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MEMORANDUM

TO: Members of the Investment Committee, CalPERS
FROM: Meketa Investment Group
DATE: March 13, 2023
RE: Semi-Annual Infrastructure Performance Review as of December 31, 2022

In our role as the Board Infrastructure Consultant, Meketa Investment Group ("Meketa") conducted a semi-annual performance review of the Infrastructure Portfolio ("the Portfolio") based on data provided by Wilshire Associates for the California Public Employees' Retirement System ("CalPERS") Real Assets Program (the "Program") for the period ended December 31, 2022, and selected CalPERS reports.[1] This memorandum provides the Portfolio performance data and information on key policy parameters, with a summarized market commentary provided as an attachment.

Performance[2]

CalPERS' Infrastructure Portfolio underperformed its policy benchmark for the shorter reporting periods between one and five years, while outperforming for the longer ten-year reporting period ending December 31, 2022.

Net Returns as of December 31, 2022	1 Year (%)	3 Year (%)	5 Year (%)	10 Year (%)
Infrastructure Portfolio Returns	8.3	7.4	8.2	11.2
Infrastructure Policy Benchmark[3]	20.9	11.3	9.1	7.2
Over (under) Performance	(12.6)	(3.9)	(0.9)	4.0
Consumer Price Index (For Reference Only)	8.2	5.0	3.8	2.5

Compared to six months ago, the above trailing one- and five-year returns are both down compared to 14.7% and 10.5%, respectively, while the above three- and ten-year returns are almost exactly the same as those as of June 30, 2022, which were at 7.2% and 11.3%, respectively. The absolute level of underperformance of the above one- and three-year returns is about the same as six months ago. The current five-year return is closer to the benchmark, and the ten-year return's absolute overperformance is about the same as six months ago.

[1] CalPERS Real Assets Quarterly Performance Report, including underlying Allocation, Characteristics, and Leverage Reports (Excel files), for the period ending September 30, 2022.
[2] Per Wilshire for the period ended December 31, 2022, reported with a 1-quarter lag, so as of September 30, 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).

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As we have been reporting over the last several quarters, the Infrastructure Portfolio's relative underperformance should be viewed in the context of comparing it to 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 the recent quarters of very strong real estate returns. These dynamics have contributed to the Infrastructure Portfolio underperforming its stated benchmark for the one- and three-year periods over the last several quarters, which are now being reflected in the five-year benchmark comparison as well, with very little non-real estate components left in the benchmark for that period. The Portfolio continues to outperform its benchmark for the ten-year period.

On an absolute basis, net infrastructure returns for a Portfolio, which is 84.9% Core, in the range of 7% to 11% per year over the various periods 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 10, 240, 440, and 870 basis points, for the four trailing periods shown in the table on the previous page, respectively. 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.

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

By Risk Classification

→ **Core,** comprising 84.9% of the Portfolio, delivered low double-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 13.1% of the Portfolio, posted mid-teens returns. These investments are predominantly diversified commingled funds, at approximately 70% of the Value Add portfolio, with a new communications fund investment representing about 20% of the category and some co-investments making up the balance.

→ **Opportunistic,** comprising 2.0% of the Portfolio, posted negative double-digit returns. This category comprises one diversified commingled fund investment.

[1] Approved at the September 13, 2021 Investment Committee.

[2] Real Assets QPR Q3 2022 Final.

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Sectors

- → **Global Diversified Infrastructure** comprises 55.1% of the NAV and delivered low double-digit returns.
- → **US Power/Energy** represents 19.1% of the Portfolio, and delivered high single-digit returns.
- → **Global Communications,** a sector where the Portfolio made several new investments, comprises 9.1% of the Portfolio, and delivered high single-digit returns.
- → **US Transportation** accounts for 8.7% of the portfolio and posted high single-digit returns.
- → **Global Transportation** is 6.8% of the portfolio, and posted very strong double-digit returns.
- → **Global Power/Energy** is 1.3% of the portfolio, and performance is not yet meaningful.

Net Income

- → The Portfolio's **one-year net income** fell to 1.3%, compared to 2.5% a year ago. For several reporting periods 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 fund J-curves, foreign exchange effects, and variability of income production from selected businesses.

Implementation

The Portfolio's Net Asset Value ("NAV") as of December 31, 2022 was $13.1 billion, an increase of $1.5 billion, or 12.9%, compared to the June 30, 2022 NAV of $11.6 billion. The current NAV represents 3.0% of the Total Fund, and 17.7% of the Real Assets Program, [1] an increase compared to 1.8% and 16.4%, respectively, as at 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 $4.1 billion to $475.1 million, respectively.[2] We would 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' separate accounts and commingled funds, a significant number of new investments were made during the H2 2022 semi-annual period in North America, Latin America, Europe, and Asia Pacific in sectors including communications, renewables and other power generation, transportation, utilities, and waste.

[1] The Total Fund market value was $442.2 billion, and the Real Asset Program NAV was $73.7 billion, as of December 31, 2022, per Wilshire.
[2] Real Assets QPR Q3 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.

Key Portfolio Parameter	Policy Range/Limit	NAV 12/30/22 Exposure[1]
Risk Classification	(%)	(%)
Core	60-100	84.9
Value Add	0-25	13.1
Opportunistic-All Strategies	0-25	2.0
Geographic Region	(%)	(%)
United States	40-100	56.7
International Developed	0-60	42.5
International Developing	0-15	0.9
International Frontier	0-5	0.0
Manager Exposure[2]	(%)	(%)
Largest Partner Relationship	20 max	5.6
Investments with No External Manager	20 max	1.6
Leverage[3]		
Loan to Value	65% max	38.5%
Debt Service Coverage Ratio	1.25x min	2.94x

[1] Private investment data are one quarter lagged, so effectively as of September 30, 2022.
[2] CalPERS Real Assets Portfolio Allocation Report, Period Ending September 30, 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 ($88.5 billion).
[3] CalPERS Real Assets Vital Statistics and Quarterly Management Report (web-based), Quarter Ending September 30, 2022.

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Conclusion

The Infrastructure Portfolio continues to perform at or above expectations for the asset class and its predominantly Core risk-return profile exposures. While it is underperforming the Real Asset Program benchmark in shorter trailing periods, it is still exceeding CalPERS' CMA for Real Assets by several hundred basis points for all trailing periods, and is also beating CPI by several hundred basis points for all trailing periods except the latest one-year where it is almost even.

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 17.7% of the Real Assets Program and 3.0% of the Total Plan. In the second half of 2022, the Real Assets Program approved several new infrastructure commitments to a combination of commingled funds, separate accounts, and co-investments, while almost $1 billion in new or follow-on infrastructure investments closed under new or existing managers, also through a variety of investment vehicles. Staff is building 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 be positively reflected in the coming quarters and years.

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

SPM/EFB/jls

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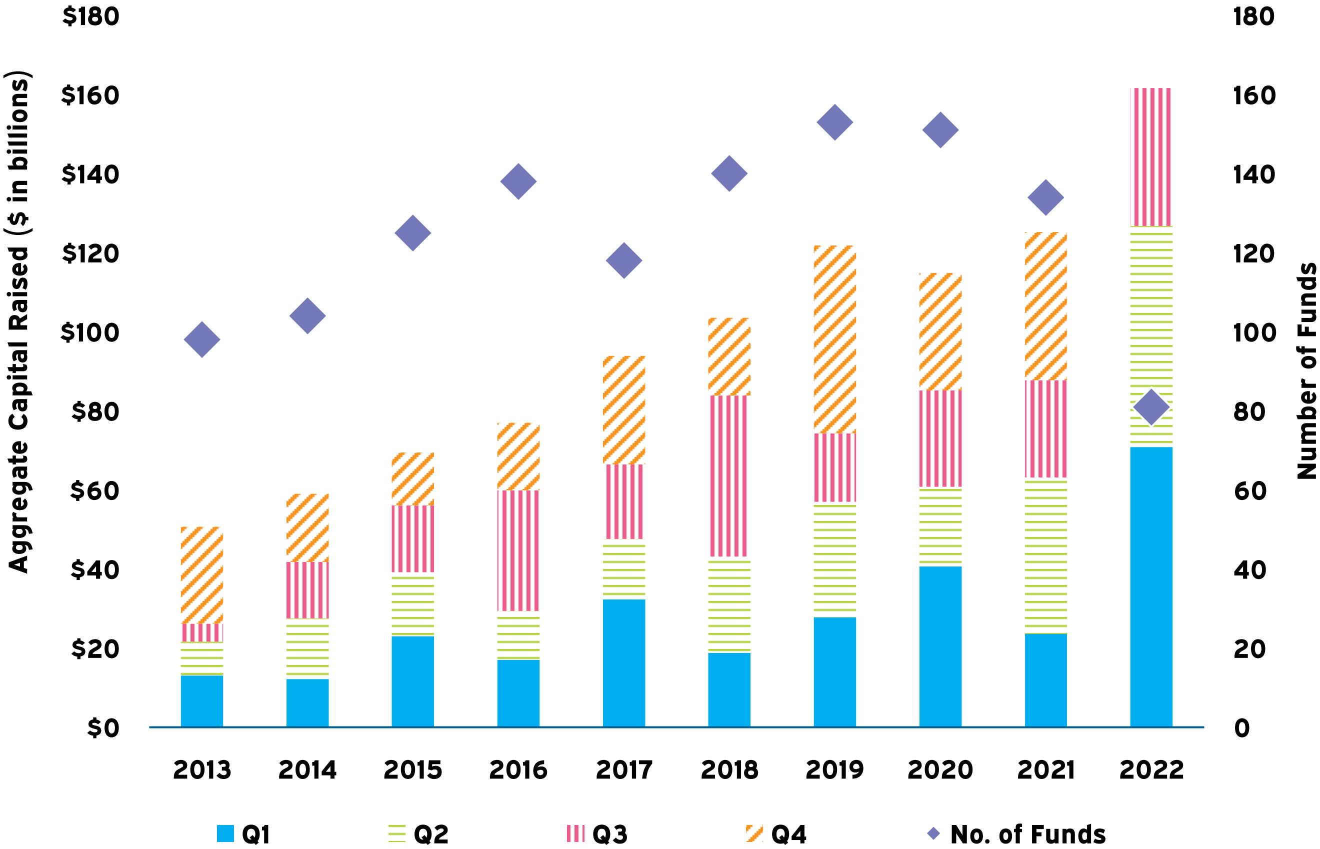
Attachment[1]

Infrastructure Market Commentary – Q3 2023

Global Quarterly Unlisted Infrastructure Fundraising[2]



Through three quarters of 2022, infrastructure has already raised more capital than any other full year in the past decade. This capital was raised by a significantly smaller number of funds totaling 81 partnerships averaging $2 billion per fund. This was an increase over the 2021 average of $1.0 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 3Q 2022..

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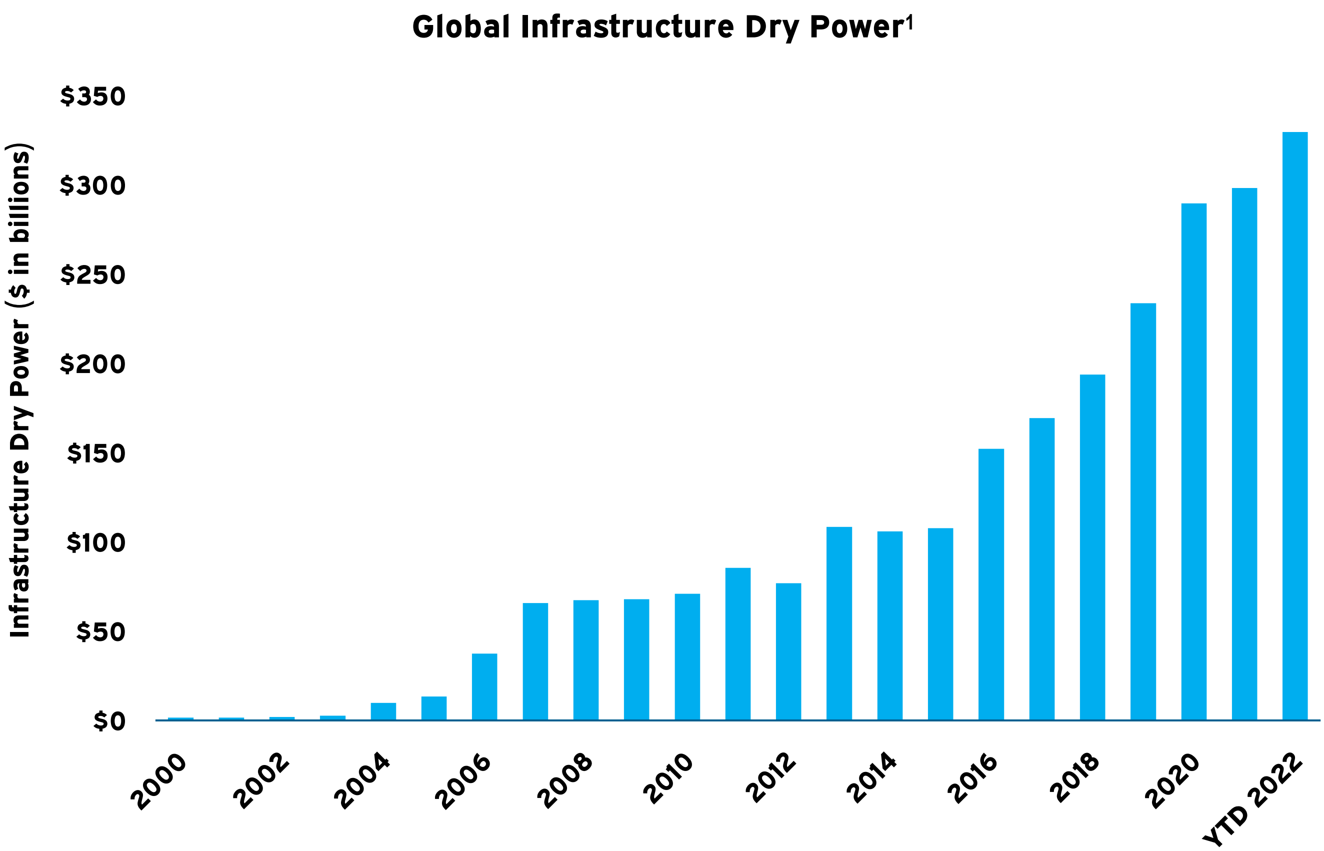

Infrastructure dry powder remains at an all-time high, with an increase year-over-year since 2015. The early days of the asset class are evident in the sub-$50 billion levels until 2006, after which levels stayed between $50 billion and $100 billion until they reached $150 billion in 2016. After that, the level began to climb to the over $300 billion today.

[1] Source: Preqin Dry Powder downloaded October 2022.

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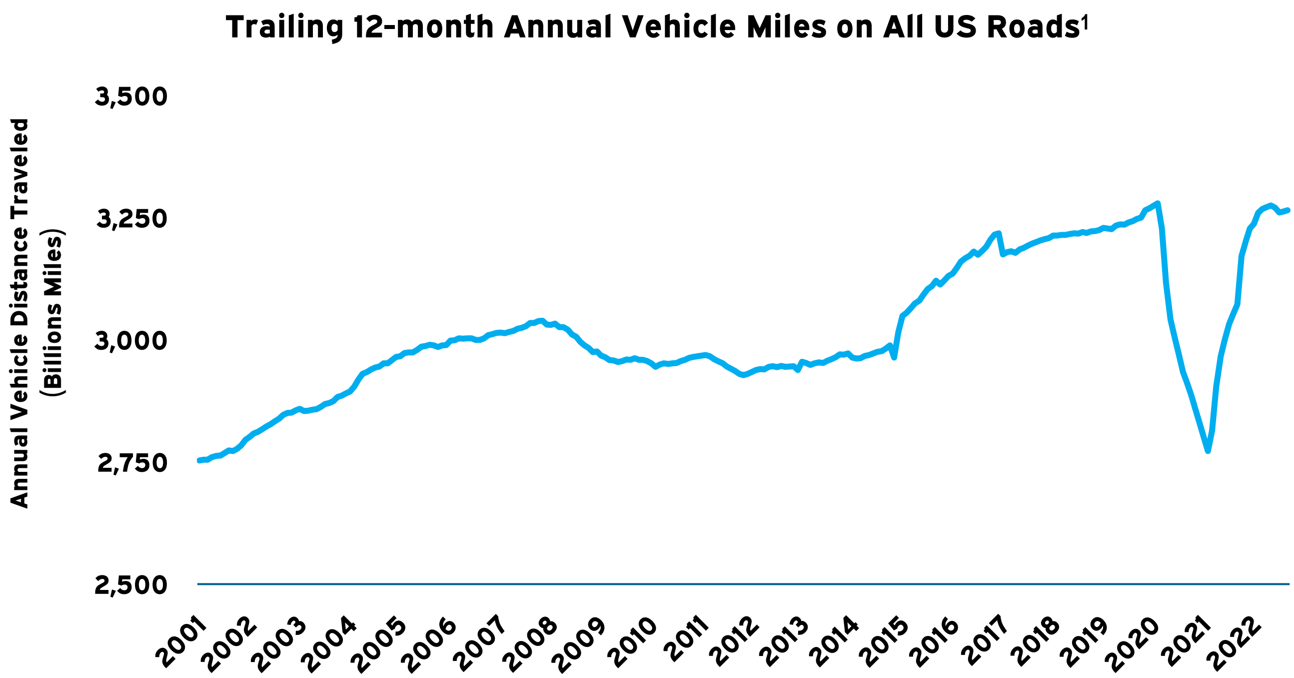

The third quarter continued post-pandemic travel recovery with a total of approximately 857 billion miles. This represented a slight decrease of negative 0.6% over the same period in 2021. The trailing 12-month travel mileage is effectively back to where it was pre-COVID, indicating a welcome and positive 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 $4.00 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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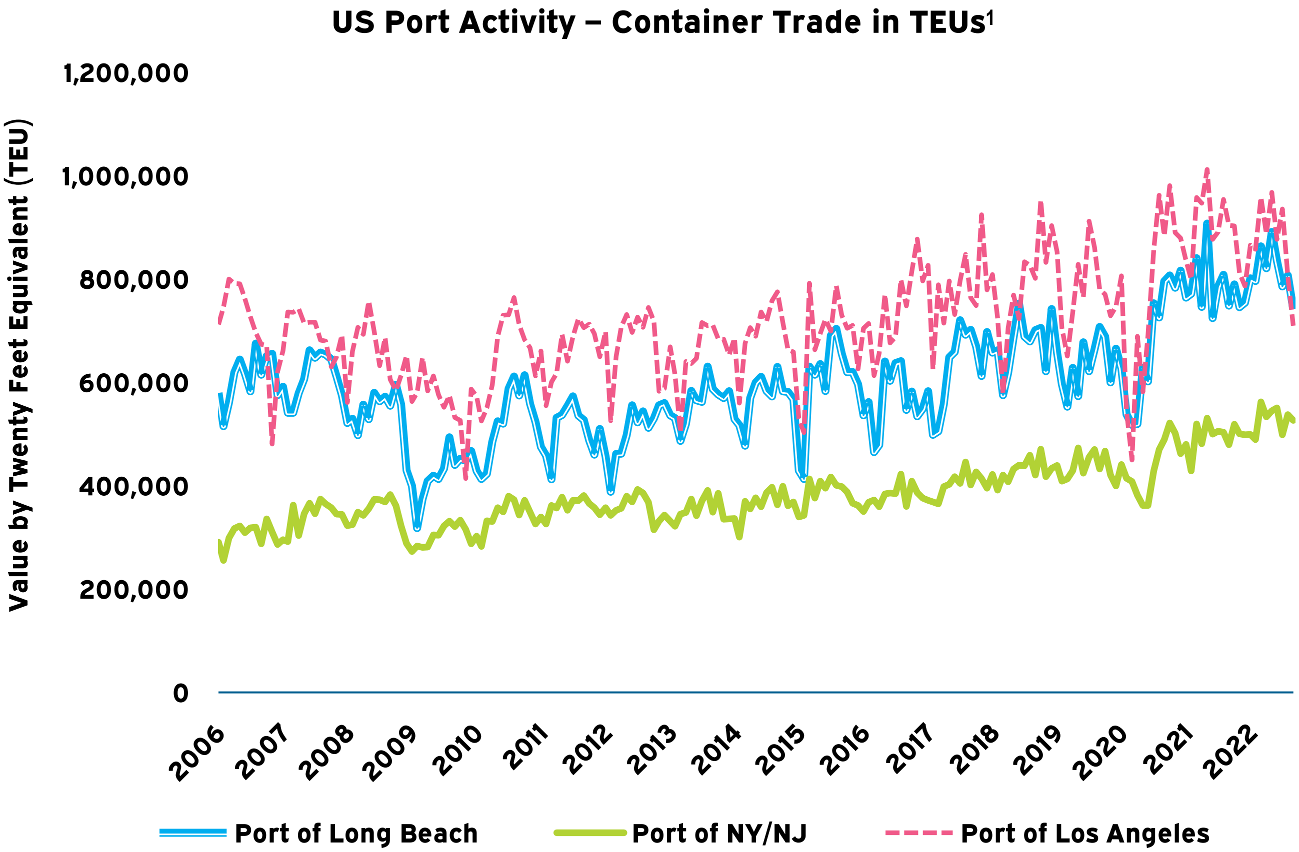

The chart presents the top three US ports by container volume, as measured by twenty-foot equivalent units ("TEU"). Activity at the three ports provides a high level representation of the volume at US ports more broadly.

During the third quarter, volumes at the three ports decreased by 0.2 million units relative to the same period in 2021. On a year-over-year basis, the combined port volumes decreased by 0.1 million TEUs, or -0.3%, over the prior 12-month period. The Port of Long Beach recorded an increase of 1.4% (0.1 million TEUs), the Port of NY/NJ reported an increase of 5.9% (0.3 million TEU), and the Port of Los Angeles recorded a decrease of 5.1% (0.6 million TEUs) over the prior 12 months.

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

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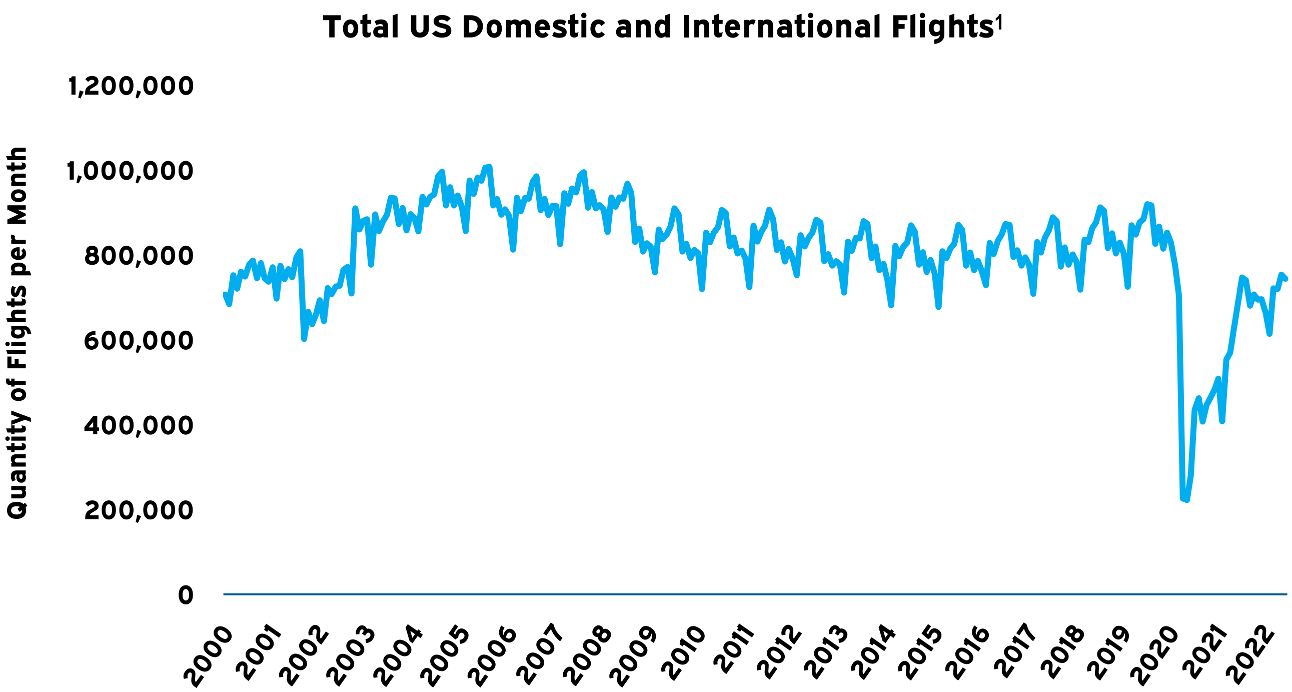
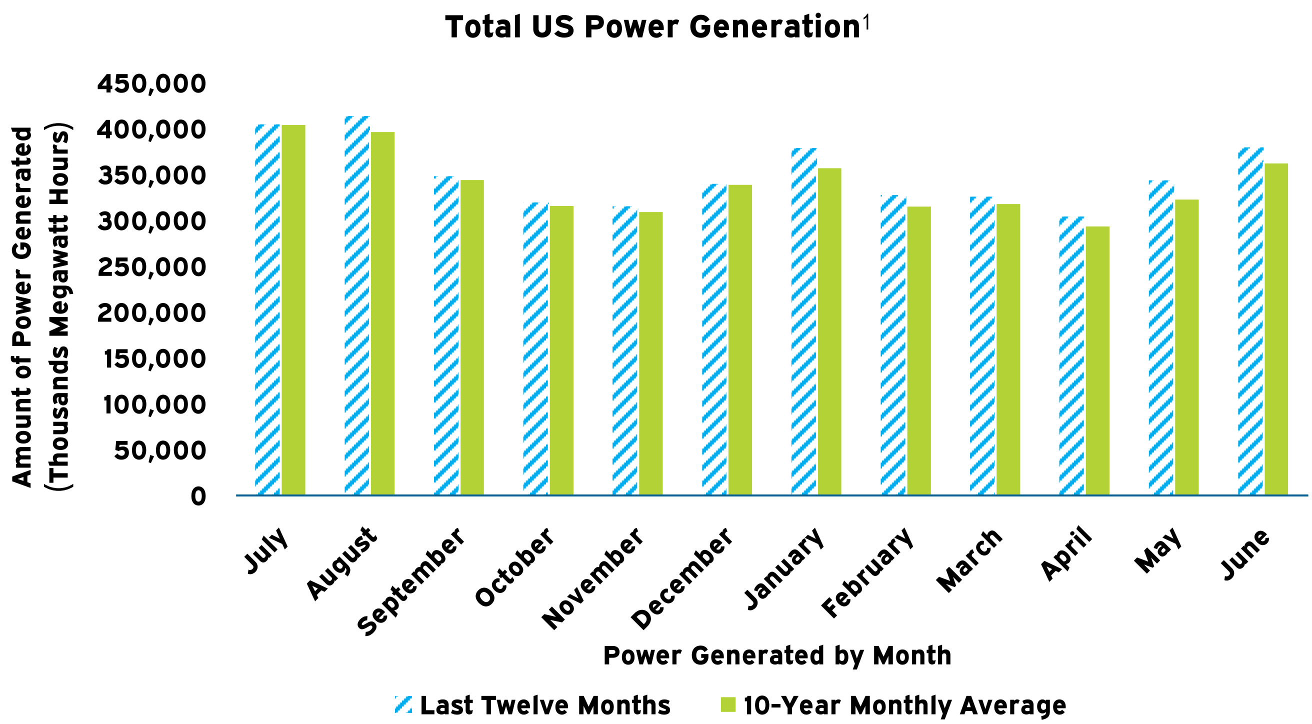


The chart above presents all US domestic and international flights, excluding foreign point-to-point flights by month. Historically, air traffic is cyclical with peaks in the summer months and troughs in the winter months.

There were 0.1 million more flights during the third quarter of 2022 over same period in 2021, representing a 6% increase. In addition to the number of flights, the total number of passengers travelling on US and international airlines increased by 53% for the 12 months ended September 2022 over the prior 12 months.

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



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 1.8% during the second quarter, compared to the same period in 2021.

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

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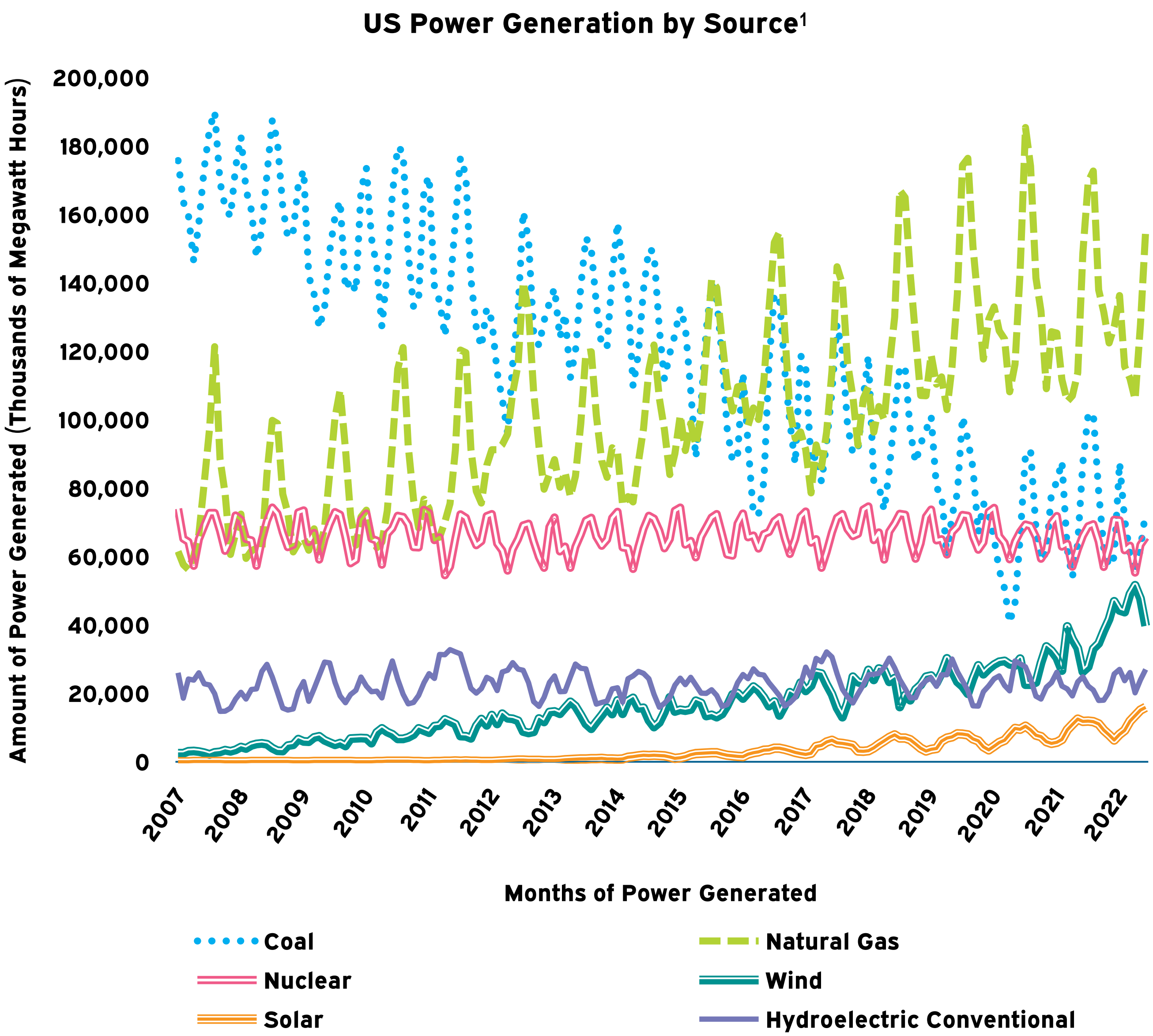

In the third quarter 2022, total US power generated increased by 2% over the same period in 2021 with the largest increase from the renewable sources and natural gas. Wind and utility-scale solar continue to make up a small portion of total net energy generation in the US, accounting for only 12% and 3% 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, September 2022.