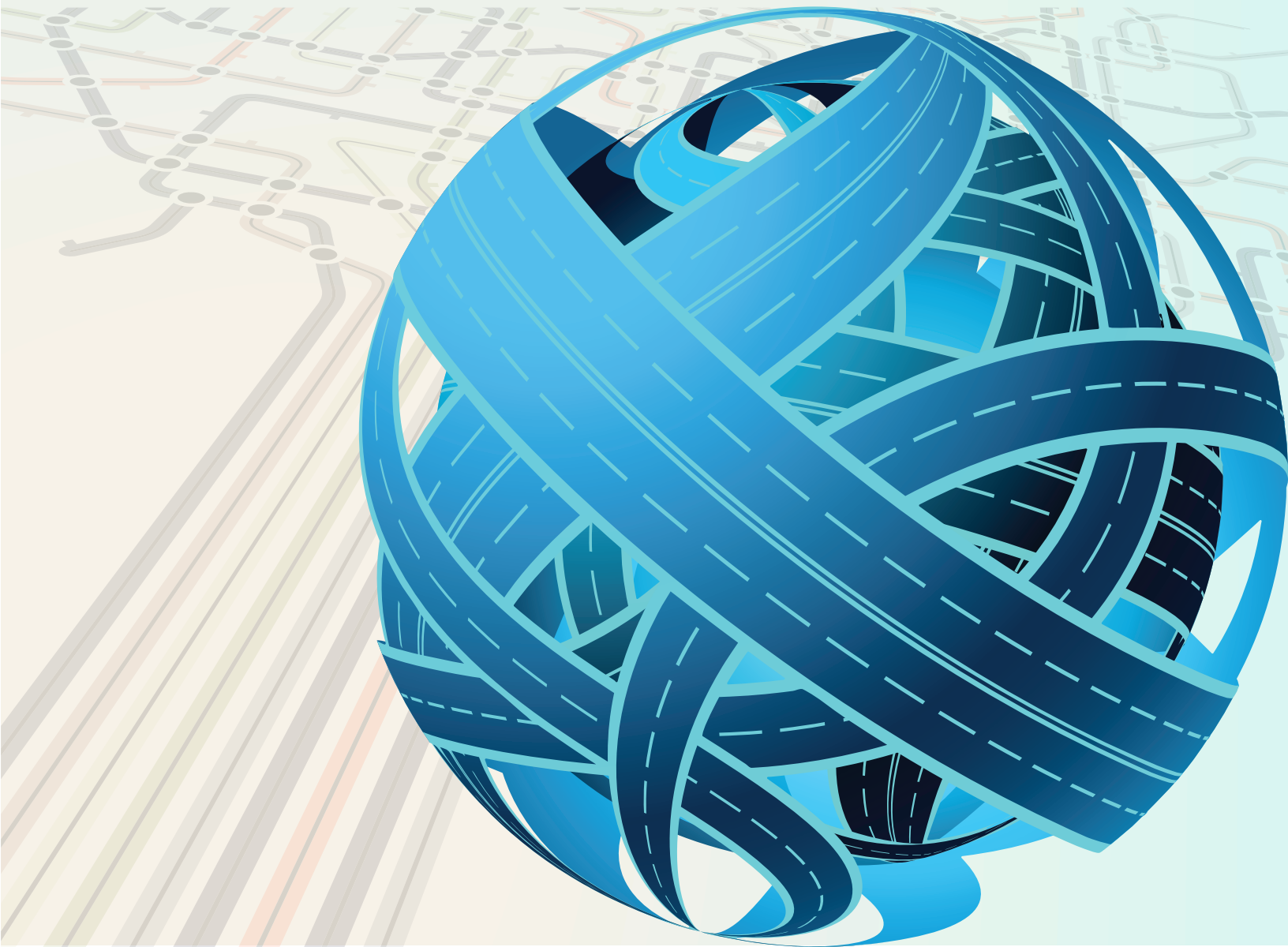




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Annual Privatization Report 2011: Surface Transportation

By Robert W. Poole, Jr.
Edited by Leonard Gilroy and Harris Kenny



Reason Foundation



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Part 1

Transportation Infrastructure Finance 2011

A. Introduction

During 2010 and the first half of 2011, infrastructure finance continued to recover from the credit market crunch of 2009. The amount of capital available in infrastructure equity investment funds reached a new all-time high, and the amount raised for such funds was nearly twice as much in 2010 compared with 2009. Pension funds expanded their participation in infrastructure finance, seeing a good match between infrastructure assets that provide reasonably steady long-term income flows and the funds' long-term liabilities.

A global survey by Terrapin of over 150 senior investors in late 2010 found a high level of interest in the infrastructure segment, both equity and debt. Sectors with the highest levels of interest included water (60%), highways (52%) and ports (50%), with rail (at 45%) and airports (36%) of somewhat less interest. The regions scored as "high priority" for infrastructure investment, in this survey, were Western Europe (50%), North America (45%), Asia (35%) and South America (33%). Those topping the list as "low priority" were Middle East (62% ranked it low priority), Russia (59%) and Africa (59%). "Deal flow" was among the investors' greatest concerns—i.e., there is ample funding available but not enough good opportunities to invest it in infrastructure.

In a *Newsweek* column (Feb. 20, 2011, "Sale of the Century"), Harvard historian Niall Ferguson suggested that in response to its massive national debt, "The U.S. needs to do exactly what it would if it were a severely indebted company: sell off assets to balance its books." He cited \$233 billion worth of non-defense property, plant and equipment identified by the U.S. Treasury's Financial Management Service, the 600–700 million acres of federal land-holdings, and utilities such as the Tennessee Valley Authority and the various power marketing administrations. He also noted the long-term leases of the Indiana Toll Road and Chicago Skyway, and suggested that many more such highways could be privatized.

B. Infrastructure Investment Funds

The record year for infrastructure fund-raising remains 2007, when these special-purpose equity funds raised \$34.3 billion. That declined to \$24.7 billion in 2008, with a further decrease to \$10.7 billion in 2009, according to Probitas Partners. But by the end of the third quarter of 2010, Probitas reported that \$16.1 billion had been raised in just those three quarters. With another \$2.9 billion raised in the fourth quarter of 2010, the year-end total reached \$19 billion, the third-highest year on

record. As of the end of 2010, there were more than 100 funds in the market, seeking to raise over \$80 billion in 2011.

In its June 2011 issue, *Infrastructure Investor* released its second annual ranking of global infrastructure funds, the Infrastructure Investor 30. Over the past five years, these 30 large funds alone have raised a total of \$183.1 billion (see Table 1). There is no definitive estimate of the total raised by all such funds, but that sum very likely now exceeds \$200 billion. One should remember that these are equity funds, which typically provide between 20% and 33% of an infrastructure project's cost, with the balance raised as various forms of debt (bank loans, revenue bonds, etc.). At a conservative leverage multiple of three times the equity amount, the equity available from the top-30 funds would finance \$732.5 billion worth of projects.

Rank	Name of Fund	Headquarters	Five-Year Capital Formed (\$B)
1	Macquarie Group	Sydney	\$31.83
2	Goldman Sachs	New York	10.72
3	Canada Pension Plan Investment Board	Toronto	9.97
4	Ferrovial	Madrid	9.42
5	APG Asset Management	Amsterdam	7.43
6	Alinda Capital Partners	Greenwich, CT	7.10
7	Energy Capital Partners	Short Hills, NJ	7.04
8	Brookfield Asset Management	Toronto	6.26
9	QIC	Brisbane	6.24
10	La Caisse de depot et placement du Quebec	Montreal	5.92
11	Ontario Teachers' Pension Plan	Toronto	5.81
12	GIC Special Investments	Singapore	5.74
13	Global Infrastructure Partners	New York	5.64
14	Ontario Municipal Employees' Retirement System	Toronto	5.49
15	Industry Funds Management	Melbourne	5.35
16	ArcLight Capital Partners	Boston	4.85
17	JP Morgan	New York	4.40
18	Highstar Capital	New York	4.25
19	Morgan Stanley	New York	4.00
20	RREEF Alternative Investments	San Francisco	3.98
21	Arcus Infrastructure Partners	London	3.81
22	SteelRiver Infrastructure Partners	San Francisco	3.73
23	Future Fund	Melbourne	3.60
24	BC Investment Management Corporation	Victoria, BC	3.53
25	Citi Infrastructure Investors	New York	3.40
26	Energy Investors Funds	San Francisco	2.85
27	AXA Private Equity	Paris	2.80
28	Alberta Investment Management Corporation	Edmonton, AB	2.70
29	Australian Super	Sydney	2.66
30	3i Group	London	2.63

Source: *Infrastructure Investor*, June 2011, p. 23.

In the United States, concerns continue to be raised about “foreign takeovers” of infrastructure. It is therefore worthwhile to compare the nationality of the funds providing equity for infrastructure projects with the nationality of the concession companies that are implementing the projects. Table 2 is based on *Infrastructure Investor*’s analysis of the 30 largest investors. As can be seen, 34% of the capital comes from U.S.-based institutions, with Australia’s share at 29%. When you add Canada to the U.S. share, the total of North American investors is 54%. European institutions constitute 14% of the capital.

Country/Region	Percentage of Firms	Percentage of Capital
United States	40%	34%
Australia	20%	29%
Canada	20%	20%
Europe (except United Kingdom)	10%	11%
United Kingdom	7%	3%
Singapore	3%	3%

Source: *Infrastructure Investor*, June 2011, p. 27.

Statistics on global PPP infrastructure projects have been maintained in a database since 1985 by *Public Works Financing*, the newsletter of record in this industry. Table 3 shows the number of planned and funded infrastructure public-private partnerships, by asset class and region, since 1985. The *PWF* database also includes figures on the world’s leading PPP transportation companies as of 2010, ranked by projects under construction or in operation as well as active proposals. For these data, shown in Table 4, the project types include airports, highways, ports and rail infrastructure.

	Roads		Rail		Water		Buildings		Total	
	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)
United States										
Planned and Funded	114	\$94,900	37	\$86,800	214	\$19,600	165	\$11,600	495	\$212,900
Funded by 10/10	47	\$23,600	23	\$20,600	148	\$14,300	159	\$9,900	377	\$68,400
Canada										
Planned and Funded	34	\$24,700	12	\$9,800	35	\$2,700	106	\$29,400	187	\$66,600
Funded by 10/10	26	\$15,700	2	\$2,200	19	\$1,300	80	\$26,000	127	\$45,200
Mexico/Latin America/Caribbean										
Planned and Funded	252	\$104,500	67	\$49,400	174	\$24,800	28	\$5,100	521	\$183,800
Funded by 10/10	152	\$62,100	28	\$11,300	94	\$12,500	15	\$2,600	289	\$88,500
Europe										
Planned and Funded	350	\$337,400	114	\$161,100	229	\$35,800	355	\$100,500	1,048	\$634,800
Funded by 10/10	205	\$184,500	60	\$67,400	176	\$25,500	258	\$75,900	699	\$353,300
Africa/Mid-East										
Planned and Funded	24	\$13,700	15	\$25,600	95	\$29,800	13	\$1,400	147	\$70,500

Table 3: Infrastructure Public-Private Partnerships by Region (1985-2011)

	Roads		Rail		Water		Buildings		Total	
	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)	No. of Projects	Cost (US \$m)
Funded by 10/10	14	\$6,000	4	\$4,700	49	\$19,800	4	\$1,000	71	\$31,500
Asia/Australia										
Planned and Funded	313	\$104,700	92	\$99,200	185	\$54,300	44	\$18,000	634	\$276,200
Funded by 10/10	207	\$69,500	53	\$70,400	123	\$37,800	23	\$9,500	406	\$187,200
Worldwide										
Planned and Funded	1,087	\$679,900	337	\$431,900	932	\$167,100	711	\$166,000	3,067	\$1,444,900
Funded by 10/10	651	\$361,400	170	\$176,600	609	\$111,200	539	\$124,900	1,969	\$774,100

Source: *Public Works Financing*, October 2011.

Table 4: Top PPP Transportation Infrastructure Companies, 2010

Rank	Company	HQ Country	# Projects in Construction or Operation	# Active Prospects
1	ACS/Iridium	Spain	60	52
2	Global Via/FCC	Spain	45	37
3	Abertis	Spain	40	7
4	Ferrovial/Cintra	Spain	38	12
5	Macquarie Group	Australia	36	9
6	Vinci/Cofiroute	France	35	14
7	OHL	Spain	29	18
8	NWS Holdings	China	28	2
9	Acciona/Necso	Spain	23	13
10	Sacyr	Spain	22	12
11	Hochtief	Germany	22	7
12	Cheung Kong Infrastructure	China	21	4
13	EGIS Projects	France	20	30
14	Bouygues	France	18	14
15	John Laing	UK	18	8
16	Andrade Gutierrez	Brazil	16	2
17	Road King	China	16	0
18	BRISA	Portugal	14	8
19	Alstom	France	14	7
20	Grupo ICA	Mexico	14	6
21	Bilfinger Berger	Germany	14	3
22	Camargo Correa	Brazil	12	1
23	Impregilo	Italy	10	6
24	Eiffage	France	10	4
25	Reliance	India	10	1
26	Strabag	Austria	9	8
27	SNC Lavalin	Canada	9	4
28	Balfour Beatty	UK	9	1
29	Transurban	Australia	9	1
30	Siemens	Germany	8	11

Table 4: Top PPP Transportation Infrastructure Companies, 2010

Rank	Company	HQ Country	# Projects in Construction or Operation	# Active Prospects
31	Odebrecht	Brazil	8	5
32	Skanska	Sweden	7	8
33	Fluor	United States	7	5
34	Itinere	Spain	7	1
35	Bombardier	UK	6	5

Source: *Public Works Finance* 2010 Survey of Public-Private Partnerships, October 2010

As can be seen from a quick perusal of Table 4, the large majority of project experience is European. Of the top 10 companies, eight are from Europe, one from Australia and one from China. Of the top 20 companies, 14 are from Europe (Spain, France, Germany, UK and Portugal), three from China, and one each from Australia, Mexico and Brazil. A U.S. firm does not show up until position 33. Thus, by comparing Tables 2 and 4, we can see that while the large majority of infrastructure development and operational expertise currently resides with European firms, the majority of the capital is coming from North American and Australian investment funds. Those who raise political concerns about foreigners “buying our toll roads” seem to have missed the difference between those who are building and operating these infrastructure projects and those who are financing them. It may help proponents to point out that more than half of all the equity investment is coming from North American funds.

Further insight into the investment funds can be garnered from *Infrastructure Investor*’s analysis by type of institution, as shown in Table 5.

Table 5: Infrastructure Funds by Type, 2011

Type of Fund	Percentage of Firms	Percentage of Capital
Developer	3%	5.2%
Fund Manager	36%	30.0%
Investment Bank	17%	29.4%
Pension Fund	30%	27.2%
Private Equity Firm	7%	3.0%
Sovereign Wealth Fund	7%	5.2%

Source: *Infrastructure Investor*, June 2011, pp. 26-27

C. The Growing Role of Pension Funds

Table 5 showed that 30% of the 30 largest infrastructure investors are pension funds, accounting for more than 27% of the equity capital raised over the past five years. This trend began with pension funds in Australia and Canada, and some of the largest funds in Table 1 are Canadian public-sector pension funds: Ontario Municipal Employees Retirement System (OMERS), Ontario

Teachers' Pension Plan and Canada Pension Plan Investment Board. These funds have been making global infrastructure investments for a decade or more.

In the *Infrastructure Investor* top 30, pension funds made some of the largest gains in the ranking for 2011, compared with 2010. Canada Pension Plan Investment Board moved from #11 to #3, Dutch pension fund APG from #15 to #5, and Queensland's QIC from #22 to #9. Until recently, U.S. pension funds, to the extent they invested in infrastructure at all, generally focused on investor-owned utilities (electricity, gas, water). But with the emergence of public-private partnerships (PPPs) for such traditionally government-run assets as airports and highways, U.S. pension funds have an additional target for equity investments.

Some public employee unions have raised concerns about their pension funds investing in infrastructure, due to their ideological opposition to PPPs. Because these pension funds are tax-exempt, they typically do not buy tax-exempt bonds, such as those typically issued by public-sector airports and toll roads. And since there is no equity in state-owned infrastructure, the only way to invest *equity* in infrastructure is with investor-owned infrastructure. As noted above, that has generally meant electric and gas utilities, some water utilities, pipelines, etc. But now that PPP airports, seaports and toll roads exist, transportation infrastructure has been added to the list of potential pension fund equity investments in infrastructure.

In 2010 CalPERS, the largest U.S. public employee pension fund, purchased a 12.7% equity stake in London Gatwick Airport from Global Infrastructure Partners. The Arizona Public Safety Personnel Retirement System is now seeking global infrastructure investments. Early in 2011, the Oregon Investment Council approved allocating 5% of its Public Employees Retirement Fund portfolio to alternative investments, including infrastructure. In mid-summer, California's other major pension fund, CalSTRS, targeted \$300–600 million for infrastructure investments. The Texas Employee Retirement System committed \$625 million toward infrastructure investment in FY 2012. The Louisiana Teachers' pension fund committed \$1 billion to private asset investment in 2012, including \$75 million for infrastructure. And the San Diego City Employees' Retirement System set an infrastructure investment target of 3% of its \$5.2 billion portfolio. This is not a comprehensive listing, but just a set of recent examples.

Part 2

The Federal Perspective

The defeat in November 2010 of Rep. James Oberstar (D, MN), and the shift in control of the House to the GOP, led to the demise of Oberstar's anti-toll, anti-PPP reauthorization bill. During 2011, House Republicans, under Transportation & Infrastructure Committee Chair Rep. John Mica (R, FL), crafted a dramatically different approach. The 20-page outline released in July would limit the size of the federal highway and transit program to the amount of revenue estimated to be produced over a six-year period by federal highway user taxes (mostly on gasoline and diesel), returning to the original concept of a users-pay/users-benefit Highway Trust Fund. The bill would consolidate a number of programs and seeks to emphasize major inter-city highways encompassed by the 160,000-mile National Highway System (which includes the 47,000 miles of Interstate highways).

Because a program limited to what the Trust Fund can support would mean a reduction from the stimulus-enhanced levels of the last several years in federal highway and transit money to the states, the bill seeks to compensate by helping state DOTs leverage this funding by expanding the size of the TIFIA federal loan and credit-support program from the current \$122 million per year to \$1 billion per year. And the Senate Environment & Public Works Committee, with a majority of Democrats, later included a similar TIFIA expansion in its reauthorization bill. Under current law, a TIFIA loan is "scored" for budgeting purposes at 10% of its face value, and the amount of the loan can cover no more than one-third of a project's total budget. Thus, each dollar of TIFIA budget authority supports up to \$30 in project finance, which is powerful leverage. Hence, the proposed \$1 billion annual budget could support up to \$33 billion worth of projects, at the current 33% maximum for TIFIA loans. TIFIA has been a key feature of recent transportation PPP mega-project finance.

From the standpoint of PPPs, however, the House bill's greatest shortcoming is its narrow position on tolling. Current federal law includes four tolling/pricing pilot programs that permit tolling to be used on Interstates under various conditions. Chairman Mica has repeatedly said (though no legislative language has yet been released) that his bill will permit Interstate tolling only on "new" lanes but not "existing" lanes. Strictly speaking, that would prohibit the conversion of HOV lanes to HOT lanes and would eliminate the pilot program that permits up to three states to reconstruct and modernize Interstates using toll finance.

The Senate Environment & Public Works Committee has passed its reauthorization measure. Instead of being for the traditional six years, it would cover only two years, and would seek to

maintain recent highway and transit funding levels (but thus far without identifying a revenue source to supplement projected user tax revenues). The outline is silent on tolling, but as noted above, would expand TIFIA to the same extent as the House bill (though it would reduce the potential leverage by permitting TIFIA loans of up to 49% of a project's cost).

Several other members of Congress have put forth bills dealing specifically with transportation PPPs. Sen. Mark Kirk (R, IL) in June 2011 introduced the Public-Private Partnership Act of 2011. It would remove the caps on the number of projects allowed under the four existing tolling/pricing pilot programs, expand TIFIA, remove the \$15 billion cap on Private Activity Bonds for highway and freight transfer facilities, and remove the current federal ban on commercializing safety rest areas on Interstate highways. A similar bill, dubbed the Lincoln Legacy Infrastructure Development Act, was introduced in the House in September 2011 by Rep. Randy Hultgren (R, IL).

On the other side of the aisle, Sen. Dick Durbin (D, IL) introduced anti-PPP legislation, dubbed the Repaying and Protecting Taxpayers in Transportation Asset Transfers Act. Any federal transportation infrastructure facility worth \$500 million or more that had received at least \$25 million in federal funds would have to repay the federal government (net of depreciation) first before making use of any lease or sale proceeds. The bill would also require the public agency leasing or selling the asset to sign an agreement with the U.S. DOT requiring various conditions to be met; the private entity acquiring the asset by lease or purchase would also have to sign an agreement with DOT making various disclosures and agreeing to maintain the asset in good condition and to return it in a state of good repair when the lease term ended.

At the time of this writing (Fall 2011), no action had been taken on any of these PPP-related bills, nor was there a full legislative draft of either the House or the Senate reauthorization bill.

Part 3

Leasing of Existing Toll Roads

After the failure of Gov. Ed Rendell's 2008 attempt to lease the Pennsylvania Turnpike due to legislative opposition, many observers considered such "brownfield" leases—leases of existing toll roads—to be a dead issue in the United States. However, 2011 saw the successful leasing of Puerto Rico's two highest-traffic toll roads, as well as serious efforts getting under way to lease the Ohio Turnpike.

Puerto Rico's Public-Private Partnership Authority selected the lease of the PR-22 and PR-5 toll roads as its first large-scale project. During a 12-month procurement process beginning in 2010, the agency pre-qualified potential bidders and ended up with two firm bids. The winner was the team of Goldman Sachs Infrastructure Partners II (a leading infrastructure investment fund launched in 2010) and Abertis Infraestructuras (one of the largest Spanish toll concession companies). The winning bid was \$1.136 billion, for the 40-year lease. It is also contractually committed to make \$350 million worth of capital improvements to the two highways. Abertis was already the operator of the Teodoro Moscoso Bridge in San Juan, one of the first privatized transportation facilities in America. The PR-22/PR-5 financial closing occurred on Sept. 22, 2011.

The Puerto Rico transaction has stimulated interest in other brownfield leases. The leading candidate as of fall 2011 is the Ohio Turnpike, as proposed by Gov. John Kasich. In September 2011, the Ohio DOT short-listed five of the 14 firms that had responded to its request for financial advisors on the proposed lease: Citigroup, KPMG, Macquarie Capital, Morgan Stanley and Public Financial Management. The enabling legislation, passed earlier in 2011, permits a lease term of up to 75 years, and requires the RFP and proposed business terms to be submitted to the legislature for approval before they are issued. Gov. Kasich has mentioned a minimum bid of \$2.4 billion, but that may be optimistic given the Puerto Rico transaction. The price paid for that lease was 14.3 times the toll roads' EBITDA (earnings before interest, taxation, depreciation and amortization, a standard financial measure). Using the Ohio Turnpike's FY 2012 projected EBITDA of \$129.5 million, a 14.3X multiple yields an estimated bid of \$1.8 billion. Analysts expect the Ohio Turnpike to generate a higher multiple than the Puerto Rico toll roads, due to higher income levels of Turnpike users, but it would take a multiple of 18X to reach the governor's \$2.4 billion target.

If Ohio succeeds in leasing its Turnpike, will there be other such leases? One toll road about which there has been speculation is E-470 in Denver. It forms the eastern half of a not-yet-completed beltway around the metro area, and was developed by a newly created local toll agency starting in 1991. An adjacent portion of the beltway—the Northwest Parkway—was leased to Brisa for 99

years in 2007. And the missing western section of the beltway, dubbed the Jefferson Parkway, is being pursued as a greenfield PPP toll project.

The Indiana Toll Road was leased for 75 years in 2006 for \$3.8 billion. After paying off the toll road's outstanding bonds, the state was able to dedicate \$2.6 billion to a 10-year highway and bridge improvement program called Major Moves. It also set aside \$500 million as a legacy fund, from which only the interest earnings are used for infrastructure projects. The privately operated Toll Road, like most others, has had traffic fall below projections due to the extended recession. *Public Works Financing* reported in August 2011 that while cash flow is below projections, EBITDA continues to increase each year. In 2015 the project's nine-year bank loans must be refinanced.

Part 4

New PPP Toll Roads

Table 6 presents all long-term surface transportation concession projects operating or under construction in the U.S. since 1990, with the majority representing new PPP toll road projects.

Table 6: U.S. Surface Transportation Concessions (1990-2011)					
Notice to Proceed	Project Name	Public Sponsor	Risk	Project Cost (\$M)	Developer
In Operation					
Jul 1993	91 Express Lanes, CA	Caltrans	DBFOM (toll)	\$130	Level 3/Cofiroute/Granite (sold to OCTA 01-03)
Sep 1993	Dulles Greenway, VA	Virginia DOT	DBFOM (toll)	\$350	TRIP II
May 1997	JFK Airport Terminal 4, NY	Port Auth. NY/NJ	DBFOM	\$689	Schipol/LCOR
May 1999	Foley Beach Express, AL	City of Foley, AL	BOO (toll)	\$44	Baldwin County Bridge Co.
Jun 1999	Camino Colombia Bypass, TX	Texas DOT	BOO (toll)	\$90	Landowners (Granite) (TXDOT purchased 01-04)
Oct 2000	Las Vegas Monorail, NV	Clark County, NV	DBFOM (farebox)	\$343	Las Vegas hotels
May 2003	SR 125 South Bay Expressway, CA	Caltrans	DBFOM (toll)	\$773	PB/Macquarie
Jan 2005	Chicago Skyway, IL	City of Chicago	99-yr lease (toll)	\$1,830*	Cintra Concessions/Macquarie
Jun 2006	Indiana Toll Road, IN	Indiana Finance Authority	75-yr lease (toll)	\$3,850*	Cintra Concessions/Macquarie
Jun 2006	Pocahantas Parkway Lease, VA	Virginia DOT	99-yr lease (toll)	\$611*	Transurban
May 2007	Northwest Parkway Lease CO	Northwest Parkway Authority	99-yr lease (toll)	\$603*	BRISA
Sep 2011	PR-22/PR-5 Lease, PR	Puerto Rico Gov't Development Bank	40-yr lease (toll)	\$1,136*	Abertis/Goldman Sachs Infra Partners II
Under Construction					
Dec 2007	I-495 HOT Lanes, VA	Virginia DOT	DBFOM (toll)	\$1,998	Transurban/Fluor
Mar 2008	SH 130 segments 5-6, TX	Texas DOT	DBFOM (toll)	\$1,358	Cintra/Zachry
Feb 2009	I-595 Managed Lanes, FL	Florida DOT	DBFOM (AP)	\$1,814	ACS Infracore
Oct 2009	Port of Miami Tunnel, FL	Florida DOT	DBFOM (AP)	\$914	Meridiam
Dec 2009	North Tarrant Express, TX	Texas DOT	DBFOM (toll)	\$2,047	Cintra/Meridiam
Jun 2010	I-635 LBJ Managed Lanes, TX	Texas DOT	DBFOM (toll)	\$2,800	Cintra/Meridiam
Aug 2010	Denver Eagle PPP Rail, CO	Denver RTD	DBFOM (AP)	\$2,100	Fluor/Laing/Uberior
Jan 2011	Jordan Bridge, VA	Chesapeake, VA	BOO (toll)	\$100	Figg/Amer. Infra. MLP/Lane

Source: *Public Works Financing*, October 2011.

* Project cost for leased assets represents discounted present value of excess cash flow.

DBFOM=design-build-finance-operate-maintain; BOO=build-own-operate; AP=availability payment

A. PPP-Enabling Legislation

Five states enacted transportation PPP legislation during the first nine months of 2011, and a number of other states debated but did not pass such legislation. Three of them passed fairly broad enabling acts (Illinois, Indiana and Ohio), while Texas modified its existing PPP legislation and Connecticut enacted a modest pilot program.

Connecticut: HB 6801 was passed in October, with nearly unanimous support in both houses of the legislature. Between 2012 and 2015 it permits the state to engage in five PPP projects in transportation and social infrastructure. Projects using tolls require specific approval from the legislature. In addition, the legislature required that state employees carry out design, construction, inspection or operation roles in each project. It remains to be seen how much private-sector interest this very limited legislation will generate.

Indiana: SB 473, enacted in May, permits the governor and the state DOT to designate projects as PPP candidates and solicit proposals from the private sector, without having to go back to the legislature for approval. It also explicitly permits PPP and tolling to be used on the planned Illiana Expressway toll road (connecting I-65 in Indiana to I-57 in Illinois) and on any new bridges connecting Indiana and Kentucky. It also permits the addition of toll lanes to existing non-tolled highways.

Illinois: The PPPs for Transportation Act (HB 1091), signed by the governor in June 2011, gives PPP authority to both the Illinois DOT and the State Toll Highway Authority, and permits terms up to 99 years, but prohibits any lease of the Illinois Tollway.

Ohio: The legislature enacted HB 114, authorizing Ohio DOT to enter into PPPs based on either solicited or unsolicited proposals, for any type of transportation facility. It also makes permanent ODOT's design-build authority. Separate legislation, noted in the previous section, permits the long-term leasing of the Ohio Turnpike.

Texas: The legislature enacted SB 19, which creates a process under which existing local toll agencies have a right of first refusal to build new toll projects. It also reinstates TxDOT's authority to enter into long-term PPPs, but only for about a dozen named projects and only through August 2015.

Several much narrower measures were enacted in other states. Nevada legislators approved development of the proposed Boulder City Bypass as a PPP project, but failed to pass general enabling legislation for the second time. The Washington legislature approved a bill funding a study of the potential for using PPPs to finance state transportation projects, with a report due by December 2011. Arizona enacted a measure that broadens the scope of transportation PPPs to include airports, rest areas and other facilities in addition to highways and bridges. New York DOT

decided not to push for PPP-enabling legislation until 2012. Still pending in Pennsylvania is general PPP-enabling legislation HB 3, similar to bills in the last several legislative sessions that have been debated but not passed.

B. Major Projects Status

Alaska: The only transportation PPP project in Alaska is the Knik Arm Bridge, to connect Anchorage with its fast-growing suburb, the Mat-Su Borough. A state agency, the Knik Arm Bridge & Toll Authority, decided in 2011 (based on the traffic and revenue studies it had commissioned) to shift the form of concession from toll-based to availability-payment-based (although the bridge will still be tolled). That shifts traffic/revenue risk from the concession company to the Authority, which is expected to lead to a larger set of bidders. In September 2011, the Authority received statements of qualifications from six development groups; late in October it announced the three consortia that will be invited to propose: Bouygues/URS/Macquarie, Meridiam/Kiewit/Parsons, and Hochtief/ACS Infrastructure/HNTB. It plans to issue a Request for Proposals in early 2012. The 2.7-mile toll crossing is expected to cost \$1.1 billion; the concession term will be 35 years. The project received its federal Record of Decision late in 2010.

Arizona: Since most of the interest in toll roads and toll lanes is in the Phoenix metro area, both Arizona DOT and the Maricopa Association of Governments (MAG) are studying potential projects. The 2009 enabling legislation, HB 2396, permits both solicited and unsolicited PPP proposals. MAG has a detailed feasibility study under way, looking at whether toll lanes are feasible, which corridors would be implemented first, and what a broader regional plan should consist of. It hopes to identify the initial corridors by mid-2012. ADOT is studying PPP programs in other states, aiming to determine applicable lessons learned. It is also developing a process for accepting unsolicited proposals. In the Tucson metro area, the Pima Association of Governments is looking into non-toll PPP possibilities, such as parking and transit facilities, which are also encompassed by HB 2396. One possible long-distance PPP toll road might be the proposed I-11 from Phoenix to Las Vegas, largely following the US 93 corridor.

California: The first PPP project under California's 2009 enabling legislation is the Presidio Parkway, a replacement for the seismically unsafe viaduct connecting downtown San Francisco to the Golden Gate Bridge. The original plan for a toll concession fell through, due to strong political opposition to tolls from affluent Marin County commuters. Hence, phase 2 of the project is being developed under a 30-year availability-payment concession (while phase 1 is already nearing completion as a design-build project). Litigation by the Caltrans engineers' union PECG contending that the availability-payment procurement is illegal (without tolls) was rejected by a state appeals court, but PECG has appealed the decision to the state Supreme Court. In Southern California, several major projects are likely to be pursued as toll concessions: the addition of truck lanes to the southern portion of the Long Beach Freeway (I-710), completion of the long-delayed missing link of the northern I-710 through South Pasadena as a toll tunnel, and the development of the east-west High Desert Corridor as a new toll road. These three projects are all being pursued as

PPPs by the Los Angeles County Metropolitan Transportation Authority. In San Diego County, the South Bay Expressway (SR 125) emerged from Chapter 11 bankruptcy in April 2011 and is likely to be acquired by the San Diego Association of Governments (SANDAG), which owns and operates the I-15 HOT lanes.

Colorado: Colorado's High Performance Transportation Enterprise is in charge of transportation PPPs for the Colorado DOT. In mid-2011 HPTE received an unsolicited proposal from Parsons Corporation for a 55-mile set of toll lanes to be added to I-70 between the Denver suburb of Golden and Silverthorne in the Colorado Rockies. There is significant congestion in portions of this corridor, especially on weekends. Two other toll PPP projects are under way in the Denver metro area. One involves adding HOT lanes on US 36 between Denver and Boulder. An initial \$311 million segment is under construction as a design-build project; phase 2 is estimated at \$140 million. The plan is to put out for bid a concession to finance and build phase 2 and for the concessionaire to operate both phases. The other project is a toll concession for the missing link in the Denver beltway, being negotiated by the Jefferson Parkway Public Highway Authority with Spanish concessionaire Isolux Corsan. The \$210 million project would produce a four-lane toll road between Golden on the south and the Northwest Parkway on the north.

Florida: Two large-scale PPP projects, the Port of Miami Tunnel and the reconstruction of I-595 in the Fort Lauderdale area, are now under construction. Both are being done as availability payment concessions. The Port Tunnel will not have tolls, since this would interfere with its goal of attracting truck traffic to the new link, rather than using an existing two-lane bridge connecting the port to downtown Miami surface streets. The I-595 project will make use of variable tolls for its new reversible managed lanes, with the state setting the toll rates and taking traffic and revenue risk. Under FDOT's new director, Ananth Prasad, a new transportation program was announced in August 2011, relying heavily on tolls and PPPs. The next large PPP project is expected to be the first phase of the 46-mile First Coast Outer Beltway in the Jacksonville area. The initial phase of this \$1.8 billion toll road will likely be a 15-mile segment that upgrades an existing highway, at a cost of \$300 million. FDOT is also planning a number of small design-build-finance contracts that would use gap financing supplied by the contractors' banks to speed delivery of currently stalled projects.

Georgia: After several false starts and changes of personnel, Georgia DOT is moving forward again with what it hopes will be its first serious PPP project. "West by Northwest" will add tolled managed lanes to I-75 and I-575 in the northwestern portion of the area and also on the western portion of the I-285 ring road, known locally as the Perimeter. In September 2011 GDOT issued an RFP for the \$1 billion project to its three pre-qualified consortia, headed by Vinci/OHL, Cintra/Meridiam, and ACS Infrastructure Development. Proposals are due in February 2012, with construction expected to begin early in 2013. GDOT had delayed issuing the RFP until receiving word from FHWA that the project had qualified for a federal TIFIA loan.

Indiana and Illinois: Governors Mitch Daniels (IN) and Pat Quinn (IL) in mid-2010 signed a bi-state Memorandum of Understanding to develop the 30-mile, \$1 billion Illiana Expressway as a

toll concession project. Illinois DOT is under way on an environmental study for the project. Subsequently, the PPP-enabling laws enacted by both states explicitly permit this project to be developed by means of a toll concession.

Indiana and Kentucky: The Ohio River Bridges Project, involving existing and new bridges across the river in Louisville (at the Indiana border), moved forward in 2011. A Wilbur Smith Associates traffic and revenue study in 2007 identified workable tolling strategies, with the preferred approach being to toll the three existing bridges in addition to the planned new one. National attention focused on Louisville in September 2011 when a serious structural crack was discovered in the Sherman Minton Bridge on I-64. Gov. Mitch Daniels ordered immediate closure of that bridge on Sept. 8th. Several weeks later the Louisville and Southern Indiana Bridge Authority issued a Request for Information from the private sector. As currently conceived, the project would involve constructing a new East End Bridge about eight miles from downtown as well as a new downtown bridge just east of the existing Kennedy Bridge on I-65; it would also reconstruct the Kennedy Interchange, where I-64, I-65 and I-71 converge near downtown Louisville. In October 2011, the Bridge Authority received 28 expressions of interest in the project in response to its RFI.

Maryland: Though not a PPP toll road, Maryland's 19-mile \$2.5 billion Inter-County Connector toll road opened to traffic in March 2011. It is the first toll road in the Northeast to operate without any toll booths or toll plazas, relying on all-electronic tolling as well as peak, shoulder and night-time rates. The toll road links I-270 on the west with I-95 and US 1 on the east.

Michigan: The focal point of PPP efforts here is the planned \$1 billion Detroit River International Crossing (DRIC), a new toll bridge to supplement the inadequate capacity of the existing Ambassador Bridge and the Detroit-Windsor Tunnel. The project has the support of Transport Canada, the government of Ontario and the Michigan DOT. DRIC would provide more-direct connections than either of the existing crossings to I-75 on the U.S. side and to H401 on the Canadian side. The Ambassador Bridge Company has its own plans for a second span adjacent to its existing bridge, but neither government supports that alternative, in part because of poor connections to the major highways on either side of the river. Due to uncertainties on traffic and toll revenues, the current plan is for an availability-payment concession, though tolls would still be charged. State enabling legislation in 2011 passed the House but stalled in the Senate, despite strong backing by Gov. Rick Snyder. The province of Ontario, which strongly backs the project, is already building the \$1.4 billion Essex-Windsor Parkway to connect with the new bridge on their side of the river. That project was financed as an availability-payment concession, without tolls.

New York: Since New York State still does not have PPP-enabling legislation, the much-needed replacement of the Tappan Zee Bridge by the New York thruway Authority via some sort of toll concession is still on hold. It is the largest of some 3,000 deficient bridges in the state, and carries by far the most traffic among them (140,000 per day). It's also the only crossing of the Hudson River in a 40-mile stretch between the George Washington Bridge and a two-lane bridge near West Point. The Port Authority of New York and New Jersey does have PPP authority and plans to use it to replace the ailing Goethals Bridge. The plan is to procure the \$1.5 billion, 2.2 mile replacement

toll bridge via an availability-payment concession, in which the Port Authority would take the traffic and revenue risk. Three teams were short-listed for the project in June 2011, headed by ACS/John Laing, Meridiam/Skanska, and Macquarie/Kiewit. The Port Authority also hired a consultant to analyze the alternatives for the Bayonne Bridge. In January 2011 it announced its preferred approach, which is to raise the height of the bridge's roadway, to increase the clearance from the present 151 ft. to 215 ft., allowing for the bigger ships that will transit the Panama Canal when its new locks open in 2014.

North Carolina: The North Carolina Turnpike Authority has three projects under way: the \$928 million Garden Parkway on the west side of Charlotte, the \$1 billion Triangle Expressway (TriEx) in the Raleigh area, and the \$650 million Mid-Currituck Bridge in the Outer Banks area. The first two are conventional state toll agency projects, but the latter may be developed as a 50-year toll concession. A competition in 2009 led to the selection of a team led by ACS Infrastructure Development to do all the preliminary work at its own expense in exchange for first dibs on negotiating a long-term concession agreement if the project appears feasible to develop that way. In February 2011 the Turnpike Authority selected a preferred alternative for the seven-mile, two-lane bridge; it also agreed to provide up to \$15 million a year to support debt financing for the project.

Puerto Rico: The PPP Authority is considering concessions for up to five greenfield toll road projects, involving \$2.2 billion worth of new construction. These projects include a 44 km. extension of PR 22, a 30-km. PR 53, a 7.5 km. PR 66, and the addition of bus rapid transit (BRT) lanes on PR 22.

South Carolina: The struggling Southern Connector toll road near Greenville, SC filed for bankruptcy in June 2010. The nonprofit entity set up to issue tax-exempt bonds for the toll road stopped making debt service payments on its bonds in January 2010. Traffic never reached more than 50% of projections, and revenue during the recession has been only one-third of projected levels. The Southern Connector was one of a handful of greenfield toll projects developed under a nonprofit corporation structure, none of which has proved successful.

Texas: Four major PPP toll projects are under way in Texas, under now-repealed enabling legislation. A 40-mile portion of the SH 130 toll road between Austin and San Antonio, funded with \$1.56 billion in private capital, is moving toward completion by the Cintra/Zachry team. Two managed lanes mega-projects, the \$2.1 billion North Tarrant Express in Fort Worth and the \$2.8 billion LBJ (I-635) Freeway in Dallas, are also under construction, both by a Cintra/Meridiam team. Also under way is the \$1 billion DFW Connector near the DFW Airport—a design-build project that includes some toll lanes. Under new legislation passed in 2011, TxDOT may pursue an additional set of concession projects. They include the SH 99 Grand Parkway around Houston, an extension of the NTE project in Fort Worth (segments 2, 3 and 4), the I-35E and SH 183 managed lanes projects in Dallas, and three additional projects in the greater Houston area. The legislation gives TxDOT four years to get these projects under way. In June 2011, TxDOT issued RFIs for the SH 99 and I-35E projects, asking for private-sector input on the best business models for each.

Virginia: This state has two major PPP tunnel projects under way in the Norfolk/Hampton Roads area. One is the \$1.5 billion Midtown Tunnel, to be developed by a Skanska/Macquarie team. Virginia DOT in July 2011 reached agreement with the developers and hopes to reach a financial close by the end of the year. The state's Commonwealth Transportation Board approved tolling of the existing tunnels to help pay for the new one and to hold down the level of the new bridge's tolls. A larger project would double the size of the Hampton Roads Bridge-Tunnel and would cost \$3.5 to \$4.5 billion. It resulted from an unsolicited proposal by a Skanska/Kiewit team. Competing proposals were subsequently submitted in February 2011 by teams led by Cintra/Ferrovial and ACS Infrastructure/Dragados. The proposal by Skanska would add four lanes to the existing 3.4-mile crossing and two lanes to the I-64 approaches. Tolls would be added to the existing James River Bridge and Monitor-Merrimac Bridge-Tunnel to help support the project. Also in Virginia, the \$1.9 billion Beltway HOT Lanes project is on schedule to be completed by the end of 2012. A companion project to expand the existing HOV lanes on I-95 south of the Beltway, by the same Fluor/Transurban team, is still being negotiated with VDOT. In addition, VDOT has allocated up to \$500 million to help fund a new US 460 toll road between Petersburg and Suffolk. An RFP for the 55-mile toll road was issued July 28, 2011, with proposals due in the first quarter of 2012 from three pre-qualified bidders. Finally, Abertis in October had discussions with the Richmond Metropolitan Authority about a possible concession to lease its toll roads.

Washington: Two major toll projects, not being done as PPPs, are moving forward in the Seattle area. The 1.7-mile, double-decked Alaskan Way tunnel will replace the seismically damaged Alaskan Way Viaduct (SR 99). Seattle voters approved the project in August 2011, ending several years of controversy, and shortly thereafter the FHWA delivered to WSDOT its record of decision allowing the \$1.9 billion project to proceed. It is scheduled to open in late 2015. The second project is replacement of the obsolete SR 520 bridge with a new floating bridge. With assistance from a federal Urban Partnership Agreement grant, WSDOT has generated public support not only to use tolling to help fund the replacement bridge but to begin electronic tolling on the existing bridge in 2011, to generate more revenue sooner (though the start of tolling has been held up by technical problems).

Part 5

HOT/Managed Lanes and Networks

The term “HOT (high occupancy toll) Lane” is gradually being supplanted by “managed lane” (ML), which generally refers to any form of priced lane. And while individual ML projects continue to be developed (often as PPP concessions), the latest trend is for state transportation departments and metropolitan planning organizations to plan entire networks of MLs. Here is a brief recap of these developments.

Atlanta: The State Transportation Board in December 2009 approved a \$16 billion plan to phase in a 300-route-mile network of managed lanes encompassing most of the metro Atlanta freeway system. The pilot project, a joint effort of GDOT and the State Road & Tollway Authority (SRTA), has converted 16 miles of existing HOV lanes on I-85 in northeastern Atlanta to Express Lanes. The start-up, in early October 2011, got off on the wrong foot thanks to toll rates that were too high to attract much paying traffic and a rule change that increased the HOV-free requirement from two persons to three. The first phase of GDOT’s planned network moved forward in September 2011 with the issuance of the RFP for the \$1 billion West by Northwest project to add new priced lanes to portions of I-75, I-575, I-285 and I-20 in the northern and western portions of the Atlanta metro area. Based on a two-year feasibility study by HNTB, the full managed lanes network is expected, by 2030, to increase by 196% the number of workers within 45 minutes driving time of downtown Atlanta.

Chicago: A 2010 study by Wilbur Smith Associates, commissioned by the Illinois Tollway and the Metropolitan Planning Council, concluded that it would be feasible to add managed lanes to the Jane Addams Tollway (I-90) and the Stephenson Expressway (I-55) and to convert the currently non-tolled reversible express lanes on the Kennedy Expressway (I-90/94) to MLs. The study’s survey and outreach efforts discerned considerable support for optional congestion-relief toll lanes. A 2009 proposal by the Illinois State Toll Highway Authority to add “Green Lanes” to its busiest Chicago-area toll roads was abandoned in 2010, but in August 2011 the agency’s board adopted a resolution endorsing the use of congestion pricing on its toll roads.

Dallas/Ft. Worth: The 2030 long-range transportation plan for this metro area includes an extensive system of managed lanes and toll roads, encompassing the majority of the region’s expressway system. Overall, the plan calls for 450 lane-miles by 2019 and 843 by 2030. The MPO has promulgated a set of managed lanes policies to ensure consistency in the operating concept and policies region-wide. In addition to the NTE and LBJ managed lanes projects discussed in the previous section, the newest project in the region will add managed lanes to I-35E. TxDOT

received responses to its July 2011 RFI for the project from 11 potential bidders in September. Still to be resolved is whether to structure this project as a toll concession, an availability-payment concession, or some other form of PPP.

Denver: Since the successful conversion of the HOV lanes on I-25 northwards from downtown Denver to HOT lanes, Colorado DOT has embarked on its second managed lanes project. This one will add such lanes to US 36, from its interchange with I-25 to Boulder, a distance of 16 miles. CDOT's High Performance Transportation Enterprise will decide by the end of 2011 which form of PPP concession to use, and expects to issue a Request for Qualifications early in 2012.

Houston: In 2008 a ML network study for Houston was completed, funded by a federal Value Pricing grant. Houston Metro is under way on its project to convert all 83 route-miles of existing HOV lanes on five radial freeways to managed lanes using federal stimulus funds; these are currently mostly single-lane reversible HOV lanes. At least one of those corridors, US 290, is planned for major reconstruction by TxDOT, along the lines of the recently completed widening of the I-10 Katy Freeway. That project replaced the single reversible HOV lane with four tolled managed lanes; it was a joint project of Houston Metro (HOV lane owner), TxDOT (freeway owner), and Harris County Toll Road Authority (toll revenue bond issuer and tolling operator). TxDOT's \$4 billion revamp of US 290 would likely add new managed lanes on a parallel highway while widening US 290 itself.

Indianapolis: The Central Indiana Task Force released a transportation proposal in mid-2010 that includes adding tolled express lanes to two freeways in the Indianapolis metro area: I-69 and I-65.

Los Angeles: The Los Angeles Metropolitan Transportation Authority won a federal Congestion Reduction Demonstration program grant to convert existing HOV lanes on I-10 (the El Monte Busway) and I-110 (Harbor Transitway) to managed lanes, and construction for those two projects got under way in 2011. Both projects will be two lanes each direction. In a separate project, Riverside County will extend the 91 Express Lanes (which currently terminate at the Riverside/Orange County line) eastward to I-15. Separate from these individual projects, a large-scale regional congestion pricing study is under way, commissioned by the Southern California Association of Governments (the MPO for the six-county metro area); a major recommendation is likely to be a ML network embracing much of the region's congested freeway system. Other ML projects are in the planning stages for portions of I-10 and I-15 in San Bernardino County and for I-405 in Orange County.

Miami: The region's only HOV lanes, on I-95 in southeast Florida, are being converted to MLs. The first phase took place in 2008–2009, replacing a single HOV lane each way between downtown Miami and the Golden Glades Interchange in northern Miami-Dade County with two tolled express lanes each way. The second phase, which began in late 2011, will extend those lanes to Fort Lauderdale. FDOT has completed a planning study on extending the I-95 MLs northward to beyond West Palm Beach. A second ML project is adding three reversible MLs to the median of I-595 in the Fort Lauderdale area, under a long-term availability-payment concession. And

feasibility studies are under way on (1) converting the South Dade Busway into a ML facility, (2) adding MLs to the Palmetto Expressway (SR 826) in Miami, and (3) adding MLs to I-75 in Broward County. Based on a 2008 FDOT feasibility study of a ML network in Miami-Dade and Broward Counties, FDOT was awarded a Value Pricing Program grant to develop the nation's first Managed Lanes Concept of Operations.

Minneapolis/St. Paul: Minnesota DOT opened its second managed lanes facility, on I-35W, in November 2010. For part of its 16-mile length, existing HOV lanes were converted; for another section, the shoulder lane was converted to a managed lane for use during peak periods only, and on the remaining section, an additional lane was added. The popularity of these two projects has revived interest in a network of such lanes. In late 2009 Gov. Tim Pawlenty directed MnDOT to do a "next stage" MnPASS study, to pursue more PPPs and innovative finance, and to study possible MLs for I-94, the major east-west freeway linking the two downtowns. That study identified eight other corridors for managed lanes, creating something of a network. The first of these is likely to be on I-35E between St. Paul and Little Canada, an eight-mile stretch. Second-priority corridors include I-94 between Minneapolis and St. Paul and several additional stretches of I-35E and I-35W.

Orlando: The only major expressway in this metro area that is not a toll road is I-4, which is by far the most congested facility in the region. Florida DOT in the early years of the last decade proposed a detailed plan to add two express toll lanes each way to provide congestion relief, but Rep. John Mica (R, FL) opposed this plan, and inserted a provision in the SAFETEA-LU legislation specifically prohibiting this project. But now that he is chairman of the House T&I Committee, Mica has had a change of heart and the I-4 managed lanes project is back on the front burner at FDOT. Initial plans call for a \$2.1 billion project to add four express toll lanes over a distance of 21 miles through central Orlando. FDOT will soon commission an investment-grade traffic and revenue study to support a start of the project in 2013.

San Diego: This region's MPO, SANDAG, was the first in the nation to include a network of managed lanes in its long-range transportation plan. The first component of the network is nearing completion, widening and lengthening the initial I-15 reversible HOT lanes to a much larger four-lane, 20-mile facility with a movable barrier so as to permit three lanes operating in the peak direction and one in the non-peak direction. Direct-access ramps will link major arterials and park-and-ride lots directly to the managed lanes. Future plans call for adding MLs on I-5, I-805, and SR 52. SANDAG's plan emphasizes carpooling and express bus service, so it plans to retain HOV-2 as its occupancy level for no-charge access to the network. That will significantly reduce the potential revenue, but SANDAG is using local transportation sales tax money, rather than toll revenues, as its primary funding source.

San Francisco: In 2008 the region's MPO, the Metropolitan Transportation Commission, approved a \$4.8 billion plan to develop an 800-mile ML network for the Bay Area, of which 500 miles would be conversions from HOV lanes and 300 miles would be new construction. Flyover ramps would be added at six major freeway interchanges to provide seamless connections from one

ML to another. Most of the network would be one lane per direction. Studies recommend an occupancy minimum of HOV-3 for no-charge access, in order to generate sufficient revenue to pay for the system, but the politics of making that policy decision are still uncertain. The initial target date for having the basic ML network in place was 2020. But budget cutbacks in 2010 led to a scaling back of the plan to a smaller network of just 560 lane-miles. In October 2011, the Metropolitan Transportation Commission (which is the MPO for the Bay Area) announced that in November it would ask the California Transportation Commission for authority to add 290 more lane-miles to the plan, in addition to the 270 lane-miles already approved. The region's first ML project—a new HOT lane on southbound I-680—opened to traffic in September 2010, and a second one, on I-580, is expected to open early in 2012. Several others are under development in Santa Clara County (the San Jose metro area).

Seattle: As the result of an extensive Vision 2040 process carried out by the MPO (Puget Sound Regional Council), the region's mayors endorsed a ML network spanning 300 route-miles of the regional freeway system, in addition to the tolled bridges and the new tolled Alaskan Way Tunnel. The network would be built by converting the existing HOV lanes and adding new lanes (a) to fill in gaps in the HOV network, and (b) to add a lane in the most congested corridors to permit two MLs in each direction. Tentative plans aim to have the initial network in operation as early as 2020. In fall 2010, WSDOT convened an Expert Review Panel to review of its I-405/SR 167 Corridor Tolling Study. That study proposed adding MLs to that 40-mile corridor, with two lanes each way for much of its length. The ERP concluded that the project makes sense and was supported by sound analysis, including a preliminary traffic and revenue study. It recommended that WSDOT proceed with more detailed analysis, including an investment-grade traffic and revenue study, and that it should consider making use of the state's PPP-enabling legislation for what is likely to be a \$1.5 billion mega-project, comparable in scope to the Beltway HOT lanes in northern Virginia and the LBJ and NTE projects in the Dallas/Fort Worth area.

Washington, DC: The metro area has several ML projects under way, at various stages. The \$1.9 billion Beltway (I-495) project is adding two MLs each way to 14 miles of the highly congested Beltway, from the Springfield interchange on the south to Tysons Corner and the Dulles Toll Road, with a completion date near the end of 2012. The Fluor/Transurban consortium has proposed an extension of the MLs northward to the American Legion Bridge over the Potomac River, as well as a project to expand and convert the HOV lanes on I-95 approaching Washington, DC from the south into a three-lanes reversible ML project. VDOT released its environmental assessment of the latter project in September 2011, concluding that the project is necessary due to the impending failure of the existing HOV facility. The initial project would extend 29 miles, with a subsequent phase extending it to 46 miles. The region's MPO, the Metropolitan Washington Council of Governments, completed a feasibility study of a region-wide ML network in 2008, but no decision has been made about including it in the long-range transportation plan.

Part 6

Overseas Highway Concession Projects

A. Overview

The long-term concession model, under which the private sector designs, finances, builds, operates and maintains a roadway, bridge or tunnel for an extended period, has a long history outside the United States. It originated in Europe after World War II as the principal means for France, Italy, Portugal and Spain to develop modern tolled superhighway networks. Some of the toll road companies were investor-owned from the outset, whereas others were either state-owned or a mixture of state and investor ownership. During the decade of the 2000s, the governments of France, Italy and Spain sold off their remaining ownership stakes in toll road companies. That has enabled European toll concession companies to do business in what has become a global marketplace.

During the 1990s and 2000s, the concession model spread to Australia and to East and South Asia (especially China and India), Latin America and much of Central and Eastern Europe. With strong support from the World Bank, the concession model has become widely used for delivering public works infrastructure in developing countries. The emphasis in the Asia-Pacific and Eastern/Central European countries has been on the development of greenfield toll roads, both urban and inter-city. In Latin America, the primary focus has been on upgrading existing two-lane inter-city highways into modern, four-lane divided toll roads.

During 2010 and 2011 there was considerable market activity within the concession industry, with companies buying and selling portions of their highway portfolios either to or from other firms or to pension funds and infrastructure funds. One of the largest such transactions occurred when the Canadian Pension Plan Investment Board (CPPIB) purchased 100% of Intoll, whose holdings included 30% of Toronto's 407ETR toll road and 25% of the Westlink M7 toll road in Sydney. Intoll itself was formed several years ago when several Macquarie infrastructure funds were sold off; the value of the transaction was about \$3.5 billion. Meanwhile, Macquarie Atlas, which holds major portions of several U.S. toll roads (Chicago Skyway, Dulles Greenway, Indiana Toll Road) as well as toll facilities in the U.K., France and Germany, reported modest growth in traffic volumes, revenue and EBITDA. CPPIB in 2010 had sought to buy Australian toll concessionaire Transurban for \$7.2 billion, but that deal did not go through. In 2011, CPPIB sold its 12% stake in Transurban for \$902 million. Skanska auctioned its 50% stake in Chile's Autopista Central toll road for \$930 million; the purchaser was the public-sector pension fund of Alberta (Canada).

Spain's ACS Infrastructure purchased a controlling interest in German company Hochtief, while selling some of its Chilean toll roads. And two European concessionaires announced stock market listings in South America. Spain's Isolux Corsan will list in Sao Paulo while Italy's Atlantia will launch an IPO of its Chilean concessionaire Autostrade Sud America in Santiago.

B. Canada

The only true toll concession in Canada (where the private sector takes the traffic and revenue risk) remains Highway 407ETR (Electronic Toll Route), which entered its 12th year of privatized operation in 2011. The core segment through Toronto was built as a public-sector toll road in the 1990s, operated for 18 months, and then leased for 99 years in 1999, for C\$3.1 billion (which netted the Ontario government C\$1.5 billion after defeasing the government's C\$1.6 billion in toll revenue bonds). Since taking over, the 407 ETR Concession Company (a joint venture of Cintra, Intoll and SNC-Lavalin) has invested more than C\$1 billion on eastward and westward extensions, interchanges and lane additions. The Ontario government is now pursuing an additional 29 km. of extensions to the 407's eastern terminus, estimated to cost C\$1.7 billion, to be procured on a design/build/finance/maintain basis. Whether or not 407ETR becomes the successful bidder, the extensions will add significant traffic to the existing toll road.

Canada's other PPP highway projects are concessions based on availability payments, about half tolled (where the government tolls the roads and takes the traffic and revenue risk) and the balance without tolls. Whether tolled or not, the concession company's compensation is in the form of availability payments. Notable projects include the Sea-to-Sky Highway, the South Fraser Perimeter Road and (tolled) Golden Ears Bridge project in British Columbia; ring-roads around the Calgary and Edmonton metro areas of Alberta; the Disraeli Bridges and part of the ring road in Winnipeg; the A25 highway, the A30 bypass route and the proposed C\$4.8 billion tolled Champlain Bridge replacement in Quebec; the C\$1.4 billion Windsor-Essex Parkway in Ontario; and the Route 1 widening project in New Brunswick. The Port Mann Bridge in Vancouver, BC was intended to be a toll concession, but due to the credit crunch was changed to a BC government-funded design-build project.

C. Latin America

Argentina: The province of Buenos Aires in summer 2011 awarded a 30-year toll concession to Autovia del Mar to upgrade and build new sections of the 1,500 km. Corredor Vial del Atlantico. Autovia will take over concessions that are expiring on portions of the toll road and will construct new sections costing \$584 million. The total value of the concession is estimated at \$1.9 billion. It was awarded based in part on the lowest proposed toll rate. Argentina developed a number of modern highways using toll concessions in the 1990s. As part of the government's attempt to recover from a default on its bonds early in the 2000s, toll rates were frozen for many years, leading some concession companies to go bankrupt. Rates were finally unfrozen in 2009.

Brazil: South America's largest country has the continent's largest toll concession program. At the federal level, OHL is upgrading over 2,000 km. of federal highway under a \$2.8 billion concession awarded in 2007. The government is implementing nationwide sticker tags, initially as electronic license plates but also suitable for nationwide tolling. In October 2011 the federal government announced that bidding will take place in November for the third phase of BR 101, a 476 km. highway connecting Rio de Janeiro and Bahia. Including both construction and maintenance costs, the 25-year concession is estimated at \$1.14 billion. Sao Paulo state awarded two 35-year concessions for the southern and eastern sections of its beltway; both went to SPMar. The total investment will be \$3.1 billion.

Chile: Chile has the most sophisticated toll concessions in Latin America. Over \$3 billion has been invested in a dozen major inter-city toll projects totaling more than 2,000 km., mostly created by upgrading existing highways to limited-access toll roads (as in Brazil). But Chile has also seen the development of a set of all-new urban toll roads in the capital of Santiago. Developed and operated by several different concession companies, they use an interoperable all-electronic toll system. The government in late 2010 announced plans for a national electronic tolling system, to be in operation by 2014. In January 2011 Sacyr Concesiones won two concessions, a 35-year toll concession to upgrade 60 km. of highway between Cabrera and Concepcion (\$356 million) and a 32-year toll concession to upgrade two approach highways to the northern port city of Iquique (\$185 million). Skanska in late 2010 reached financial close on the \$320 million Autopistas de la Region de Antofagasta.

Colombia: The government's National Institute of Concessions (INCO) in September 2011 announced plans to double the route-kilometers of toll concessions, hoping to bid out 5,000 km. of roadway by the end of 2012. Tenders for 19 projects worth \$1.9 billion are expected by the end of 2011. One of the highest priorities is to have modern four-lane toll roads linking inland Medellin (the second-largest city) to both the Pacific and Caribbean ports. In December 2010, a consortium led by Odebrecht reached financial close on a \$1.25 billion project to build and operate the 528 km. central section of the 1,000 km. Ruta del Sol between Bogota and the Caribbean. The Andean Development Bank has proposed four urban toll roads, totaling 168 km. and worth \$2.6 billion, to help solve traffic congestion in Bogota. They would be developed and operated by separate concessionaires, similar to the system that exists in Santiago, Chile.

Costa Rica: The first toll concession highway in Costa Rica opened in May 2010. The 77 km. highway links the capital city of San Jose with Caldera on the Pacific, cutting the travel time in half to 90 minutes. The \$360 million toll road was developed under a 25-year concession by a consortium headed by Global Via. A second such toll road has been proposed between San Jose and San Ramon.

Ecuador: As part of the airport concession held by Quiport, a four-lane 8.5 km toll road will be built linking Quito with the international airport being developed by Quiport.

Mexico: America's southern NAFTA partner was one of the pioneers of toll concession projects in Latin America, but its poorly structured program in the 1990s led to most of the projects being taken over by the government due to insufficient revenues. They are gradually being re-privatized, and the government continues to offer concessions for new toll roads. Mexico is introducing electronic vehicle registration nationwide, in the form of sticker tags which can also be used nationwide for electronic toll collection, similar to what Brazil is doing.

The government is having mixed success with auctioning off its older toll roads, with some receiving no bids exceeding its undisclosed reserve price. Even some new toll road concessions have been difficult. For example, in April 2011 the government rejected the only bid it received for the 30-year Pacifico Sur concession to construct 141 km. of bypasses and make other upgrades to another 168 km. of existing highway between Guadalajara and Tepic. After another rebidding, IDEAL was awarded the concession in August 2011. The \$1.3 billion project is expected to begin construction in early 2012. In mid-2010 the Mexico Federal District government granted a 30-year concession to a 50/50 joint venture of IDEAL and ICA for the \$713 million, 21 km. Supervia Sur Poniente, a portion of the Mexico City beltway. And in October 2011 Guerrero state published a tender for a toll road and tunnel in Acapulco.

Panama: Like the early experience of Mexico, Panama's toll concessions have been plagued by poor revenue forecasting. In 2010, after international audits projected serious revenue shortfalls for two such toll roads in Panama City—Corredor Sur and Corredor Norte—the government announced plans to bail them out. State agency Empresa Nacional de Autopistas (ENA) has issued \$395 million of bonds to purchase Corredor Sur from Mexico's ICA and is planning a \$650 million bond issue to buy Corredor Norte from PYCSA. Both were developed under 30-year concessions. The deals will require ENA to increase tolls on the highways if debt service coverage falls below a specified threshold.

Peru: Concession companies are developing two major projects in Peru. One set of 25-year concessions covers major upgrades to Peru's portion of the Pan American Highway (Ruta del Sol). The other major project is a 2,500 km. highway system linking Brazil's Amazon region with three ports on Peru's Pacific coast. Once the three roads (Norte, Centro and Sur) are completed, they will cut the travel times from Brazil to the Peruvian coast significantly, since the project is replacing non-paved road with asphalt pavement. Some stretches will have two lanes, others four. In February 2011, the final 196 km. section of Norte opened to traffic. The Sur is due to be completed in March 2012. These 25-year concessions are based on availability payments. The new highways will be tolled, but the toll revenues are projected to be well short of covering the costs.

D. Europe

France: Along with Italy, France pioneered toll concessions in Europe, developing a national system of tolled motorways via concession companies, some of which are former state-owned firms that were privatized in 2005. That system now extends to 12,000 km. of tollway. Recent

concessions have departed from the earlier model of negotiated extensions of existing toll roads. New projects these days are developed as individual projects, selected via competitive procurement.

The second and final segment of the seven-mile, cars-only A86 West tunnel opened in January 2011. This \$2 billion toll tunnel provides the missing link on the A86 ring road around Paris, originally planned as a surface expressway through the historic Versailles area. Cofiroute's innovative proposal to finance, develop and operate the project as a deep-bored tunnel, financed by congestion-priced tolling, led to this missing link finally being completed. A second tunnel, large enough for heavy trucks, is still under review by the French government.

The most spectacular concession project prior to the A86 tunnel was the \$536 million Millau Viaduct, the world's highest bridge and the longest cable-stayed bridge. Opened to traffic in 2004, it was developed and is operated by Eiffage under a 75-year toll concession. More recent toll projects have been mostly upgrades of existing highways, such as the \$1.5 billion A63 project, which reached financial close in January 2011. A consortium led by Bouygues won the 40-year concession in September 2010 to widen and upgrade 102 km. of the A63 highway in western France. Also in January 2011, the 150 km. A65 toll road opened to traffic between Bordeaux and Pau. This \$1.6 billion tollway was developed under a 55-year concession by a consortium led by Eiffage. In July 2011 a preferred bidder was selected for the \$287 million A150 project to link two existing toll roads, closing a missing link in the network. And as of mid-summer 2011, the government is embarking on its first availability-payment concession. The L2 bypass is a \$940 million urban motorway in Marseilles. It will link the existing A7 and A50 routes.

Germany: The land of the non-tolled autobahn has not adopted tolling, except for heavy trucks and an occasional toll bridge or tunnel (such as the Herren Tunnel in Lübeck and the Rostok Tunnel in Rostok). Instead, the government has adopted a variant of shadow toll, which it calls A-model highways. The projects offer companies a 30-year concession to upgrade an existing highway from four to six lanes, financed by fees linked to traffic volumes. The government is using some of its revenues from its national heavy truck tolling scheme to pay for its shadow-toll commitments. Six A-model concessions were awarded between 2007 and 2011, with the most recent two reaching financial close in June 2011 (the \$575 million A8) and September 2011 (the \$297 million A9). For the last of these, the government shifted from shadow tolls to availability payments. A second wave of A-model concessions is now in the planning stage, all to be financed based on availability payments.

Italy: As with France, all of Italy's motorways are operated under long-term concessions, with Autostrade as the largest toll company. In anticipation of the 2014 Milan World Trade Fair, a consortium led by Autostrade and Impregilo has financed a \$2 billion project to build and operate the 33 km. missing link in the eastern part of Milan's ring road, under a 50-year concession. A second major project will build a 151 km. largely sunken expressway, of which 87 km. will be tolled, between Bergamo and Varese, north of Milan, at a cost of \$6.5 billion. A third tollway, the 62 km., \$2.75 billion road from Milan to Bergamo was near to reaching financial close in fall

2011. Spain's Sacyr is under way on a \$3.3 billion, 90 km. toll road linking Vicenza and Teviso north of Venice. And a regional consortium has been awarded a 40-year concession for the \$1.5 billion, 60 km. toll expressway Autostrade Regionale Cispadana between Reggio and Ferrara. In 2010 the government introduced a new model concession agreement (Convenzione Unica) that shifts the form of regulation from British-style price caps (RPI minus X) to public-utility type rate-of-return regulation. The first project to reach financial close under this new model was the Strade dei Parchi that will reconstruct and modernize the A24 and A25 toll roads, which date to the 1960s, at a cost of \$1.1 billion.

Spain: Spain's large and diverse concession toll industry developed out of the government's reliance on toll concessions to develop its initial motorway system in the 1960s and 1970s, totaling 2,000 km. by 1991. Government policy under the socialist regime in the 1980s turned against toll roads, producing instead non-tolled "autovias." Several financially struggling toll concession companies were nationalized by the government (only to be reprivatized in 2003). The 1990s saw a revival of toll concessions under a conservative national government. But the early 2000s saw yet another change of government and of highway policy, this time retaining concession companies but shifting new projects to shadow tolls. Regional governments are also pursuing such non-toll concession projects.

In 2009 and 2010, a number of Spanish toll concessions got into serious financial trouble. First, in 2009 the Supreme Court ruled that the payments due to landowners for the rights of way used for Madrid's toll roads should be 20 times higher than what was originally paid. The total for three radial toll roads and two others was put at \$2.9 billion. Second, the collapse of Spain's housing bubble and the resulting deep recession have cut heavily into traffic and revenue on all of Spain's toll roads. The concession companies have asked the government to "rebalance" the concession agreements (which is the general practice in Spain) to enable them to survive. Transport Minister Jose Blanco in late 2010 pledged help, and in June 2011 the government launched a \$115 million loan fund for those concessions whose revenue fell below 80% of what was estimated in their concession agreements. That is in addition to a larger loan fund that is assisting the Madrid-area toll roads with the unexpected land compensation costs. Despite the government's overall fiscal distress, it has approved several new availability-payment concessions during 2011.

Portugal: Like Spain, Portugal has also gone through several shifts of policy, beginning with toll concessions mostly carried out by state-owned companies such as BRISA that were eventually privatized. In the 1990s, Portugal shifted primarily to concessions financed via shadow tolls, on a design-build-finance-operate (DBFO) basis. In 2006, the government decided that the future liabilities created by these long-term concessions were unaffordable. Indeed, a former judge on the country's Court of Auditors estimated the government's total shadow toll payment liability at \$65 billion through 2049, equivalent to 30% of the country's GDP. Conversion of shadow toll concessions to electronic tolling finally began in 2010.

Nonetheless, state concessions agency Estradas de Portugal (EP) announced that it would proceed with nine availability-payment concessions to upgrade 1,500 km. of highways, which will be tolled

but are not expected to be self-supporting from toll revenue. Two such 30-year concessions were awarded in 2008 and 2009. But with shadow tolls and availability payments estimated to have cost the government \$950 million in 2009 alone, Portugal's Court of Auditors in early 2010 rejected nearly all the concession contracts awarded by EP. Then came 2011 and the EU/IMF financial bailout of the Portuguese government. A condition of the €78 billion deal was to halt all concession deal-making until completion of an external review; this likely means there will be no more shadow toll or availability-payment deals.

U.K. and Ireland: England has only a few tolled projects, all of them developed as concessions with the private sector. The only actual toll road (as opposed to several toll bridges) is the M6Toll near Birmingham, which provides an alternative to the frequently congested M6 motorway. Thanks first to record-high fuel prices in 2008 and then to the recession, traffic on both M6 and M6Toll dropped significantly in 2008–2009, recovering somewhat in 2010—and at around 45,000 vehicles per day, traffic on M6Toll is still far below the projected 72,000. M6Toll's high debt level and lower-than-forecast traffic led Standard & Poor's to downgrade its bond rating from BB to B+ in 2010.

Britain nevertheless has a thriving highway concession industry, thanks to the country's overall Private Finance Initiative for infrastructure PPPs. In the highway sector, these projects are financed based on either shadow tolls or availability payments. A dozen design/build/finance/operate (DBFO) highway concession agreements are operational.

The largest of these is the \$9.4 billion (life-cycle cost), 30-year concession to widen and maintain the principal London beltway, the M25. A consortium led by Balfour Beatty and Skanska won the bidding in July 2008, but financial closing was delayed by the credit crunch. The deal finally closed in May 2010, raising \$1.4 billion in senior debt from a group of 16 banks, along with sponsor equity of \$300 million and a loan of \$280 million from the European Investment Bank.

Scotland has several shadow toll concession projects under way, using the DBFO model. Ireland has done both toll concession projects and availability-payment concessions. The most recent toll concession is the \$910 million Limerick Tunnel, awarded in 2006 and opened in September 2010. In March 2009 the National Roads Authority authorized four new DBFO highway projects, to be financed via availability payments. The first of these, awarded in September 2010, is the \$393 million M17/M18 motorway near Galway.

Russia: Concession toll roads have been discussed in Russia for the past decade, with two very large and ambitious projects receiving most of the attention—a tolled superhighway between Moscow and St. Petersburg and a tolled beltway around the latter city. A competition was held to select a concession team for the latter in 2008, but the global financial crisis made it impossible to finance. The government tried again with a scaled-back project in 2010—a 30-year DBFO concession for the central 12 km. of the beltway, estimated at \$4 billion (including a deep-bore tunnel beneath a river). The winning bidder was selected in mid-2011: a consortium of two Russian financial institutions and construction companies from Italy and Turkey. The government is putting

in \$1.6 billion and providing a minimum revenue guarantee; the European Bank for Reconstruction & Development has agreed to lend €200 million. The other two segments of the beltway are being developed with public funds, with the beltway totaling 46.6 km. Two other toll concession projects reached financial closings in 2010, thanks in part to the Russian government agreeing to guarantee their bonds. One is the \$850 million Odintsovo Bypass, linking downtown Moscow to the Moscow-Minsk highway, and the other is the first 43 km. of the Moscow-St. Petersburg toll road. The start of construction on that project has been held up by local land-use protests against routing the toll road through the Khimki Forest near Moscow's northwestern suburbs.

Turkey: This country has some 2,000 km. of toll roads and two major toll bridges across the Bosphorus waterway in Istanbul. In 2011 Turkey's Privatization Board offered a 25-year concession to operate, maintain and improve this entire system. Qualifications of prospective bidders are due by mid-November, with bids due in mid-February 2012. Speculation about the amount to be raised ranges from \$2 billion to as much as \$4 to \$5 billion.

Eastern and Central Europe: In most of this post-Communist region, the economies are not yet strong enough to support motorway-quality highways solely from toll revenues. Thus, we see a mixture of tolling, shadow tolling and availability-payment concession projects, with significant debt being provided at low interest rates by government development banks.

Hungary's showcase project is the M6 motorway, from Budapest southwards. In spring 2010, the last 200 km. of this highway were opened to traffic, having been developed under three concessions totaling \$2.7 billion. The concession companies are paid availability payments, part of the cost of which is recouped from road users via purchased window stickers called vignettes. The new right-of-center government in 2011 announced that it plans to terminate up to 100 PPP infrastructure concessions, including four motorways, expecting to reap \$2 billion in long-term savings by getting out of what it terms projects developed via flawed procurements.

Poland has used concessions for major portions of its new A1 and A2 motorways. Tolls are charged on both, but the concession companies are being paid by means of availability payments. In July 2011, Poland began operating its new truck tolling system, covering 1,560 km. of motorway and major arterial roadways, mainly around the major cities and on the Wroclaw/Katowice/Krakov corridor from the German border. The system uses ViaTOLL transponders. Thus far, it is not interoperable with similar transponder-based truck tolling systems in Austria and the Czech Republic, but could be adapted to be.

The Slovak Republic has three concession motorways, of which the third began construction in February 2010, at a price of \$2.7 billion. Its financing is based on availability payments. In September 2010, a newly elected right-of-center government opted not to proceed with a \$4.5 billion D1 highway concession, based on claims that the concession approach would be too costly. Bulgaria and Romania each have concession projects under way, funded by a mix of tolls and availability payments.

E. Asia/Pacific

Australia and New Zealand: Australia was a pioneer of toll road concessions in this region, beginning with the Sydney Harbor Tunnel in the 1990s. With the completion of the Lane Cove Tunnel in 2008, Sydney now has an “orbital” (ring road) consisting of six toll-concession highways and tunnels, as well as the separate M4 and Cross City Tunnel concessions. Australia has been doing toll road concessions for two decades, and the M4, its first such project, reached the end of its original 20-year concession in February 2010. The New South Wales government at that point resumed control—and proceeded to abolish the tolls, meaning that congestion on the M4 will increase, and the roadway will lose a critical funding source for ongoing maintenance, expansion and eventual rebuilding.

Sydney’s two newer tunnels, Cross City and Lane Cove, both went into receivership, due to traffic running far below projections. The A\$1 billion Cross City Tunnel was placed in receivership in December 2006 and auctioned off to a replacement concession company for A\$700 million. The A\$1.6 billion Lane Cove Tunnel entered receivership in January 2010, and was purchased by Transurban for A\$630 million. In both cases, the intended risk transfer feature of long-term concessions worked as planned. There was no taxpayer bailout; only the original investors lost money.

In March 2011, yet another toll tunnel went bankrupt: the A\$2 billion CLEM7 tunnel in Brisbane. Traffic had been running at 22–23,000 vehicles per day compared with a projected 58,000. Once again, it is investors rather than taxpayers who are taking the loss; the tunnel remains in service, and toll revenues are sufficient to cover its operating and maintenance costs. The concession company, RiverCity Motorway Group, is expected to take 12 to 18 months to work its way out of receivership. If the experience with the other two tunnels is any guide, the 45-year concession will likely be picked up by another operator for some fraction of the original A\$2 billion cost.

There are two other concession mega-projects in Brisbane. The A\$1.9 billion second span of the Gateway Bridge was completed with a grand opening in May 2010. The opening included the elimination of cash tolling on both spans, replaced by all-electronic tolling. The largest project—the A\$4.8 billion Airport Link toll tunnel—began construction in late 2008, despite serious financial difficulties due to the credit markets collapse. Two huge tunnel-boring machines from Germany continue to work on the project, though cost overruns are now in prospect.

Victoria was another PPP toll road pioneer with its successful Melbourne CityLink, the continent’s first cashless toll road, developed and operated by Transurban. The state’s second PPP toll road—the 24-mile A\$2.5 billion EastLink Motorway in the Melbourne suburbs—opened in mid-2008 to disappointing traffic numbers, thanks to the recession. Though traffic has increased somewhat, it is still below projections. In July 2011, the concession company, ConnectEast Group, was purchased by Horizon Roads for A\$2.2 billion. Victoria’s third highway concession, the A\$759 million Peninsula Link, is being done as a design/build/finance/operate concession, financed via availability payments, the first use of this method in Australia.

New Zealand's first modern toll road opened in January 2009, the 4.7 mile NZ\$215 million Northern Gateway Toll Road to Auckland's northern suburbs. It uses open-road video tolling, with off-line cash options. The country's first PPP concession highway may be the planned NZ\$1.5 billion 4.5 km. Waterview Connection, which would be the last link in the Western Ring Route around Auckland. If done as a PPP project, it would be financed based on availability payments. In July 2010, the government announced that the 23 km. Tauranga Eastern Link will be built as a toll road, which will enable the NZ\$455 million project to be completed seven years earlier than otherwise.

China: Hong Kong pioneered toll concessions for several harbor crossings, and in the last two decades China has made increasing use of this model. Tens of thousands of kilometers of tolled motorways were in operation as of 2011, nearly all developed under long-term concessions. Most of the investment has come from domestic sources, but China has gradually opened up to outside investment in toll projects. In August 2008 China Infrastructure Investment Corp. secured a listing on the NASDAQ exchange. At least 20 such Chinese toll road companies are listed on the Shanghai, Shenzhen and Hong Kong stock exchanges.

Some of the Chinese toll concession projects are impressive engineering feats. One is the world's longest ocean crossing: the \$2 billion, 36 km. long, six-lane Hangzhou Bay Bridge, which opened to limited traffic in July 2008. Another is the \$1.9 billion Changjiang Tunnel-Bridge Expressway, linking Shanghai's Pudong area to Chongming Island. It includes a 10 km. cable-stayed bridge and 8.9 km. twin 50' 6" tunnels under the Yangtze River. Another mega-project is the \$10 billion Hong Kong-Zhuhai-Macao Bridge across the Pearl River Delta, scheduled for completion in 2016. Yet another major project is the 8.8 km. Jiazhou Bay Tunnel, which opened in July 2011. Several dozen large-scale tunnel-boring machines are at work on such projects in China, with diameters ranging from 37 to 50 feet.

India: This country's ambitious highway concession program was announced in early 2008. It was intended to include 175 toll concession projects encompassing nearly 18,000 km., with private investment of \$27 billion. The government also opted for revenue sharing, rather than up-front concession payments. A number of concessions were awarded during 2008, but the credit market crunch slowed things down considerably in 2009. In early 2010 Transport Minister Kamal Nath announced a revised program, in which the government is seeking \$41 billion in private-sector highway investment over a four-year period, aiming to build 15,000 km. of roads, of which about half would be privately financed and developed. But the reality continues to lag well behind these large-scale plans. In April 2011 the Transport Ministry sent seven proposed toll concession projects to its PPP Appraisal Committee for review, valued at \$1.8 billion. By July, concessions had been awarded for 860 km. out of a planned 2,500 km. for 2011. Tollway projects that are under way are often plagued by land rights problems, which can add years of delay and significantly higher costs. Lenders have also complained that Indian concession agreements have no provision for termination payments during construction.

South Korea: Toll concessions are a key tool for delivering major infrastructure projects in South Korea. Opening late in 2009 was the 12.3 km. Incheon Bridge, which includes a 1.5-mile cable-stayed main span. The \$1.6 billion project links Incheon City with Yeongjong Island. The even bigger \$1.8 billion Busan-Geoje fixed-link project opened in December 2010. The 8.2 km. project includes a 3.2 km. immersed tunnel and two cable-stayed bridges. It was developed under a 40-year toll concession by a seven-company consortium led by Daewoo. The fixed link will shorten the distance from Busan (South Korea's second-largest city) to Geoje from 140 km. to 80 km., saving 60 km. of travel.

Vietnam: The first toll concession highway in this nominally Communist country got under way in April 2010. According to the Nhan Dan news agency, the 15.7 km. toll expressway is being undertaken by the Ho Chi Minh City Infrastructure Investment Joint Stock Company. Groundbreaking took place in April and the \$120 million toll road is expected to be in operation by 2012. In late 2007, *Public Works Financing* reported that the Asian Development Bank planned to assist the government with a 244 km. \$1.2 billion toll road from Hanoi to Lao Cai on the Chinese border.

Other Asian Countries: Indonesia has invited the private sector to bid for concessions to widen and modernize six toll roads in Jakarta, with qualifications to be submitted by October 2011 and bids due from qualified bidders before the end of 2011. Pakistan's Sindh province is seeking bidders to upgrade the 98 km. Hyderabad-Badin toll road. And Bangladesh is seeking to procure a 34 km. \$2 billion Dhaka-to-Aphelia elevated toll road as a long-term concession. If the project goes forward, it would be the country's second one, having signed a concession agreement in January 2011 for a \$1.2 billion Dhaka Elevated Expressway.

F. Middle East and Africa

Israel: This country's first toll concession project, the Cross-Israel Highway, was financed in 1999 with the first segment opening in the early 2000s. The government retained a 60% stake, with the concession company holding the other 40%. In July 2011, the government sold its stake to a group of local infrastructure funds and pension funds for \$480 million. The concession runs until 2029. Next up is a concession to extend the toll road between Galilee in the north and Negev in the south, at an estimated cost of \$824 million. Seven companies have submitted their qualifications.

Other Middle East Countries: The Dubai government in mid-2011 securitized its toll road system, raising \$800 million by selling six years worth of projected toll revenues. Prior to its revolution, in December 2010 Egypt's Ministry of Transport prequalified five international teams to bid for a 34 km. toll highway connecting Cairo's beltway with the Cairo-Alexandria highway. If it goes forward, it will be the first transport concession project in the country.

South Africa: Until recently, South Africa was the only country in Africa making use of long-term concessions for highways. Its large, professional state toll agency, SANRAL, has 1,832 km. of its

own toll roads and oversees another 1,288 km. developed and operated by concession companies. SANRAL has a massive expansion and modernization of the Johannesburg metro area expressway system under way—the Gauteng Freeway Improvement Program. The \$2.7 billion project began in 2007 and is targeted for completion in 2015. Phase I involves widening major expressways and adding new ones, encompassing 185 km. Phase II will add another 180 km. of completely new road, along with upgrading others, for a total of 560 km. The entire system will be electronically tolled. In mid-2011 SANRAL held a competition for a 30-year DBFOM concession, estimated at \$1.4 billion, to upgrade the N1 and N2 toll roads which converge on Cape Town. In September the winning bidder, a consortium led by Bouygues, was announced. But the Cape Town government is challenging SANRAL’s decision to fund the project via tolls, which are not currently charged on either highway.

Senegal: In November 2010 the planned \$437 million Dakar-Diamniadio Toll Road project reached financial close, the first such project in sub-Saharan Africa (outside of South Africa) to get financed. Winning bidder for the 30-year concession was a team led by France’s Eiffage. It will generally parallel the existing Route Nationale 1 between Dakar and Thies. The World Bank’s International Finance Corporation provided both senior and subordinated debt worth \$31 million. Both the African Development Bank and the Western African Development Bank also provided loans, as did a local bank. The Senegalese government, the World Bank, the African Development Bank and the French Development Agency contributed \$178 million. Eiffage is putting in \$44 million in equity.

Mozambique: A consortium headed by Portuguese firms Mota-Engil and Soares da Costa won a 30-year concession to design, build, finance, operate and maintain 700 km. of highway in Tete province. It includes taking over the existing Samora Machel Bridge over the Zambeze River and constructing a new one—the New Tete Bridge—as well as upgrading the N7, N8, N9 and N34 national highways. As reported by *Infrastructure Investor*, revenues to support the financed project costs will come initially from tolls on the existing bridge plus existing border taxes along the route. The new bridge will also be tolled, and the government is said to be receptive to tolling on the highway section between Colomue and Zobue. Should that materialize, the concession is expected to become a fully toll concession, no longer supported by border taxes. The government is also providing minimum-revenue guarantees, and will allow annual inflation adjustment of the toll rates. Unlike the project in Senegal, this one has not yet achieved financial closing.

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