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2022 ANNUAL PRIVATIZATION REPORT: TRANSPORTATION FINANCE

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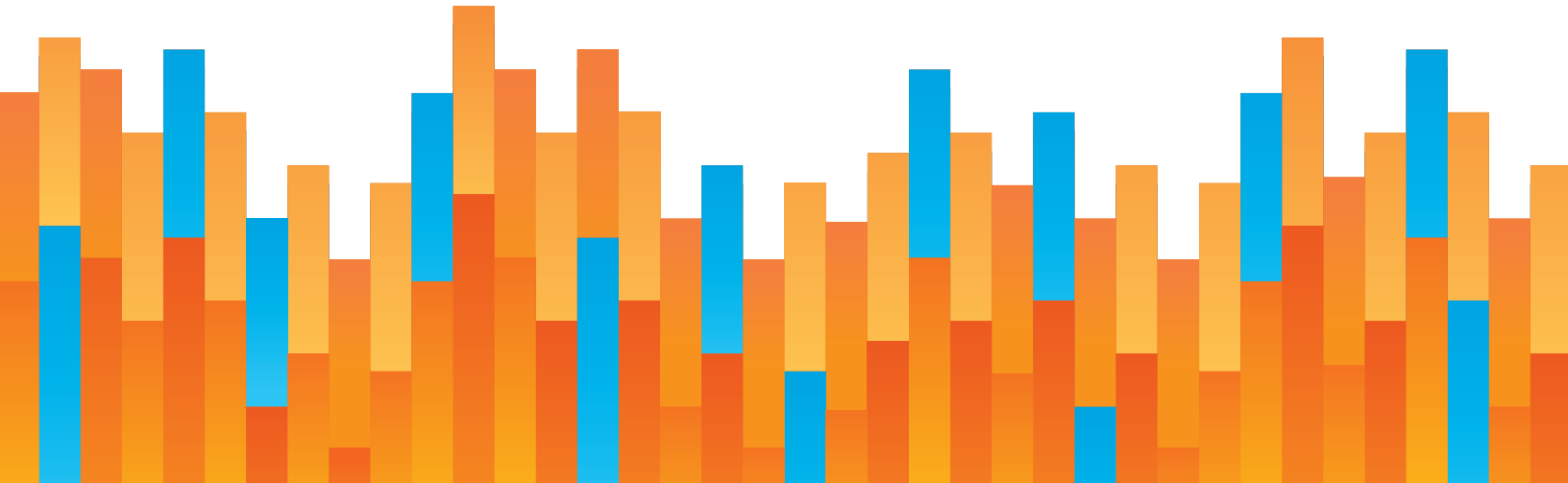

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TABLE OF CONTENTS

PART 1 INTRODUCTION 1

PART 2 MAJOR INFRASTRUCTURE INVESTMENT FUNDS AND TRENDS 3

2.1 Overview 3

2.2 Examples of Divestitures and Acquisitions 8

2.3 Longer-Term Funds 10

PART 3 P3 COMPANIES AND PROJECTS 12

3.1 Global Companies and Projects 12

3.2 U.S. Companies and Projects 14

3.3 Refinancing of Existing P3 Concessions 17

3.4 Projects in the Transportation DBFOM Pipeline 18

PART 4 PUBLIC PENSION FUND INFRASTRUCTURE INVESTING 25

4.1 Introduction 25

4.2 Recent Pension Fund Infrastructure Developments 27

ABOUT THE AUTHOR 34

PART 1

INTRODUCTION

Since the late 1980s, governments have privatized many state-owned enterprises, including infrastructure such as airports, electricity, gas, railroads, seaports, telecommunication providers, and toll roads. Some of these facilities were sold to investors, in whole or in part (as is the case with many European airports). In other countries, public infrastructure facilities were leased to investors under long-term public-private partnerships (P3s). Thereafter, a growing number of governments also used such P3s to finance, build, and operate new airports or airport terminals, electricity facilities, seaports, and toll roads. The sale or lease of an existing facility is called a "brownfield" transaction (in part because significant refurbishment may be needed). By contrast, P3s for brand new facilities are referred to as "greenfield" transactions.

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In the United States, a significant amount of infrastructure is owned and operated by the private sector, including most U.S. energy production and distribution plus electric and gas utilities, as well as a fraction of water and wastewater infrastructure. These assets may be held through publicly traded corporations or (in the case of energy) master limited partnerships, or they may be owned directly by private investors. In transportation, however, nearly all U.S. airports, seaports, and toll roads are government-owned enterprises, generally by either state or local governments.

Infrastructure projects of both brownfield and greenfield types require long-term financing. In the public sector, such facilities are often financed 100% by government bonds, which in the United States are tax-exempt. When the private sector invests in infrastructure, it typically invests equity to cover part of the cost and finances the rest via either bank loans or long-term borrowing, such as via revenue bonds. These large financing needs have led to the development and growth of infrastructure investment funds, most of which raise equity to invest in privately owned or P3 infrastructure (though a more recent development is infrastructure debt funds, as well). Public pension funds, seeking to increase their overall return on investments, are also making significant equity investments in revenue-generating infrastructure.

Infrastructure Investor reports that during 2021 investors put $136 billion in new money into infrastructure investment funds.[1] Pension funds continued to increase their investment in infrastructure, in most cases by placing a specific allocation with one or more of the infrastructure funds, but a handful of large pension funds have built professional staffs that enable them to make direct investments in individual facilities.

This report reviews 2021 developments in the infrastructure investment fund world, focusing on transportation infrastructure. While the scope of the report is global, it pays particular attention to U.S. developments in P3 infrastructure and the growth of U.S. pension fund investing in this field. Part 2 reviews the continuing growth and scope of infrastructure investment funds worldwide. Part 3 then provides an update on the largest companies and major P3 projects under way globally and in the United States. Finally, Part 4 reviews pension funds' increasing investment in revenue-generating infrastructure.

[1] "Infrastructure Fundraising Sets New Record for 2021," *Infrastructure Investor* email, 3 February 2022.

PART 2

MAJOR INFRASTRUCTURE INVESTMENT FUNDS AND TRENDS

2.1 OVERVIEW

For many years, *Infrastructure Investor* has published a table of the amounts raised by the 50 largest infrastructure investment funds over the latest five-year period. For 2021, the publication expanded this list to the largest 100 funds. Table 1 lists those funds and the five-year total each had raised by autumn 2021. The five-year total raised by all 100 funds is $791 billion.

TABLE 1: INFRASTRUCTURE INVESTOR 100, 2021

Rank	Fund Manager	Headquarters	Capital Raised ($M)	Europe	USA	Canada	Australia	Asia, except China	China	Latin America
1	Macquarie Asset Management	London	$75,865	$75,865						
2	Global Infrastructure Partners	New York	$64,834		$64,834					
3	Brookfield Asset Management	Toronto	$52,387			$52,387				
4	KKR	New York	$46,867		$46,867					
5	EQT	Stockholm	$37,345	$37,345						

Rank	Fund Manager	Headquarters	Capital Raised ($M)	Europe	USA	Canada	Australia	Asia, except China	China	Latin America
6	Stonepeak Infrastructure Partners	New York	$31,928		$31,928					
7	I Squared Capital	Miami	$22,266		$22,266					
8	BlackRock	New York	$22,037		$22,037					
9	IFM Investors	Melbourne	$21,623				$21,623			
10	AMP Capital	Sydney	$19,649				$19,649			
11	Antin Infrastructure Partners	Paris	$18,182	$18,182						
12	Blackstone	New York	$17,513		$17,513					
13	First Sentier Investors	Sydney	$16,866				$16,866			
14	Copenhagen Infrastructure Partners	Copenhagem	$15,372	$15,372						
15	Digital Bridge Group	Boca Raton	$14,805		$14,805					
16	Morgan Stanley Infrastructure Partners	New York	$12,124		$12,124					
17	Ardian	Paris	$12,110	$12,110						
18	Actis	London	$10,246	$10,246						
19	Partners Group	Baar-Zug	$8,842	$8,842						
20	Energy Capital Partners	Summit	$8,626		$8,626					
21	DIF Capital Partners	Schiphol	$8,531	$8,531						
22	Meridiam	Paris	$8,381	$8,381						
23	InfraVia Capital Partners	Paris	$7,925	$7,925						
24	Greencoat Capital	London	$7,475	$7,475						
25	Dalmore Capital Limited	London	$7,095	$7,095						
26	QIC Limited	Brisbane	$7,088				$7,088			
27	DWS	Frankfurt	$6,693	$6,693						
28	Equitix	London	$6,490	$6,490						
29	Vauban Infrastructure Partners	Paris	$6,406	$6,406						
30	AIP Management	Copenhagem	$6,229	$6,229						
31	The Carlyle Group	Washington, DC	$5,988		$5,988					
32	Axium Infrastructure	Montreal	$5,854			$5,854				
33	F2i Sgr SpA	Milan	$5,748	$5,748						
34	InfraRed Capital Partners	London	$5,655	$5,655						
35	InfraCapital	London	$5,639	$5,639						
36	National Investment & Infrastructure Fund	Mumbai	$5,349					$5,349		
37	IPI Partners	Chicago	$5,300		$5,300					
38	Grain Management	Washington, DC	$5,110		$5,110					
39	China Merchants Capital	Shenzhen	$5,055						$5,055	
40	Swiss Life Asset Managers	Zurich	$4,428	$4,428						
41	Basalt Infrastructure Partners	London	$4,254	$4,254						
42	Arcus Infrastructure Partners	London	$4,243	$4,243						
43	Capital Dynamics	Zug	$4,235	$4,235						
44	Energy Infrastructure Partners	Zurich	$4,069	$4,069						
45	Argo Infrastructure Partners	New York	$4,059		$4,059					
46	Goldman Sachs	New York	$4,005		$4,005					
47	GCM Grosvenor	Chicago	$3,958		$3,958					
48	Mirova	Paris	$3,700	$3,700						

Rank	Fund Manager	Headquarters	Capital Raised ($M)	Europe	USA	Canada	Australia	Asia, except China	China	Latin America
49	Amber Infrastructure Group	London	$3,669	$3,669						
50	ICON Infrastructure	London	$3,439	$3,439						
51	Allianz Global Investors	Frankfurt	$3,439	$3,439						
52	LS Power Group	New York	$3,425		$3,425					
53	ArcLight Capital Partners	Boston	$3,400		$3,400					
54	Manulife Investment Management	Boston	$3,381		$3,381					
55	Generate Capital	San Francisco	$3,200		$3,200					
56	Oaktree Capital Management	Los Angeles	$3,080		$3,080					
57	3I Group	London	$3,055	$3,055						
58	Foresight Group	London	$3,054	$3,054						
59	Ares	Los Angeles	$2,944		$2,944					
60	Aquila Capital	Hamburg	$2,780	$2,780						
61	GLIL Infrastructure	London	$2,744	$2,744						
62	Mexico Infrastructure Partners	Mexico City	$2,734							$2,734
63	Apollo Global Management	New York	$2,511		$2,511					
64	Northleaf Capital Partners	Toronto	$2,412			$2,412				
65	Instar Asset Management	Toronto	$2,282			$2,282				
66	GI Partners	San Francisco	$2,260		$2,260					
67	JP Morgan Asset Management	New York	$2,260		$2,260					
68	Patria	Sao Paulo	$2,256							$2,256
69	CICC	Beijing	$2,180						$2,180	
70	Quinbrook Infrastructure Partners	London	$2,144	$2,144						
71	Vision Ridge Partners	Boulder	$2,121		$2,121					
72	Ancala Partners	London	$2,056	$2,056						
73	Infranode	Stockholm	$2,018	$2,018						
74	China Everbright Limited	Hong Kong	$1,864						$1,864	
75	Cube Infrastructure Managers	Luxembourg	$1,849	$1,849						
76	Whitehelm Capital	Canberra	$1,841				$1,841			
77	Strait Energy	Beijing	$1,804						$1,804	
78	NextEnergy Capital	London	$1,634	$1,634						
79	SUSI Partners	Zug	$1,455	$1,455						
80	Arjun Infrastructure Partners	London	$1,409	$1,409						
81	Fundamental Advisors	New York	$1,406		$1,406					
82	Aberdeen Standard Investments	Edinburgh	$1,304	$1,304						
83	Alinda Capital Partners	Greenwich	$1,300		$1,300					
84	American Infrastructure Partners	Foster City	$1,278		$1,278					
85	Omnes Capital	Paris	$1,217	$1,217						
86	SDC Capital Partners	New York	$1,208		$1,208					
87	CIM Group	Los Angeles	$1,203		$1,203					
88	Starwood Energy	Greenwich	$1,200		$1,200					
89	EIV Capital	Houston	$1,107		$1,107					
90	Octopus Investments	London	$1,074	$1,074						
91	Sunvision Holdings	Shanghai	$1,072						$1,072	
92	Keppel Capital	Singapore	$1,050					$1,050		

Rank	Fund Manager	Headquarters	Capital Raised ($M)	Europe	USA	Canada	Australia	Asia, except China	China	Latin America
93	Quaero Capital	Geneva	$1,047	$1,047						
94	First Infrastructure Advisors	Houston	$1,000		$1,000					
95	AP Moller Capital	Copenhagen	$982	$982						
96	Glennmont Partners	London	$903	$903						
97	Marguerite	Luxembourg	$870	$870						
98	Tages Capital SGR	Milan	$862	$862						
99	Melody Capital Management	San Juan	$859		$859					
100	Arroyo Energy Investment Partners	Houston	$856		$856					
	Totals:		$790,947	$328,162	$309,419	$62,935	$67,067	$6,399	$11,975	$4,990
				41.49%	39.12%	7.96%	8.48%	0.81%	1.51%	0.63%

Source: Infrastructure *Investor*, November 2021

As Table 1 shows, these funds exist in many countries, but as in past years, North America and Europe account for the lion's share. The 2021 geographical breakdown is shown in Table 2.

TABLE 2: HEADQUARTERS LOCATION OF TOP 100 INFRASTRUCTURE INVESTORS

Europe	$328.2 billion	41.5%
United States	$309.6 billion	39.1%
Australia	$ 67.1 billion	8.5%
Canada	$ 62.9 billion	8.0%
China	$ 12.0 billion	1.5%
Other Asia	$ 6.4 billion	0.8%
Latin America	$ 5.0 billion	0.6%
Total:	$791.1 billion	100.0%

Source: *Infrastructure Investor*

The regions of origin of these infrastructure funds have not changed very much, with Europe and the United States as the predominant sources. Australia and Canada were pioneers in specialized infrastructure funds, and while they are still important, their relative shares are somewhat smaller than in previous annual tallies, due mainly to continued growth in U.S. and European funds. *Infrastructure Investor* points out that the 30 largest funds in its 2010 five-year tally had raised $96.5 billion; 2021's top 30, by contrast, have raised $479 billion in their most recent five-year period.

The above data indicate the size and scope of the growing infrastructure investment fund industry. By early in 2022, tallies of how much these funds raised in 2021 began to appear.

In January, *Inframation News* reported a new high of $109.23 billion for the year just ended.[2] Evidently measuring things a bit differently, *Infrastructure Investor* reported in February that the record-high total raised in 2021 was $136.5 billion.[3]

Financial data firm Preqin reports $888 billion in assets under management by the infrastructure fund industry in 2021, up from $778 billion in 2020.[4] In both years, "core" and "core+" funds attracted just over 52% of the total. ("Core" refers to investments with low demand risk and a long-term revenue stream, such as regulated utilities. "Core+ refers to investments with some market risk but features that limit risk, such as non-regulated airports.[5]) Inspiratia Infrastructure reports that funds raised but not yet invested in infrastructure (termed "dry powder") increased from $153 billion in 2016 to $303 billion in 2021, thanks to the large increase in fundraising.[6]

Looking ahead, many new funds were in the market in the closing months of 2021. *Infrastructure Investor* identified the geographic focus of funds in the market as of October 2021.[7] The targeted amounts to be raised are shown in Table 3.

TABLE 3: GEOGRAPHIC FOCUS OF FUNDS IN THE MARKET, LATE 2021

Multi-Regional	$102.8 billion
Europe	$ 55.1 billion
North America	$ 46.0 billion
Asia-Pacific	$ 34.8 billion
Middle East & Africa	$ 5.8 billion
Latin America	$ 1.5 billion

Source: Infrastructure Investor

Preqin provided historical data on the changing focus of infrastructure by industry sectors. As can be seen in Table 4, in 2021 transportation was the third most popular sector, as measured by aggregate value of infrastructure deals made in each of the past three years.

2 Pablo Martinez, "Fundraising Report for 2021: Full Steam Ahead," *Inframation News*, 18 January 2022.

3 "Infrastructure Fundraising Sets New Record in 2021," *Institutional Investor* email, 3 February 2022.

4 Preqin, *2022 Global Infrastructure Report*, January 2022.

5 Linklaters, "Growth of Non-Core Infrastructure," https://linklaters.com/en-us/insights/publications/2018/July/the-growth-of-non-core-infrastructure. (30 March 2022)

6 Inspiratia Infrastructure, "Fundraising and Investment Activities: Stories in the Numbers," 11 October 2021.

7 "Key Statistics on Global Investment," *Infrastructure Investor*, October 2021.

TABLE 4: INFRASTRUCTURE INVESTMENT BY SECTORS

Sector	2019	2020	2021
Energy and Power	50%	30%	26%
Telecommunications	11%	25%	26%
Transportation	18%	10%	23%
Other	4%	8%	12%
Renewable Energy	13%	24%	10%
Water & Waste	3%	2%	2%
Diversified	0%	0%	1%
Social Infrastructure	1%	1%	0%

Source: Preqin Pro

2.2 EXAMPLES OF DIVESTITURES AND ACQUISITIONS

Most current infrastructure investment funds are "closed end," which means they raise money to invest for a pre-set period of time, typically 10 years. These funds are not "buy and hold" investors; rather, they seek to develop a portfolio that will be adjusted during its life to maximize the overall return to those who have placed funds with it. Hence, at various points in time during a fund's life, it will acquire investments, work to improve their operations, and then sell some holdings to realize value appreciation. This is not short-term "asset flipping" as is sometimes seen in housing markets. Rather, it is an ongoing process that seeks to optimize fund investment performance. Transportation examples from 2021 included:

- Macquarie Infrastructure and Real Assets (#1 in Table 1), together with Blackstone (#12) and Italy's CDP Equity, reached a deal in June to acquire Atlantia's 88% of Italian toll roads company Autostrade per Italia (ASPI) for $21.8 billion. HRA, the special-purpose vehicle (SPV) created to manage ASPI, will be owned 51% by CDP Equity and 24.5% each by Macquarie and Blackstone.[8] CDP Equity is an Italian sovereign wealth fund.
- In another multi-billion dollar transaction, IFM Investors (#9), teamed with Global Infrastructure Partners (#2) and three Australian pension funds, won nearly unanimous shareholder support for their $17 billion offer to buy the long-term

[8] IPE staff, "CDP Equity, Blackstone, and Macquarie to Buy Italian Toll Road in €19bn Deal," *IPE Real Assets*, 14 June 2021.

concession for Sydney International Airport, Australia's largest airport.[9] The deal still requires regulatory approval.

- Oaktree Capital Management (#56) was reported to be in advanced talks with minority investor pension fund Canada Pension Plan Investment Board (CPPIB) to sell it the balance of Ports America, potentially worth $4 billion.[10]
- Two other port groups are tentatively up for sale, Seattle-based Carrix (mostly owned by two families) and Fenix Marine Services, owned by EQT Infrastructure (#5) and P5 Infrastructure. Blackstone (#12) is a minority owner of Carrix.[11]
- Macquarie Infrastructure and Real Assets (#1) is reported to be considering the sale of its Maher Terminals USA, based in New Jersey.[12]
- KKR (#4) acquired a portfolio of highway assets 487 km long in India from Global Infrastructure Partners (#2). The projects were developed and operated as Highway Concessions One.[13]
- Macquarie is expected to launch its seventh North American infrastructure fund as early as the second quarter of 2022, with a $7 billion target. It was also reported to be having discussions with the British government regarding a $14 billion infrastructure investment.[14]
- Manulife Investment Management (#54) had raised $4.6 billion for its second fund as of early December, nearly twice its initial target.[15]
- Brookfield (#3) acquired Canada's fourth-largest pipeline company for $6.8 billion.[16]
- Australia's Queensland Investment Corporation (QIC) reached financial close on a $1 billion infrastructure investment fund.[17]

9 Jamie Fried, "Sydney Airport Shareholders Approve $17bln Takeover," *Reuters*, 3 February 2022.

10 Matt O'Brien and Jay Antenen, "News Analysis: U.S. Port Consolidation Is About to Make Waves," *Inframation News*, 21 September 2021.

11 Ibid.

12 Ibid.

13 Jasleen Mann, "KKR Has Acquired Seven Highway Assets from GIP," *Inspiratia*, 6 July 2021.

14 Robert Leeming, "Macquarie Thought to be Plotting Major New Investments in UK, US," *Inspiratia*, 7 February 2022.

15 Staff reporter, *Inspiratia*, 1 December 2022.

16 "Financing Hydrocarbons: Fossil Hunters," *The Economist*, 12 February 2022.

17 Robert Leeming, "QIC Reaches Hard Cap on Infra Fund," *Inspiratia*, 28 October 2021.

In some such transactions, infrastructure funds may buy some or all of the equity invested by the original construction-oriented companies that won the concessions and took on initial risks such as environmental permitting, late completion, and construction cost overruns. Once those risks are in the past, the operational project has lower overall risk, and better fits the criteria of many infrastructure investment funds. Other funds are willing to be greenfield investors, taking the early-stage development and construction risks in hopes of a higher return on their equity investment.

2.3 LONGER-TERM FUNDS

> *While closed-end infrastructure funds of 10 to 12 years' duration remain the most common type, there is a growing trend of new funds with 25-year or indefinite lives.*

While closed-end infrastructure funds of 10 to 12 years' duration remain the most common type, there is a growing trend of new funds with 25-year or indefinite lives. That is consistent with the desire of investors (such as pension funds and insurance companies) seeking long-term revenue streams generated by revenue-producing infrastructure.[18] Two pioneers in this trend were IFM Investors and Meridiam Infrastructure. IFM launched its open-ended Global Infrastructure Fund in 2004, and Meridiam began a series of 25-year funds in 2007. Meridiam founder Thierry Deau told *Infrastructure Investor*, "There was a growing appetite for long-term assets for certain types of LPs [limited partners]," which led Meridiam to move into long-term funds.[19] IFM's motivation was to match its infrastructure investments with the long-term liabilities of its public pension fund owners.

More-recent moves into long-term and open-ended funds include some of the largest entities in Table 1. *Infrastructure Investor* reports that Blackstone's open-ended fund has raised $14 billion, and IFM's Global Infrastructure Fund has raised $26 billion since its

18 Zak Bentley, "Deep Dive: Is It Time to Take a Closer Look at Long-Term Funds?" *Infrastructure Investor.com*, 2 April 2020.

19 Ibid.

inception. Market leader Macquarie joined the trend in 2017 with its 20-year Super Core Infrastructure Fund, which had raised €3.5 billion by the first quarter of 2020. And in early 2021 Macquarie announced a new open-ended fund, Macquarie Global Infrastructure Fund, with an initial $3 billion target.[20] J. P. Morgan Asset Management (#67) began fund-raising for its first open-ended infrastructure fund in January 2021.[21] In January 2022, Carlyle Group (#31) announced its first core open-ended infrastructure fund, joining a number of others that have recently launched core and open-ended funds, including Global Infrastructure Partners (#2).[22] Early in 2022, EQT Infrastructure (#5) launched a €5 billion core infrastructure fund, aiming to hold assets for 15 to 25 years.[23]

“Another relatively new type of fund is the infrastructure debt fund. The Wall Street Journal reported in July that funds of this kind raised a new high of $20.13 billion in 2020.”

Another relatively new type of fund is the infrastructure debt fund. *The Wall Street Journal* reported in July that funds of this kind raised a new high of $20.13 billion in 2020. The reporter noted that “Institutional investors are embracing infrastructure debt strategies as they see a chance to earn higher returns compared with plain-vanilla fixed-income investments and at a low risk compared with other types of lending.”[24]

20 Dermot McCloskey, “Macquarie to Launch Global Open-Ended Infrastructure Fund,” *Inframation News*, 3 February 2021.

21 Bianca Giacobone, “JPMAM Enlists UK LP for Open-Ended Infra Fund,” *Inframation News*, 25 May 2021.

22 Bianca Giacobone, “Carlyle Pursues Open-Ended Infra Fund,” *Inframation News*, 20 January 2022.

23 Pablo Martinez, “EQT Infra Formally Launches Long-Awaited Core Infra Fund,” *Inframation News*, 2 March 2022.

24 Luis Garcia, “Infrastructure Debt Strategies Rise,” *The Wall Street Journal*, 23 July 2021.

PART 3

P3 COMPANIES AND PROJECTS

3.1 GLOBAL COMPANIES AND PROJECTS

During 2021, infrastructure investors financed $104 billion worth of infrastructure transactions (including transportation), encompassing new (greenfield) projects, acquisition of existing facilities, and refinancing already-owned facilities. Greenfield projects set a new annual high of $53 billion.[25] Table 5 provides two breakdowns of 2021's $104 billion investment, first by infrastructure sector and second by type of investment. Transportation ranked first in both dollar value and number of deals. And greenfield projects constituted 53% of the total investment.

TABLE 5: 2021 INFRASTRUCTURE INVESTMENTS BY SECTOR AND TYPE

Sector	Value $B	% of Total	Number	% of Total
Transport	$60.377	58.0%	144	54.8%
Power	$13.983	13.4%	6	2.3%
Social Infrastructure	$12.832	12.3%	60	22.8%
Environment	$ 9.353	9.0%	27	10.3%
Other	$ 2.554	2.4%	3	1.1%
Renewables	$ 2.443	2.3%	4	1.5%
Telecommunications	$ 2.075	2.0%	10	3.8%
Energy	$ 0.561	0.5%	9	3.4%

[25] Juan Pereira, Ion Group, Email to Robert Poole, 4 March 2022.

Sector	Value $B	% of Total	Number	% of Total
Total:	$104.18		263	
Type	**Value $B**	**% of Total**	**Number**	**% of Total**
Greenfield	$55.263	53.0%	158	60.1%
Refinancing	$23.372	22.4%	53	20.2%
Mergers & Acquisitions	$23.296	22.4%	48	18.3%
Take Private	$ 2.246	2.2%	1	0.5%
Privatize Existing	$ 0.000	0%	3	1.1%
Total:	$104.18		263	

Source: Tables 5–8 were produced by Infralogic, a platform of The Inframation Group, the parent company of *Inframation News*.

Table 6 lists the 15 largest greenfield transportation infrastructure P3 projects worldwide financed in 2021, totaling $20.389 billion. As can be seen, only one of these is located in the United States. The two largest projects are located in Australia and China. By sector, highways was the largest category, representing 60.5% of the total, at $12.3 billion. Rail transit projects was in second place, at 27.5% totaling $5.6 billion. Airports and seaports each had two projects, accounting for 6.3% and 5.6% respectively.

TABLE 6: MAJOR GREENFIELD TRANSPORTATION P3S FINANCED IN 2021

Country	Project	Sector	Value $B	Lead Developers
Australia	North East Link Motorway	Highways	$8.378	CSCEC, John Laing, DIF Capital Partners
China	Tianjin Metro 24, Phase 1	Rail Transit	$3.280	TEDA. Tianjin Muni. Govt., China Railway Engineering Corp.
Turkey	Aydin-Denizli-Burdur Motorway	Highways	$1.132	Fernas Construction Co.
Brazil	BR-153 Retender	Highways	$0.790	GLP, Ecorodovias
Czech Republic	D4 Expressway	Highways	$0.748	Meridiam, Eurovia (Vinci)
Colombia	Magdalena River Highway 2	Highways	$0.736	Aleatica (was OHL Concessions)
India	Jewar International Airport, Phase 1	Airports	$0.704	Zurich Intl. Airport
Colombia	Uraba Port	Ports	$0.672	CMA CGM, Eiffage, others
Canada	Scarborough Subway Tunnel	Rail Transit	$0.627	Strabag, Arup Canada
Canada	Eglinton Crosstown Tunnel	Rail Transit	$0.604	Exp Services, Grupo Ghella, Dragados, AECON
Japan	Kansai Terminal Expansion	Airports	$0.580	Orix, Vinci Airports
Brazil	São Paulo Light Rail 8 and 9	Rail Transit	$0.575	RuasInvest, CCR
Chile	G-66 Camino de la Fruta	Highways	$0.560	Sacyr
United States	Philadelphia 30th Street Station	Rail Station	$0.527	Gilbane, Plenary, Vantage Airport Group, Johnson Controls
Ivory Coast	Port Terminal	Ports	$0.471	Maersk, Bollore

Source: Infralogic

Table 7 lists the 25 largest (by numbers of projects to date) investors in P3 transportation projects through the end of December 2021. Europe is the home base of 17 of the 25 companies, with eight based in Spain, four based in France, two in Germany, and one each

in Italy, Netherlands, and the U.K. Beyond Europe there are four in India, two in Australia, and one each in Brazil and the United States.

TABLE 7: WORLD'S LARGEST TRANSPORTATION P3 INVESTORS, BY NUMBER OF PROJECTS TO DATE

Investor	Headquarters	Value ($B)	Number of Projects
Ferrovial	Spain	$35.274	39
FCC Construction	Spain	$19.478	36
Grupo ACS	Spain	$40.100	34
Sacyr	Spain	$15.756	34
Meridiam	France	$47.106	32
Acciona	Spain	$12.609	30
John Laing	United Kingdom	$37.602	28
Bouygues	France	$18.530	25
Vinci	France	$26.967	23
Dragados	Spain	$ 9.884	23
Hochtief	Germany	$17.268	19
Iridium S.A.	Spain	$ 7.426	18
Sadbhav Engineering	India	$ 2.618	18
Transurban Group	Australia	$17.934	17
IRB Infrastructure	India	$ 6.456	17
OHL	Spain	$ 6.656	16
Itinere Infrastructure	Italy	$ 3.619	16
Dilip Buildcon	India	$ 2.685	16
DIF Capital Partners	Netherlands	$19.603	15
Macquarie	Australia	$16.016	14
GMR Infrastructure	India	$ 5.801	14
Fluor Corporation	United States	$20.269	13
CCR	Brazil	$15.556	13
Eiffage	France	$12.938	13
Bilfinger RE Asset Management	Germany	$ 8.019	13

Source: Infralogic

3.2 TOP DEVELOPERS OF U.S. P3 TRANSPORTATION PROJECTS

Table 8 lists the 15 largest developers of P3 transportation projects in the United States to date. Here the breakdown is far less European and more widely diversified. U.S.-headquartered developers account for four of the 18, with France and the U.K. having three apiece, followed by Australia and Spain with two apiece. Canada, Germany, the Netherlands, and Sweden each have one.

TABLE 8: TOP U.S. P3 TRANSPORTATION DEVELOPERS, BY PROJECT VALUE TO DATE

Name	Headquarters	Project Value ($B)	Number of Projects
Meridiam Infrastructure Managers	France	$21.237	10
Meridiam Infra North America	France	$14.505	5
Fluor Corporation	United States	$12.477	5
Ferrovial/Cintra	Spain	$11.645	8
Skanska	Sweden	$ 8.315	3
Star America Infra. Fund	United States	$ 7.469	3
John Laing	United Kingdom	$ 7.141	5
Dallas Police & Fire Pension System	United States	$ 5.950	3
Meridiam Infrastructure SCA	France	$ 5.822	4
Grupo ACS	Spain	$ 5.283	5
Transurban Group	Australia	$ 4.642	5
Vantage Airport Group	Canada	$ 4.442	2
APG Group	Netherlands	$ 4.360	3
Macquarie Asset Management	Australia	$ 3.600	2
Balfour Beatty	United Kingdom	$ 3.586	2

Source: Infralogic

Finally, Table 9 provides an overview of U.S. greenfield transportation DBFOM P3 projects since the first such projects were financed in 1993. Prior to the advent of the federal Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program and tax-exempt Private Activity Bonds (PABs), the earliest projects were financed by taxable bank debt. Since the advent of the two federal financing tools, most such projects in surface transportation have used TIFIA or PABs, or both, to be competitive with the tax-exempt bonds available to state transportation agencies. These projects are separated into two groups; those in the top half are financed based on project-derived revenues, denoted as Revenue-Risk (RR). In the lower half of the table are projects financed based on annual availability payments from the sponsoring agency, denoted as Availability-Pay (AP).

As Table 9 shows, there is a much higher level of equity invested in the RR projects, because the investors are taking on revenue risk in addition to risks that are common to both types of P3 (such as construction cost overruns and late completion). Because they are taking on greater risk, RR investors put in more equity, because creditors demand it. The additional equity has two important benefits. First, the state contribution to the financing is much less for the RR projects, saving taxpayers money. Second, the larger amount of equity as a percentage of the overall project financing provides a "cushion" in the event of a recession, when user fee revenues are likely to decrease. Debt service must be paid regardless, so if the debt is a smaller fraction of the project cost, it is easier to service that debt when revenues decline.

TABLE 9: HISTORICAL OVERVIEW OF U.S. LONG-TERM P3 GREENFIELD PROJECTS

Project	Type	Govt. Grant (M)	Infra Bank Loan (M)	TIFIA (M)	PABs (M)	Bank Debt (M)	Equity (M)	Total (M)	% Equity	Financial Close
91 Express Lanes	RR	0		0	0	$100	$30	$130	23%	1993
Dulles Greenway	RR	0		0	0	$298	$80	$378	21%	1993
S. Bay Expressway	RR	0		$140	0	$340	$130	$610	21%	2003
I-495 Express	RR	$495		$598	$589	0	$630	$2,312	27%	2007
SH 130, Seg. 5-6	RR	0		$430	0	$686	$210	$1,326	16%	2008
N. Tarrant Express, TX	RR	$594		$650	$398	0	$426	$2,068	21%	2009
LBJ Expressway, TX	RR	$490		$850	$606	0	$682	$2,628	26%	2010
Midtown Tunnel, VA	RR	$582		$422	$675	0	$272	$1,951	14%	2012
I-95 HOT, VA	RR	$83		$300	$253	0	$280	$916	31%	2012
N. Tarrant 3A/B, TX	RR	$379		$531	$274	0	$442	$1,626	27%	2013
US 36, Ph. 2, CO	RR	$75		$60	$21	0	$41	$197	21%	2014
I-77 MLs, NC	RR	$95		$189	$100	0	$248	$632	39%	2015
SH 288, Texas	RR	$17		$357	$100	0	$375	$849	44%	2016
I-66, Virginia	RR	$0		$1,229	$737	0	$1,549	$3,515	44%	2017
I-95, ext., Virginia	RR	$0		$0	$277	0	$532	$809	66%	2019
N. Tarrant, 3C, TX	RR	$14		$0	$750	0	$160	$924	17%	2019
Newark ConRAC	RR	$110		$0	$0	$310	$60	$480	13%	2019
Belle Chasse Bridge, LA	RR	$45		$0	$110	0	$28	$183	15%	2019
I-495 NEXT (VA)	RR	$0	$49	$212	$225	0	$268	$754	36%	2021
Total		$2,979	$49	$5,968	$5,115	$1,734	$6,443	$22,288		
Average		$157	$0	$303	$257	$91	$325	$1,133		
Percent		13.4%	0.0%	26.8%	22.9%	7.8%	28.9%			
I-595, FL	AP	0		$603	0	$781	$208	$1,592	13%	2009
Port Miami Tunnel	AP	$100		$341	0	$342	$80	$863	9%	2009
Denver Eagle rail	AP	$1,312		$280	$396	$0	$54	$2,042	3%	2010
Presidio Pkway Ph 2	AP	0		$150	0	$167	$45	$362	12%	2012
East End Bridge	AP	$526		$162	$508	$0	$78	$1,274	6%	2013
Goethals Bridge	AP	$125		$474	$453	$0	$107	$1,159	9%	2013
I-69, IN	AP	$80		$0	$244	$0	$41	$365	11%	2014
I-4 , FL	AP	$1,035		$950	$0	$484	$103	$2,572	4%	2014
Penn. Rapid Bridges	AP	$255		$0	$721	$0	$59	$1,035	6%	2015
Portsmouth Bypass	AP	$178		$209	$227	$0	$49	$663	7%	2015
Purple Line rail refinance	AP	$852		$1,760	$643	$0	$293	$3,548	8%	2022
LaGuardia Terminal	AP	$1,200		$0	$2,400	$0	$200	$3,800	5%	2016
I-70, Colorado	AP	$687		$404	$141	$0	$65	$1,297	5%	2017
LAX People Mover	AP	$1,031		$0	$1,295	$269	$103	$2,698	4%	2018
LAX ConRAC	AP	$690		$0	$458	$73	$43	$1,264	3%	2019
Total		$8,071		$5,333	$7,486	$2,116	$1,528	$24,534		
Average		$538		$356	$499	$141	$102	$1,551		
Percent		32.9%		21.7%	30.5%	8.6%	6.2%			

Sources: ***Public Works Financing, Inframation News,*** **and U.S. DOT**

No new U.S. greenfield DBFOM deals reached financial close in 2021, as project development and procurement activity was reduced due to COVID-19. However, activity continued in two areas: sales and refinancing of existing DBFOM projects, and new greenfield projects moving toward financial close after the end of 2021 (such as Virginia's I-495Next project financed in early 2022).

One of the largest projects in Table 9—the $5.1 billion LaGuardia Airport Central Terminal P3—neared completion by the end of 2021.[26] The P3 team built an all-new Central Terminal, while maintaining airline operations in the existing terminal over the five-year construction period. As 2022 began, demolition of old Terminal B's remaining portions was under way, along with completing construction of the eight miles of new roadway, 20 bridges, and landscaping. The P3 special purpose vehicle (SPV) consisted of Meridiam, Vantage Airport Group, Skanska, and JLC Infrastructure, dubbed LaGuardia Gateway Partners.

3.3 REFINANCING OF EXISTING P3 CONCESSIONS

During 2021, U.S. DOT's Build America Bureau made a number of new TIFIA loans, some for new transportation projects and others to refinance existing projects. Only one such refinancing applied to a large P3 project. The Central 70 project in the Denver metro area received a $465 million TIFIA loan to replace a $406 million (plus capitalized interest) loan. The new loan, at a reduced interest rate, enabled Kiewit Meridiam Partners (the SPV for this reconstruction project on I-70) to add $50 million to facilitate project completion.[27]

Other non-P3 transportation projects financed with TIFIA loans included:[28]

- $908 million for Silver Line Regional Rail, Dallas
- $448 million for SR 183 and SR 290E projects in Austin
- $225 million for I-10 express lanes in San Bernardino County, CA
- $499.5 million for Complete 540 tollway in North Carolina
- $629 million for I-405 express lanes project in Orange County, CA
- $3.84 billion for six Sound Transit projects in the Seattle metro area
- $1.66 billion for Hampton Roads Bridge Tunnel project in Virginia

26 Aileen Cho, "LaGuardia Nears On-Time Arrival," *Engineering News-Record*, 21/28 February, 2022.

27 News release, "U.S. Department of Transportation Announces up to $464.96 Million in New TIFIA Credit Assistance to Central 70 Project in Colorado," DOT Build America Bureau, 20 September 2021.

28 "2021 News Releases," DOT Build America Bureau, https://www.transportation.gov/buildamerica/about/news-releases (8 March 2022)

- $339 million for Chesapeake Bay Bridge Tunnel project in Virginia
- $250 million for the SR 183N project in Austin

Early 2022 saw several large P3 SPVs announce refinancings. In January, Abertis subsidiary Elizabeth River Crossings Opco sold $571.5 million in tax-exempt Private Activity Bonds to refund previous bonds issued at higher interest rates. These bonds were oversubscribed by nearly six times.[29] Also in Virginia, Transurban's 95 Express Lanes announced plans to refinance outstanding PABs via a $323 million issuance of new PABs. Another Transurban-led P3, Capital Beltway Express, planned to issue $303 million in new PABs to refinance higher-interest PABs issued some years ago.[30] Soon thereafter, Capital Beltway Express received a $1.05 billion TIFIA loan to refinance an existing loan and to help finance its 2.5-mile northward extension of the I-495 express lanes.[31]

3.4 PROJECTS IN THE TRANSPORTATION DBFOM PIPELINE

Table 9 showed the extensive use of federal tax-exempt Private Activity Bonds (PABs) in DBFOM P3s. By early 2021, however, the federal cap of $15 billion worth of PAB issuance had been reached, so no further PABs could be authorized by US DOT. The Bipartisan Infrastructure Law, enacted by Congress and signed by President Biden in November 2021, increased the cap to $30 billion, thereby authorizing DOT to approve another $15 billion worth of PABs in coming years. This bodes well for the growing number of DBFOM projects in the pipeline in various states.

The largest revenue-risk P3 concession in the current project pipeline is Maryland's plan to add express toll lanes to its half of the Beltway around the District of Columbia (I-495), rebuild the American Legion Bridge with express lanes in both directions, and add express lanes to I-270, which is a spoke off I-495 to I-70 near Frederick, Maryland. The total project was estimated as costing $9 billion, but its Phase 1, currently in procurement, consists of the bridge reconstruction, I-495 express lanes on the bridge and I-495 to I-270, and express lanes on a portion of the latter. Of the four teams short-listed in July 2020, three submitted proposals and the winner was the Macquarie/Transurban team.[32] One of the

29 Press release, "Virginia Toll Tunnel P3 Bonds Oversubscribed," *Inframation News*, 13 January 2022.

30 Liam Ford, "Virginia Toll Roads Tapping Debt Market," *Inframation News*, 1 February 2022.

31 News release, "U.S. Department of Transportation Announces Up to $1.05 Billion Financing for Capital Beltway Express Lanes Construction in Virginia," DOT Build America Bureau, 3 March 2022.

32 Michael Bennon, "Transurban, Macquarie Team Selected for Beltway Managed Lanes," *Public Works Financing*, February 2021.

other teams filed a protest against the selection decision, which was rejected by Maryland DOT but that rejection has been appealed.[33] Macquarie/Transurban signed a predevelopment agreement with MDOT and is underway detailing aspects such as right of way and utility relocations.[34] Assuming the project receives final approval to be constructed, Macquarie/Transurban has the right of first refusal to become the developer/operator.

> *The Bipartisan Infrastructure Law, enacted by Congress and signed by President Biden in November 2021, increased the cap to $30 billion, thereby authorizing DOT to approve another $15 billion worth of PABs in coming years. This bodes well for the growing number of DBFOM projects in the pipeline in various states.*

Another large project is a replacement for the aging bridge on I-10 spanning the Calcasieu River near Lake Charles, Louisiana. In January 2021, the Louisiana Department of Transportation & Development (DOTD) began the procurement process, after having received legislative endorsement of using a DBFOM procurement for this project, estimated to cost between $600 million and $800 million.[35] The DOTD received 37 letters of interest from an array of companies.[36] The original plan called for getting to a federal Record of Decision by early 2022, but the pandemic has delayed that schedule. In July 2021, the DOTD shortlisted four teams, headed by AECON/Acciona, Macquarie/John Laing, Itinera/BCP Infrastructure Fund, and Cintra/Vinci/Meridiam.[37]

[33] Michael Bennon, "MD OP Lanes Bid Protest Ruling Will Require New Response from MDOT," *Public Works Financing*, February 2022.

[34] Michael Bennon, "Hogan Closes Predevelopment for Maryland Managed Lanes," *Public Works Financing*, August 2021.

[35] Michael Bennon, "Louisiana Moves Forward with I-10 Calcasieu River Bridge Project," *Public Works Financing*, January 2021.

[36] "Louisiana Receives 37 Letters of Interest for Bridge P3," *Inframation News*, 4 March 2021

[37] Eugene Gilligan, "Louisiana Shortlists Four Teams for Bridge P3," *Inframation News*, 15 July 2021.

A larger Louisiana bridge project, which will also require toll financing, is an additional bridge spanning the Mississippi River at Baton Rouge, to relieve chronic traffic congestion on I-10. Louisiana Gov. John Bel Edwards in January 2022 endorsed P3 procurement for this project, and its estimated $900 million cost will require toll financing.[38] There is not yet local consensus on which of several alternative paths the replacement span will follow, so its potential P3 procurement is likely several years away. In February 2022, the DOTD estimated that the total cost of this project, including needed connectors to the bridge, would be in the vicinity of $2 billion.[39]

> *Having had success with its Rapid Bridge Replacement P3 project, financed via availability payments, Pennsylvania DOT has embarked on a program to use toll-financed P3s to replace nine aging major Interstate highway bridges with traffic volumes large enough to make toll financing feasible.*

Georgia DOT announced in June 2021 that it plans to procure a set of major express lanes projects on its highly congested I-285 (Perimeter) freeway as revenue-risk DBFOM projects. They will include four separate projects, in two stages.[40] It held an "industry day" regarding these projects on Feb. 22, 2022. *Public Works Financing* has estimated cost of these I-285 projects at $6 billion, though Georgia DOT has not yet issued its own estimate.[41] The concession term will be 50 years, given the revenue risk that will be taken on by the P3 companies responsible for each project. In early 2022 GDOT announced that it will also use a revenue-risk DBFOM approach for its project to add express toll lanes to SR 400, which

38 Liam Ford, "Louisiana Considers P3 for Mississippi River Bridge," *Inframation News*, 25 January 2022.

39 WBRZ, "In Latest Estimate, DOTD Says Mississippi Bridge Project to Cost $2 Billion," 23 February 2022.

40 Eugene Gilligan, "Georgia Shifts to Revenue-Risk Model for Express Lanes Projects," *Inframation News*, 16 June 2021.

41 Michael Bennon, "Atlanta Perimeter Express Lanes Projects Bundled, Expanded to Revenue Risk Deal," *Public Works Financing*, June 2021.

connects to I-285. This replaces a previous availability-payment (AP) procurement that was canceled after the construction cost bids came in too high.[42]

Having had success with its Rapid Bridge Replacement P3 project, financed via availability payments, Pennsylvania DOT has embarked on a program to use toll-financed P3s to replace nine aging major Interstate highway bridges with traffic volumes high enough to make toll financing feasible.[43] Called the Major Bridge P3 Initiative, the measure builds on the state's P3 law and on the federal policy that permits replacing non-tolled bridges with toll-financed bridges on the Interstate system. PennDOT selected nine such bridges in February 2021.[44] It issued a Request for Qualifications in June 2021. An RFP for a predevelopment concession company was sent to short-listed firms, and in March 2022 PennDOT selected a consortium of Macquarie, Shikun & Binui, and several other firms.[45] Opposition to tolling led to legislation that would forbid PennDOT to use tolls, but Gov. Tom Wolf vetoed it in late 2021, which allows the project to go forward.[46]

"Three major airport terminal P3 projects are under way at John F. Kennedy International Airport (JFK)."

In December 2021, Alabama DOT received approval from the Metropolitan Planning Organizations (MPOs) on both sides of the Mobile River for a $2.1 billion project to develop a new high-level Mobile River Bridge and a modernized Bayway and causeway. The MPOs' previous rejection of ALDOT's toll-financed DBFOM P3 plan stemmed from an estimated $5 toll per crossing for passenger cars, which was politically unacceptable. The new proposal, which would cap that toll at $2.50 and provide the causeway as a non-tolled alternative, makes a revenue-risk P3 unlikely. A hybrid tolls-plus-availability-payments P3, such as used

42 Eugene Gilligan, "Georgia Sets Schedule for Express Lanes P3," *Inframation News*, 22 February 2022.

43 Don McLoud, "Toll Bridges Proposed as Pennsylvania's Aging Bridges Deteriorate and Funding Falls Flat," *Equipment World*, 5 February 2021.

44 Michael Bennon, "Nine Soon-to-Be Bridge P3s in Pennsylvania," *Public Works Financing*, February 2021.

45 "PennDOT Selects Team for Major Bridge P3 Initiative," Pennsylvania Pressroom, 9 March 2022.

46 Michael Bennon, "PennDOT Major Bridges Preferred Bidder Selected," *Public Works Financing*, March 2022.

for the East End Bridge over the Ohio River between Indiana and Kentucky at Louisville (see Table 9) could be feasible in this case.[47]

Three major airport terminal P3 projects are under way at John F. Kennedy International Airport (JFK). The largest of these is New Terminal One (NTO), with an estimated cost of $9.2 billion. The private-sector team is composed of Carlyle Group and its CAG Holdings entity, JLC Infrastructure, Ullico, and Munich Airport International (which will operate the new terminal).[48] It will replace the existing Terminals 1, 2, and 3 with a new terminal of 23 gates, a new arrivals and departure hall, and associated facilities. When completed, it will be the largest international terminal at JFK. In February 2022, Carlyle reached an agreement with Ferrovial under which the latter will acquire 96% of Carlyle's 51% share in the project's special purpose vehicle.[49] Financial close and the start of construction are expected in the first half of 2022.

The second JFK project is the $3.9 billion Terminal 6 project, with JetBlue as its anchor tenant. JFK Millenium Partners, the DBFOM special purpose vehicle, consists of JetBlue Airways, Vantage Airport Group, and American Triple I. The new terminal will occupy the site of the former Terminals 6 and 7. The project will be financed with 20% equity/80% debt, and financial close is expected in spring 2022.[50]

The last of the three JFK projects is the $1.5 billion Terminal 4 renovation and expansion, which—like the other two—was scheduled to begin in 2020 but was postponed due to the pandemic. The private partners are Delta Airlines and JFK International Air Terminal, the developer/operator of the original T4 P3 project. The project will add 10 gates and an additional 150,000 sq. ft.[51]

47 Michael Bennon, "Alabama I-10 Bridge Project Revived, P3 Still Dead," *Public Works Financing*, January 2022.

48 "JFK's New Terminal One Accentuates the Appeal of the Airport P3," CAPA Centre for Aviation, 15 December 2021.

49 Robert Leeming, "Ferrovial Set to Replace Carlyle Group as Majority Stakeholder in JFK Redevelopment," *Inspiratia*, 25 February 2022.

50 Bianca Giacobone and Eugene Gilligan, "JFK Terminal 6 Redevelopment Resumes with Revised Agreement," *Inframation News*, 3 August 2021.

51 "$1.5 Billion JFK Terminal Gets Underway After Pandemic Delay," *Engineering News-Record*, 20/27 December 2021.

Another potential project is the planned $1.5 billion I-69 bridge across the Ohio River between Indiana and Kentucky. The bridge will complete the construction of I-69 in Indiana and connect with its continuation in Kentucky. The preferred alternative was selected in January 2021, with toll revenue as the primary basis for financing.[52] While no decision has yet been made about the procurement method, the two state DOTs collaborated on the earlier East End Bridge project across the Ohio River as an availability-payment DBFOM concession, with the toll revenues as a key source of funding for the state-provided availability payments.

Several other projects are not in a procurement process as this is being written but are potential DBFOM P3s that could be launched within the next few years:

- Colorado DOT is considering a proposal for a DBFOM P3 to finance, build, and operate express toll lanes to be added to I-25 between Denver and Fort Collins, as previewed in a November 2020 interview with the director of Colorado DOT's High-Performance Transportation Enterprise (HPTE).[53]
- Kentucky's Transportation Cabinet and Ohio DOT have for years sought to reach political consensus on replacing the obsolete Brent Spence Bridge that conveys I-71/I-75 across the Ohio River between Cincinnati, Ohio and Covington, Kentucky. Opposition to tolling on the Kentucky side has stymied previous plans for the $2.6 billion replacement project. With some funding potentially available from the Bipartisan Infrastructure Law's new bridge program, a hybrid toll/availability-payment DBFOM P3 might lead to a politically viable plan.
- Oregon and Washington State are moving forward on a second attempt to reach agreement on the design, cost, and financing of a replacement for the obsolete I-5 bridge between Portland, Oregon and Vancouver, Washington. Tolling has been accepted as necessary to help finance the new bridge, whose cost is estimated as between $3.2 billion and $4.8 billion, depending on a number of design decisions yet to be made.[54]

[52] Tyson Fisher, "I-69 Ohio River Crossing Will Include Toll on New Interstate Bridge," *Land Line*, 21 January 2021.

[53] Bianca Giacobone, "The Story in Numbers: Which US States Might Turn to P3 Post-Covid," *Inframation News*, 9 November 2020.

[54] Sam Stites, "Federal Cash Means Momentum—but Not Certainty—for Interstate 5 Bridge Talks," Oregon Public Broadcasting, 21 January 2022.

- Finally, Virginia DOT has begun studying the one missing link in its I-495 Capital Beltway express toll lanes system: from the Springfield Interchange to the Woodrow Wilson Bridge. There is no cost estimate yet for this potential project. All the other express toll lane projects in the Washington, D.C. metro area have been developed as long-term, revenue-risk DBFOM P3s, so if this project goes forward it is likely to use that procurement model.[55]

[55] Michael Bennon, "VDOT Begins Planning for Additional Beltway Managed Lanes Extension," *Public Works Financing*, January 2022.

PART 4

PUBLIC PENSION FUND INFRASTRUCTURE INVESTING

4.1 INTRODUCTION

The concept of public pension funds including infrastructure in their investment portfolios is not new. Pension funds generally invest in relatively safe long-term bonds for a significant portion of their portfolios, as well as relatively conservative corporate stocks such as those of railroads and investor-owned utilities. But a great deal of U.S. infrastructure is owned by governments: airports, seaports, toll roads, and most municipal water and wastewater systems. Pension funds do not invest in these government-owned infrastructure assets for two reasons. First, these facilities' bonds are tax-exempt, and the tax exemption is of no value to nonprofit, tax-exempt public pension funds. Second, it is not possible to buy shares in government-owned infrastructure, since there are no tradeable shares.

On the other hand, U.S. public pension funds are seeking overall returns on their investment portfolios averaging 7.2%. Yet, as a recent analysis by Reason Foundation's Pension Integrity Project determined, their diversification into private equity, hedge funds,

and alternative investments as of 2020 had not boosted their average return to even 6%.[56] Expanded infrastructure investment is one means by which public pension funds hope to achieve a better match between long-term investment returns and their long-term liabilities.

> *Infrastructure investment opportunities are much greater today than 20 years ago, as governments in many countries have leased or sold revenue-generating infrastructure.*

Infrastructure investment opportunities are much greater today than 20 years ago, as governments in many countries have leased or sold revenue-generating infrastructure. In some cases, such as the British airports, seaports, telecom systems, electricity utilities, and water systems, the government sold shares to the public or auctioned the entities to private-sector investors. In a larger number of cases, governments created long-term P3 leases for such facilities, as is typically the case in Asia, Australia, and Latin America, as well as some European countries. The shares in the special purpose vehicles that win the long-term concessions for such infrastructure are generally not traded on stock markets (i.e., they are unlisted), but knowledgeable investors, such as infrastructure investment funds and public pension funds, can purchase portions of the equity of the SPVs.

The pioneer pension funds investing in privatized infrastructure were those of Australia and Canada. In 1992 the Australian government required employers to set aside 3% of nearly all employees' wages in their choice of approved pension funds. Over subsequent years, that annual percentage was gradually increased to 9.5%. The pension funds built diversified portfolios, including shares in Australia's newly privatized utilities, airports, seaports, toll roads, and other infrastructure. As of 2018, those pension funds had assets of $1.9 trillion and growing. Canada's public pension funds followed a similar course. Since both Australia and Canada have relatively small populations and industries, their pension funds expanded

[56] Anil Niraula and Truong Bui, "The 'New Normal' in Public Pension Investment Returns," Reason Foundation, April 2020.

the scope of their investments worldwide, including their investments in privatized infrastructure.

Most pension funds that invest in private and P3 infrastructure minimize their risk by not making direct investments in specific facilities. Instead, they allocate a specific sum for infrastructure and place it with one or more infrastructure investment funds, such as those shown in Table 1. A handful of large Australian and Canadian pension funds have developed staffs with detailed knowledge and understanding of private and P3 infrastructure. Those funds make direct investments, in addition to placing some of their capital with major infrastructure funds. Also of note, the ninth-largest fund in Table 1—IFM Investors—was created by pension funds acting together to invest in infrastructure on behalf of their member beneficiaries.

4.2 RECENT PENSION FUND INFRASTRUCTURE DEVELOPMENTS

4.2.1 OVERSEAS PENSION FUND ACTIVITY

Australian and Canadian pension funds with extensive infrastructure expertise remained very active in 2021. Colin Leopold of *Inframation News* reported in September 2021 that "financial results and returns from pension funds in July and August proved that any losses they experienced in infrastructure and real assets as a result of the pandemic were either less than expected or have now returned to growth."[57] He also noted that "unlisted [including P3] infrastructure investments outperformed for many pension funds globally."

Some examples of recent transactions by Australian and Canadian pension funds include the following:

- **IFM Investors** launched a new open-ended fund that quickly signed up 10 investors for the fund targeted at raising $32 billion.[58] By August it had attracted four more limited partners. One of its largest investments was the buyout of the original investors in Australia's Sydney Airport, the country's largest. Joining IFM were three

[57] Colin Leopold, "News Analysis: Infra Funds Listen for 'Big Bang' in Pension Allocations," *Inframation News*, 23 September 2021

[58] Bianca Giacobone, "IFM Signs Up 10 LPs for Global Fund," *Inframation News*, 13 May 2021.

Australian pension funds and New York-based Global Infrastructure Partners.[59] The offer was approved by 96% of Sydney shareholders on 3 February 2022, at a price of $16.85 billion.

- **CDPQ**, the large Quebec public pension fund, acquired a 15% stake in the Indiana Toll Road Concession Company in early 2022.[60] In May 2021, together with Dutch asset manager APG and the Abu Dhabi Investment Authority, CDPQ signed a memorandum of understanding with the Indonesia Investment Authority to invest in Indonesia's toll roads.[61] And in December, CDPQ acquired 40% of the Shree Janannath Expressway for 2100 crore ($525 million).[62]
- **OMERS, the Ontario Municipal Employee Retirement System** achieved a 10.7% net return on its infrastructure portfolio in 2021, compared with its 7.9% benchmark return. Its five-year average infrastructure return is 10.2%. Infrastructure constitutes 20% of the plan's assets, with a long-term target of 22.5% of its portfolio. It has C$121 billion in net assets under management.[63]
- **Ontario Teachers' Pension Plan (OTPP)** managed to achieve a total fund net return of 8.6% in pandemic year 2020, with net assets at year-end of C$221.1 billion.[64] In a joint venture with CPPIB, it acquired an additional 8.4% stake in Mexican toll road provider IDEAL, ending up with 24.8% ownership, the same as CPPIB's new share. In addition to toll roads, IDEAL owns concessions for water facilities, transit terminals and electronic toll collection systems.[65] OTPP and CPPIB each acquired 25% of the recently launched Infrastructure Investment Trust of the National Highways Authority of India.[66]
- **Canada Pension Plan Investment Board (CPPIB)** made several major transportation infrastructure investments in 2021. In May, it increased its stake in Indian tollway concession provider IndInfravit by 15.9% by investing another $141 million. Its total

59 Robert Leeming, "IFM-Led Consortium to Take Over Sydney Airport in Multi-Billion Dollar Deal," *Inspiratia*, 9 November 2021.

60 Liam Ford, "Indiana Toll Road Concessionaire to Issue Debt," *Inframation News*, 2 March 2022.

61 "CDPQ, APG and ADIA Will Invest in Indonesia's Toll Roads," *Pension Pulse*, 27 May 2021.

62 Press Trust of India, "Canadian Fund CDPQ Buys 40% in Odisha Toll Road for Rs 2,100 Crore," *Business Standard*, 21 December 2021.

63 Bianca Giacobone, "OMERS Infra Returns Beat Benchmark," *Inframation News*, 2 March 2022.

64 "OTTP Gains 8.6% in 2020," *Pension Pulse*, 21 March 2021.

65 "OTPP and CPP Investments Expand Partnership with Mexico's Ideal," *Pension Pulse*, 7 December 2021.

66 "CPP Investment and OTPP Buy Half the Units in India's NHAI InvIT," *Pension Pulse*, 4 November 2021.

stake in the company is now 43.8%. OMERS owns a 22.4% stake.[67] Later in the year, CPPIB acquired 100% of Ports America, in which it had been a minority investor since 2014; it purchased the remaining stake of Oaktree Capital Management. Ports America is the largest port terminal operator in North America, with 70 terminals in 33 ports.[68] And as noted previously under OTPP, CPPIB now owns 24.8% of the shares of Mexican toll road company IDEAL.

- **PSP Investments** released its fiscal year 2021 results in June 2021, posting an 18.4% return, with C$204 billion in assets under management. Its 10-year net annualized return was 8.9%. Infrastructure accounts for 9% of its assets.[69] PSP also wholly owns global toll road company ROADIS.

PEI, the publisher of *Infrastructure Investor*, compiles a list of world's 100 largest private equity investors, the Global Investor 100. Three of the top seven on that list are Canadian pension funds: CPPIB (#1), CDPQ (#3), and OTPP (#6). Also on that list are PSP Investments (#16), OMERS (#29) and Canada-based Manulife Investment Management (#38).[70]

4.2.2 U.S. PENSION FUND DEVELOPMENTS

The United States still has a long way to go to match the extent of public pension fund investments in infrastructure by Australian and Canadian pension funds. In a 2020 journal article titled, "Public Pension Reform and the 49th Parallel: Lessons from Canada for the U.S.," researchers Clive Lipshitz and Ingo Walter argue that U.S. pension funds should learn lessons from Canadian pension fund reforms in the 1980s and 1990s.[71] *Pension Pulse* published an interview with Lipshitz explaining one of the success factors of Canadian pension funds: achieving scale via portfolio aggregation—a role that IFM plays for a consortium of Australian pension funds.[72] This idea has even begun to influence pension

67 Fernando Moncada Rivera, "CPPIB Ups Stake in Indian Road Platform for Can$173M," *Inspiratia*, 10 May 2021.

68 Press release, "CPPIB Acquires 100% of Ports America, *Inframation News*, 29 September 2021.

69 "PSP Investments Gains 18.4% in Fiscal 2021," *Pension Pulse*, 17 June 2021.

70 "Canadian Pensions Climb the Global Investor 100," *Pension Pulse*, 1 September 2021.

71 Clive Lipshitz and Ingo Walter, "Public Pension Reform and the 49th Parallel: Lessons from Canada for the U.S.," *Financial Markets Inst & Inst.*, 2020, pp 122-162. (https://doi.org/10.1111/fmii.12133)

72 Clive Lipshitz, "Achieving Scale in Pensions Through Portfolio Aggregation," *Pension Pulse*, 11 November 2021.

funds in Africa. *The Economist* reports that more than 20 pension funds in Kenya "have formed a consortium to invest in infrastructure, pooling their capacity to spot duds."[73]

The large Canadian and Australian pension funds are all fully funded, which is far from true for the large majority of U.S. public pension funds. Colin Leopold notes that "Higher return-seeking U.S. pension funds are slowly shifting out of private equity-based fossil fuel investments, but they are still grossly under-allocated to infrastructure, compared to their Canadian or Australian peers (around 1%, compared to 7% or 8%)."[74] David Lebovitz of JP Morgan Asset Management suggests that a typical U.S. pension fund "should start off by allocating 5-10% of its assets to [property and infrastructure], with the share rising to 15-20% over time."[75]

"It is the lack of more long-term P3 airports, seaports, toll roads, etc. that limits pension fund investment in the United States. That could be changed by revised federal and state P3 policy to facilitate more long-term DBFOM concessions."

As of 2021, there were not many U.S. infrastructure projects for pension funds to invest in. Pension funds invest *equity* in infrastructure, but there is no equity available to purchase in government-owned and -operated airports, seaports, toll roads, or other revenue-generating infrastructure. So, when U.S. pension funds do allocate a small portion of their portfolios to infrastructure, they place it with one or more of the infrastructure investment funds like those in Table 1—and those funds invest mostly in non-U.S. infrastructure. It is the lack of more long-term P3 airports, seaports, toll roads, etc. that limits pension fund investment in the United States. That could be changed by revised federal and state P3 policy to facilitate more long-term DBFOM concessions.

73 "Pension Funds: Building Bridges," *The Economist*, 2 October 2021.

74 Colin Leopold, "News Analysis: Infra Funds Listen for 'Big Bang' in Pension Allocations," *Inframation News*, 23 September 2021.

75 Buttonwood, "Do Physical Assets Offer Investors Refuge from Inflation?" *The Economist*, 11 September 2021.

The nation's largest public employee pension fund, **CalPERS**, was one of the first to invest in privatized and P3 infrastructure, with notable investments including stakes in London Gatwick Airport and the SPV for the Indiana Toll Road. In 2021 it committed just over $1 billion to the Golden Reef Infrastructure Trust, a separately managed account (SMA) within the **Queensland Investment Corporation (QIC)**, a pension fund of the Australian state government Queensland.[76] CalPERS set up the SMA with QIC in 2015, and prior to 2020 had committed $1.6 billion to it. CalPERS has also made commitments of $500 million to J.P. Morgan Infrastructure Investment Fund, $300 million to Alinda Infrastructure Fund II, $300 million to North Haven Infrastructure Partners, and $250 million to ArcLight Energy Partners Fund IV, among others.

Thanks to a booming U.S. stock market, fiscal year 2021 turned out to be a banner year for U.S. pension fund returns. As of September, the median return on investment was 27%, far above the 7% annual return rate assumption used by the median public pension system. CalPERS reported an unprecedented 21.3% return. But as pointed out by pension researchers Richard Hiller and Marc Joffe, a single year of very high returns was not sufficient to make a large dent in most pension systems' very large unfunded liabilities.[77]

State and local public pension funds continued to make or increase commitments to infrastructure investment during 2021. Here is an illustrative selection:

- In March, the **Oregon Public Employees Retirement System** said it plans to make five to 10 commitments to infrastructure, agriculture, and natural resources. In 2020, it invested $1.4 billion with a number of leading infrastructure funds such as Stonepeak and Brookfield.[78]
- In April, the **Ohio Police & Fire Pension Board** approved investing $125 million in KKR's Diversified Core Infrastructure Fund. Prior to that, OP&F had invested $268 million in infrastructure.[79] Also that month, the **Stanislaus County Employees'**

[76] Yuanqing Sun, "CalPERS Commits USD 1BN to QIC-Managed Account," *Inframation News*, 14 September 2020.

[77] Richard Hiller and Marc Joffe, "Putting a Year of Good Investment Returns for Public Pension Plans in Perspective," Reason Foundation, 23 September 2021.

[78] Bianca Giacobone, "Oregon PERF to Invest Up to USD 2BN in Alternatives," *Inframation News*, 17 March 2021.

[79] Bianca Giacobone, "Ohio Pension Manager Commits USD 125M to KKR Core Fund," *Inframation News*, 1 April 2021.

Retirement Association allocated $80 million (3.2% of its assets) to two open-ended infrastructure funds managed by IFM and JP Morgan.[80]

- In June, the **New York State Common Retirement Fund** allocated $650 million to two funds, one from KKR and the other from Northleaf. This $268 billion pension fund has a 3% allocation to Real Assets, one component of which is infrastructure.[81]
- In July, the **California State Teachers' Retirement System** said it was considering investing in infrastructure debt funds. This would be part of its plan to increase its infrastructure assets under management to $1.5 billion in the new fiscal year.[82] Also that month, the **Sonoma County Employees' Retirement Association** voted to increase its target infrastructure allocation from 5% to 8%.[83]
- In October, the **Cincinnati Retirement System** announced new commitments to open-ended infrastructure funds. It increased commitments to funds managed by IFM and JP Morgan and made a new $50 million commitment to Ullico Infrastructure Fund. Infrastructure now represents 6.3% of the system's $2.5 billion portfolio, and its target is 10%.[84]
- In November the **New Jersey State Investment Council** said it was considering a $600 million investment with two Brookfield funds; if finalized, it would represent the largest commitment yet to infrastructure.[85] Also in November, the **Los Angeles City Employee Retirement System** committed up to $50 million to the TPG Climate Fund, which invests in clean energy and decarbonized transport.[86]
- In December, the **Texas Municipal Retirement System** committed $150 million to Pioneer Infrastructure Partners, its fourth infrastructure commitment in 2021. The system's assets under management total $36 billion.[87] Also in December, two pension systems made commitments to a Stonepeak infrastructure fund. The **South Carolina Retirement System** committed $75 million and the **Alaska Permanent Fund**

80 Bianca Giacobone, "StanCERA Commits to Open-Ended Platforms with New Infra Target," *Inframation News*, 26 April 2021.

81 Bianca Giacobone, "NY Backs KKR Infra Fund," *Inframation News*, 16 August 2021.

82 Bianca Giacobone, "CalSTRS Considering Infrastructure Debt Strategy," *Inframation News*, 8 July 2021.

83 Bianca Giacobone, "SCERA Takes Infra Allocation Up to 8%," *Inframation News*, 22 July 2021.

84 Bianca Giacobone, "Cincinnati Pension Commits to Infra Funds," *Inframation News*, 22 October 2021.

85 Bianca Giacobone, "New Jersey Makes Big Commitment to Infra Impact Fund," *Inframation News*, 22 November 2021.

86 Bianca Giacobone, "The Week in Pension Commitments," *Inframation News*, 12 November 2021.

87 Bianca Giacobone, "US and UK Weekly Commitments," *Inframation News*, 3 December 2021

Corporation committed $100 million.[88] Finally, the **San Mateo County Employees' Retirement Association** committed $20 million to Tiger Infrastructure Partners III, and the **Hartford Municipal Employees' Retirement Fund** committed $10 million each to Melody Communications Infrastructure Fund and to Tiger Infrastructure Partners III.[89]

The above examples illustrate that even the employee retirement systems of relatively small municipal governments are embracing infrastructure investment as a means of increasing their overall return on investment, along with large-city and state retirement systems.

88 Bianca Giacobone, "The Week in U.Sl Pension Commitments," *Inframation News*, 10 December 2021.

89 Bianca Giacobone, "Weekly Commitments: Tiber Infrastructure, Melody Communications," *Inframation News*, 22 December 2021.

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Poole has advised the Federal Highway Administration, the Federal Transit Administration, the White House Office of Policy Development and National Economic Council, the Government Accountability Office (GAO), and the California, Florida, Georgia, Indiana, Texas, Utah, Virginia, and Washington State Departments of Transportation. He has served on various transportation committees throughout the U.S.

Poole is the author of dozens of policy studies and journal articles on transportation issues. His popular writings have appeared in national newspapers, including *The New York Times* and *The Wall Street Journal*; he has also been a guest on such network TV programs as "Crossfire," "Good Morning America," and "The O'Reilly Factor," as well as ABC and NBC

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