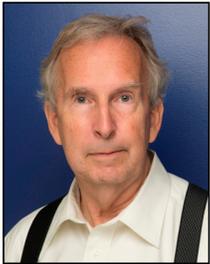


Spring 2023 (Published: March 2023)

# U.S. Put-in-Place Construction Forecasts

Prepared by Alex Carrick, ConstructConnect® Chief Economist



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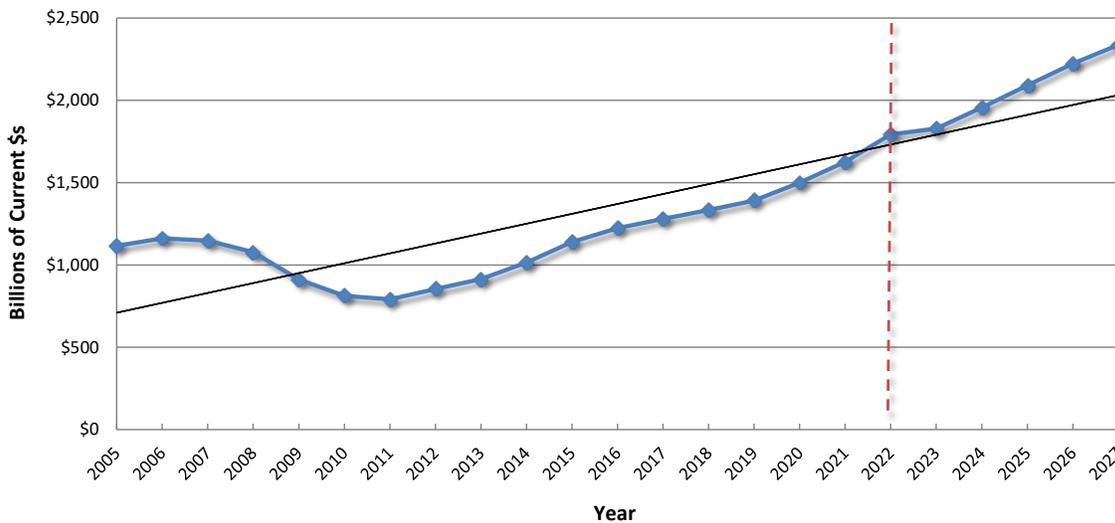
## Quarterly U.S. Put-in-Place Construction Forecast Report, Spring 2023

A slowdown verging on recession in 2023 seems inevitable. The problems for the economy are coming from the financial side, due to the Federal Reserve's aggressive stance in raising interest rates to fight an annual inflation rate that is well above the Consumer Price Index (CPI)'s +2% target. Goods and services spending by individuals and corporations is in the Fed's crosshairs as evidenced by the escalation in debt carrying costs. From another angle, banks are worried about the solvency of their borrowers, making them more wary in their lending habits.

The Fed's monetary moves have placed the likelihood of go-aheads for many small and medium-sized construction projects in jeopardy. Last year, though, marked a seismic shift in the onsite marketplace. There was an approvals level for mega-sized construction projects, i.e., those car-

Cont'd on page 2

Graph 1: U.S. Grand Total Construction Spending Put-in-place (PIP) Investment



Graph includes a 'best fit' linear trend line.

Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect.  
Chart: ConstructConnect.

### 'Starts' versus Put-in-place (PIP) Statistics

'Starts' compile the total estimated dollar value of all projects on which ground is broken in any given month. By way of contrast, put-in-place capital spending statistics are analogous to work-in-progress payments as the building of structures proceeds to completion.

Consider a \$60 million office tower for which ground is broken in June 2023. For the 'starts' series, the entire estimated value (\$60 million) will be entered in June 2023. In PIP numbers, it will be captured as spending of approximately \$15 million in 2023; \$25 million in 2024; and the final \$20 million in 2025.

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rying an estimated value of a billion dollars or more each, beyond anything ever seen before. All the mega project starts from last year are set out in Table 2 on the back page of this report. Mega projects imply sizable capital spending, with accompanying jobs stability, for years.

When the owners of those mega projects talk about their go-ahead decisions, interest rates are rarely mentioned. Instead, commitments are said to have been predicated on cash flow and special depreciation measures; or spreading the financial risk through joint ventures; or the utilization of federal, state, and local government tax breaks and grants; or, an imperative to proceed now to reach target dates on carbon reduction amounts that have become set in stone.

There is a sub-set category of construction work, formerly a mainstay of activity, which has now gone largely missing, mixed-

use residential and commercial (mainly office building) projects. Also, it warrants saying that some major undertakings, such as the Penn Station development in New York, by Vornado Realty Trust, and work on Amazon's next-phase second headquarters in Arlington, Virginia, are being paused due to present uncertain economic circumstances.

There is a question that will increasingly come forward as 2023 unfolds, and if the Fed pursues an even tighter interest rate policy. Will it really be in everyone's best interests to keep squeezing the economy and attempting to suppress employment in order to achieve what may have become an unrealistic +2% inflation goal? The +2.0% per year figure for the CPI was managed earlier, in large measure, through adoption of a management strategy, globalization, which has now become unfashionable, due to the recent exposure of international supply chain fragilities.

**Table 1: U.S. Construction Spending (put-in-place investment)**

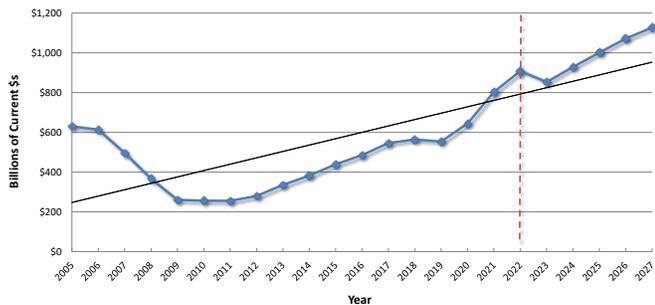
(billions of "current" \$s)

Type of Construction:	Actuals		Forecasts				
	2021	2022	2023	2024	2025	2026	2027
Grand Total	1,626.5	1,792.9	1,828.8	1,956.8	2,090.9	2,223.1	2,337.1
(year vs previous year)	8.5%	10.2%	2.0%	7.0%	6.9%	6.3%	5.1%
Total Residential	802.9	908.3	852.9	928.8	1,001.4	1,071.9	1,127.1
	24.6%	13.1%	-6.1%	8.9%	7.8%	7.0%	5.2%
Total Non-residential	823.5	884.6	975.9	1,028.0	1,089.6	1,151.2	1,210.0
	-3.7%	7.4%	10.3%	5.3%	6.0%	5.7%	5.1%
Total Commercial/for Lease	199.4	220.6	239.8	252.1	264.0	277.3	291.4
	-5.5%	10.6%	8.7%	5.1%	4.7%	5.0%	5.1%
Lodging	18.2	18.6	22.2	25.3	27.1	30.3	33.6
	-36.0%	1.8%	19.7%	13.9%	7.1%	11.7%	11.0%
Office	86.6	87.2	89.4	89.9	93.9	99.1	103.6
	-6.7%	0.6%	2.5%	0.5%	4.5%	5.4%	4.5%
Commercial (retail/warehouse)	94.6	114.8	128.2	136.9	143.0	148.0	154.3
	5.4%	21.4%	11.7%	6.8%	4.4%	3.5%	4.2%
Total Institutional	187.2	192.7	205.2	211.6	219.0	226.1	234.8
	-10.3%	2.9%	6.5%	3.1%	3.5%	3.2%	3.8%
Health Care	48.5	52.6	57.2	58.3	60.2	63.1	67.5
	-0.3%	8.5%	8.7%	2.0%	3.2%	4.9%	6.9%
Educational	98.4	99.0	105.0	108.4	111.5	113.4	115.6
	-11.1%	0.6%	6.0%	3.3%	2.8%	1.7%	1.9%
Religious	2.9	2.9	2.7	2.8	3.0	3.1	3.2
	-15.8%	-1.9%	-5.8%	5.4%	5.8%	2.8%	3.2%
Public Safety	12.2	11.2	11.8	12.2	13.0	13.3	13.6
	-31.2%	-7.4%	5.1%	3.4%	6.0%	2.4%	2.4%
Amusement and Recreation	25.3	27.0	28.5	29.8	31.4	33.2	34.9
	-10.7%	6.8%	5.7%	4.4%	5.5%	5.7%	5.1%
Total Engineering/Civil	358.0	365.0	393.9	423.3	460.8	494.9	523.4
(year vs previous year)	-0.6%	2.0%	7.9%	7.4%	8.9%	7.4%	5.8%
Transportation	56.7	56.8	59.8	65.9	72.5	78.5	83.4
	-6.7%	0.2%	5.4%	10.1%	10.1%	8.3%	6.2%
Communication	24.7	24.3	25.5	26.5	27.8	29.1	30.8
	3.4%	-1.4%	4.6%	4.1%	4.9%	4.7%	5.7%
Power	120.8	110.0	125.5	141.4	160.0	178.9	196.2
	2.3%	-9.0%	14.1%	12.7%	13.2%	11.8%	9.7%
Highway and Street	100.7	109.7	116.7	121.3	128.2	133.6	136.6
	-1.6%	9.0%	6.3%	3.9%	5.7%	4.2%	2.2%
Water Supply & Waste Disposal	47.2	54.9	56.5	57.7	60.7	62.8	64.3
	2.3%	16.3%	3.0%	2.1%	5.3%	3.4%	2.3%
Conservation and Development	7.9	9.3	10.0	10.6	11.5	11.9	12.2
	-11.4%	17.8%	7.4%	6.0%	8.6%	3.5%	2.0%
Total Industrial/Manufacturing	78.9	106.4	136.9	141.1	145.7	152.9	160.4
	4.6%	34.8%	28.7%	3.0%	3.3%	4.9%	4.9%

\*Current\* means not adjusted for inflation.

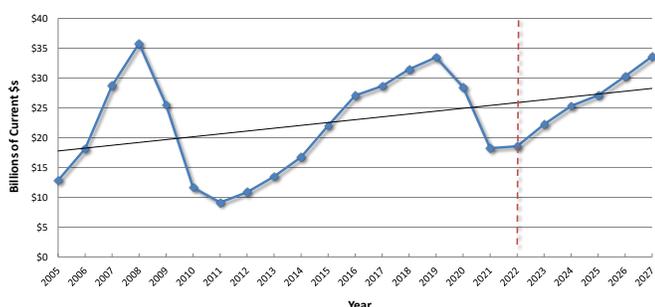
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Table: ConstructConnect.

**Graph 2: U.S. Construction Spending: Residential Put-in-place (PIP) Investment**



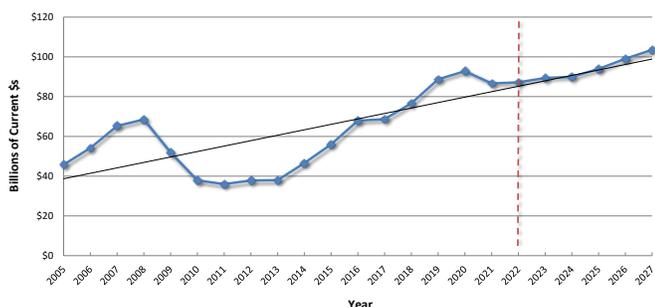
Record low interest rates during much of the pandemic inspired a big uptick in new home demand. Then in 2022, the Federal Reserve's raising of interest rates moved housing starts in the opposite direction. Lately, single-family housing has been impacted more severely than multi-family work. From 2023 onwards, the put-in-place dollars on new homes and renovation projects will improve nicely. A prime driver of multi-family (high-rise) projects will be the burgeoning number of single-family households, comprised of young adults, empty nesters and individuals left on their own through death of a partner or divorce. In about half the major cities in the U.S., new multi-unit starts have now overtaken singles as the dominant share of the total.

**Graph 3: U.S. Construction Spending: Lodging Put-in-place (PIP) Investment**



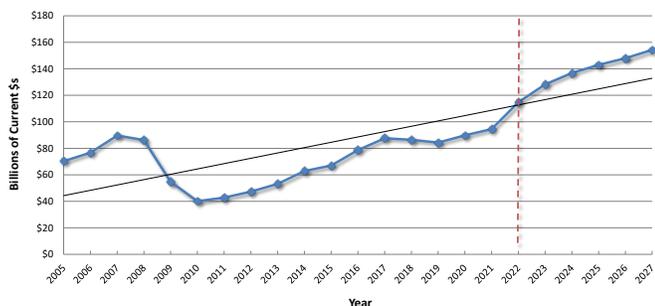
The cycle for put-in-place construction spending on hotels and motels was probably at a peak in 2019 anyway, but then the coronavirus came along and turned what would have been a normal downturn into a free-for-all tailspin, as nearly all travel was suspended. Three years of staying indoors are now culminating in a vast need among many people to experience the world again. Covid-inspired contemplation about what one wishes to gain from life has also led to lengthier catalogues of travel destination goals, often referred to gaudily as 'bucket' lists. Developers of temporary accommodation projects are highly responsive to what they see the competition doing. If one hotel chain begins expanding or upgrading existing sites, they're all likely to hop onboard.

**Graph 4: U.S. Construction Spending: Office Buildings Put-in-place (PIP) Investment**



The work-from-home phenomenon is gradually easing, but it won't vanish any time soon. The owners of many office buildings will be forced to keep dealing with vacant space in their assets. Nor are conversion opportunities, to condos for example, as abundant as one might suppose, given issues tied to sound-proofing, plumbing, no window views from deep within, and return on investment (ROI). There's virtually no likelihood of a repeat of the capital spending surge that occurred between 2013 and 2020, when high-tech companies went on a leasing binge. Presently, notable for their absence, are proposed mixed-use projects which previously included substantial office space. Still, there will be some showcase office projects offering the best in new amenities.

**Graph 5: U.S. Construction Spending: Retail, Warehouse, Restaurant Put-in-place (PIP) Investment**

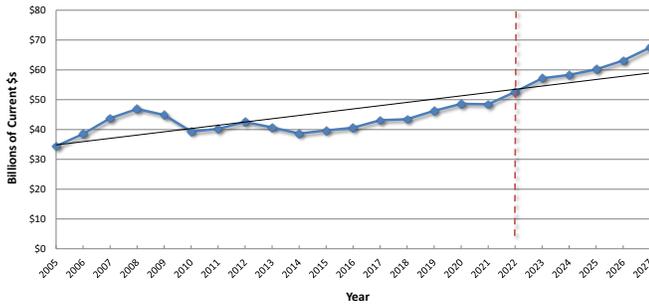


Once access to usual shopping outlets (malls, etc.) became restricted in March 2020, online buying soared, necessitating the building of immense fulfilment centers. With unemployment low and wage growth strong, current retail sales are still vastly outperforming past trends. Going forward, though, much of the impetus for warehouse construction will come from the industrial side of the economy. A move is afoot to bring more American jobs home from foreign locales. The economy has just suffered through extreme supply shortages due to glitches in international cargo delivery. The offshoot is that globalization is being reversed. Domestic producers, to up their storage capacity for inputs and inventory, are turning to extra onsite warehousing capacity.

Graphs include a 'best fit' linear trend line.

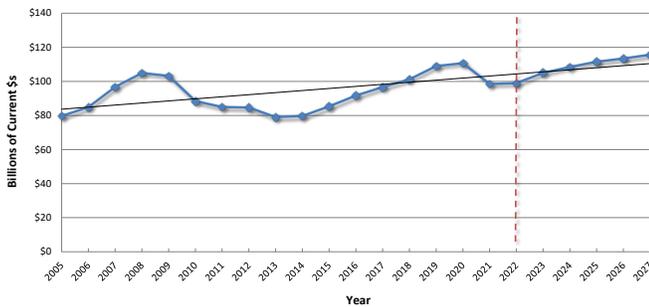
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Charts: ConstructConnect.

**Graph 6: U.S. Construction Spending: Health Care Put-in-place (PIP) Investment**



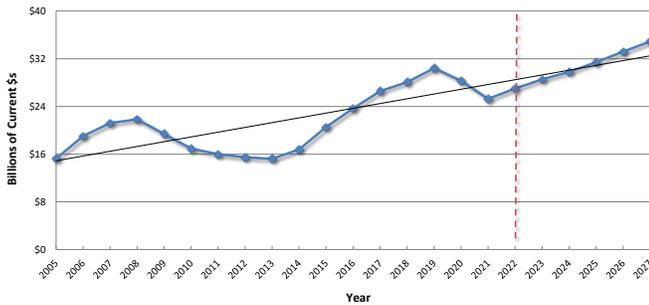
Hospital construction has come back into favor. 2020 and 2021 featured only a few large hospital groundbreakings. The entire focus of health care in those years was on grappling with and beating back the shocking number of coronavirus infections. A side effect was the drying up of revenue streams from the normal conduct of operations related to cardiovascular, carcinogenic, osteopathic, and other problems, the traditional source of funding for capital projects. In 2022, some large hospital works made it back onto big upcoming projects lists. And in the early days of 2023, more such big jobs have sprung up, often doubling as teaching complexes at academic institutions. An aging population is sure to keep the momentum going for years to come.

**Graph 7: U.S. Construction Spending: Educational Put-in-place (PIP) Investment**



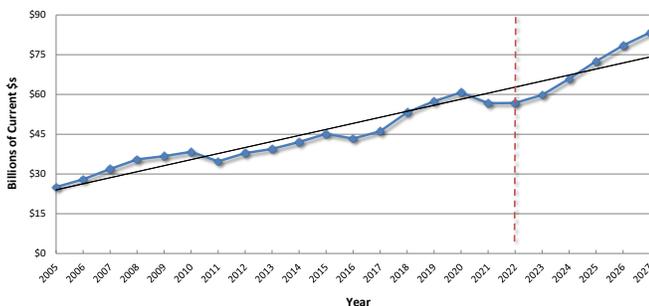
Low annual births in the U.S. and less immigration of families with young children have reduced the feeder stream enrolling in K-12 classes. Construction dollars spent on elementary and high schools will correlate with suburban sprawl, and with ongoing efforts to improve the built environment (e.g., air quality) in existing sites. At the level of higher education, there are fewer foreign students now and courses online have proliferated, but the extraordinary opening up of new job categories — e.g., in the engineering of EV batteries and hyperloops and space travel; in the expanding discipline of logistics; in activities conducted in the metaverse; and the list goes on and on — ensures the need for teachers and lecture halls and/or labs to facilitate instruction.

**Graph 8: U.S. Construction Spending: Amusement and Recreation Put-in-place (PIP) Investment**



Still to be determined is whether a slowdown or recession in 2023 will do much to curtail a U.S. labor market that is seeing limited unemployment and robust nominal earnings growth. Workers are well situated to pay for the items and services that deliver on their promises of enjoyment. A lesson learned from being housebound in the pandemic was how dependent we have all become on videos and music delivered by streaming and download services. The provision of entertainment worldwide has mushroomed into a global industry of a size barely believable and not yet fully recognized. It's not much of an exaggeration to say that studios are being built everywhere. There are also major new sports arenas (NFL Bills and Titans) planned in America.

**Graph 9: U.S. Construction Spending: Transportation Put-in-place (PIP) Investment**

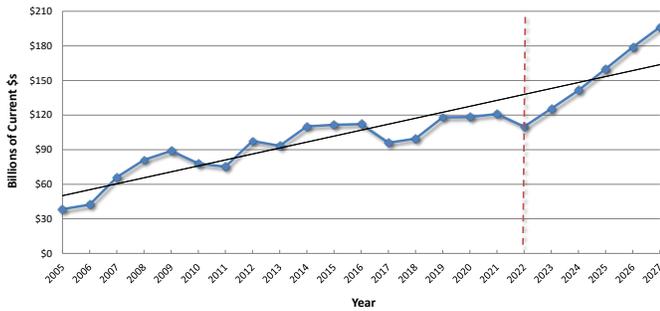


Single-family construction in urban locations will promote commuter assistance projects. Multi-family construction, which has been steaming ahead faster than the single-family variety, will align with light rail and subway projects. Infrastructure spending measures in recent legislative bills emanating from Washington set aside billions of dollars in support for transit and rail line additions and improvements. Not surprisingly, given their high volumes of intra-state traffic, California, Florida, and Texas will be leaders in transportation construction spending. The other standout portion of transport building work will key on adding gates and runways at the nation's major international airports. Plans that were put on hold due to Covid are being dusted off.

Graphs include a 'best fit' linear trend line.

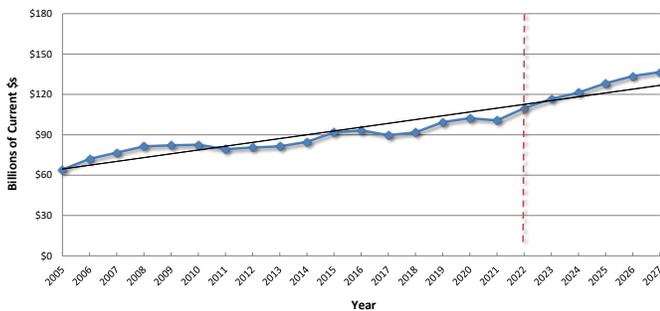
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Charts: ConstructConnect.

**Graph 10: U.S. Construction Spending: Power Put-in-place (PIP) Investment**



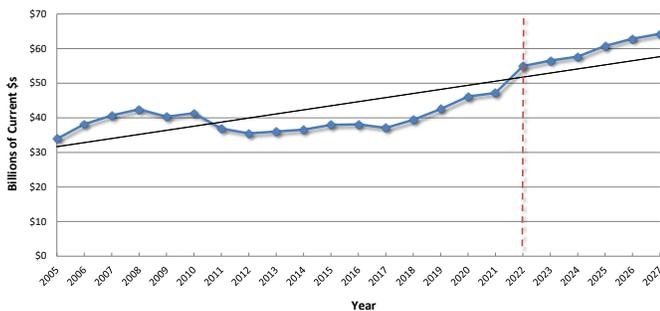
A global consensus has emerged that if the goal of net zero carbon emissions is to be achieved by mid-century, there will need to be significant increases in electric power capacity. Even the production of hydrogen, another clean-burning fuel, seemingly meets with greater favor when it is carried out through electrolysis, rather than the use of natural gas. Most of the new power generation in the U.S. last year arose from wind farms. Nuclear power, once shoved to the back burner, is now being given a second look, with small modular reactors (SMRs) moving past the proposal stage. As a corollary to the power generation sustainability push, Washington and the big car makers are rushing to expand the nationwide network of vehicle recharging stations.

**Graph 11: U.S. Construction Spending: Highways and Streets Put-in-place (PIP) Investment**



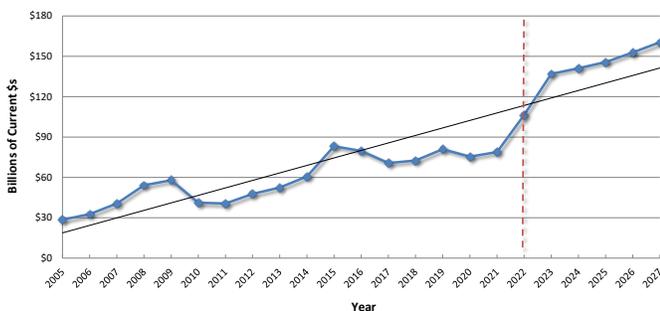
Among all the construction put-in-place type-of-structure categories, the one displaying the steadiest pattern of spending from year to year is 'highways and streets'. Amidst annual outcries over apparently inadequate funding, somehow the dollars always add up close to what was laid out the year before. Because repairs to deteriorating roadways and bridges have not been overlooked among infrastructure spending initiatives in recent government legislation, the annual average increase for street work over the next five years will rise to +4.5% from +4.2% during the five-year pre-forecast period, 2018 to 2022. Progressive innovations to appear among new projects will include traffic flow and wear and tear monitors, and phosphorescent line markings.

**Graph 12: U.S. Construction Spending: Water Supply, plus Sewage & Waste Disposal Put-in-place (PIP) Investment**



Failings in the nation's water delivery and effluent takeaway systems have been exposed in headlines out of Flint, Michigan (lead in the water) and Jackson, Mississippi (drink only bottled water advisories). The revenue to pay for the operations of water utilities derives in main from homeowners' water usage bills. A general understanding among local politicians dictates that there are limits to how much water service charges can be jacked up. In turn, this assures shortcomings in the ability to cover crucial repairs to aging infrastructure. With crisis conditions looming, this situation is being addressed. Federal money, through the IIJA, is available. Also, there have been upward trending put-in-place construction dollars for the past several years.

**Graph 13: U.S. Construction Spending: Manufacturing Put-in-place (PIP) Investment**



Deglobalization and a strengthening of 'Buy America' provisions will both play roles in bolstering American manufacturing. An enormous and favorable energy product price differential in North America versus Europe and Asia is an incentive for the building of petrochemical plants and LNG export facilities. Plus, there are new energy opportunities in hydrogen and ammonia production, and carbon capture and storage. And there are the deep veins of construction work for electric vehicle assembly and battery plants, and for semiconductor chipmaking facilities. Nor should more traditional manufacturing be overlooked. Boeing and Airbus recently won long-term contracts to supply Air India with nearly 500 passenger jets.

Graphs include a 'best fit' linear trend line.

Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Charts: ConstructConnect.

## FLIP-SIDE CRUCIAL ASPECTS TO COMMODITY PRICE INCREASES

A factor warranting attention in the outlook will be the performance of commodity markets. A full-on commitment to electrification, through heightened demand for nickel (batteries), copper (transmission lines), lithium and a host of alloy minerals (to make steel and aluminum stronger and lighter) will

almost certainly lead to a next commodities super-cycle sometime before 2030.

For the construction industry, there are counter-balancing aspects to commodity price increases. Commodities are the base components going into every construction building material. An increase in a com-

modity's price will lift the cost of construction. On the flip side, though, it's also true that an increase in a commodity's price is an incentive for a resource owner to spend on an extraction capacity increase, and this is where mega-sized resource projects enter the picture.

## CURRENT VS CONSTANT DOLLARS

After not being much of an issue for many years, the 'constant' versus 'current' dollar value of construction question has become important once again. The reason is because there have been large spikes in the costs of many building material inputs; plus, wages have been ascending rapidly as well. There are indications from Producer Price Index (PPI) readings that the worst of the material price advances are over, especially in forestry and steel products. Nevertheless, it is important to understand how the 'real' or inflation-adjusted value of construction is derived.

A price index or deflator is used to convert current dollars to constant dollars. A base period is chosen for a certain price

level, and it is assigned the value of 100.0. Then if prices increase by +5% over the next year, the index in year two moves to  $1.05 \times 100.0 = 105.0$ . If prices rise by +4% in the third year, the index will shift up to  $1.04 \times 105.0 = 109.2$ . If prices change by -4% instead, the index value in the third year will become  $0.96 \times 105.0 = 100.8$ .

Market volumes divided by an appropriate price index or deflator will yield dollars that are termed 'constant' (i.e., in the sense that they have had inflation removed) relative to the chosen base period. In the next paragraph, the price index adopted by Oxford Economics employs a base year of 2015 equal to 100.0

The PIP construction dollar volumes set

out in this report, as calculated by Oxford Economics and ConstructConnect, are in 'current' dollars. The estimates of the year-over-previous-year pricing impacts, as provided by Oxford Economics, are +2.9% in 2020; +3.3% in 2021; and a stunning +18.5% in 2022. In 2023 and 2024, the increments retreat to +3.4% and +2.0% respectively. 2025 to 2027 will see modest price advances of +2.2%, +1.8%, and +2.0% respectively.

This means that the 'real' performance of Grand Total put-in-place construction activity in 2020 was +4.8%; in 2021, +5.0%; in 2022, -7.0%; and predicted for 2023, -1.4%. The annual real gains will then return close to +5.0% over the remainder of the forecast period out to 2027.

**TABLE 2 - THE U.S. 2022 MEGA PROJECTS 'STARTS' STORY**

Month	State	City/County	Type	Name	\$s (millions)	
Jan 2022	New York	East Hampton	Engineering/Civil	South Fork Wind Farm	\$2,000	1 for \$2.0 billion
April 2022	Maine	Kittery	Institutional	P-381 Multi-Mission Dry Dock 1, Portsmouth Naval Shipyard	\$1,700	
April 2022	New Jersey	Kearny	Engineering/Civil	Portal North Bridge Project	\$1,600	
April 2022	Louisiana	Sulphur	Industrial	Tellurian Driftwood Liquefied Natural Gas (LNG) Production & Export Facility - Phase 1	\$10,000	
April 2022	California	Cupertino	Residential	The Rise Mixed-Use, Sand Hill Property Co. (3.9 million sf)	\$2,700	
April 2022	California	Sacramento	Institutional	Aggie Square Mixed-Use Project Phase 1 - University of California, GMH Associates	\$1,100	5 for \$17.1 billion
May 2022	New York	New York	Commercial	Terminal 4 (T4) Redevelopment (10 New Gates), JFK Airport	\$1,500	
May 2022	Pennsylvania	Philadelphia	Institutional	New Inpatient Tower - Children's Hospital of Philadelphia (2.5 million sf)	\$1,900	
May 2022	Indiana	Indianapolis	Institutional	IU Health Methodist Hospital - Hospital Consolidation, Indiana University Health (IUH)	\$1,600	
May 2022	Texas	Sherman	Industrial	Texas Instruments Semiconductor Wafer Fabrication Plants (4.7 million sf)	\$15,000	4 for \$20.0 billion
June 2022	Florida	Apopka	Industrial	Apopka 429, Blue Steel Dev LLC (2.5 million sf)	\$1,000	
June 2022	Kentucky	Glendale	Industrial	BlueOvalSK Battery Park - Ford Motor Company (5.0 million sf)	\$5,800	
June 2022	Texas	Beaumont	Engineering/Civil	Arbor Renewable Gas Facility - Spindletop Plant	\$1,000	3 for \$7.8 billion
July 2022	Massachusetts	Boston	Residential	Bunker Hill Housing Redevelopment (fka One Charlestown) (2.8 million sf)	\$1,400	
July 2022	Pennsylvania	Pittsburgh	Institutional	Heart & Transplant Hospital at UPMC Presbyterian - U of Pittsburgh Medical Center	\$1,500	
July 2022	Michigan	Lansing	Industrial	General Motors Battery Cell Manufacturing Plant (2.5 million sf)	\$7,000	
July 2022	Texas	Baytown	Industrial	TGS 500K, Trans-Global Solutions	\$1,400	
July 2022	California	Paramount	Industrial	World Energy Paramount Sustainable Fuel Refinery Upgrades	\$2,000	5 for \$13.3 billion
Sept 2022	Texas	Taylor	Industrial	Samsung Semiconductor Chipmaking Plant (6.0 million sf)	\$9,000	
Sept 2022	Texas	San Antonio	Engineering/Civil	I-35 NEX Central Project (Texas Dept of Transport)	\$3,000	
Sept 2022	Arizona	Litchfield Park	Industrial	Prologis 303 (Loop 303) Industrial Park (1.6 million sf)	\$1,000	
Sept 2022	California	Torrance	Institutional	Harbor-UCLA Medical Center Replacement Program (1.3 million sf)	\$1,200	4 for \$14.2 billion
October 2022	Massachusetts	Boston	Institutional	Massachusetts General Hospital / Clinical & Campus Services Bldg (1.1 million sf)	\$1,900	
October 2022	Georgia	Savannah	Industrial	Hyundai Motors Electric Vehicle & Battery Mnfng Plant (11 Buildings) (14.0 million sf)	\$5,500	
October 2022	Texas	Beaumont	Industrial	OCI Beaumont Blue Ammonia Facility	\$2,000	3 for \$9.4 billion
November 2022	Texas	Odessa	Industrial	1PointFive Direct Air Carbon Capture Plant, with Occidental Pete (1.5 million sf)	\$1,100	
November 2022	Nevada	Las Vegas	Engineering/Civil	The Gemini Solar Array, Quinbrook Infrastructure Partners/Rowan Green Data	\$1,000	2 for \$2.1 billion
December 2022	New York	Albany	Engineering/Civil	Champlain Hudson Power Express Project (underground cable, Canada to New York)	\$4,500	
December 2022	Tennessee	Stanton	Industrial	Blue Oval City Manufacturing Facility - Ford Motor Company (7.5 million sf)	\$5,600	
December 2022	Arizona	Phoenix	Industrial	Taiwan Semiconductor Manufacturing Company (TSMC) - Fab 2 (2.5 million sf)	\$8,000	
December 2022	Arizona	Buckeye	Industrial	KOREPlex Manufacturing Facility (batteries), KORE Power Inc (2.0 million sf)	\$1,300	4 for \$19.4 billion

Data source and table: ConstructConnect.

2022's Totals = 31 for \$105.3 billion

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