YOUR MARKET METRICS

AN INDEX OF PRICES PAID BY GROWERS IN THE GREEN INDUSTRY 2007–2023

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Dr. Hall's expertise is in the production and marketing of Green Industry crops is **nationally recognized** in academia and among the horticultural clientele he serves. His major research, teaching, & extension areas of specialization include strategic management, market situation/outlook, cost accounting, and financial analysis for Green Industry firms.

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He is an **Honorary Lifetime Member** of the Texas Nursery and Landscape Association and has received TNLA's **Award for Outstanding Service to the Nursery Industry**. He is also a member of the **Hall of Fame** and **Honorary Lifetime Member** of the Tennessee Nursery and Landscape Association. Dr. Hall has received Texas A&M University's A**ssociation of Former Students' Distinguished Achievement Award in Teaching** and the **Vice Chancellor's Award in Excellence for Student Counseling and Relations**. He is a member of Alpha Gamma Rho agricultural fraternity and has received their **Grand Presidents Award** and **Brother of the Century** designation.

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Executive Summary

Prior to the recent global pandemic (effectively beginning Q1 2020), the green industry was in the mature stage of its industry life cycle. As such, there was margin compression occurring in the industry, where prices were slow to increase due to *real and perceived* competitive forces while, at the same time, the costs of the inputs used to produce these products were increasing. Even in situations where industry firms were able to increase prices for their plants, the costs of production inputs rose more quickly and margins across the entire industry were being "squeezed."

The pandemic resulted in significant supply chain challenges, while at the same time the industry experienced unprecedented increases in final demand. This has resulted in extraordinarily high inflationary pressures, making it essential for growers to have full and accurate information about their cost structure to aid in managerial decision-making such as SKU rationalization, customer profitability analyses, and determining the appropriate level of price increases. Armed with such information, growers have been in a much better position to understand the inflationary pressures on their relative costs of production and to use the 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*).

The ***Index of Prices Paid by Growers***, first developed in 2017 as part of the **Your MarketMetrics** industry benchmarking program, has documented these inflationary pressures annually on the most important inputs used by green industry growers and 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.

Results from this indexing analysis indicate that the weighted Index of Prices Paid by Growers ranges from 100 in 2007 to a high of 159.8 in 2022. **This means that the overall cost of producing nursery and greenhouse crops is almost 60% higher in 2022 than it was in 2007, with labor experiencing the largest increase (69.8% higher in 2022) among these inputs**. The year-over-year (YOY) increases, reflecting the inflationary pressures of costs over time, are also calculated. The tracked expenses in 2022 increased about **8.4%** over what they were in 2021. **Based on currently available market data across the green industry allied trade sector, a 3.5% increase in input costs is forecast for 2023 input cost increases**.

An Index of Prices Paid by Growers in the Green Industry

Introduction

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. While there are already-existing indices that are available that reflect general inflationary pressures in the economy, the use of standard measures such as the *Producers Price Index* (PPI) and *Consumer Price Index* (CPI) for this purpose is insufficient because wholesale growers in the green industry purchase different goods and services from those used for calculating these indexes. The USDA National Agricultural Statistics Service 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 many items that are not applicable to nursery and greenhouse growers or exclude items that are applicable.

This **Index of Prices Paid by Growers** overcomes these challenges and includes major production inputs (e.g., containers, soil mixes, propagation stock, plant protection products, fertilizers, and fuel), along with the costs of labor, maintenance supplies, packaging materials, labels and other signage, freight, and other shipping-related expenses.

Indexing Methodology

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

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

COST CATEGORY	% OF SALES	% OF TRACKED EXPENSES
Containers & other plastics	6.50%	10.24%
Media (peat-based)	2.50%	3.94%
Propagative materials	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 (supplies & repairs)	2.00%	3.15%
Freight and trucking	11.00%	17.32%
TOTAL	63.50%	100.00%
Other expenses	36.50%	---
	100.0%	100.00%

Altogether, the production-related line items included in the calculation of the index represented 63.5% of sales. The remaining 36.5% were either SG&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.

Once the weights were established, then an index for each cost line item was estimated that reflected the relative changes in price for these expense line items through time. The base year for calculation of the index was 2007, so that year is set to 100 since it reflects the most recent pre-Great Recession time frame. The costs of each line item in each subsequent year can then be compared to the same line item costs in 2007 to determine how much the cost has increased. Multiplying the weight of each line item times the index for that line item each year and then summing all of the line items yields the summary weighted index.

The 2022 Index of Prices Paid by Growers

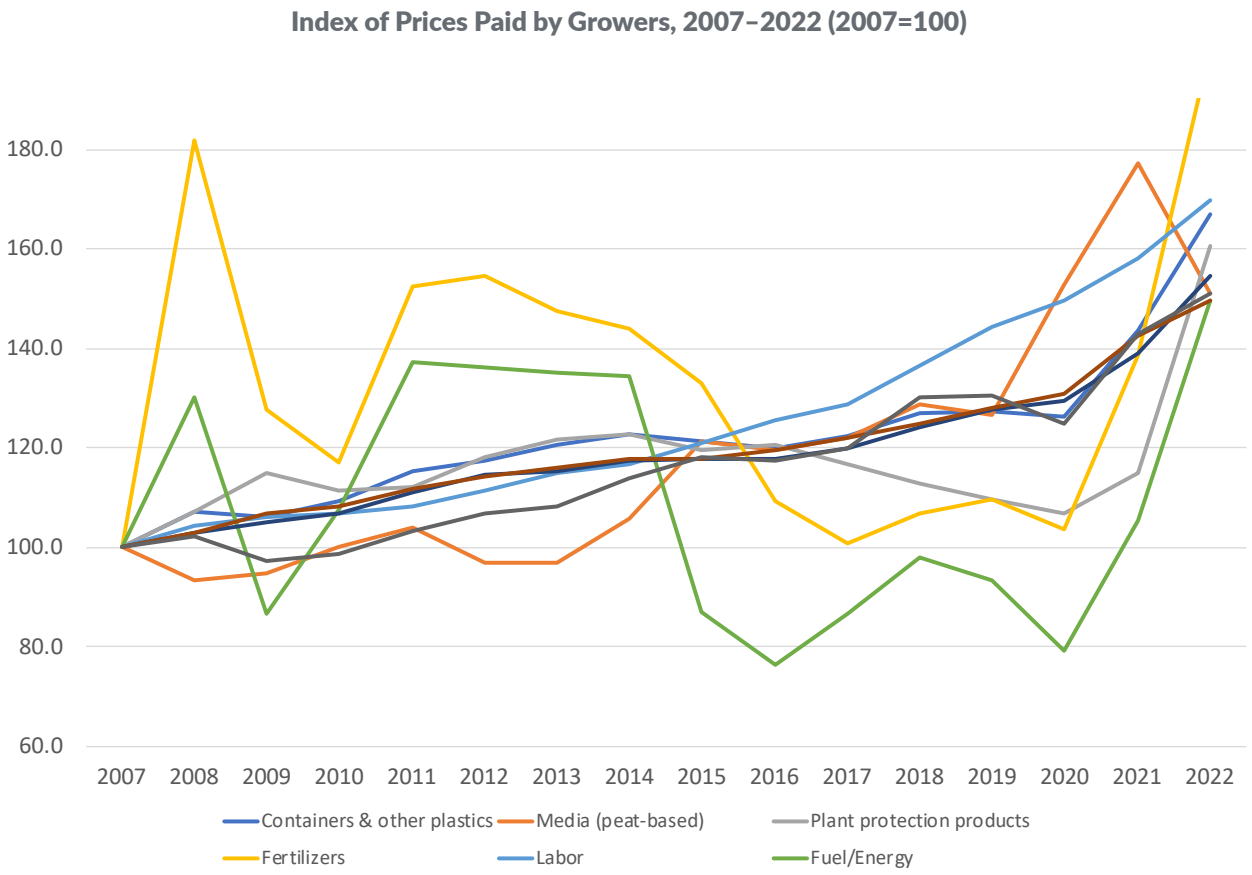
The 2022 index is 159.8, which means the **overall cost of inputs used in producing nursery and greenhouse crops is about 59.8% higher in 2022 than it was in 2007**. The year-over-year (YOY) increases are also presented, reflecting the annual inflationary pressures of costs over time. For example, the tracked costs in 2022 increased about 8.4% over what they were in 2021.

Index of Prices Paid by Growers in the Green Industry, 2007-2022 (2007=100).

Cost category	Weight	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f
Containers & other plastics	10.24%	100.0	107.0	106.3	109.3	115.3	117.6	120.8	122.8	121.5	119.9	122.5	126.9	127.3	126.4	143.5	166.8	171.8
Media (peat-based)	3.94%	100.0	93.4	94.7	100.3	104.1	96.9	97.0	105.8	121.4	119.5	121.9	128.9	126.5	152.8	177.1	151.1	155.6
Propagative materials	23.62%	100.0	102.8	106.7	108.4	111.9	114.2	115.9	117.8	117.9	119.5	122.0	125.0	128.1	131.0	142.6	149.7	157.2
Plant protection products	1.57%	100.0	107.3	114.9	111.5	112.1	118.2	121.6	122.8	119.4	120.7	116.6	112.9	109.8	107.0	115.1	160.5	162.1
Fertilizers	1.57%	100.0	181.7	127.7	117.1	152.4	154.6	147.4	144.1	132.9	109.5	100.9	106.9	109.5	103.5	138.6	200.3	208.3
Labor	34.65%	100.0	104.5	106.0	107.0	108.2	111.4	115.0	116.9	121.1	125.4	128.9	136.7	144.2	149.6	158.1	169.8	180.0
Fuel/Energy	3.94%	100.0	130.2	86.6	107.4	137.2	136.2	135.0	134.3	87.1	76.3	86.7	97.9	93.3	79.3	105.6	149.7	145.2
Supplies & repairs	3.15%	100.0	102.9	104.9	106.9	111.2	114.5	115.5	117.6	117.7	117.9	120.0	124.1	127.6	129.6	138.9	154.6	157.7
Freight and trucking	17.32%	100.0	102.2	97.3	98.8	103.2	106.8	108.4	113.8	118.3	117.6	119.8	130.0	130.5	124.9	143.1	151.1	148.1
Weighted index (2007=100)		100.0	105.7	103.9	106.1	110.8	113.2	115.4	118.0	118.6	119.4	122.2	128.7	132.0	133.9	147.4	159.8	165.4
YOY increase/decrease		---	5.7%	-1.7%	2.1%	4.4%	2.2%	1.9%	2.2%	0.6%	0.6%	2.4%	5.3%	2.5%	1.4%	10.1%	8.4%	3.5%

f=forecast

Recent data for growers and retailers that participate in the Your MarketMetrics benchmarking program indicate margins improved during the pandemic because plant prices increased at a much faster rate than they had historically. Survey data points to the dilemma that, while most growers raised their prices, only about 40% have raised them enough to cover the entirety of their input cost increases. **On top of this, it is anticipated that input costs in 2023 will rise by an additional 3.5% because of the continuing (though improving) supply chain disruptions, backlogs of higher-priced inventory of certain inputs, and the still relatively strong demand manufacturers and distributors face from growers in the industry who are looking to increase their tradeable assets (build inventory)**.



The three individual components of the index that experienced the largest cost increases since 2007 included containers, labor, and the cost of freight and trucking, which are 66.8%, 69.8%, and 48.1% more expensive, respectively, than they were in 2007. Labor has been a two-fold dilemma for growers with both the cost and availability of labor being a severe limitation for nursery and greenhouse growers alike. Search and acquisition costs for labor have also increased, on top of the increased wages and associated burden of labor. All other categories of costs have also experienced increases since 2007.

Forecast for 2023

Based on the available market research data across the green industry sectors and "ground-truthing" conversations with allied trade pundits associated with manufacturing and distributing these inputs, **a 3.5% weighted average increase** in input costs is forecast for 2023. The leading input cost increases are for containers and other plastics, freight and trucking, propagative materials, fertilizers, fuel and energy, and, of course, labor.

Implications

The purpose of this white paper was to update the 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 costs) may vary depending on the region of the country. Thus, it is recommended that growers develop their own index by either adjusting the weights of each of the line items contained in the overall index the higher or lower percentage of those expenses in their relative COGS.

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 than inflationary pressures have the potential to erode margins for green industry growers (unless they are able to raise plant prices accordingly) and that there will continue to be increases, albeit smaller than the last couple of years, in the costs of major inputs they utilize during production, particularly labor.

Though outside the scope of this analysis, the industry will need to continue 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. But while supply-side dynamics continue to pressure growers to increase prices to cover additional input cost increases, the demand-side dynamics of inelasticity of demand are still unknown at this point. In other words, how much runway is left before consumers start pushing back on increasing plant costs?

APPENDIX A Labor Situation & Outlook

The US labor market entered 2022 with considerable momentum. Despite a slowdown in economic growth and a moderation in demand for workers, jobs continued to grow briskly and wages increased at a quick pace. This year's outlook is less rosy, with many projections showing the US economy is poised for a mild recession. Whether or not recession predictions prove true, the labor market is set to experience a cool down. It's the extent of that moderation that is the largest unknown.

Employers hired workers at a rapid pace in 2022, continuing the rapid expansion of employment that began in the spring of 2021. This pace of hiring was unsurprising given employers' strong appetites for more employees and a relatively abundant pool of jobless workers. A slowdown in hiring can come from a combination of weaker demand and a more constrained supply of readily-hireable workers. Whether demand or supply is the dominant constraint will set the stage for much of 2023.

Demand for new hires was strong as 2022 wrapped up — the most recent government data shows there were 10.5 million job openings at the end of November. But while hiring remained strong, demand tempered last year, as both job openings and job postings on Indeed showed considerable decline, down 9.9% year-over-year as of January 2023.

That contraction was particularly notable in occupational categories linked to the retreating tech sector, such as software development. On the other hand, postings remained strong in categories related to in-person categories, such as food preparation and services. If this trend continues into 2023, then demand will remain robust as in-person services employ far more workers than higher-wage industries, like the technology sector, for example.

The current state of labor supply is relatively unclear, but the data shows strong demand was attracting more people into jobs for much of 2022. The labor force participation rate didn't rise much over the year, moving just a tenth of a percentage point from 62.2% in January 2022 to 62.3% in December. A similar trend was true for workers ages 25 to 54, though this hides an important pattern — the prime-age labor force participation rate rose for most of 2022, then backslid from September to November. This series can be volatile, with months of decline followed by rebounds, something we saw in 2021. It's very possible that 2023 will see more workers join the labor force if strong demand endures as the prime-age labor force participation rate is still 0.4 percentage points below its late 2019 average.

For large chunks of 2021 and 2022, workers had more leverage in the US labor market than they've had in decades. The elevated number of job opportunities and level of urgency from employers gave job seekers the ability to find new jobs, seek out higher compensation, and retain many workplace benefits. However, as the labor market begins to slow down, it is possible some of the advantages and progress made for employees in recent years may fade. While some gains may be more enduring, others may be more susceptible to fluctuations in economic conditions.

Remote work is also set to endure. Though this mode of work isn't available to everyone, its mass adoption has been, and will continue to be, transformative for many people. However, a weaker labor market could prompt some employers to shift work back into the office. If the trend reverses and many companies choose to end their experiment with remote work, less leverage for workers could mean employers take advantage of that opportunity.

Workers who continued to show up in person also saw a variety of gains last year in large part because of increased competition for their services. The experience of the leisure and hospitality and retail trade sectors is instructive. Workers in these sectors were in high demand. Leveraging that advantage, these employees realized fast wage gains and increased access to other forms of compensation. It's unclear how much of this leverage will endure in a slower labor market — workers in low-wage industries are often the hardest hit by downturns — but there is still good news for this group. Their ability to quit a job and move to a new one is still sending strong signals.

Rapid wage growth was one of the defining characteristics of the 2022 labor market. Strong competition for workers, particularly those in lower-paying jobs, resulted in a pace of pay gains that haven't been seen in the US for quite some time. Of course, high inflation meant these strong gains were disappointing for many workers. Still, many saw their paychecks grow more quickly than prices.

With signs that inflation may be steadily ticking down in the US, the big question remains whether wage growth does the same. If wage growth is resilient as inflation moderates, then more households will see increases in their purchasing power, which could power consumer spending and overall economic growth. Such an outcome would likely be seen by the Federal Reserve as a threat to their campaign against high inflation, resulting in even more restrictive monetary policy in 2023.

For now, many signs point toward moderating, but still strong wage gains. Key wage growth indicators such as the Employment Cost Index and the Atlanta Fed's Wage Growth Tracker show gains well above their pre-pandemic pace. For example, private sector wages and salaries grew 3% year-over-year in the third quarter of 2019 according to the ECI. The metric showed 5.3% growth in the third quarter of 2022.

The US labor market entered this year with considerable strength. Demand for workers is strong but moderating, suggesting employers are looking to add more headcount despite recession fears. If economic growth can muddle through, avoid significant new headwinds, and maintain momentum in the face of restrictive monetary policy, then workers will retain many of the gains of recent years. That, of course, is more easily said than done. This year will pose challenges for the US economy, but hopefully the strength of the US labor market can continue to provide a solid foundation.

General Farm Labor Wage Rates

There were 785,000 workers hired directly by farm operators on the Nation's farms and ranches during the week of October 9-15, 2022, up 2 percent from the October 2021 reference week. Workers hired directly by farm operators numbered 797,000 during the week of July 10-16, 2022, unchanged from the July 2021 reference week.

Farm operators paid their hired workers an average gross wage of $17.72 per hour during the October 2022 reference week, up 7 percent from the October 2021 reference week. Field workers received an average of $17.04 per hour, up 6 percent. Livestock workers earned $16.52 per hour, up 7 percent. The field and livestock worker combined gross wage rate, at $16.90 per hour, was up 6 percent from the 2021 reference week. Hired laborers worked an average of 41.8 hours during the October 2022 reference week, down slightly from the hours worked during the October 2021 reference week.

Farm operators paid their hired workers an average gross wage of $17.63 per hour during the July 2022 reference week, up 6 percent from the July 2021 reference week. Field workers received an average of $16.80 per hour, up 4 percent, while livestock workers earned $16.65 per hour, up 10 percent from a year earlier. The field and livestock worker combined gross wage rate, at $16.76 per hour, was up 6 percent from the July 2021 reference week. Hired laborers worked an average of 41.1 hours during the July 2022 reference week, up slightly from the hours worked during the July 2021 reference week.

The 2022 all hired worker annual average gross wage rate was $17.56 per hour, up 7 percent from the 2021 annual average gross wage rate. The 2022 field worker annual average gross wage rate was $16.77 per hour, up 6 percent from the 2021 annual average. The 2022 livestock worker annual average gross wage rate was $16.29 per hour. The 2022 annual average combined gross wage for field and livestock workers was $16.62, up 7 percent from the 2021 annual average of $15.56 per hour.

Adverse Effect Wage Rates for Foreign Labor

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. When 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 USDA, 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. Essentially, the AEWR is a minimum wage that provides a floor below which the wages of H-2A workers cannot fall. This wage rate has, anecdotally, had the effect of raising the existing wage rates for non-H2A workers.

With the release of USDA's Farm Labor Survey, farmers and growers that utilize the H-2A program essentially know the minimum wage they must pay their H-2A workers the following year. **The FLS reveals an average increase of 6%, for field workers from 2022 over 2021, though there are considerable regional differences. By comparison, according to the Bureau of Labor Statistics Employment Cost Index, nationally, compensation costs for civilian workers increased 5.1 percent for the 12-month period ending in December 2022 (they had increased 4.0 percent YOY in December 2021)**.

DOL's H–2A regulations at 20 CFR 655.122(l) stipulate that employers must pay their H–2A workers and workers in corresponding employment at least the highest of:

(i) The AEWR
(ii) the prevailing hourly wage rate
(iii) the prevailing piece rate
(iv) the agreed- upon collective bargaining wage rate
(v) the federal or state minimum wage rate in effect at the time the work is performed.

Further, when the AEWR is adjusted during a work contract and is higher than the highest of the previous AEWR, the prevailing rate, the agreed- upon collective bargaining wage, the federal minimum wage rate, or the state minimum wage rate, the employer must pay that adjusted AEWR upon the effective date of the new rate, as provided in the applicable Federal Register Notice. See 20 CFR 655.122(l) (requiring the applicable AEWR or other wage rate to be paid based on the AEWR or rate in effect "at the time work is performed").

On November 5, 2020, DOL published a final rule, Adverse Effect Wage Rate Methodology for the Temporary Employment of H–2A Nonimmigrants in Non-Range Occupations in the United States, 85 FR 70445 (2020 AEWR Final Rule), to establish a new methodology for setting hourly AEWRs, effective December 21, 2020. However, on December 23, 2020, the U.S. District Court for the Eastern District of California issued an order enjoining DOL from implementing the 2020 AEWR Final Rule and ordering DOL to set the hourly AEWRs using the methodology set forth in the Temporary Agricultural Employment of H–2A Aliens in the United States, 75 FR 6884 (Feb. 12, 2010) (2010 H–2A Final Rule). See Order Granting Plaintiffs' Motion for a Preliminary Injunction, United Farm Workers, et al. v. U.S. Dept of Labor, et al., No. 20–cv–1690 (E.D. Cal.), ECF No. 37. Pursuant to that order, DOL has used the methodology set forth in the 2010 H–2A Final Rule to determine the 2022 AEWRs.

The semi-annual November 2022 USDA Farm Labor Report (FLR) includes quarterly estimates of number of hired workers, average hours worked per worker and average hourly wage rates. The report also provides an annual weighted average hourly wage rate for field workers, field and livestock workers combined, and all hired workers, based on the quarterly estimates. Of utmost importance to users of the H-2A visa program, the field and livestock workers' combined wage rate for 2022 contained in the FLR becomes the Adverse Effect Wage Rate utilized in the H-2A program in 2023. So, while the rates don't become official until they are released by the Department of Labor in the Federal Register, usually around mid-December, the rates published in the FR are typically unchanged from what is published in the FLR.

Accordingly, the 2023 AEWRs for all agricultural employment (except for the herding or production of livestock on the range, which is covered by 20 CFR 655.200 through 655.235) for which temporary H–2A certification is being sought is equal to the annual weighted average hourly wage rate for field and livestock workers (combined) in the state or region as published by the U.S. Department of Agriculture (USDA) in the November 2021 Farm Labor Report. The 2010 H–2A Final Rule, 20 CFR 655.120(c), requires that the Administrator of the Office of Foreign Labor Certification publish the USDA field and livestock worker (combined) wage data as AEWRs in a Federal Register Notice. The 2023 AEWRs to be paid for agricultural work performed by H–2A and workers in corresponding employment on and after the effective date of this notice are set forth in the table at the end of this section.

Given the overall tightness in the U.S. labor market, few would be surprised that the fiscal year 2022 U.S. average field and livestock workers' combined wage rate rose, but **the 6.8% fiscal year-over-fiscal year increase outpaced the 5.3% fiscal year-over-fiscal year growth in seasonally adjusted average hourly earnings of all private employees and will continue to put significant pressure on the bottom lines of farmers with significant labor needs**.

In 2023, every state will have an AEWR in excess of $13 per hour. Six states (Alabama, Georgia, South Carolina, Arkansas, Louisiana and Mississippi) will have an AEWR between $13.00 and $13.99. Eight states (Kentucky, Tennessee, West Virginia, Florida, Oklahoma, Texas, North Carolina and Virginia) will have an AEWR between $14.00 and $14.99. Five states (Arizona, New Mexico, Idaho, Montana and Wyoming) will have an AEWR between $15.00 and $15.99. Seventeen states (Colorado, Nevada, Utah, Delaware, Maryland, New Jersey, Pennsylvania, Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont) will have an AEWR between $16.00 and $16.99. And sixteen states will have an AEWR in excess of $17.00 per hour (Illinois, Indiana, Ohio, Hawaii, Kansas, Nebraska, North Dakota, South Dakota, Michigan, Minnesota, Wisconsin, Iowa, Missouri, Oregon, Washington and California).

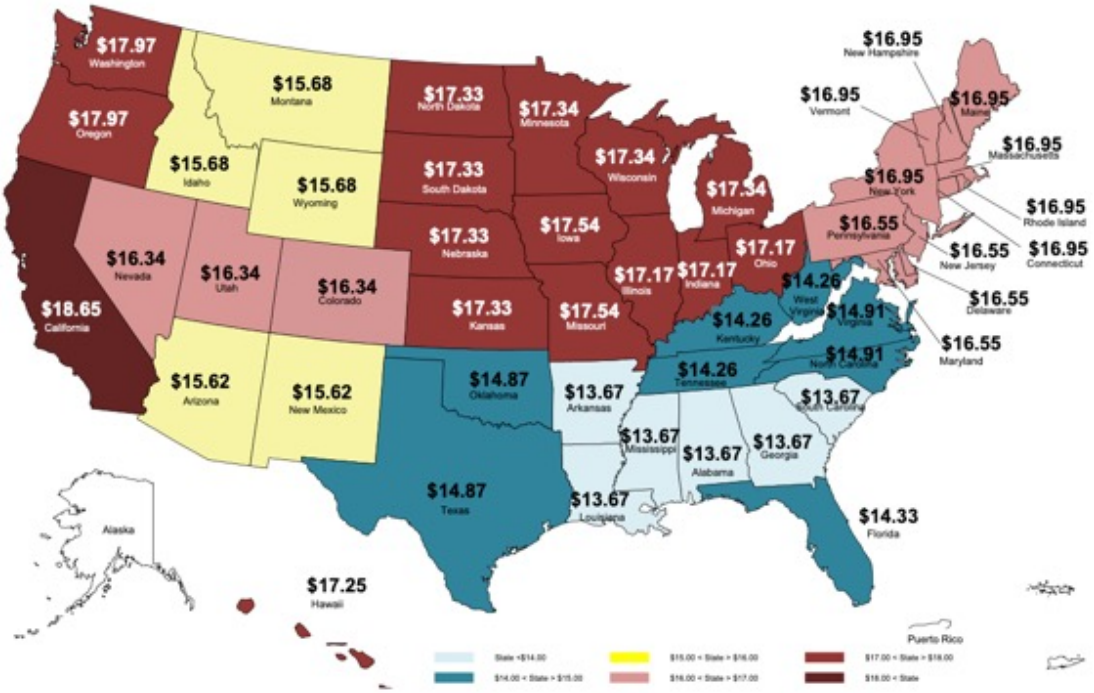
Unlike in 2021, every farm labor region and state experienced a higher average wage rate in 2022 and will subsequently have a higher AEWR in 2023. The Appalachian II region (Kentucky, Tennessee and West Virginia) had the smallest increase in terms of dollar per hour and percentage with a $0.37 per hour or 2.7% increase. Florida had the largest percentage increase – 15.5%. The Lake region (Michigan, Minnesota and Wisconsin) had the largest increase in dollar terms – $1.97 per hour. Once again in 2022, California had the highest overall wage rate at $18.65 per hour.

With the release of the FLR we now know that labor costs for nursery and greenhouse growers will be rising. With labor costs accounting for an average of 35% of total COGS, this increase is no small part of the budget.

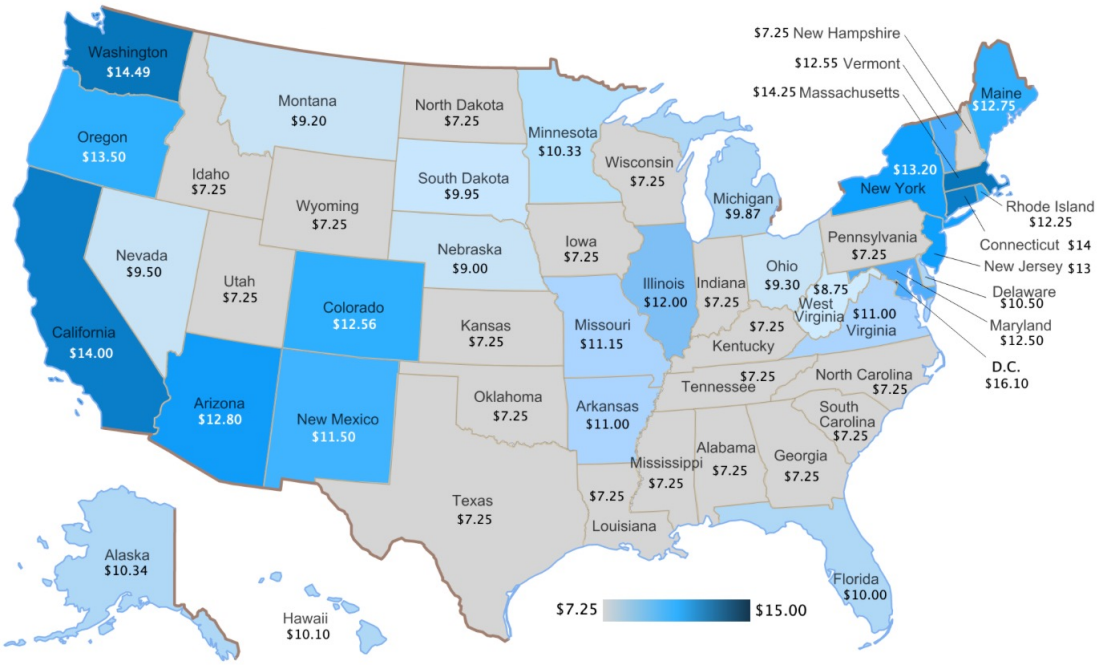
Adverse Effect Wage Rates by State 2018-2022

State	2019 AEWR	2020 AEWR	2021 AEWR	2022 AEWR	2023 AEWR	YOY increase 2022 to 2023	Percent increase from 2019 to 2023
(effective date)	1/9/19	1/1/20	2/23/21	12/29/21	1/1/23		
Alabama	11.13	11.71	11.81	11.99	13.37	11.51%	20.13%
Arizona	12.00	12.91	13.67	14.79	15.62	5.61%	30.17%
Arkansas	11.33	11.83	11.88	12.45	13.67	9.80%	20.65%
California	13.92	14.77	16.05	17.51	18.65	6.51%	33.98%
Colorado	13.13	14.26	14.82	15.58	16.34	4.88%	24.45%
Connecticut	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
Delaware	13.15	13.34	14.05	15.54	16.55	6.50%	25.86%
Florida	11.24	11.71	12.08	12.41	14.33	15.47%	27.49%
Georgia	11.13	11.71	11.81	11.99	13.67	14.01%	22.82%
Hawaii	14.73	14.90	15.56	16.54	17.25	4.29%	17.11%
Idaho	13.48	13.62	14.55	14.68	15.68	6.81%	16.32%
Illinois	13.26	14.52	15.31	15.89	17.17	8.06%	29.49%
Indiana	13.26	14.52	15.31	15.89	17.17	8.06%	29.49%
Iowa	13.34	14.58	15.37	16.19	17.54	8.34%	31.48%
Kansas	14.38	14.99	15.89	16.47	17.33	5.22%	20.51%
Kentucky	11.63	12.40	12.96	13.89	14.26	2.66%	22.61%
Louisiana	11.33	11.83	11.88	12.45	13.67	9.80%	20.65%
Maine	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
Maryland	13.15	13.34	14.05	15.54	16.55	6.50%	25.86%
Massachusetts	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
Michigan	13.54	14.40	14.72	15.37	17.34	12.82%	28.06%
Minnesota	13.54	14.40	14.72	15.37	17.34	12.82%	28.06%
Mississippi	11.33	11.83	11.88	12.45	13.67	9.80%	20.65%
Missouri	13.34	14.58	15.37	16.19	17.54	8.34%	31.48%
Montana	13.48	13.62	14.55	14.68	15.68	6.81%	16.32%
Nebraska	14.38	14.99	15.89	16.47	17.33	5.22%	20.51%
Nevada	13.13	14.26	14.82	15.58	16.34	4.88%	24.45%
New Hampshire	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
New Jersey	13.15	13.34	14.05	15.54	16.55	6.50%	25.86%
New Mexico	12.00	12.91	13.67	14.79	15.62	5.61%	30.17%
New York	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
North Carolina	12.25	12.67	13.15	14.16	14.91	5.30%	21.71%
North Dakota	14.38	14.99	15.89	16.47	17.33	5.22%	20.51%
Ohio	13.26	14.52	15.31	15.89	17.17	8.06%	29.49%
Oklahoma	12.23	12.67	13.03	13.88	14.87	7.13%	21.59%
Oregon	15.03	15.83	16.34	17.41	17.97	3.22%	19.56%
Pennsylvania	13.15	13.34	14.05	15.54	16.55	6.50%	25.86%
Rhode Island	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
South Carolina	11.13	11.71	11.81	11.99	13.67	14.01%	22.82%
South Dakota	14.38	14.99	15.89	16.47	17.33	5.22%	20.51%
Tennessee	11.63	12.40	12.96	13.89	14.26	2.66%	22.61%
Texas	12.23	12.67	13.03	13.88	14.87	7.13%	21.59%
Utah	13.13	14.26	14.82	15.58	16.34	4.88%	24.45%
Vermont	13.25	14.29	14.99	15.66	16.95	8.24%	27.92%
Virginia	12.25	12.67	13.15	14.16	14.91	5.30%	21.71%
Washington	15.03	15.83	16.34	17.41	17.97	3.22%	19.56%
West Virginia	11.63	12.40	12.96	13.89	14.26	2.66%	22.61%
Wisconsin	13.54	14.40	14.72	15.37	17.34	12.82%	28.06%
Wyoming	13.48	13.62	14.55	14.68	15.68	6.81%	16.32%
Average	**$12.96**	**$13.68**	**$14.28**	**$15.03**	**$16.13**	**7.44%**	**24.47%**
YOY increase	-----	5.56%	4.38%	5.27%	7.30%		
	2019	**2020**	**2021**	**2022**	**2023**		

FY2023 Adverse Effect Wage Rates



State Minimum Wage (July 2022)



APPENDIX B Energy Situation & Outlook

Fuels commentary

Typically, from February to June, the U.S. gasoline crack spread (the difference between the wholesale price of gasoline and the price of Brent crude oil) increases because of the shift to the more expensive, summer-grade gasoline and rising gasoline demand leading up to the summer. Over the past five years, the increase in the gasoline crack spread from February to June averaged almost 30 cents per gallon (gal). Also because of the seasonal increase in gasoline demand from February to June, gasoline inventories have fallen by 13 million barrels on average over the past five years. From February to June this year, however, increasing refining to offset seasonal increases in demand is expected, generating slight gasoline inventory builds and a small decline in gasoline crack spreads. The current forecast projects that U.S. gasoline inventories will decrease by 9 million barrels in March because of postponed refinery maintenance. However, as refineries complete turnarounds, inventories are expected to end June with 10 million barrels more gasoline than at the end of March.

Our U.S. gasoline inventory forecast for February through June 2023 reflects increasing refining activity and gasoline production, as well as gasoline consumption that remains below pre-pandemic levels. Although distillate refining margins are expected to remain higher than gasoline refining margins, the limited ability of refiners to shift their product yields will keep gasoline inventories within the 2018–2022 range from April through the end of the forecast. ExxonMobil's planned startup of a 250,000 b/d capacity expansion at its Beaumont, Texas, refinery in the first half of this year will also contribute to increased production. Rising gasoline inventories, along with falling crude oil prices, will gradually decrease gasoline prices throughout the forecast period. Retail gasoline prices will likely average near $3.20/gal in the fourth quarter of 2023 (4Q23), down more than 30 cents/gal from 4Q22, and decrease further to an average of about $3.10/gal in 2024.

U.S. distillate crack spreads are expected to decrease, averaging almost 90 cents/gal in 2023, down 30 cents/gal from 2022. Crack spreads are expected to fall further to almost 60 cents/gal in 2024. Partly as a result of a warm start to 2023 and inventory builds at the Amsterdam, Rotterdam, and Antwerp (ARA) hub in Northwest Europe, the U.S. distillate crack spread decreased by almost 40 cents/gal from January to February.

Demand for U.S. diesel exports amid shifting trade flows and increased freight costs following responses to Russia's full-scale invasion of Ukraine have reduced diesel inventories in the United States and driven up diesel prices globally. U.S. distillate inventories are expected to remain below the five-year average in 2023 but to increase slightly compared with 2022 as refinery runs increase and U.S. distillate fuel demand falls.

U.S. distillate inventories are forecast to remain similar to this year in 2024, but U.S. distillate crack spreads are expected to continue falling because more distillate fuel supplies will be available in markets outside of

the United States, particularly at the ARA and Singapore hubs, limiting growth in demand for U.S. exports. Supply has increased because of more diesel exports from the Middle East as a result of expanded refinery capacity. Since lifting its zero-COVID policy, China has also increased diesel exports compared with this time last year. Despite recent increases in diesel supplies, the impact of changing economic conditions and the longer-term impact of Europe's ban on petroleum product imports from Russia continue to present significant uncertainty in our distillate outlook.

Natural Gas

In January and February, below-average U.S. natural gas consumption in the residential and commercial sectors was driven by mild winter weather across large parts of the country, particularly in the Northeast and the Midwest. Based on preliminary data from the National Oceanic and Atmospheric Administration for January and February, the first two months of 2023 combined were among the three warmest on record for that period going back to 1895. In March, natural gas consumption in the residential and commercial sectors is expected to average almost 32 billion cubic feet per day (Bcf/d), which is close to the five-year average, because of more normal temperatures in March with a close to average number of heating degree days.

As a result of the mild winter and low natural gas consumption in the residential and commercial sectors, 2.4% (2 Bcf/d) less U.S. natural gas consumption is expected in 2023 than in 2022. Reduced natural gas consumption in January and February slowed withdrawals from natural gas inventories to less than the five-year average and reduced natural gas prices. The spot price of natural gas at the U.S. benchmark Henry Hub averaged $2.38 per million British thermal units (MMBtu) in February, the lowest monthly average since September 2020. But natural gas prices are still expected to increase in the coming months, resulting from rising demand from Freeport LNG reopening, which shut down last June due to a fire, and seasonal increases in natural gas demand in the electric power sector. In addition, natural gas production is expected to be relatively flat for the rest of 2023 as producers reduce drilling in response to lower prices.

U.S. liquefied natural gas (LNG) exports is forecast to average about 12 Bcf/d in 2023, up 14% from last year. LNG exports are expected to increase by an additional 5% in 2024. The Freeport LNG export terminal's return to service and LNG export projects under construction that will come online by the end of 2024 will contribute to rising exports.

The Freeport LNG terminal can produce more than 2.1 Bcf/d of LNG for export on a peak day, and exports from Freeport averaged 1.9 Bcf/d from January 2021 through May 2022, prior to the full shutdown of the facility in June 2022, according to Natural Gas Monthly. Because of the Freeport shutdown, U.S. LNG exports averaged 10.0 Bcf/d from June 2022 through December 2022, after peaking at 11.7 Bcf/d in March. The new Calcasieu Pass LNG export facility partially offset the decline in exports from Freeport LNG, with exports from Calcasieu Pass averaging 1.2 Bcf/d since June 2022.

This year, once all three trains at Freeport LNG return to service, U.S. LNG exports will likely exceed 12 Bcf/d in most months for the rest of the forecast period. U.S. LNG exports will increase to 14 Bcf/d by December 2024 because new LNG export capacity from three major projects under construction that are scheduled to come online.

Electricity, coal, renewables, and emissions

Natural gas will continue to be the predominant source of U.S. electricity generation through 2024, as it has been over the past five years, accounting for an average of around 38% of total generation in 2023 and 2024. However, renewable energy sources will grow the most during the next two years, with about 7 gigawatts (GW) of new wind capacity and 29 GW of new solar PV capacity being installed in 2023. These additions will result in additional renewable energy resources other than hydropower, accounting for 19% of generation in 2024 compared with 15% in 2022.

Natural gas's current place as the largest source of U.S. electricity generation means that its fuel costs are a significant driver of wholesale electricity prices. For 2023, the cost of natural gas delivered to U.S. electric generators will likely average around $3.50/MMBtu, which would be about half the average in 2022. Although wholesale power prices can be extremely volatile in the short-term, the average wholesale prices this year will likely be lower than in 2022 as a result of lower natural gas costs.

The western United States experienced increases in natural gas prices late in 2022, which pushed monthly average power prices above $250 per megawatthour (MWh) in December 2022 at the main western price hubs. Although prices have come down in recent weeks, prices are forecast to remain lower, on average, than in 2022. Growth in overall electricity demand will keep wholesale power prices in that region relatively high compared with other parts of the country. Wholesale prices will likely decrease by an average of around 20% between 2022 and 2023 at California's SP-15 hub and by slightly less at the Mid-Columbia hub in the Pacific Northwest.

Wholesale electricity prices will average between $50/MWh and $60/MWh in New England, New York, and the PJM power markets in 2023. The Northeast power markets also had some of the highest wholesale prices last year as a result of regional constraints on receiving natural gas. Electricity prices during 2022 averaged close to $90/MWh in the ISO-New England and New York ISO markets.

The lowest U.S. wholesale prices will likely occur in Texas's ERCOT market, averaging $30/MWh in 2023 compared with $77/MWh last year. Because of the nearby abundance of natural gas production, Texas tends to have lower fuel costs than other regions. In addition, it will also have some of the fastest growth in renewable generating capacity, which we expect will put downward pressure on wholesale power prices.

Coal stocks held by the power sector are forecast to rise by more than 30% from the end of December 2022 through May 2023, after which they decline as electric power generation ramps up to meet summer air-conditioning needs. Coal stocks increased over the past two months because warmer-than-average

temperatures and falling natural gas prices reduced the need for coal generation. Monthly coal production had been rising in response to relatively strong coal demand in the fourth quarter of 2022, due in, part, to a colder-than-average December in 2022.

Coal production declined by 14% in February 2023 compared with January 2023, from 52 million short tons (MMst) to 45 MMst, because the mild weather reduced coal-fired generations. After increasing in both 2021 and 2022, U.S. coal production is expected to decline by 7% from more than 590 MMst in 2022 to about 550 MMst in 2023, with a further 9% decline to around 500 MMst in 2024. Among the drivers of the steady decline is the on-going retirement of coal-fired generating plants. About 11 GW of coal-fired capacity will close from the end of 2022 to the end of 2024.

The average price of coal to electric generators reached $2.67 per million British thermal units (MMBtu) in January 2023, rising 41% from $1.89/MMBtu in May 2021. The rise in coal price over that period was a result of upward pressures on coal demand due to high natural gas prices and several extreme weather-related events, which occurred amid constrains on coal production and transportation capacity. Prices fell slightly in February to $2.65/MMBtu, and are expected to fall slightly to $2.54/MMBtu by December 2024.

APPENDIX C Supply Chain Situation & Outlook

Overview

The **Logistics Managers' Index** is a combination of eight unique components that make up the supply chain & logistics industry, including: inventory levels and costs, warehousing capacity, utilization, and prices, and transportation capacity, utilization, and prices. The LMI is calculated using a diffusion index, in which any reading above 50.0 indicates that logistics is expanding; a reading below 50.0 is indicative of a shrinking supply chain.

The LMI reading of 57.6 in January is up (+3.0) from December's reading of 54.6. This marks the second consecutive increase in the overall index. Back-to-back rates of growth are notable as they come after a run of seven of eight months of declining growth. The one exception to the decreases we have seen since last spring was September of 2022. That reprieve was driven primarily by the transfer of overstocked inventories from upstream wholesalers and distributors to downstream retailers preparing for Q4 demand. January's growth rate is different in that there have been two increases in a row, suggesting a trend; and, unlike September, supply chains are not so flush with inventory that they are merely shifting goods around. Inventories are much lower now than they were in Q3 of last year, and it seems the supply chains are coming back to life with the goal of replenishment.

Once again warehousing metrics are the primary driver of logistic activity. *Warehousing capacity* is declining for the 30th consecutive month, driving up both utilization and price. This is partially due to an increase in *inventory levels* and *inventory costs* – which may be evidence that firms are finally beginning to restock after nine months of doing everything in their power to reduce inventories. Transportation metrics remain down from where they were from late 2020 to early 2022, but there are some encouraging signs. Chief among those is *transportation utilization*, which is back up to expanding at a rate of 57.0 after its one-month foray into contraction territory. *Transportation prices* have continued to decline, but at a slower rate than over the last few months. There is still excess *transportation capacity* in the market, but respondent future predictions and anecdotal evidence from carriers suggest that increased demand may begin soaking up some of this excess soon.

Current conditions

Much of the current decrease in inflation is due to falling prices in products like food, energy, and housing — all of which be particularly impactful to consumers. This would be a welcome sign as consumer retail spending decreased in three of the last four months. This is exacerbated in industries dependent on financing such as housing and autos. Seasonally adjusted spending was down 0.2% in December, due partially to a decrease in prices resulting from slowing rates of inflation, as well as the trend towards spreading holiday spending out over the entire fall season as opposed to being all centralized in late

December. Despite this slowdown, the overall U.S. economy grew at a rate of 2.9% in the fourth quarter of 2022 and unemployment continues to hover around 3.5% which is near the 50-year low. While global inflation may continue to be a muted issue in 2023, experts are predicting that the abnormal inflation growth will fade by 2024.

Retailers were finally able to run down inventories over the 2022 holiday season. We see evidence in January's numbers that they are now working to replenish them, with *inventory levels* up (+5.2) to 62.5. Last year inventories were peaking in February and March due to port congestion; this will likely not be the case this year as the lack of backlog at the ports combined with shorter order times is starting to resemble "normal" seasonality. Traditional seasonality has been upended since COVID lockdowns began three years ago. If 2023 is the return to normal that many in the industry are anticipating, we would expect to see inventories continue to climb slowly, peaking sometime in Q3. Whatever the case with inventory replenishment may be, the cost of holding goods continues to climb. In January, *inventory costs* were up (+1.4) to 74.2, marking 28 consecutive months of costs growing at accelerated rates like in the 70's, 80's or 90's. One of the factors that has been limiting the ability to fully rebuild inventories was the stop-start nature of Chinese manufacturing due to their prior zero-COVID policy. However, China's economy surged back to life in January as the pullback of COVID restrictions led to an increase in manufacturing and consumer spending. China's reawakening is one of the primary factors behind the IMF's revised projection of 2.9% growth in the global economy in 2023. In another sign that the upstream economy is revving back to life, the PMI's manufacturing activity index moved back into expansion at 50.1 in January (up from 47.0 in December).

The rebuilding of inventories may be a boon for the still-slow transportation sector. *Transportation capacity* continues to rise (+0.7) at a rate of 70.2. JB Hunt expects freight demand to pick back up sometime in Q2 as shippers begin to rebuild inventories after a year of winding them down. This sentiment was echoed by Knight-Swift, who told investors in late January that their customer base had indicated a return to normal demand by spring. This optimism is reflected in the demand for class 8 trucks, which has been "unprecedented" according to David Carson (senior vice president of sales at Daimler Trucks North America). This demand is due to both optimism regarding consumer demand as well as a need to renew fleets that could not be upgraded during COVID. Relatedly, there was a significant jump in *transportation utilization* rates, which are up (+8.9) to 57.0 in January. This metric contracted in December for the first time since the start of the pandemic, and many wondered whether it would be a sign of things to come or a short-term blip. It is still too early to say for sure but based on movements in the metric and the anecdotal evidence discussed above, it seems most likely that it is the latter, and that t*ransportation utilization* will continue to grow.

On the flip side of the supply chain coin, carriers have seen *transportation prices* contract for seven consecutive months. For the first time since March of last year, the reading for t*ransportation prices* came in higher (+5.1) than the month before with January's metric reading in at 42.0. This slowing in the rate of contraction was driven by the latter half of January where the metric read in at 43.9 as opposed to early January's 39.8. The transportation market has been tough for carriers since the Russian invasion of Ukraine cut fuel supplies and sparked a run of inflation that hurt consumer spending. As always, the cost of fuel will be a factor here. U.S. diesel prices have hovered between $4.52-$4.62 per gallon in January, stabilizing at over a dollar below the rates observed in the summer of 2022. Despite this, supply continues to be an issue, particularly on the east coast. Overall, there seems to be some belief that easing will continue to be an overarching trend as prices decreased in both spot and futures markets in late January.

One limiting factor on any potential restocking of inventories is the continued tightness in the warehousing sector. *Warehousing capacity* contracted at a slightly slower rate (+1.7) than in December, reading in at 46.4. This marks the 30th consecutive month of contraction, the longest run of contraction observed for any LMI metrics during the 6.5 years of its existence. There are some signs that this run could be nearing its end, as *warehousing capacity* actually increased in the second half of January. Whether this is indicative of a shift in the market, or a temporary diversion before firms begin restocking is unclear. Interestingly, there is some anecdotal evidence supporting both hypotheses. Cushman & Wakefield reported that the amount of industrial space leased in the fourth quarter was 132 million square feet, down 28.2% from Q3. This reflects that growth remains strong, but not as robust as the explosion observed over the past 18 months. On the other hand, Prologis (a leading industrial real estate company) expects continued strength in the warehousing sector. They told shareholders in January that average occupancy was 98% in the fourth quarter of 2022 and is expected to remain between 96.5-97.0% through 2023. It will be interesting to see whether or not the warehousing industry is able to have a softer landing than their counterparts in transportation. What is clear however is that *warehousing utilization* continues to grow and is up (3.0) to 67.1 in January. As would be expected with capacity contracting and utilization continuing to increase, *warehousing prices* expanded (+2.9) in January at a rate of 75.0.

In the reverse of what we saw in December, available *warehousing capacity* increased in January, moving from significant contraction (40.7) to a very minimal level of expansion (51.5). If the growth rate we saw in the second half of January were to continue on through February, it would mark the first time in a full two and half years that this metric showed signs of expansion. It will be interesting to observe whether this is a sign of capacity finally loosening up in the warehousing sector, or if this is merely a momentary few weeks of calm before firms begin to rebuild their inventories for 2023. A datapoint in favor of the latter hypothesis is that transportation was up (+8.7) marginally in the second half of January.

Future Expectations

The LMI currently sits at a modest rate of expansion but is below the all-time average of 64.5. If the transportation metrics do begin to show the growth that some are predicting, the overall index may move closer to this “normal” level of expansion. That being said, the expansion rate of the overall index is expected to stay fairly consistent with where it is now, predicting a future growth rate of 56.1, up (+2.9) from December’s future prediction of 53.2.