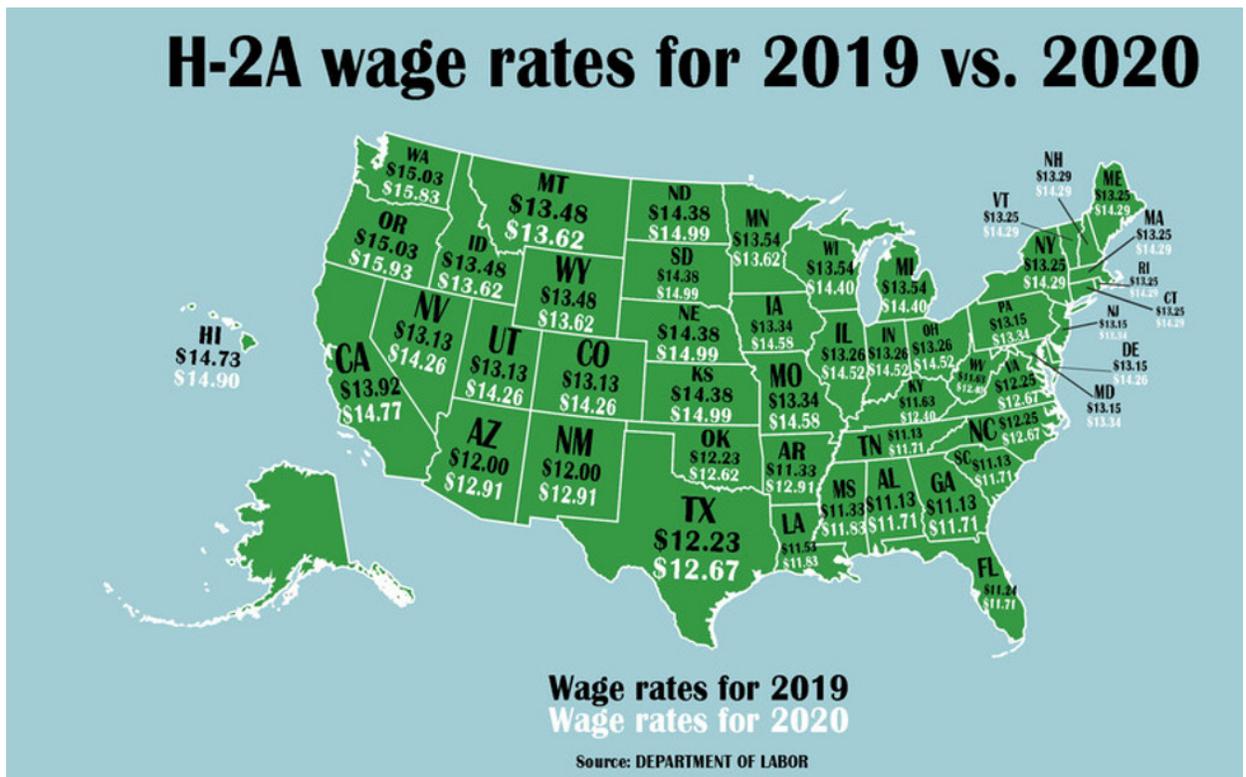


The Adverse Effect Wage Rate (AEWR) is the minimum wage that the U.S. Department of Labor (DOL) has determined that must be offered and paid to U.S. and alien workers by agricultural employers of nonimmigrant H-2A agricultural workers. Where agricultural employers offer employment to nonimmigrant foreign workers, payment of at least the AEWR is required. Published once a year by the



DOL with the assistance of the U.S. Department of Agriculture, the AEWR sets a separate minimum wage rate (i.e., a rate that will not adversely affect the employment opportunities of U.S. workers) for each state.

The employer must pay all covered workers at least the highest of the following applicable wage rates in effect at the time work is performed: the adverse effect wage rate (AEWR), the applicable prevailing wage, the agreed-upon collective bargaining rate, or the Federal or State statutory minimum wage. This wage rate has the effect of raising the existing wage rates, even for non-H2A workers.



Job growth slowed in 2019 and may continue to do so in 2020

Employment growth slowed substantially in 2019, however job expansion was strong in 2018, so milder gains shouldn't be a surprise. But even accounting for the comedown from a stronger year, the slowdown in job growth is notable. Average monthly jobs gains are the most tepid since 2010 when the US economy was struggling to recover from the Great Recession. The job growth slowdown seems to reflect a pullback in employer demand for workers. A downshift in employment gains in a tight labor market isn't necessarily surprising, as employers may be finding it harder to hire workers. Yet there are signs that underlying employer demand is starting to shrink. Job postings peaked late last year and have been declining on a year-over-year basis for four straight months.



Despite the slowdown, employment is expanding at more than twice the rate needed to keep up with population growth. The result is a slow, but steady increase in employment rates. The share of people from 25 to 54 — considered prime working age — with a job has now reached levels last seen in 2007, before the Great Recession. Yet this still stands below its peak in 2000 before the recession of 2001, suggesting the labor market has a bit more room to run. It would take roughly two more years of growth at the current rate for employment of prime-age workers to get back to its previous peak.

Meanwhile, there are longer-run concerns. Productivity growth remains weak, which holds down both the potential expansion rate of the overall economy and wage growth. Slower population increases and a potential fall in immigration are also likely to reduce the pace of economic expansion. Recent changes in immigration policy already appear to have altered the behavior of international job seekers.

For the average worker, wage growth is now the strongest it has been at any point in the current economic expansion. However, the pace of pay gains did not pick up in 2019, but held steady over the year, even after adjusting for inflation. Whether wages will accelerate in 2020 is something to keep an eye on.

A stronger labor market tends to reduce wage inequality, narrowing gaps between groups. Wage growth for workers in low-wage industries has picked up and is stronger than in other industries. Yet a slowing labor market — even if it doesn't tip into recession — could reverse this trend and reduce pay gains most for lower-wage workers. At the same time, employment growth has slowed most in middle-wage industries — which include many goods-related jobs, such as those in residential building construction, as well as jobs in warehousing and transportation. The latest BLS projections call for middle-wage occupations to post the slowest job growth over the next decade, so this trend might be here to stay.



APPENDIX B Energy Situation & Outlook

The U.S. Energy Information Administration (EIA) forecasts Brent crude oil spot prices will average \$65 per barrel (b) in 2020 and \$68/b in 2021, compared with an average of \$64/b in 2019. EIA expects West Texas Intermediate (WTI) crude oil prices will average about \$5.50/b lower than Brent prices through 2020 and 2021, compared with an average WTI discount of about \$7.35/b in 2019.

U.S. regular gasoline retail prices averaged \$2.60/gal in 2019, and EIA forecasts that they will average \$2.63/gal in both 2020 and 2021. U.S. crude oil production averaged 12.2 million b/d in 2019, up 1.3 million b/d from 2018. U.S. crude oil production will likely average 13.3 million b/d in 2020 and 13.7 million b/d in 2021. Most of the production growth in the forecast occurs in the Permian Basin region of Texas and New Mexico.

U.S. net imports of crude oil and petroleum product fell from an average of 2.3 million b/d in 2018 to an average of 0.5 million b/d in 2019, and the United States has exported more total crude oil and petroleum products than it has imported since September. The United States will likely continue to be a net exporter of total crude oil and petroleum products by 0.8 million b/d in 2020 and by 1.4 million b/d in 2021.

U.S. dry natural gas production set a new record in 2019, averaging 92.0 billion cubic feet per day (Bcf/d). Dry natural gas production is projected to rise to 94.7 Bcf/d in 2020 and then decline to 94.1 Bcf/d in 2021. Production in the Appalachian region drives the forecast as it shifts from growth in 2020 to declining production in 2021. Henry Hub natural gas spot prices will likely average \$2.33 per million British thermal units (MMBtu) in 2020, down from \$2.57/MMBtu in 2019. Natural gas prices will then increase in 2021, reaching an annual average of \$2.54/MMBtu.

The share of U.S. total utility-scale electricity generation from natural gas-fired power plants will remain relatively steady, it was 37% in 2019, and it will likely be 38% in 2020 and 37% in 2021. Electricity generation from renewable energy sources rises from a share of 17% last year to 19% in 2020 and 22% in 2021. The increase in the renewables share is the result of expected additions to wind and solar generating capacity. Coal's forecast share of electricity generation falls from 24% in 2019 to 21% in both 2020 and 2021. The nuclear share of generation, which averaged slightly more than 20% in 2019 will be slightly less than 20% by 2021, consistent with upcoming reactor retirements.

After decreasing by 2.1% in 2019, energy-related carbon dioxide (CO₂) emissions are expected to decrease by 2.0% in 2020 and by 1.5% in 2021. Declining emissions reflect forecast declines in total U.S. energy consumption combined with assumptions of relatively normal weather. Energy-related CO₂ emissions are sensitive to changes in weather, economic growth, energy prices, and fuel mix.

The EIA also develops what is called their Reference Case projection which generally assumes that energy-related trends are consistent with historical and current market behavior, technological and

demographic changes, and current laws and regulations. The EIA 2020 Reference case, which serves as a baseline for exploring the effects of different assumptions about the economy, policy, and technology, projects renewables to be the fastest-growing source of electricity generation through 2050, driven by continued declines in the capital costs for solar and wind technologies. Slow growth in U.S. energy consumption, as a result of continued increases in energy efficiency, and technologically enabled growth in domestic oil and natural gas production lead the United States to remain a net energy exporter through 2050.

The 2020 Reference case projects domestic energy demand to grow 0.3% per year on average through 2050, slower than the projected average annual growth of 1.9% in U.S. gross domestic product. This projection is largely driven by continued increases in energy efficiency in the end-use sectors. Gains in appliance efficiency in the residential and commercial sectors, increases in efficiency of new capital equipment in the industrial sector, and increases in fuel economy partially offset the growth in the number of households, industrial activity, and vehicle-miles traveled.

The AEO2020 Reference case also projects the share of U.S. electricity generation from renewable sources to double from 19% of total generation in 2019 to 38% by 2050. Solar contributes the most to the growth, more than tripling from 14% of total renewable generation in 2019 to 46% by 2050. Although coal and nuclear generation decline through the mid-2020s as a result of capacity retirements, their generation stabilizes over the longer term as the more economically viable plants remain in service.

At the same time, the United States continues to produce historically high levels of crude oil and natural gas. In the Reference case, U.S. crude oil production continues to set annual records through the mid-2020s and remains near 14.0 million barrels per day (b/d) through the mid-2040s. EIA projects U.S. dry natural gas production will reach 45 trillion cubic feet by 2050. The continued development of tight oil and shale gas resources supports growth in these fuels.

With the production growth outpacing growth in domestic consumption of crude oil, petroleum products, and natural gas, U.S. net exports of these fuels increase. In the Reference case, the United States will continue to export more petroleum and other liquids than it imports, with a peak at more than 3.8 million barrels per day (b/d) in the early 2030s before gradually declining to 0.2 million b/d in 2050 as domestic consumption slowly rises. U.S. liquefied natural gas (LNG) exports and natural gas pipeline exports to Canada and to Mexico continue to rise through the 2020s before flattening for the remainder of the projection period.



APPENDIX C Freight & Trucking Situation & Outlook

It was a good year for shippers as freight rates plummeted for the majority of 2019, substantially backing off the historic highs the industry witnessed in 2018 in the trucking market. But much in the same way shippers had transportation difficulties in 2018, the past year was not easy on the other side of the industry – carriers.

An overall economic sluggishness hit freight particularly hard in 2019 leading to what many have labeled as a “freight recession.” A number of trucking companies were forced to close their doors permanently in 2019 as their revenues were slashed and talk of recession intensified. Industry incumbents like Celadon, New England Motor Freight, Falcon Transport, and HVH Transportation all shut down, some abruptly, after supply-side conditions did not improve. Through just six months of 2019, approximately 640 trucking companies went bankrupt. That half-year closure figure outpaces the entirety of 2018.

Carriers have felt the pinch because of falling freight rates, a result of the lower demand for freight services. Loads on the spot market, in which retailers and manufacturers buy trucking capacity as they need it, rather than through a contract, fell by 62.6% in 2019. Thus, the year’s struggles were pervasive and felt by most carriers. The trade war, started in 2017, resulted in a threatened 25 percent tariff rate on \$200 billion worth of Chinese goods. As a result of the expensive duty, vendors and suppliers began importing goods ahead of the tariffs’ institution. It created an influx of demand for freight services in 2018 that has since quelled to a near standstill as companies have preemptively built their supply chains ahead of the hike.

This has led to tough conditions in the logistics sector, extending to both traditional over-the-road carriers and intermodal providers. Lower shipping volume drove down freight rates to combat falling demand thus cutting into many carriers’ revenue stream. But with trade negotiations resuming and mildly progressing between the US and China, some relief could be on the way for the industry toward the latter half of 2020. Despite any progress, however, the economy will take some time to rebound. Even if the two sides reach an ideal trade agreement, it will not result in a rapid uptick for the domestic economy.

Tariffs are just one piece of the puzzle that contributed to a down year for the transportation industry. And like the trade war, the remainder of conditions may not have an immediate solution to them either. The trucking market is still plagued by labor difficulties and a driver shortage. Carriers are having trouble attracting and retaining truckers, many of whom are opting for other equally well-paying blue-collar and localized delivery jobs. This has driven up wages for the limited pool of remaining drivers, which is a cost that some small carriers cannot absorb. To dilute the pool further, the online retail giant Amazon is building its own in-house fleet of truck drivers.

In addition to increasing pay to compete in a tight job market, carriers have had difficulty bearing increasing transportation insurance costs. Insurance premiums for long-haul trucks and trucking companies have



increased dramatically in the past few years, doubling from an average between \$6,000 and \$7,000 in the beginning of the decade to between \$12,000 and \$14,000 today. Increased insurance costs combined with larger capital requirements to purchase and upkeep technologically enabled tractor trailers have further strained many carriers. The final phase of the electronic logging devices (ELD) mandate is now in effect. It requires all trucks that were previously using an AORBD system to now be equipped with an ELD. While the mandate should prove to be beneficial to the industry in the long-term, getting all trucks in a carrier's fleet technologically enabled has proven expensive.

According to a recent report from the American Transportation Research Institute, the marginal, per-mile costs of a truck increased by 7.7 percent last year. A large portion of which can be attributed to a 17.7 percent increase in the price of fuel. That increase is likely here to stay as a new sulfur-free marine rule will inflate prices for at least another year. Refiners will pass increased production costs off to consumers while they shift to the new fuel formulas.

When synthesized, all these factors have created a difficult environment for trucking companies to turn a profit or even remain operable. Despite some optimistic perspectives about the state of the industry in 2020, there are too many unpredictable factors to say for certain how the entire year will look. However, with fewer carriers in the marketplace, paired with a decrease in overall demand for freight services, 2020 will mostly be defined by a market in equilibrium, at least for the first six months of this year.

While the trucking industry might not be in the best market situation currently, the ATA Freight Transportation Forecast: 2019 to 2030 shows continued growth in the industry as the country's economy and population grow. They estimate that overall freight tonnage will grow to 20.6 billion tons in 2030, up 25.6% from 2019's projection of 16.4 billion tons.

Data analytics is an important tool that businesses around the world are looking to incorporate and is something that has helped boost the overall impact that businesses have. Many companies in the trucking industry have already realized the benefit of incorporating data analytics and more companies are likely to follow in their footsteps in the coming year. This information technology can help the trucking industry identify the areas that need development and also helps them understand the areas that they can improve on when it comes to making their operations more efficient. All of these developments are likely to alter the manner in which the trucking industry is likely to function in 2020.



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Grower Edition with Dr. Charlie Hall



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A Community
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Expert Insights
to Drive Results

Your MarketMetrics is a secure, anonymous, cloud-based data visualization and benchmarking platform, tailored to nursery and greenhouse growers.

It allows you to easily see how your company is doing compared to your peers, identify critical industry trends, and make meaningful business decisions to drive *better profitability and financial stability.*

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