

Fall 2023 (Published: August 2023)

U.S. Put-in-Place Construction Forecasts

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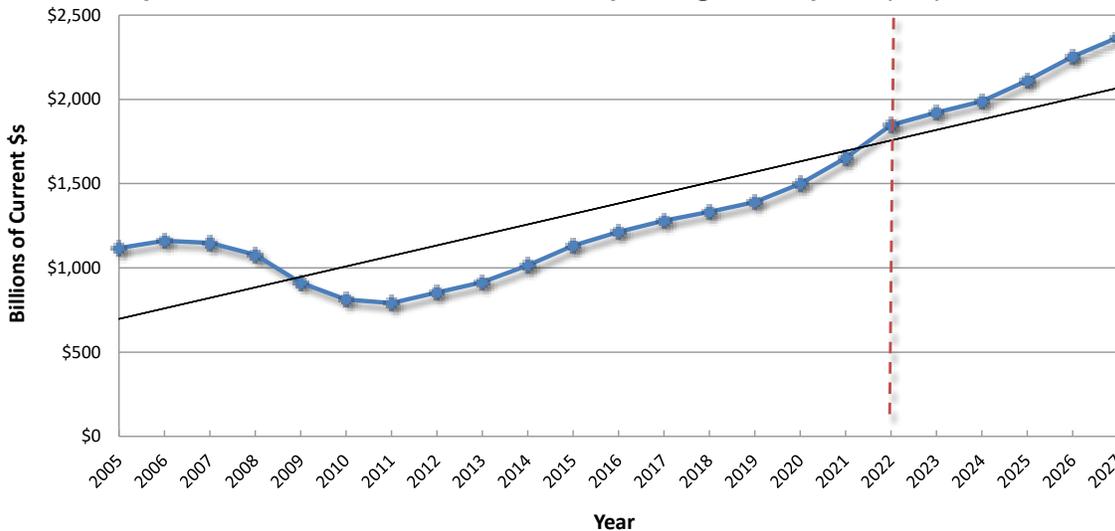
Quarterly U.S. Put-in-Place Construction Forecast Report, Fall 2023

Two forces are currently sculpting economic events. They are in many ways, but not all ways, contradictory. There is the fight against inflation which continues to be pressed through high interest rates by the Federal Reserve. The year-over-year change in the Consumer Price Index has eased by about a third versus its peak rate and appears to have settled at a level just beyond +3.0%, only a percentage point above the long-held target of +2.0%. What prevents the Fed from declaring victory is that price volatility persists in some key consumer product areas, primarily gasoline, where the knock-on effects can be wide-ranging for other goods and services.

Plus, a surge in wage increases is just now entering early-stage contraction as the unemployment rate, while staying historically low, does slowly creep upwards. Gross Domestic Product (GDP) growth in the first

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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 \$100 million mixed use complex for which ground is broken in June 2023. For the 'starts' series, the entire estimated value (\$100 million) will be entered in June 2023. In PIP numbers, it will be captured as spending of approximately \$25 million in 2023; \$60 million in 2024; and the final \$15 million in 2025.

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half of this year, at +2.0% in Q1 and +2.4% in Q2, considerably outperformed the expectations of most analysts. A slowdown is anticipated in late 2023 extending into early 2024, but many prognosticators no longer see a recession as a sure thing. The mood of stock market investors has lightened with major indices recovering to near previous summits.

Counterproductively, high interest rates are inhibitors on efforts to achieve one of the greatest shifts in world economic history, the transition away from carbon-emitting fossil fuels in favor of renewables. The capital spending required will be enormous. Changes to the construction landscape are already apparent, in the number of mega projects (i.e., those carrying an estimated value of a billion dollars or more each) that have been launched over the past year and a half.

The kinds of ultra-large projects carrying the banner for a cleaner environment include electric vehicle and battery facto-

ries; carbon capture and storage facilities; wind, solar, nuclear, and hydrogen plants; and country-spanning recharging networks. Also, companies are studying and adopting ways to transform their production processes and means of transportation to reduce their carbon footprints.

There will be no escaping the heightened expense of doing business. Also, the dollars spent in energy transition areas will take away from investments made to increase output, a traditional inflation busting answer. The Fed is right in one sense, though. Keeping a check on costs will be necessary to avoid the construction price escalation of nearly +20.0% that occurred in 2022.

Finally, as an overriding imperative, a great deal more care will need to be taken in the scheduling and carrying out of mega project work moving forward if the often twin problems of cost overruns and completion delays plaguing such undertakings in the past are to be avoided.

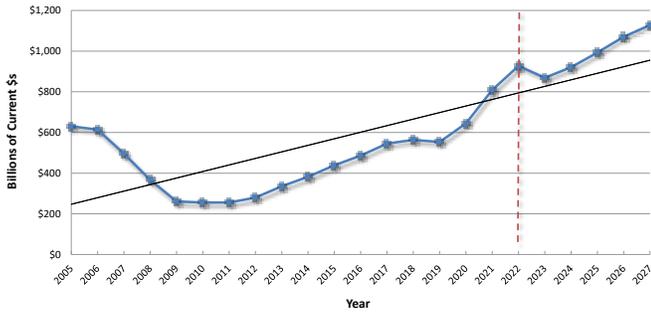
Table 1: U.S. Construction Spending (put-in-place investment)
(billions of "current" \$s)

Type of Construction:	Actuals		Forecasts				
	2021	2022	2023	2024	2025	2026	2027
Grand Total	1,653.4	1,848.7	1,922.3	1,988.0	2,112.4	2,253.9	2,367.9
(year vs previous year)	10.3%	11.8%	4.0%	3.4%	6.3%	6.7%	5.1%
Total Residential	809.0	927.4	868.5	921.4	993.3	1,070.2	1,128.3
	25.6%	14.6%	-6.4%	6.1%	7.8%	7.7%	5.4%
Total Non-residential	844.4	921.3	1,053.7	1,066.6	1,119.1	1,183.7	1,239.7
	-1.3%	9.1%	14.4%	1.2%	4.9%	5.8%	4.7%
Total Commercial/for Lease	206.4	232.7	242.7	241.7	254.5	269.2	284.0
	-2.2%	12.8%	4.3%	-0.4%	5.3%	5.8%	5.5%
Lodging	19.1	19.7	22.2	24.5	27.5	30.4	33.7
	-33.0%	3.5%	12.6%	10.4%	12.1%	10.5%	10.9%
Office	89.9	91.6	93.5	84.8	87.2	94.2	100.2
	-3.2%	1.9%	2.1%	-9.3%	2.8%	8.0%	6.3%
Commercial (retail/warehouse)	97.4	121.4	127.0	132.4	139.7	144.6	150.2
	8.6%	24.6%	4.6%	4.3%	5.6%	3.5%	3.9%
Total Institutional	194.3	201.4	215.7	219.0	226.6	233.9	242.8
	-6.9%	3.6%	7.1%	1.6%	3.5%	3.2%	3.8%
Health Care	50.3	54.8	60.7	60.6	62.2	65.6	69.9
	3.5%	8.8%	10.8%	-0.1%	2.6%	5.4%	6.6%
Educational	101.0	102.1	108.9	110.3	113.9	115.9	118.4
	-8.8%	1.1%	6.7%	1.2%	3.3%	1.8%	2.1%
Religious	3.1	2.9	3.1	3.0	3.1	3.2	3.3
	-10.8%	-4.8%	3.8%	-1.3%	3.0%	2.2%	2.8%
Public Safety	12.8	11.6	12.4	13.2	13.8	14.1	14.4
	-27.4%	-9.8%	7.0%	6.5%	4.9%	1.9%	2.5%
Amusement and Recreation	27.1	30.0	30.6	31.9	33.5	35.1	36.8
	-4.2%	10.7%	1.9%	4.3%	5.1%	4.6%	4.8%
Total Engineering/Civil	361.7	372.5	410.6	433.7	468.8	502.5	530.0
(year vs previous year)	0.4%	3.0%	10.2%	5.6%	8.1%	7.2%	5.5%
Transportation	59.1	58.7	63.1	68.2	75.0	81.0	86.0
	-2.7%	-0.6%	7.5%	8.0%	10.1%	8.0%	6.1%
Communication	23.1	24.3	24.7	26.2	27.6	29.2	31.0
	-3.3%	5.3%	1.6%	5.9%	5.5%	5.8%	6.2%
Power	119.1	109.8	119.9	136.0	158.0	177.8	194.3
	0.8%	-7.8%	9.2%	13.4%	16.1%	12.6%	9.3%
Highway and Street	103.4	114.1	127.4	128.1	131.6	136.2	139.2
	1.0%	10.4%	11.7%	0.5%	2.7%	3.5%	2.2%
Water Supply & Waste Disposal	49.1	56.1	63.7	62.8	63.8	65.0	66.2
	6.4%	14.2%	13.6%	-1.4%	1.6%	1.9%	1.7%
Conservation and Development	7.9	9.4	11.7	12.4	12.7	13.1	13.3
	-11.2%	19.3%	23.7%	6.0%	3.1%	2.9%	1.5%
Total Industrial/Manufacturing	82.0	114.7	184.8	172.2	169.2	178.1	182.8
	8.8%	39.8%	61.1%	-6.8%	-1.7%	5.3%	2.6%

*Current" means not adjusted for inflation.

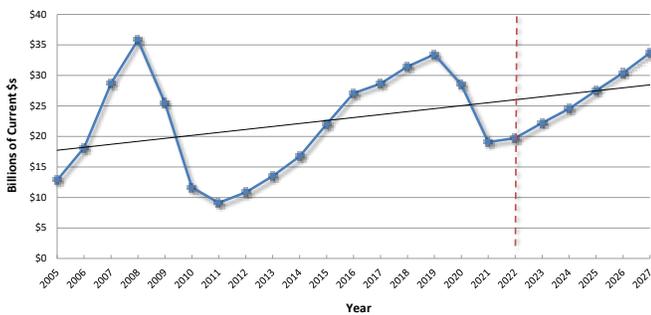
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Table: ConstructConnect.

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



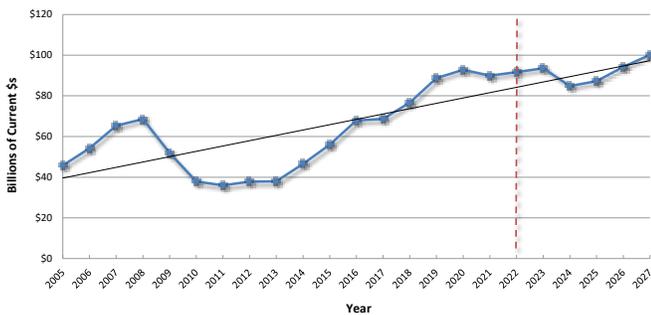
For several years, even encompassing the worst of the pandemic period, U.S. housing starts were on a tear, making up for the fallow times following the 2008-09 recession. The early 20s uplift arose from a federal funds rate at its lowest ebb. The climb in mortgage rates throughout last year, and again ascending to 7.0% this year, has put a damper on new home groundbreakings. Weakness in initiations in 2022 is adversely impacting the put-in-place (PIP) numbers in 2023. Underlying demand for new housing, however, is strong and there will be recovery in 2024 that will build momentum in subsequent years. The average annual growth rate for the residential PIP data set will be +4.1% for the five years 2023-2027, a bit slower than total construction's +5.1%.

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



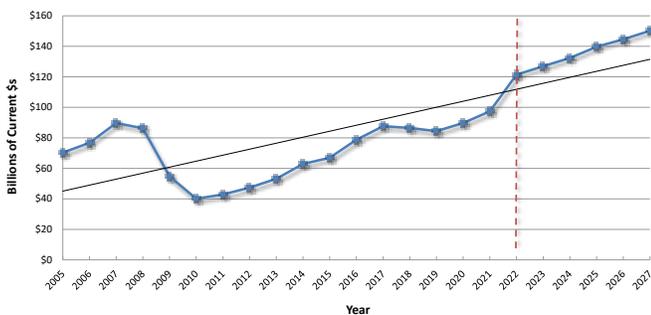
An uptick in hotel and motel construction starts, in dollar volume, began in 2022 and has continued through the first half of 2023, the latter tallying +6.0% versus January-June 2022. The significant downturn that occurred in the sector in 2020 and 2021 was due to severe travel restrictions imposed globally in an attempt to thwart COVID's onslaught. But executives know that success in business will often require live interaction with suppliers and customers. Also, with the dropping of mask mandates, many individuals have been compelled to visit far-away places and distant relatives. Sparks have been re-ignited under the accommodation and travel industry. Still, lodging PIP construction won't return to 2008 and 2019 dollar levels until 2027.

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



The pressure placed on many workers by their employers to return to the office place will continue. But the tendency for many others to keep operating from home will probably never be fully reversed. Inordinately high office vacancy rates may not have even maxed out yet, as long-term leases in some instances are just now expiring, taking an old descriptive phrase, 'see-through buildings', to a new extreme. Lining up lending for a new development is problematic; conversions to other types of usage, such as residential, have become commonplace. An exception in this space is data centers. They're sprouting everywhere, and with nearly everything in our lives being digitized, it's hard to see where full capacity demand will ever be reached.

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

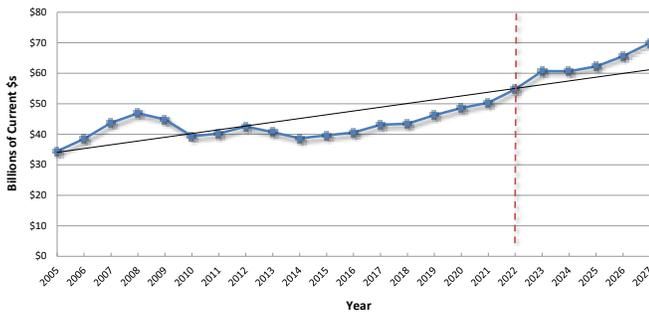


The retail/warehouse category of construction has been displaying an interesting dynamic. Declines in the 'bricks and mortar' aspect of the former have been counterbalanced by the building of giant structures designated in the latter to fulfill the burgeoning number of orders placed over the Internet, accelerated by the stay-at-home strictures imposed upon COVID's arrival. Presently, the shopping and distribution side of warehouse construction is quieting, to be replaced by industrial activity tied to a desire for better input and output inventory management. This follows from a scaling back of globalization that was revealed to have major flaws a short while ago, when shipments from overseas suppliers were suddenly and unexpectedly curtailed.

Graphs include a 'best fit' linear trend line.

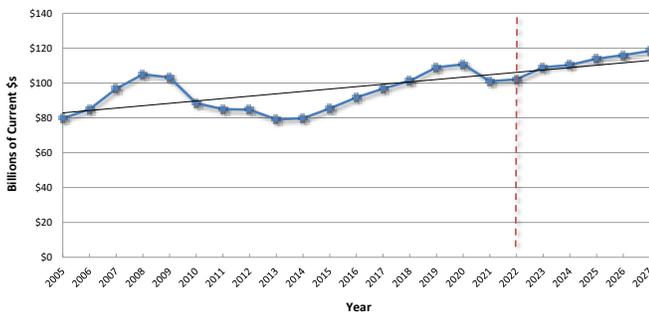
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Charts: ConstructConnect.

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



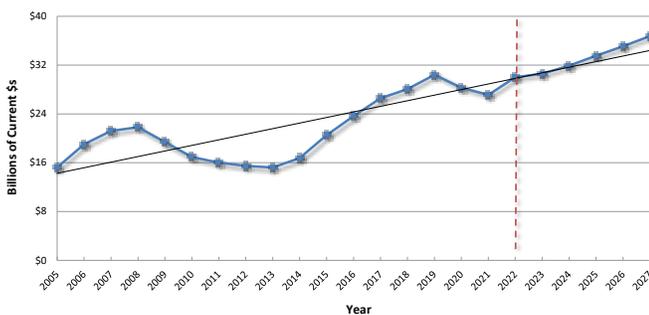
In the five years prior to the forecast period, the average annual increase in health care capital spending was +4.9%. During the follow-up five years, 2023 to 2027, the average annual increase is projected to be marginally more, +5.1%, the same as for the dollar volume of total put-in-place construction. Given the aging of the population (i.e., the youngest 'baby boomers' extant have circled the sun 58 times), and the toll life takes on physical well-being, the pressures placed on the caregiving sector can hardly be anything but fraught. It's in the mix of choices presented to patients, from for-profit, government-funded, or religion-founded hospitals, through private medical clinics and an array of seniors' home alternatives, where the drama will be found.

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



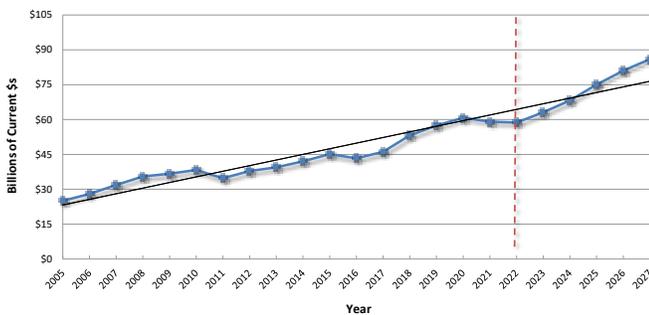
A hiccup in college and university construction spending was brought on by courses migrating to the Internet and foreign student enrolments going for a slide. Also, endowment funds took a hit when stock market prices plummeted after the Fed turned hawkish on interest rates. But the ship is being righted, as understanding grows about how desperately instructional sites will need to be expanded to give young adults and older workers the requisite skills for a world of innovative jobs never previously imagined (i.e., in disaster mitigation; doing business in the meta-verse; streamlining logistics; space exploration and tourism; etc.). New and renovation investments in K-12 education are being supported by ongoing solid returns from property tax collections.

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



No one was gadding about in 2020 and 2021, as COVID-19 lockdowns prevailed, and spending on amusement and recreation projects nosedived. In the past year or so, however, there's been a 180-degree turn, with people free to go wherever they wish (i.e., sporting events, the theater, concerts) and having the financial wherewithal to do so, thanks to nearly full employment and earnings growth that is double the historical norm. Underway and upcoming arena and stadium projects, casinos, and movie and television recording studios are making their construction marks once again. The degree to which the entertainment industry has blossomed, not only at home but worldwide, abetted by the likes of streaming services, has yet to be thoroughly recognized.

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

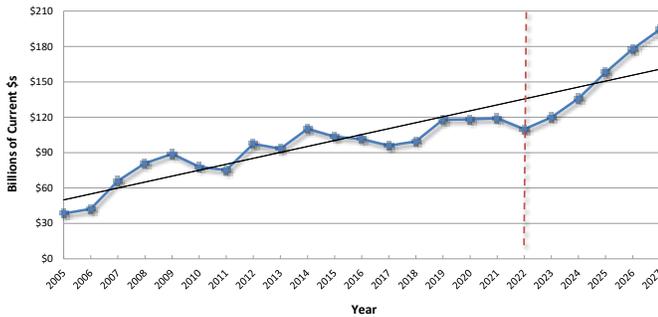


There's a lot of catching up to do if America's ports, transit systems, railroads, and airports are to become globally competitive in delivering individuals and goods to destination points safely, rapidly, and without doing environmental damage. Problems on the product delivery side were emphasized during the supply chain breakdowns that occurred in 2021-2022, despite there being far less commuter traffic than usual. Big dollar spending on transportation works is virtually guaranteed. Airport expansions involve massive amounts of money, provided by government and by user fees and retail lease holdings. Also, there's little clarity on when the first commercial hyperloop project will break ground, but when it does, consider what an impact it will make.

Graphs include a 'best fit' linear trend line.

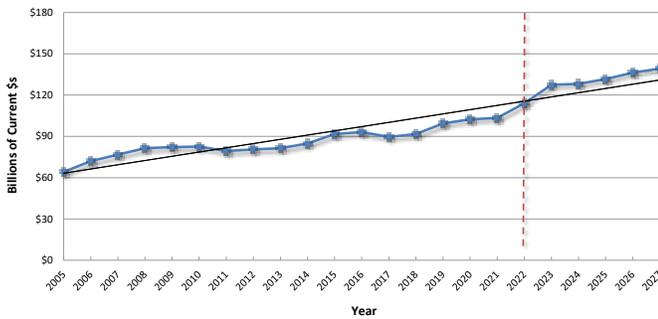
Source of actuals: U.S. Census Bureau/Forecasts: Oxford Economics and ConstructConnect/Charts: ConstructConnect.

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



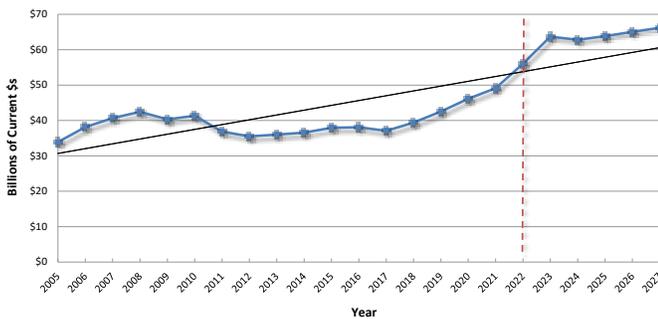
The 'power' category within overall PIP construction includes more than just electric power. It also encompasses oil and natural gas pipelines, storage systems, and distribution networks. Impediments to fossil fuel development come from court challenges over environmental and native land claim issues. Investment potential lies in LNG exporting facilities, and the building of fertilizer plants, but both fall under manufacturing. Where the explosive growth in power PIP construction will occur is in renewable electricity generation, through wind, solar and perhaps nuclear means. The ultimate goal of achieving net zero carbon emissions economy-wide cannot be reached without greatly expanding electric power capacity and ramping up transmission grids.

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



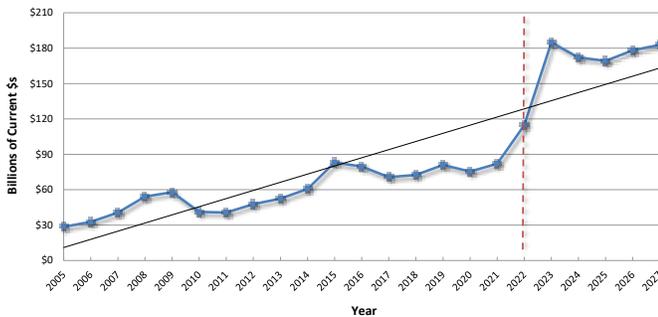
In the IJA and IRA stimulus bills authorized in Washington, the upgrading of infrastructure, with a heavy weighting towards roadwork and bridges, both new and repair, received much financial attention. There was a nice uptick in related PIP spending in 2022, with H1 2023 ahead by a further +17% year over year. The extra allocation of funds for roadwork will expire, however, and the recent small downgrade of U.S. federal debt may complicate the setting of future appropriations. Also, much highway work is financed by means of a gasoline fuel tax. Not only is it set too low, given the increases in fuel efficiency over the years, but it soon won't apply for many of the cars and trucks on the road as the switchover to electric vehicles intensifies.

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



There has been a rising trajectory in the dollar volume of spending on water supply and waste disposal construction projects since 2017. The bumps in the initial years corresponded with a marked pickup in suburban housing starts. Lately, this has been another category of PIP construction to benefit from government top-ups of spending on infrastructure. Through the first half of 2023, there's been another jump in capital spending, versus H1 2022, of nearly a third. The outsized year-over-year gains, though, won't be sustainable and a period of more modest advances is likely. Except that extreme weather events are increasingly cropping up to make striking and unpredictable demands on public sector cash to quickly fix life-sustaining services.

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



Through 2015, there was a slow creep upwards in manufacturing's PIP investment. From 2015 to 2021, the pattern was flat. In 2022, the picture changed dramatically for the better. Key industries, most notably the auto sector, began acting on their commitments to mitigate the harmful effects of greenhouse gas emissions. There's been a proliferation of green light go-aheads for electric vehicle assembly plants, and in even more abundance, battery plants. Plus, there's been the concerted effort to foster domestic computer chip making capacity. Such facilities entail the expenditure of tens of billions of dollars. Manufacturing is set to become the largest PIP sub-category on a dollar-volume basis. Its 2023 H1 'actuals' increase was +74%.

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 were unusually large spikes in the costs of many building material inputs in 2021, continuing into 2022 in some instances; plus, wages have been kicking up as well. From Producer Price Index (PPI) readings, the worst of the material price advances appears to be over. Nevertheless, it is important to understand how the 'real' or inflation-adjusted value of construction is calculated.

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 'real' or 'constant' (i.e., in the sense that they have had inflation removed) relative to the chosen base period. In the next paragraph (and in Table 2 below), 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 +19.2% in 2022. In 2023, the increment stays elevated, at +9.3%, but in 2024, it retreats to -0.6%. From 2025 on, the annual change will be moderate, at +2.0% or less.

This means that the 'real' performance of Grand Total put-in-place construction activity in 2020 was +4.8%; in 2021, +6.7%; in 2022, -6.2%; and predicted for 2023, -4.9%. The annual real gains will then return close to +5.0% in 2025 and 2026, before easing to +3.0% in 2027.

Table 2 - U.S. 'CONSTANT' DOLLAR OR 'REAL' PUT-IN-PLACE CONSTRUCTION SPENDING

Year	Construction Output Price Index (2015 = 100.0)	Change in Price Index Y/Y	'Current' \$ PIP Construction Spending (\$ billions)	% Change Y/Y	'Constant' \$ PIP Construction Spending (2015 as base period)	'Real' Y/Y % Change in Total PIP Construction Spending
2015	100.0		\$1,132.1		\$1,132.1	
2016	103.6	3.6%	\$1,213.2	7.2%	\$1,171.0	3.4%
2017	107.2	3.5%	\$1,279.9	5.5%	\$1,193.6	1.9%
2018	111.0	3.5%	\$1,333.2	4.2%	\$1,201.3	0.6%
2019	116.7	5.1%	\$1,391.1	4.3%	\$1,191.5	-0.8%
2020	120.1	2.9%	\$1,499.6	7.8%	\$1,248.3	4.8%
2021	124.1	3.3%	\$1,653.4	10.3%	\$1,332.3	6.7%
2022	147.9	19.2%	\$1,848.7	11.8%	\$1,249.7	-6.2%
2023	161.7	9.3%	\$1,922.3	4.0%	\$1,188.9	-4.9%
2024	160.7	-0.6%	\$1,988.0	3.4%	\$1,237.0	4.0%
2025	163.0	1.4%	\$2,112.4	6.3%	\$1,296.2	4.8%
2026	165.9	1.8%	\$2,253.9	6.7%	\$1,358.6	4.8%
2027	169.2	2.0%	\$2,367.9	5.1%	\$1,399.3	3.0%

Source of Price Index: Oxford Economics / Table: ConstructConnect.

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