MEMORANDUM

TO: Members of the Investment Committee, CalPERS
FROM: Meketa Investment Group
DATE: September 19, 2022
RE: Semi-Annual Infrastructure Performance Review as of June 30, 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 for the period ended June 30, 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.

As reported herein, the Portfolio's performance for all trailing periods has been solid and representative of the asset class, consistently delivering low- to mid-double digit net returns, except a short period where COVID depressed revenues and valuations. Even then the Portfolio overall was resilient and has since recovered well, with its one- and three-year trailing returns now well above those posted a year ago.

Performance[2]

CalPERS' Infrastructure Portfolio continues to outperform its policy benchmark for the longer five- and ten-year reporting periods, but this reporting period, as was the case last quarter for the period ending March 31, 2022, it underperformed against the benchmark for the shorter one- and three-year periods, as seen in the table below.

Net Returns as of June 30, 2022	1 Year (%)	3 Year (%)	5 Year (%)	10 Year (%)
Infrastructure Portfolio Returns	14.7	7.2	10.5	11.3
Infrastructure Policy Benchmark[3]	27.1	10.2	8.7	7.0
Over (under) Performance	(12.4)	(3.0)	1.8	4.3
Consumer Price Index (For Reference Only)	9.1	5.0	3.9	2.6

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

This is the second quarter that the one- and three-year periods fell short of the benchmark, where as the Portfolio outperformed its benchmark for all four trailing periods ending December 31, 2021, September 30, 2021, and June 30, 2021.

As reported last quarter, we believe the current results reflect several Portfolio and benchmark dynamics discussed below, including that for the one- and three-year periods the benchmark is the Real Assets Program benchmark with underlying assets that are 100% real estate.

→ **Trailing 1 Year Context:** A one-year 14.7% return for infrastructure is very strong for an 84.1% Core portfolio, and is up over last quarter's 10.5%, and last year's 7.2%. However, compared against a banner 27.1% trailing one-year return from a benchmark of real estate assets it looks anemic. With the Policy Benchmark up another 630 basis point over last quarter, this quarter it beats the Portfolio by 2,010 to 1,690 basis points ("bps") for the trailing periods.

→ **Trailing 3 Year Context**: The Infrastructure Portfolio's trailing three-year return of 7.2% is still below, but much closer to its benchmark, noting the three-year benchmark itself is 1,690 bps below its one-year return. The three-year return includes the COVID pandemic period, including the first several worst quarters, during which reduced economic activity in certain sectors resulted in decreased revenues and lower asset valuations. As previously noted in our other reviews for the Board, infrastructure managers' valuation policies and practices mean that the asset class' valuations tend to more closely track the market, with a shorter lag than in real estate. We would expect the three-year return to improve as the most impactful COVID quarters roll off, and the return of 7.2% is an improvement over last quarter's three-year posting of 6.5%, and the prior year's return of 6.0%.

We note that the one- and three-year Portfolio returns, along with the five- and ten-year returns, exceed CalPERS' expectations for the asset class of 5.3% to 5.5%, set by the Capital Market Assumptions 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 560, 220, 660, and 870 bps, 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 basis points 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 Q1 2022 Final.

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

By Risk Classification

→ **Core,** comprising 84.1% of the Portfolio, delivered solid mid-teen returns. Global Diversified Infrastructure comprised about half of the Core portfolio, with almost 20% US Power & Energy, and less than 10% each in US Transportation, Global Transportation, and Global Communications.

→ **Value Add,** comprising 12.3% of the Portfolio, posted high-teen returns. These investments are predominantly diversified commingled funds, at approximately 80% of the Value Add portfolio, with a new communications fund investment representing the balance.

→ **Opportunistic**, comprising 3.6% of the Portfolio, posted negative low-teen returns. This category comprises one diversified commingled fund investment.

Sectors

→ **Global Diversified Infrastructure** comprises 55.5% of the NAV and delivered high single-digit returns.

→ **US Power/Energy** represents 18.3% of the Portfolio, and delivered low-teens returns.

→ **Global Communications**, a sector where the Portfolio made several new investments, comprises 9.7% of the Portfolio, and performance is not yet meaningful.

→ **US Transportation** accounts for 9.3% of the portfolio and posted extremely strong double-digit returns.

→ **Global Transportation** is 7.3% of the portfolio, but performance is not yet meaningful.

→ **US Diversified Infrastructure** and **International Transportation** together make up less than 0.1% of the Portfolio.

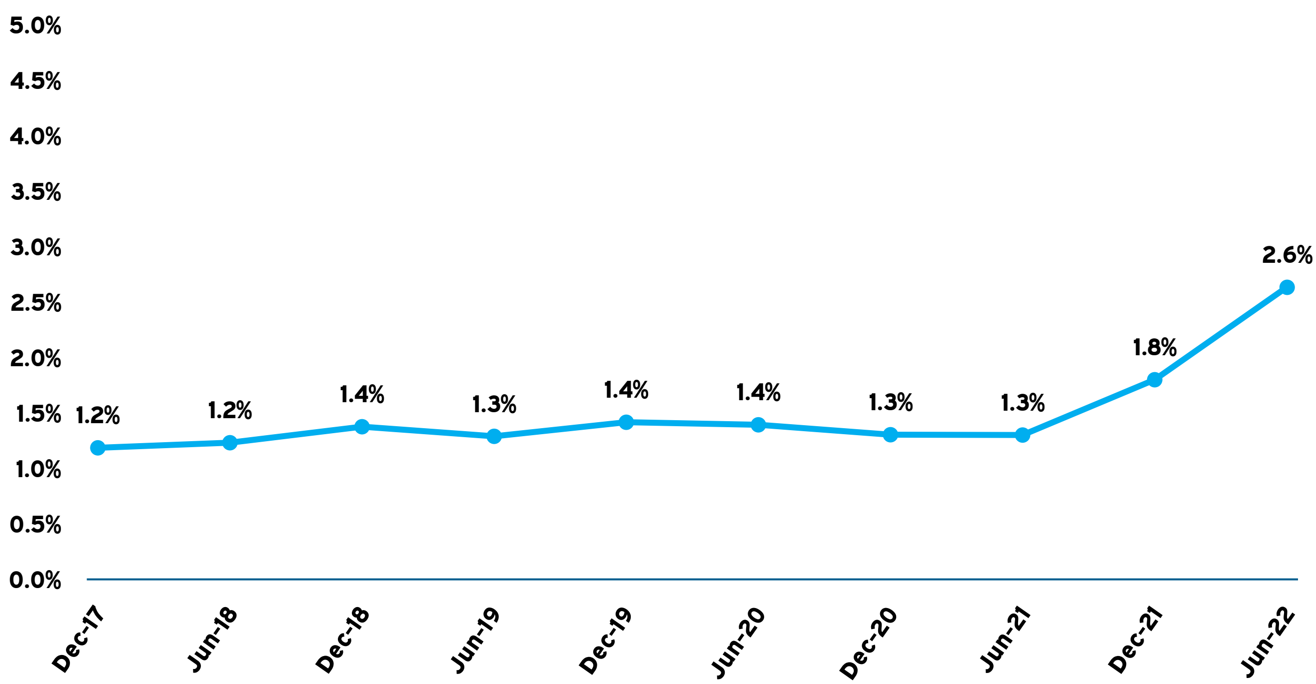
Net Income

→ The Portfolio's **one-year net income** is down at 1.8% compared to 2.8% 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 continuing lower levels of income are 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. See for example the chart showing Total US Domestic and International Flights in the Appendix. This period, the Portfolio's net income was dragged down further by several asset- and fund-specific factors, including those related to fund J-curves, foreign exchange effects, and variability of income production from selected businesses. Not surprisingly, given the 14.7% total return for the trailing one-year period, in light of the low net income, appreciation represents the preponderance of the total return.

Implementation

The Portfolio's Net Asset Value ("NAV") as of June 30, 2022 was $11.6 billion, an increase of $2.6 billion, or 28.5%, compared to the December 31, 2021 NAV of $9.0 billion. The current NAV represents 2.6% of the Total Fund, and 16.6% of the Real Assets Program.[1] A year ago, the Portfolio's NAV was 1.3% of the Total Fund, and 13.4% of the Real Assets Program. The chart below shows the growth of the Infrastructure Portfolio as a percentage of the Total Fund over the last 10 six-month periods.

Infrastructure NAV as a Percent of Total Fund NAV



For the prior year period, the Portfolio's contributions outpaced distributions $4.4 billion to $650.4 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.

Several new investments were made during the H1 2022 semi-annual period through CalPERS' separate accounts and commingled funds in North America and Europe in multiple sectors, including: communications, energy, power, transportation, and waste.

[1] The Total Fund market value was $439.6 billion, and the Real Asset Program NAV was $69.6 billion, as of June 30, 2022, per Wilshire.
[2] Real Assets QPR Q1 2022 Final.

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 6/30/22[1] Exposure
Risk Classification	(%)	(%)[2]
Core	60-100	84.1
Value Add	0-25	12.3
Opportunistic-All Strategies	0-25	3.6
Geographic Region	(%)	(%)[2]
United States	40-100	54.0
International Developed	0-60	45.2
International Developing	0-15	0.6
International Frontier	0-5	0.2
Manager Exposure[3]	(%)	(%)
Largest Partner Relationship	20 max	5.7
Investments with No External Manager	20 max	1.7
Leverage[4]		
Loan to Value	65% max	40.0%
Debt Service Coverage Ratio	1.25x min	1.43x

[1] Private investment data are one quarter lagged, so as of March 31, 2021.

[2] Real Assets QPR Q1 2022 Final and 2022.03.31 RA Characteristics Datasheets (Final).xlsx, based on asset-level risk and geography.

[3] 2022.03.31 RA Allocation Datasheet.xlsx (Final), 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 ($78.3 billion).

[4] CalPERS Real Assets Leverage Report, Quarter 2022/03, web-based Dashboard.

Conclusion

We continue to believe the Portfolio's performance for all trailing periods has been solid and representative of the asset class, consistently delivering low- to mid-double digit net returns, except for the 18 month to two year period where COVID depressed economic activity and created some medium-term revenue contractions and valuation write-downs. During that period, the Portfolio overall was resilient, buttressed by good diversification, defensive investments, and some early recovering assets. The Portfolio has also participated in the broader economic recovery, with its one- and three-year trailing returns now well above those posted a year ago.

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 observed last reporting period, the Portfolio is an increasingly important part of the Real Assets Program, consistent with its Strategic Plans, now sitting at 16.6% of the Program. In the first half of 2022, approximately $2.1 billion in new or follow-on investments closed made through separate accounts, commingled fund commitments, or via co-investment. We expect to see the Portfolio continue to grow over the coming quarters and years, with follow-on and new acquisitions through existing managers and commitments to new partners. The growing and diversifying manager roster and asset base supports Portfolio construction goals of inflation-linkage, continued resiliency, and strong total returns.

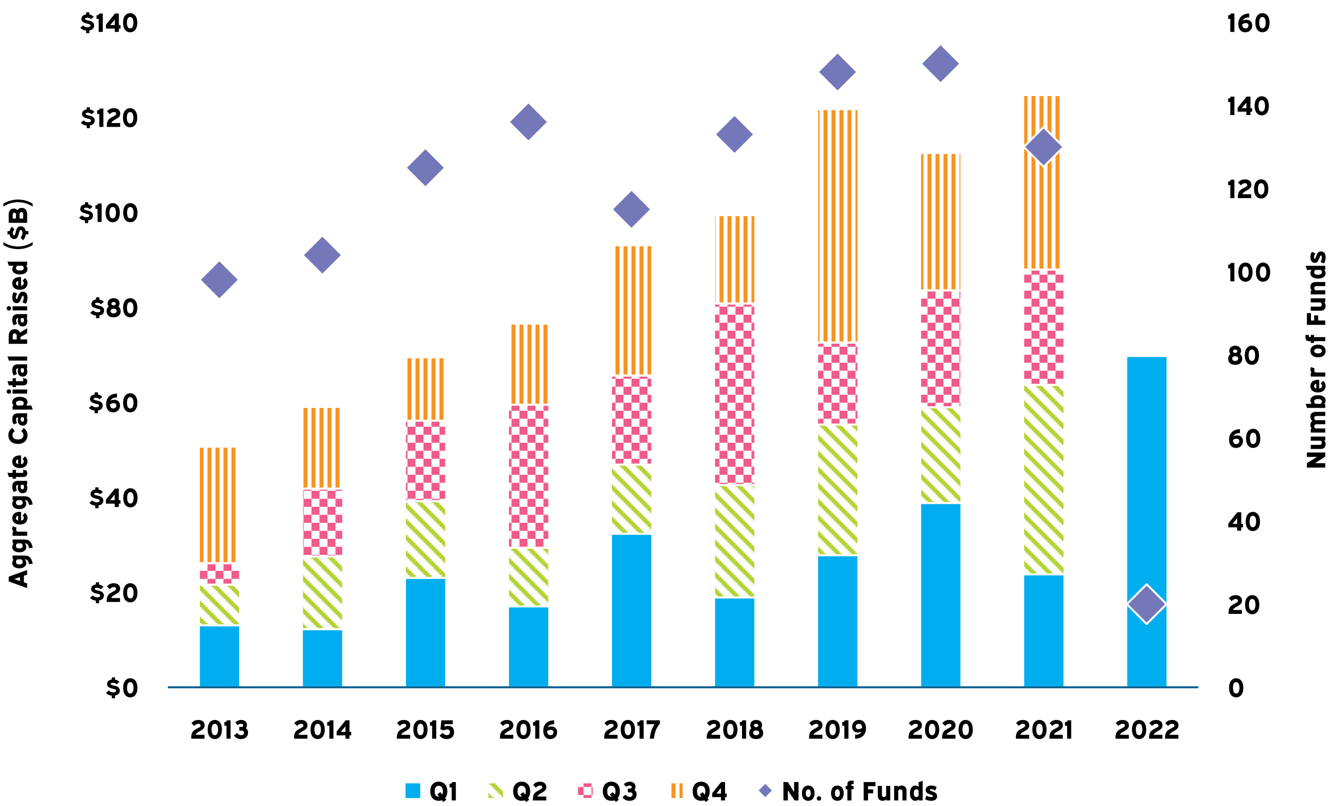
Please do not hesitate to contact us if you have questions or require additional information.

SPM/EFB/jls

Attachment[1]

Infrastructure Market Commentary – Q1 2022

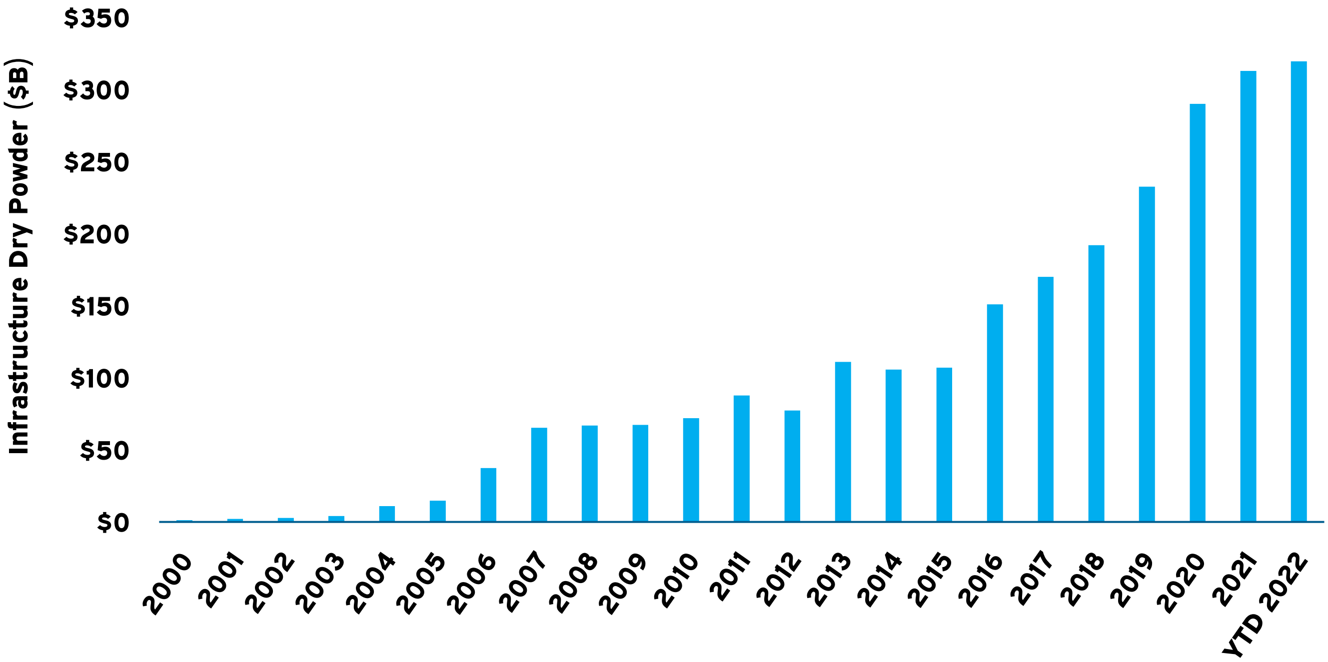
Global Quarterly Unlisted Infrastructure Fundraising[2]



Capital raised in the first quarter of 2022 exceeded the amount raised in the first half of 2021. The aggregate capital came from just 20 funds with an average fund size of $3.5 billion. This was an increase over the 2021 average of $1.0 billion.

[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 1Q 2022 Global Infrastructure Report.

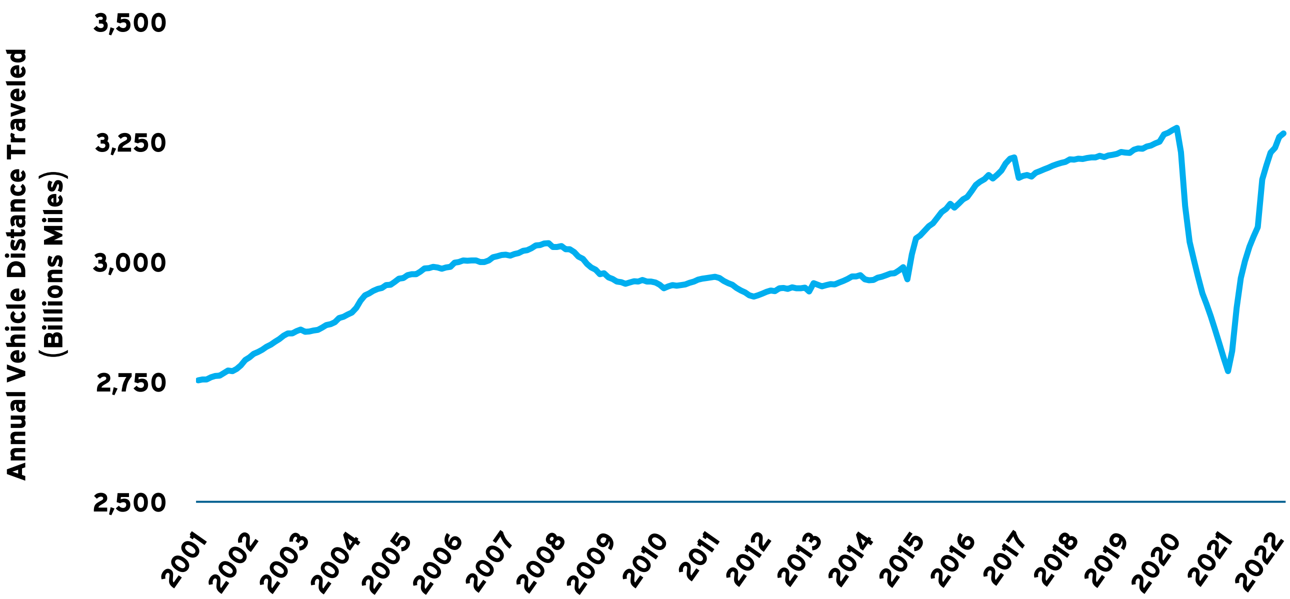
Infrastructure Dry Powder[1]



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.

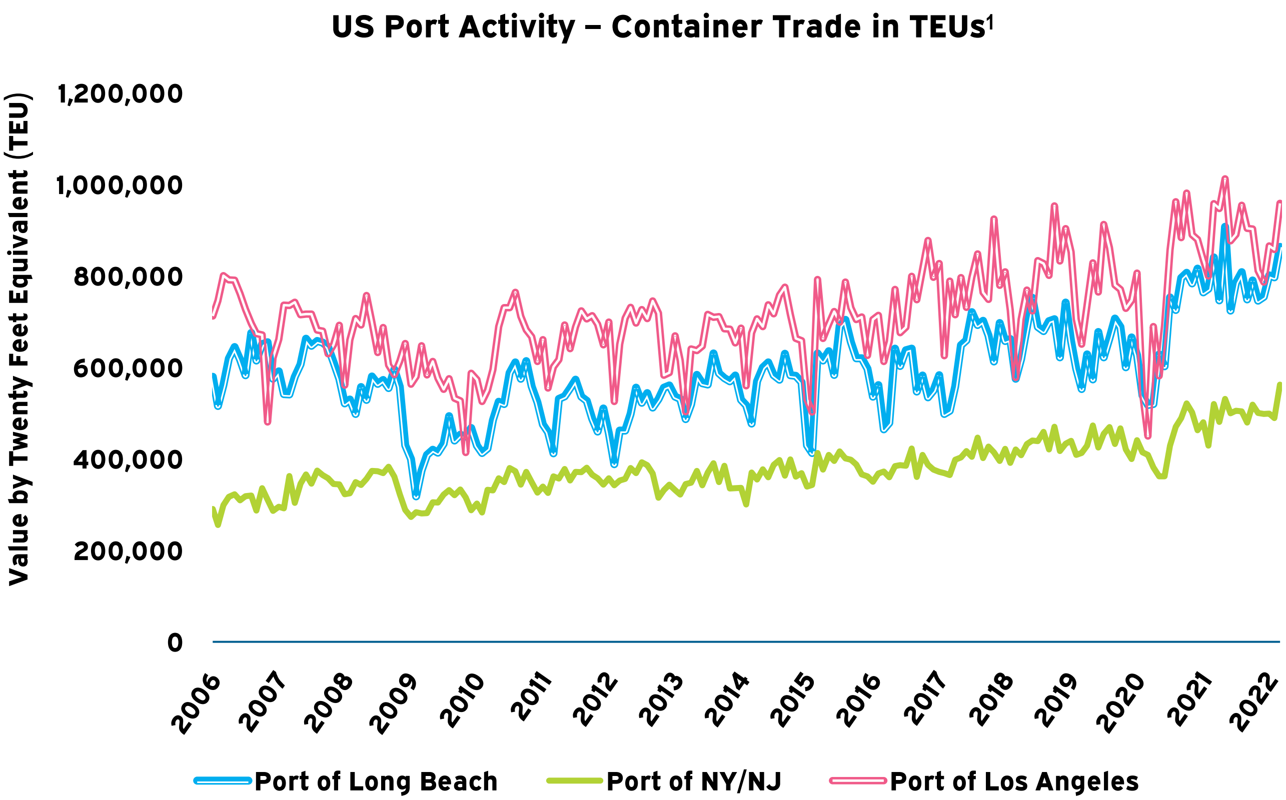
[1] Source: Preqin 1Q 2022 Global Infrastructure Report.

Moving 12-month Total Miles Traveled on All US Roads[1]



The first quarter continued post-pandemic travel recovery with a total of approximately 753 billion miles. This represented an increase of 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 first quarter continued to show an increase in the US price of a gallon of gas, which steadily increased to an average price of $4.32 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.

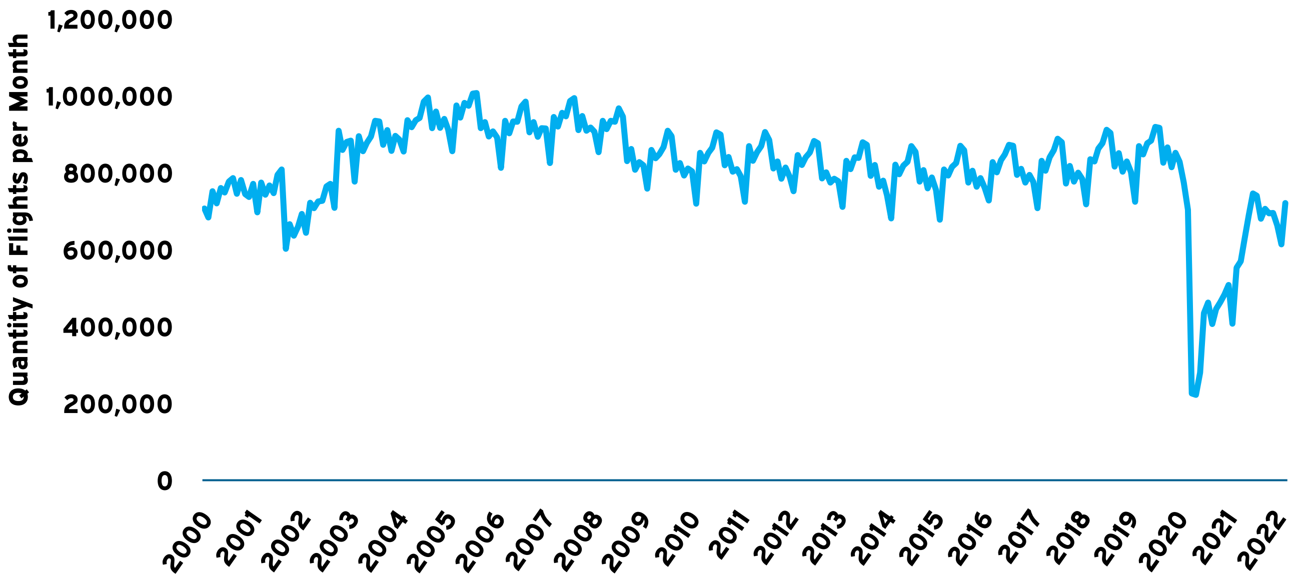


The chart presents the top three US ports by container volume, as measured by twenty-foot equivalent units ("TEU"). Activity at the three ports provides a high level representation of the volume at US ports more broadly.

During the first quarter, volumes at the three ports increased by 0.3 million units relative to the same period in 2021. On a year-over-year basis, the combined port volumes increased by 2.1 million TEUs, or 8.6%, over the prior 12-month period. The Port of Long Beach recorded an increase of 8% (0.7 million TEUs), the Port of NY/NJ reported an increase of 12% (0.7 million TEU), and the Port of Los Angeles recorded an increase of 8% (0.8 million TEUs) over the prior 12 months.

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

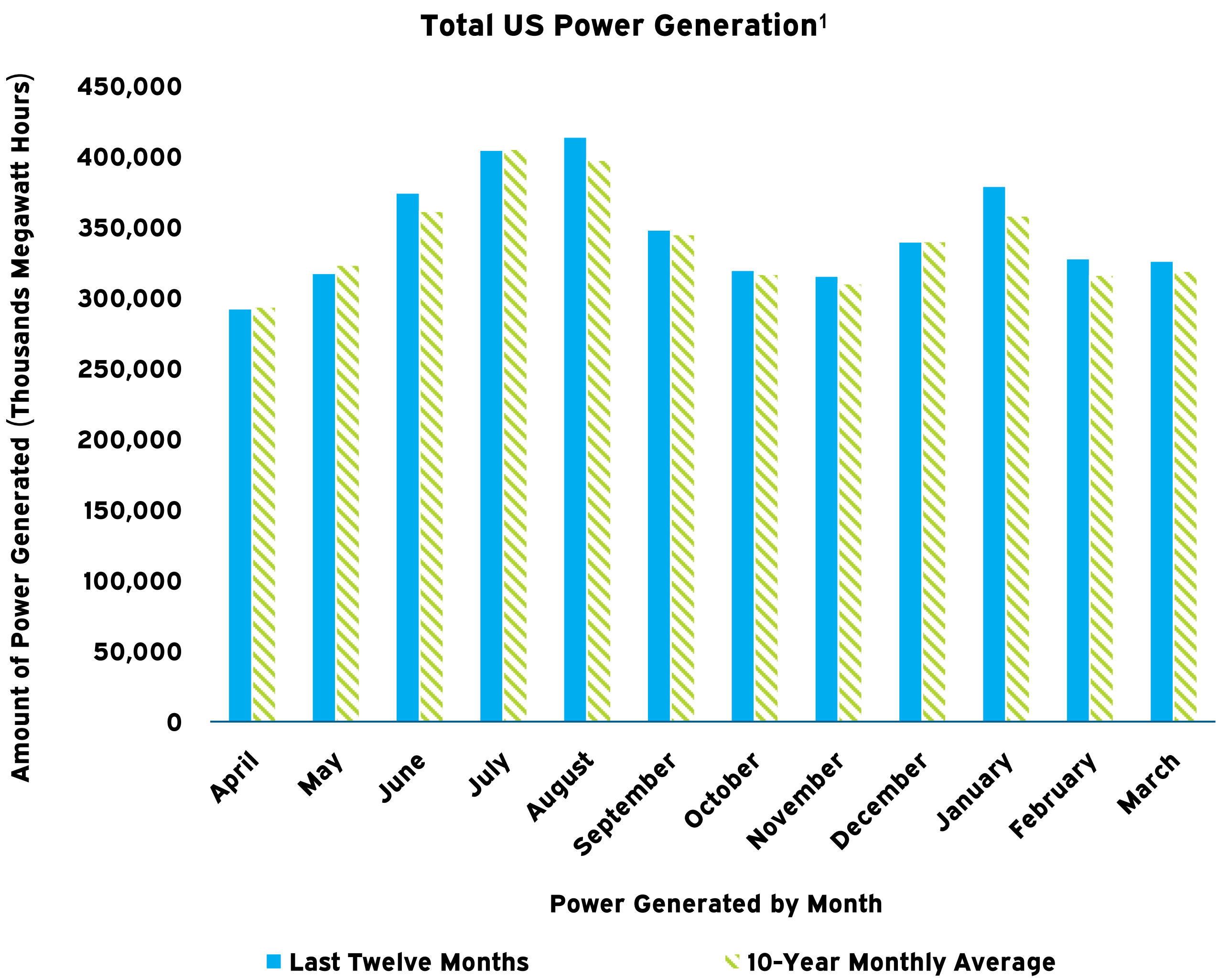
Total US Domestic and International Flights[1]



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 0.5 million more flights during the first quarter of 2022 over same period in 2021, representing a 36% increase. In addition to the number of flights, the total number of passengers travelling on US and international airlines increased by 158% for the 12 months ended March 2021 over the prior 12 months.

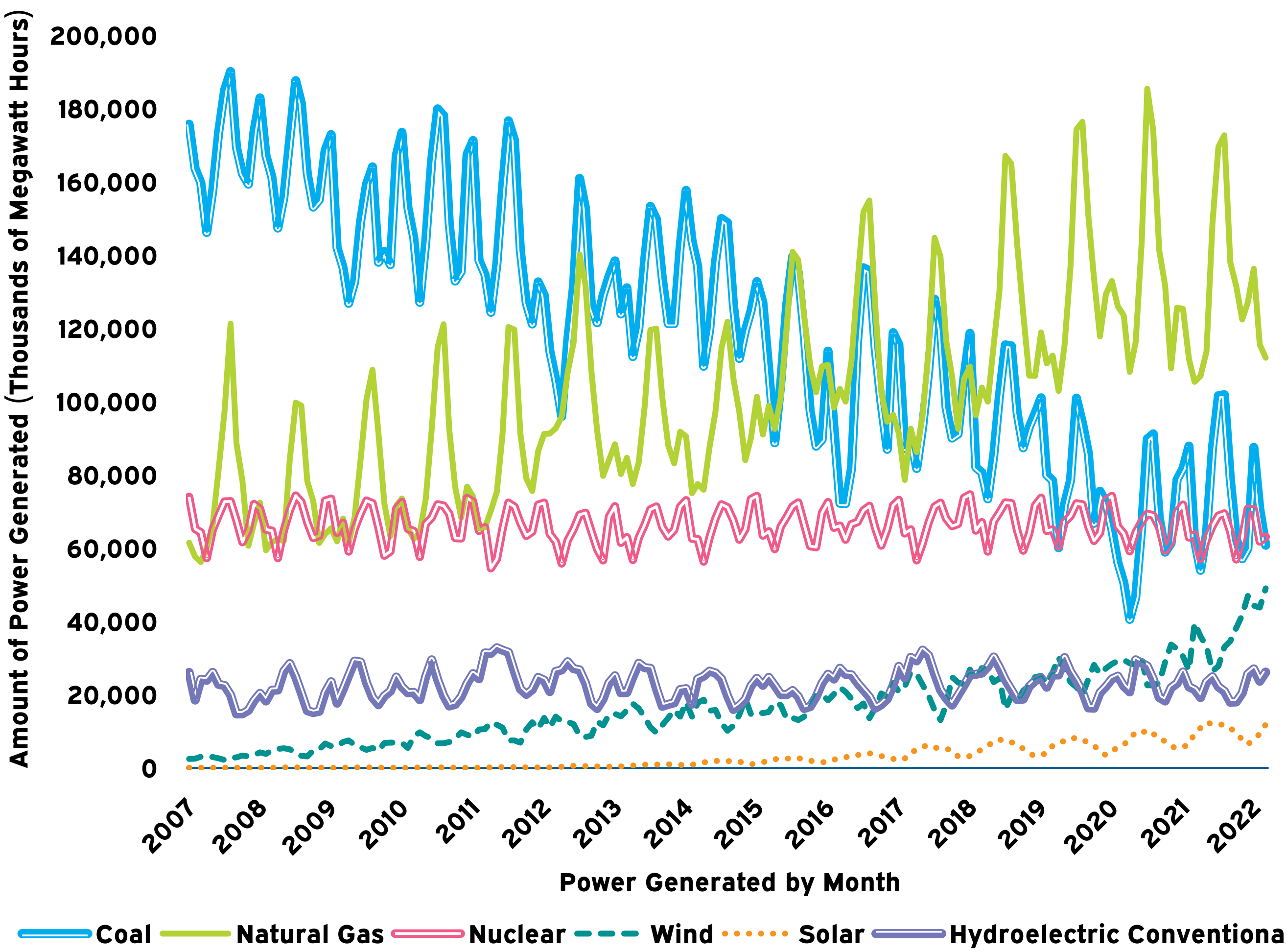
[1] Source: Bureau of Transportation Statistics: Flights, All US, and Foreign Carriers.



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 remained flat with an increase by 1.4% during the first quarter, compared to the same period in 2021.

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

US Power Generation by Source[1]



In the first quarter 2022, total US power generated increased by 5% over the same time 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 11% and 3% of energy generation, respectively. Natural gas, coal, and nuclear accounted for 38%, 21%, and 19%, 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, March 2022.