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MEMORANDUM

TO: Members of the Investment Committee, CalPERS
FROM: Meketa Investment Group
DATE: June 20, 2023
RE: Annual Program Review, inclusive of Quarterly Infrastructure Performance Review, as of March 31, 2023

In our role as the Board Infrastructure Consultant, Meketa Investment Group ("Meketa") conducted an annual program review, inclusive of the quarterly performance review, of the Infrastructure Portfolio ("the Portfolio") for the California Public Employees' Retirement System ("CalPERS") Real Assets Program (the "Program") for the period ended March 31, 2023, based on data provided by Wilshire Associates and selected CalPERS reports.[1] This memorandum provides the following: Portfolio performance data and information on key policy parameters; information about the structure of the Portfolio; a Program update; and a summarized market commentary provided as an attachment.

Performance[2]

CalPERS' Infrastructure Portfolio outperformed its policy benchmark for all reporting periods except the trailing three-years.

Net Returns as of March 31, 2023	1 Year (%)	3 Year (%)	5 Year (%)	10 Year (%)
Infrastructure Portfolio Returns	7.8	5.7	7.8	11.0
Infrastructure Policy Benchmark[3]	6.4	8.9	7.7	6.6
Over (under) Performance[4]	1.3	(3.1)	0.1	4.4
Consumer Price Index (For Reference Only)	6.5	4.9	3.8	2.6

Relative to one year ago, all trailing period returns, except the ten-year return, are down on an absolute basis, from 10.5%, 6.5%, and 9.8%, respectively, for the one-, three-, and five-year periods as of March 31, 2022. In contrast to a year ago, the one-year return beat the benchmark, by 130 bps, compared to underperforming it by 1040 basis points a year ago. The five-year return for this period squeaked by

[1] CalPERS Real Assets Quarterly Performance Report, including underlying Allocation, Characteristics, and Leverage Reports (Excel files), for the period ending December 31, 2022.
[2] Per Wilshire for the period ended March 31, 2023, reported with a 1-quarter lag, so as of December 31, 2022 (State Street Bank data).
[3] CalPERS Custom Infrastructure Benchmark, with historical composition as follows: MSCI/PREA U.S. ACOE Quarterly Property Fund Index Net of Fees (April 1, 2018 forward); Consumer Price Index ("CPI") + 400 basis points (July 1, 2011 through March 31, 2018); and CPI + 500 basis points (October 1, 2007 through June 30, 2011).
[4] Calculated using more decimal places than show, so result may not calculate exactly from the table data due to rounding.

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its benchmark, while beating it by 220 basis points a year ago. The current ten-year outperformance is about the same as a year ago, better by 440 basis points compared to 470 basis points.

The Portfolio has outperformed its benchmark meaningfully over the trailing one- and ten-year periods. Regarding the relative underperformance and even performance for the three- and five-year periods, respectively, as we have been reporting over the last several quarters, these results should be viewed in the context of having a benchmark that since April 2018 has had underlying assets that are 100% real estate. We have previously noted that during the worst quarters of COVID, infrastructure managers' valuation policies and practices meant that the asset class' valuations tended to more closely track the market, with a shorter lag than in real estate. We have also noted some quarters of very strong real estate returns; however, that is modulating. These dynamics have contributed to the Infrastructure Portfolio underperforming its stated benchmark for three-year period over the last several quarters, which are now being reflected in the five-year benchmark comparison as well, with very little non-real estate assets left in the benchmark for that period.

On an absolute basis, long term net infrastructure returns in the range of 8% to 11% per year for a portfolio that is 82.7% Core are in the expected to better-than-expected range. We note that the Portfolio returns for all periods exceed CalPERS' expectations for the asset class of 5.3% to 5.5% set by the Capital Market Assumptions ("CMA") for Real Assets for the near- and long-term (five and 20 years).[1] Additionally, we note that the Portfolio's performance has exceeded CPI by 128, 82, 403, and 841 basis points, respectively, for the four trailing periods shown in the table on the previous page. While not currently part of the Portfolio's policy benchmark, we show the CPI for reference as it used to be part of the Portfolio's benchmark, and continues to be used by other institutional investors, usually with a premium of anywhere from +300 to + 500 basis points, depending on the risk-orientation of the portfolio.

Other aspects of performance drivers are consistent with prior reporting periods and recent market conditions, as highlighted below.[2] We note that the Real Assets Program no longer reports on a segment basis, and the new sectors, as represented in the Infrastructure Portfolio, are covered below. Please see the Market Activity Attachment for additional information on selected infrastructure sectors and related economic data.

[1] Approved at the September 13, 2021 Investment Committee.
[2] Real Assets QPR Q4 2022 Final.

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All returns cited are for the trailing one-year period.

Risk Classification

→ **Core,** comprising 82.7% of the Portfolio, delivered high single-digit returns. Global Diversified Infrastructure comprised almost half of the Core portfolio, with almost 20% in US Power & Energy, and less than 10% each in US Transportation, Global Transportation, and Global Communications.

→ **Value Add,** comprising 15.5% of the Portfolio, also posted high single-digit returns. These investments are predominantly diversified commingled funds, at approximately 60% of the Value Add portfolio, with a new communications fund investment representing about 30% of the category and some co-investments making up the balance.

→ **Opportunistic,** comprising 1.8% of the Portfolio, continues to post negative double-digit returns. This category comprises one diversified commingled fund investment.

Sectors

→ **Global Diversified Infrastructure** comprises 51.6% of the NAV and posted high single-digit returns.

→ **US Power/Energy** represents 18.3% of the Portfolio, and delivered middle single-digit returns.

→ **Global Communications,** a sector where the Portfolio made several new investments, comprises 12.5% of the Portfolio, and delivered low teens returns.

→ **US Transportation** accounts for 8.8% of the Portfolio and posted low teens returns.

→ **Global Transportation** is 6.8% of the Portfolio, and posted high single-digit returns.

→ **Global Power/Energy** is 1.2% of the Portfolio, and performance is not yet meaningful.

→ **International Communications** is 0.8% of the Portfolio, and performance is not yet meaningful.

Net Income

→ The Portfolio's **one-year net income** fell to 1.2%, compared to 2.1% a year ago. Since before COVID, it has remained below Staff's long-term expectations of annual income between 3% and 5% over the long term. The low net income levels continue to be primarily due to lower levels of distributed income at certain transportation assets, including, in particular, airports, which experienced significant decreases in passenger traffic for a protracted period, and still have yet to fully recover. Other continuing asset- and fund-specific factors holding the Portfolio's net income down include those related to new funds' J-curves, foreign exchange effects, and variability of income production from selected businesses.

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Implementation

The Portfolio's Net Asset Value ("NAV") as of March 31, 2023 was $14.1 billion, an increase of $3.6 billion, or 34.4%, compared to the March 31, 2022 NAV of $10.5 billion. The current NAV represents 3.1% of the Total Fund, and 19.8% of the Real Assets Program, [1] an increase compared to 2.2% and 16.9%, respectively, a year ago.

The increase in NAV is the result of a combination of contributions to existing and new investments, distributions, and net realized and unrealized gains and losses. For the prior year period, the Portfolio's contributions outpaced distributions $3.0 billion to $0.6 billion, respectively.[2] We continue to expect to see contributions outpace distributions going forward, given the number and size of new commitments made over the last several years compared to the remaining smaller size of legacy assets.

Through CalPERS' various investment vehicles, a significant number of new investments were made during the prior year period in North America, Latin America, Europe and the UK, and Asia Pacific in sectors including communications, renewable power, transportation (including logistics and rail), and energy-related infrastructure (including gas distribution, pipelines, and storage).

As of March 31, 2023, Portfolio NAV distribution is as follows relative to investment type and sub-type: Transportation is 35.9% and includes airports, seaports, rail, and roads; Power is 23.1% and includes renewables, conventional, and transmission assets; Communications is 14.6%; Energy is 13.0% and includes pipelines, storage, and distribution assets; and Other is 13.4%, and includes about 1% water and waste assets.

Infrastructure Portfolio Structure

The Portfolio invests via a number of different managers and investment vehicles, currently relying primarily on separate accounts and commingled funds, noting that six of the latter are winding down as they come to the end of their terms.

Active Partners	Active Vehicles	Investments	Countries
11	23	101	10+

Investment Vehicle Type	Count	% of NAV	% of NAV + Unfunded
Commingled Funds	16	25.5	26.6
Direct Investments	2	11.3	7.7
Fund Co-Investments	5	10.6	11.4
Separate Accounts	3	52.6	54.3
Total	**26**	**100.0%**	**100.0%**

[1] The Total Fund market value was $452.6 billion, and the Real Asset Program NAV was $71.2 billion, as of March 31, 2023, per Wilshire.
[2] Real Assets QPR Q4 2022 Final.

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Key Policy Parameters

The Portfolio is compliant with all key parameters related to diversification and other limits applicable at the Portfolio level, as documented in the table below. For this annual review, we also included the exposure data from a year ago, as of March 31, 2022. We observe that most of the parameters are about the same, noting the following differences: Value Add exposures are slightly higher, reflecting the intentional new commitments to such strategies; there is slightly more International Developed and slightly less United States exposure, reflecting the opportunity set and managers' recent activity; and there is marginally more debt, perhaps reflecting more comfort among managers coming out of COVID during which some of them reduced debt levels.

Key Portfolio Parameter	Policy Range/Limit	NAV 3/31/23 Exposure[1]	*Exposure as of a Year Ago*
Risk Classification	(%)	(%)	(%)
Core	60-100	**82.7**	*82.2*
Value Add	0-25	**15.5**	*12.8*
Opportunistic-All Strategies	0-25	**1.8**	*5.0*
Geographic Region	(%)	(%)	(%)
United States	40-100	**56.0**	*60.0*
International Developed	0-60	**42.9**	*39.3*
International Developing	0-15	**1.1**	*0.7*
International Frontier	0-5	**0.0**	*0.0*
Manager Exposure[2]	(%)	(%)	(%)
Largest Partner Relationship	20 max	**6.0**	*6.1*
Investments with No External Manager	20 max	**1.6**	*1.8*
Leverage[3]			
Loan to Value	65% max	**39.5%**	*37.3%*
Debt Service Coverage Ratio	1.25x min	**2.33x**	*2.24x*

Real Assets Staffing Program Update

The Real Assets Program is led by its Managing Investment Director ("MID"), along with three Investment Directors, who together oversee 40 other Staff positions, as of December 31, 2022. Of the Real Assets Program's 10 Investment Manager ("IM") positions, three are effectively dedicated to infrastructure, with seven additional positions supporting them, also on a dedicated basis. Additionally, most team members currently work across all phases of the investment program, including sourcing and diligencing new investments, as well as managing existing investments and manager relationships.

[1] Private investment data are one quarter lagged, so effectively as of December 31, 2022.
[2] CalPERS Real Assets Portfolio Allocation Report, Period Ending December 31, 2022: calculated based on manager- and account-level NAV. Percent calculated using relevant NAV plus total unfunded commitments for relationships/investments and same for the Real Assets Program ($85.3 billion).
[3] CalPERS Real Assets Vital Statistics and Quarterly Management Report (web-based), Quarter Ending December 31, 2022.

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The Program is recruiting a fourth ID, as well as an Investment Officer ("IO") II, with the plan for those individuals to focus exclusively on infrastructure. Staffing movements among professionals supporting the Infrastructure Portfolio over the prior fiscal year were as follows: two departures, an IO III and an IO II; two hires/promotions from IO III to AIM, with the IO III positions being upgraded to AIM; and one IO I hire from another CalPERS division.

Overall, we have observed the Real Assets team as stable, engaged, and collaboratively working together in a rigorous investment sourcing, diligencing, decision-making, and post-commitment and post-acquisition management process. Their rigor and focus have been important to increasing the infrastructure portfolio's scale and diversification in a thoughtful, strategic, and prudent manner.

Conclusion

The Infrastructure Portfolio continues to perform at or above expectations for the asset class and its predominantly Core risk-return profile. We note that performance is improving relative to the benchmark as the underlying real estate valuations moderate, thereby bringing down the benchmark's performance. Additionally, the Portfolio is still exceeding CalPERS' CMA for Real Assets for all trailing periods, and is also beating CPI for all trailing periods. We would expect the trailing three-year return to improve in the coming quarters on an absolute and relative basis, as the COVID quarters fall out and the benchmark's performance moderates. The Portfolio's development and its current position remains appropriate and consistent with applicable policies and guidelines:

→ *Risk*—Exposures are within the classification policy ranges;

→ *Geography*—Exposures are within the categorical ranges;

→ *Partner Relationships and Direct Investments*—Exposures are well below the maximums allowed; and

→ *Leverage*—Metrics are comfortably compliant.

As we have been observing for several reporting periods, the Portfolio continues to grow consistent with its Strategic Plan, now comprising 19.8% of the Real Assets Program and 3.1% of the Total Plan. In 2022, the Real Assets Program began investing through six new vehicles, including a combination of commingled funds, separate accounts, and co-investments, while more than $1.2 billion in new or follow-on infrastructure investments closed under new or existing managers, through a variety of investment vehicles. Staff continues to build out the Portfolio through a combination of investing more with proven existing managers and adding new managers to increase capacity, target attractive sectors and geographies, and further diversify and strengthen the infrastructure manager roster. We believe this activity will enhance the Portfolio's diversification, resiliency, and return potential.

Please do not hesitate to contact us if you have questions or require additional information.

SPM/EFB/jls

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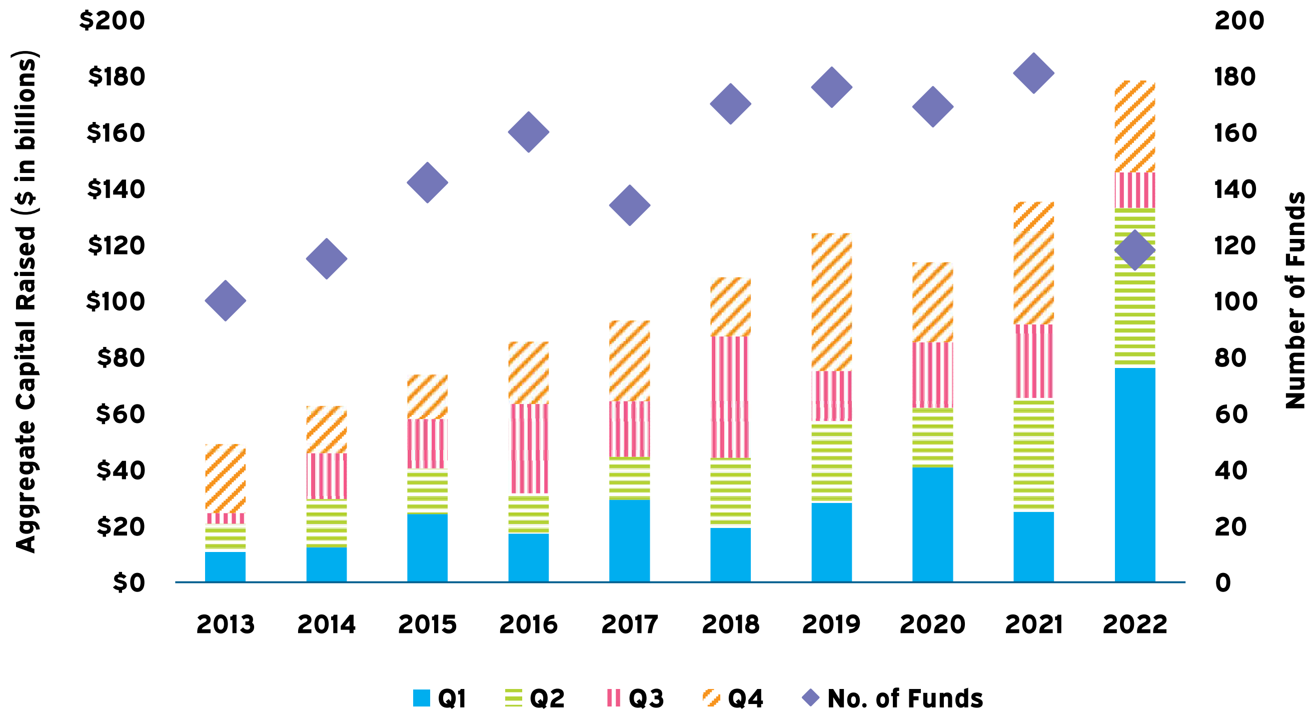
Attachment[1]

Infrastructure Market Commentary – Q4 2022



In 2022, infrastructure has raised 30% more capital than 2021 raising nearly $180 billion across 118 funds. This capital was raised by a significantly smaller number of partnerships averaging $1.5 billion per fund. This was an increase over the 2021 average of $0.7 billion per fund.

[1] Commentary based on analysis of aggregated and deal-level data from Preqin, and other Preqin data, unless otherwise cited. Prior year data may have changed from figures shown in prior reports.
[2] Source: Preqin 4Q 2022.

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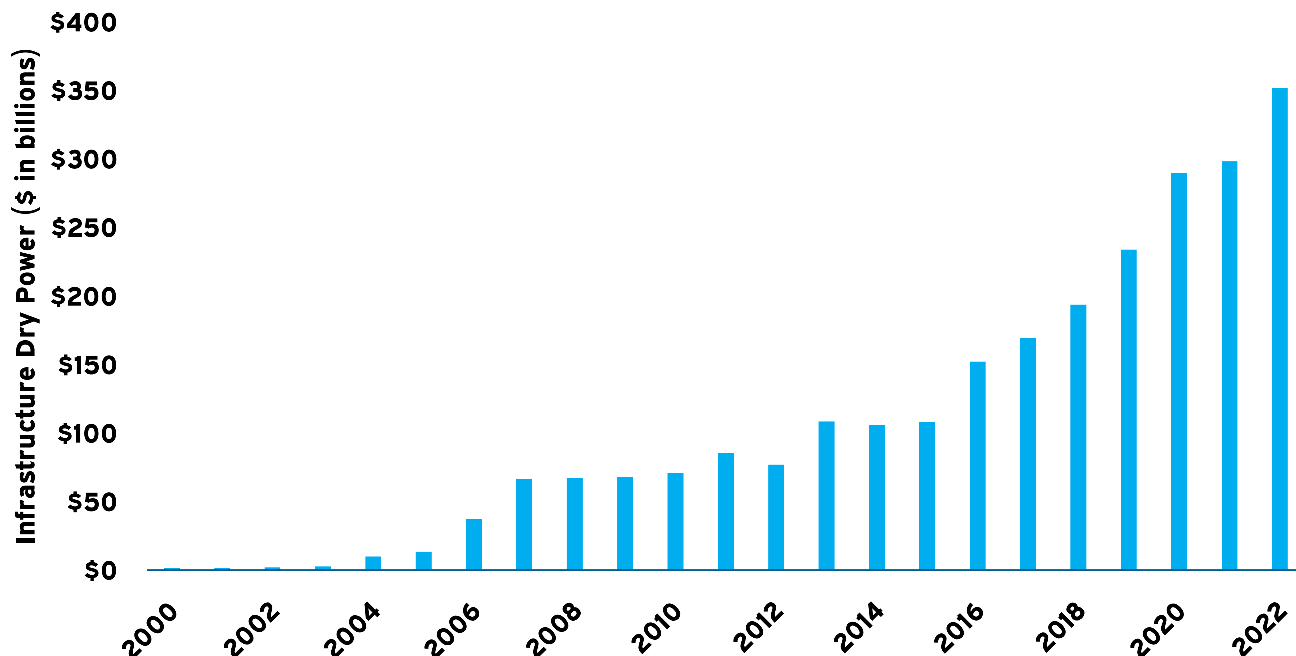

Infrastructure dry powder remains at an all-time high, with an increase year-over-year since 2015. The early days of the asset class are evident in the sub-$50 billion levels until 2007, after which levels stayed between $50 billion and $100 billion until they reached $150 billion in 2016. After that, the level began to climb to the over $350 billion today.

[1] Source: Preqin Dry Powder downloaded January 2023.

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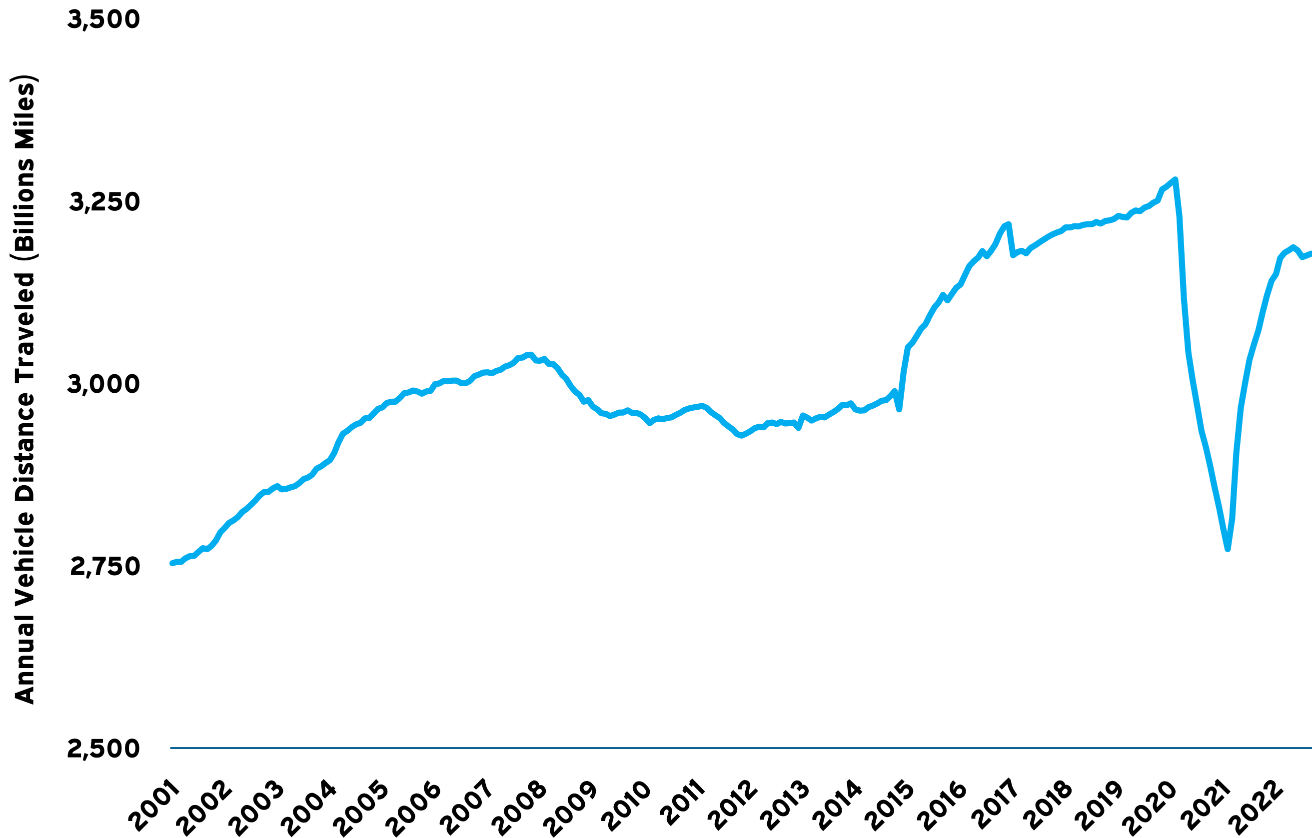

The fourth quarter continued post-pandemic travel recovery with a total of approximately 791 billion miles. This represented a slight decrease of 1.0% over the same period in 2021. The trailing 12-month travel mileage is effectively back to where it was pre-COVID, indicating a welcome and positive return to movement as COVID-19 restrictions loosened and people continue going back to offices, etc. The third quarter continued to show an increase in the US price of a gallon of gas, which steadily increased to an average price of $4.06 per gallon. This compares to $3.09 per gallon average in 2021.

[1] Source: US Department of Transportation, Federal Highway Administration: Office of Highway Policy Information.

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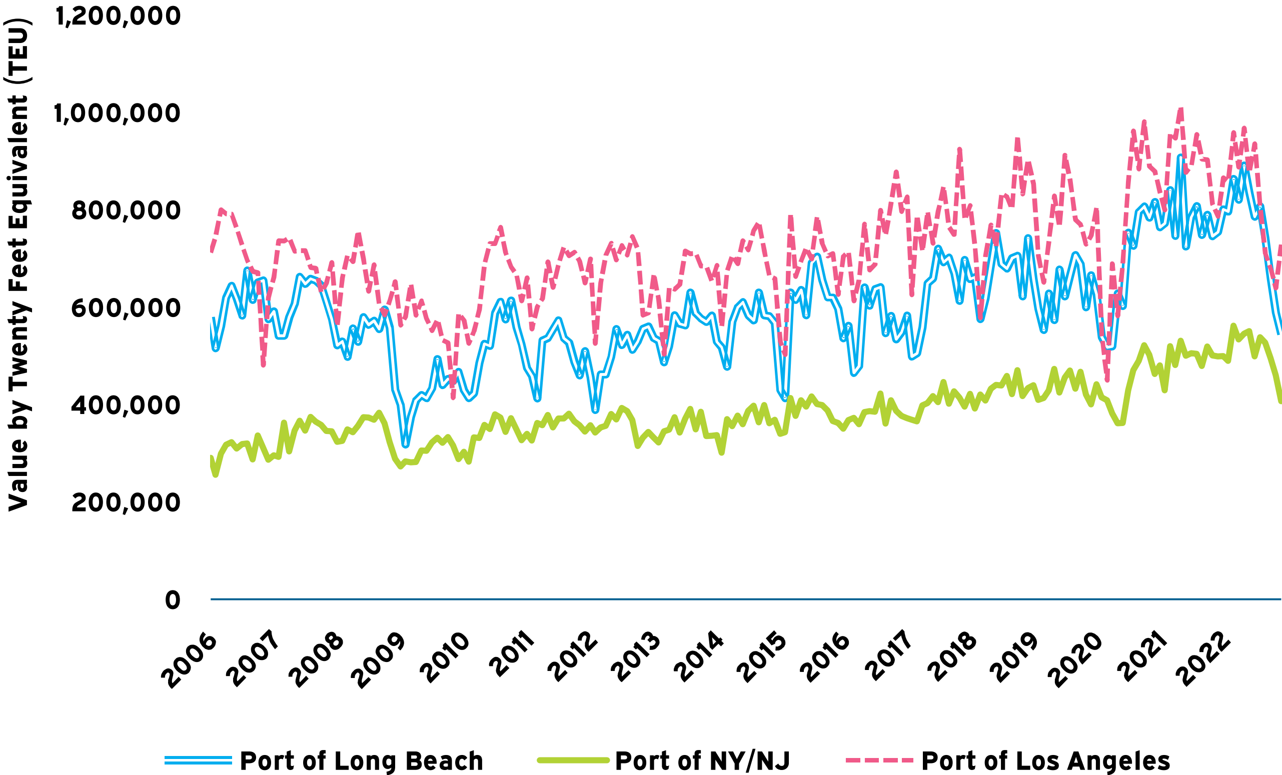

The chart presents the top three US ports by container volume, as measured by twenty-foot equivalent units ("TEU"). Activity at the three ports provides a high level representation of the volume at US ports more broadly.

During the fourth quarter, volumes at the three ports decreased by 1.1 million units relative to the same period in 2021. On a year-over-year basis, the combined port volumes decreased by 0.9 million TEUs, or -3.3%, over the prior 12-month period. The Port of Long Beach recorded a decrease of 2.7% (0.3 million TEUs), the Port of NY/NJ reported an increase of 2.7% (0.2 million TEU), and the Port of Los Angeles recorded a decrease of 3.3% (0.9 million TEUs) over the prior 12 months.

[1] Source: www.polb.com, www.panynj.gov and www.portoflosangeles.org

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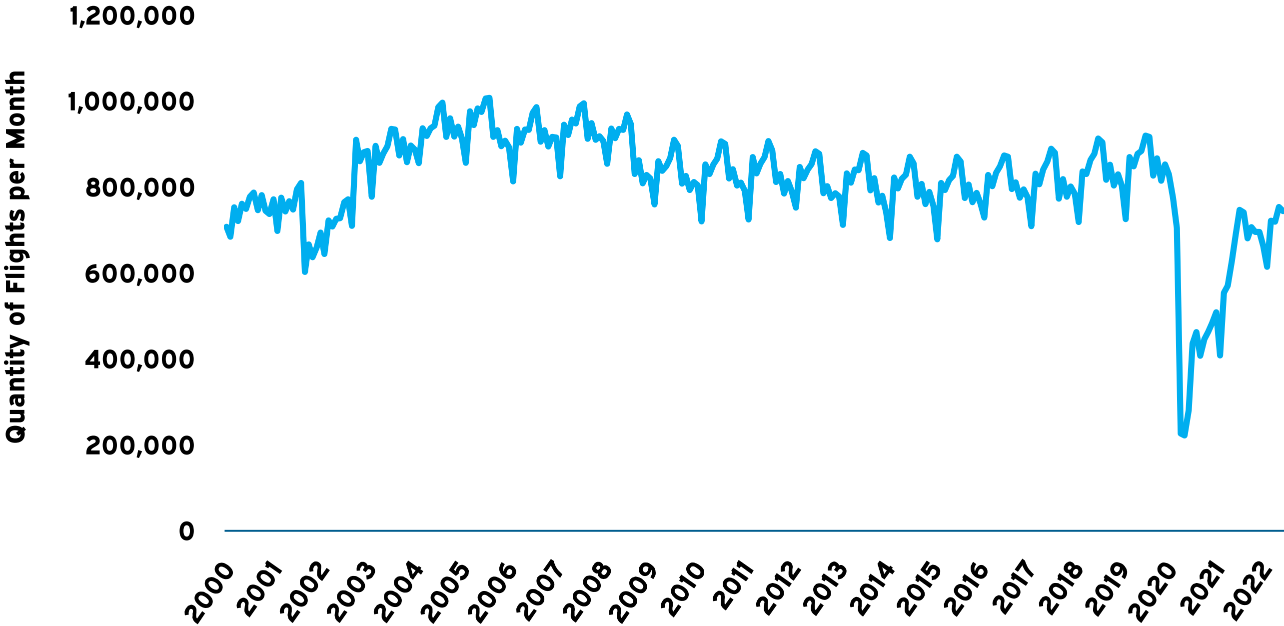

The chart above presents all US domestic and international flights, excluding foreign point-to-point flights by month. Historically, air traffic is cyclical with peaks in the summer months and troughs in the winter months.

There were 0.1 million more flights during the fourth quarter of 2022 over same period in 2021, representing a 3% increase. In addition to the number of flights, the total number of passengers travelling on US and international airlines increased by 32% for the 12 months ended December 2022 over the prior 12 months.

[1] Source: Bureau of Transportation Statistics: Flights, All US, and Foreign Carriers.

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Total US Power Generation[1]

450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0

Amount of Power Generated (Thousands Megawatt Hours)

January February March April May June July August September October November December

Power Generated by Month

Last Twelve Months   10-Year Monthly Average

The graph above presents the total net generation for the past 12 months compared to the 10-year average for each month. Net energy generation in the US increased by 3% during the fourth quarter, compared to the same period in 2021.

[1] Source: US Energy Information Administration: Electric Power Monthly, December 2022.

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US Power Generation by Source[1]

Amount of Power Generated (Thousands of Megawatt Hours)

200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

Months of Power Generated

Coal
Natural Gas
Nuclear
Wind
Solar
Hydroelectric Conventional

In the fourth quarter 2022, total US power generated increased by 3% over the same period in 2021 with the largest increase from the renewable sources and natural gas. Wind and utility-scale solar continue to make up a small portion of total net energy generation in the US, accounting for only 12% and 5% of energy generation, respectively. Natural gas, coal, and nuclear accounted for 40%, 20%, and 18%, respectively. However, the growth of wind and solar as sources of energy generation continues to increase at a faster rate than coal and natural gas, especially over the last several years.

[1] Source: US Energy Information Administration: Electric Power Monthly, December 2022.