



Economics and Highway Construction Cost Estimating

**Transportation Estimators' Association
2026 Annual Conference
Tampa, FL**

Economic

ts’ Perspectiv
Context
Industry Perspectiv e
Cost Indices
Key Takeaway s

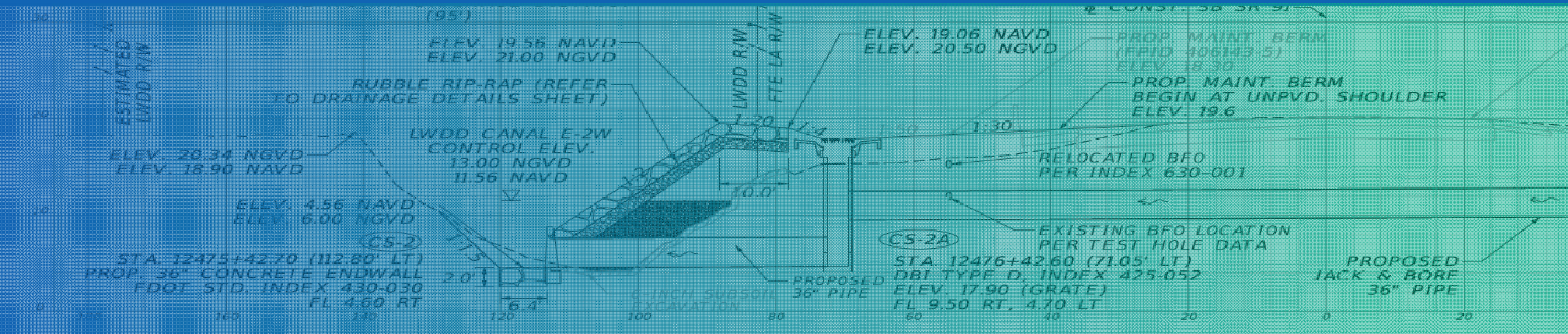


Perspective



Cost Factors

- How economists think about construction costs
- How this is relevant for Estimators



Economists' Perspective

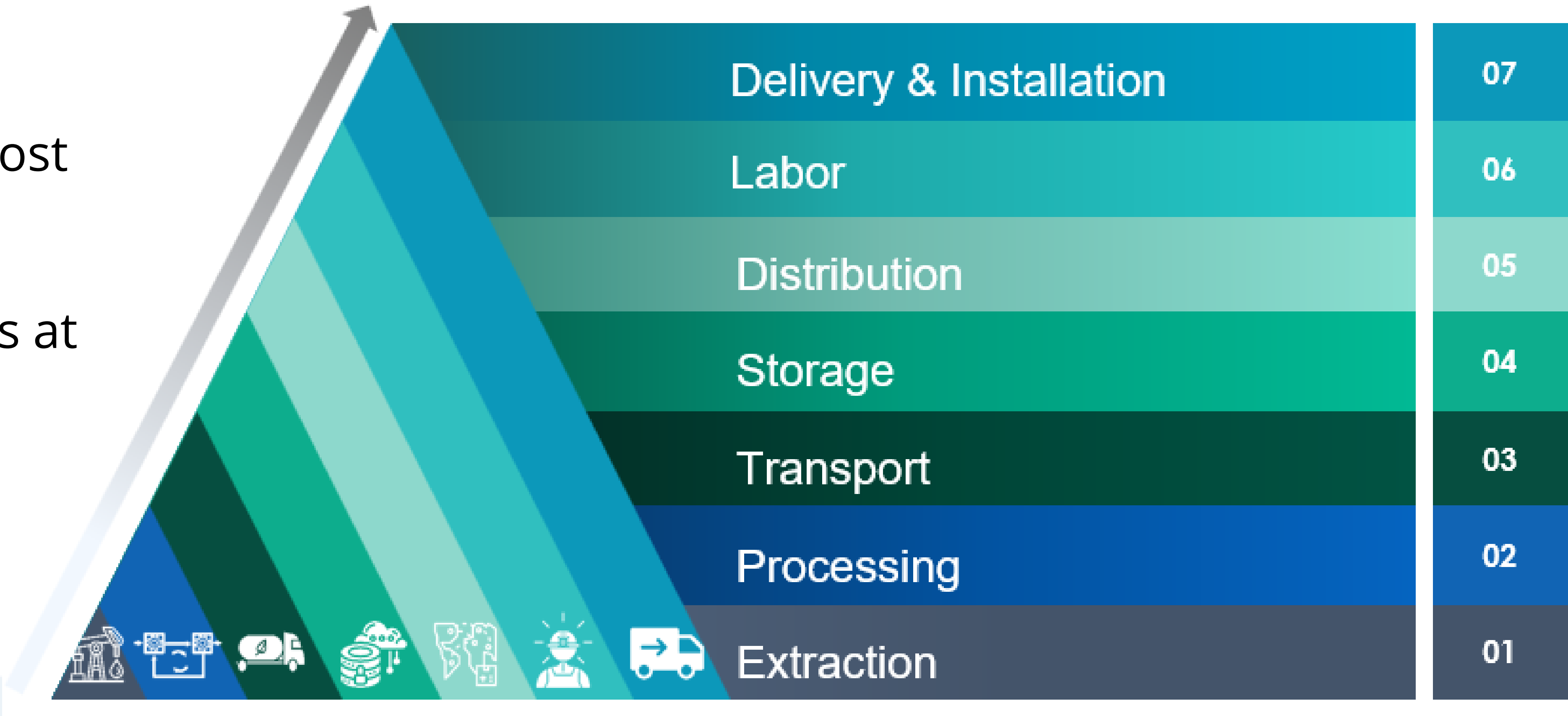


Supply Chain for Highway Construction



Transport – adds energy and labor cost at each step

Competition effects at each step

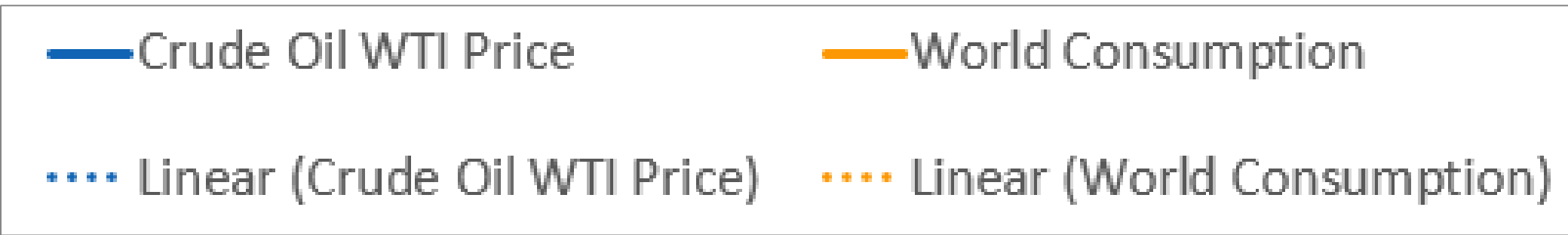
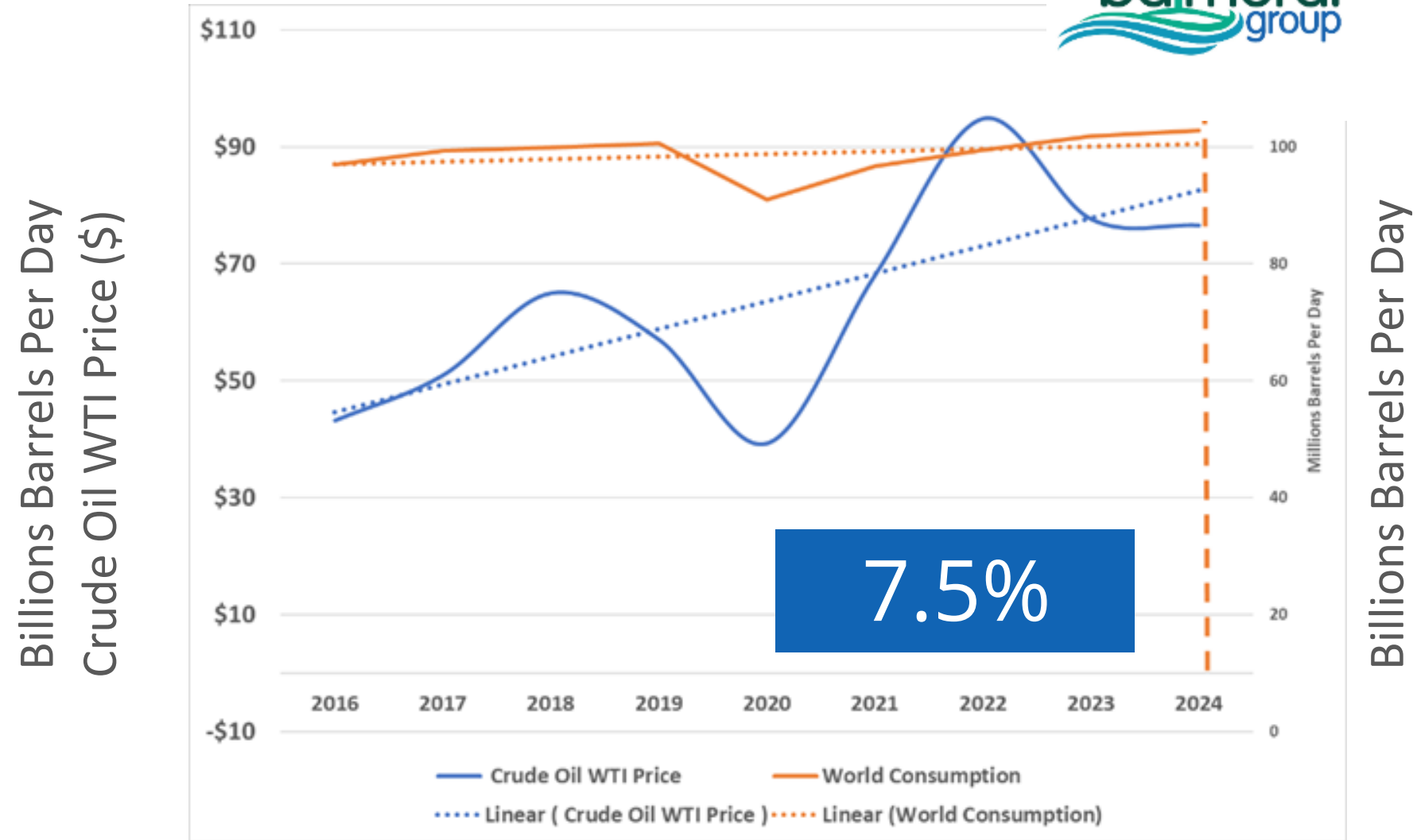
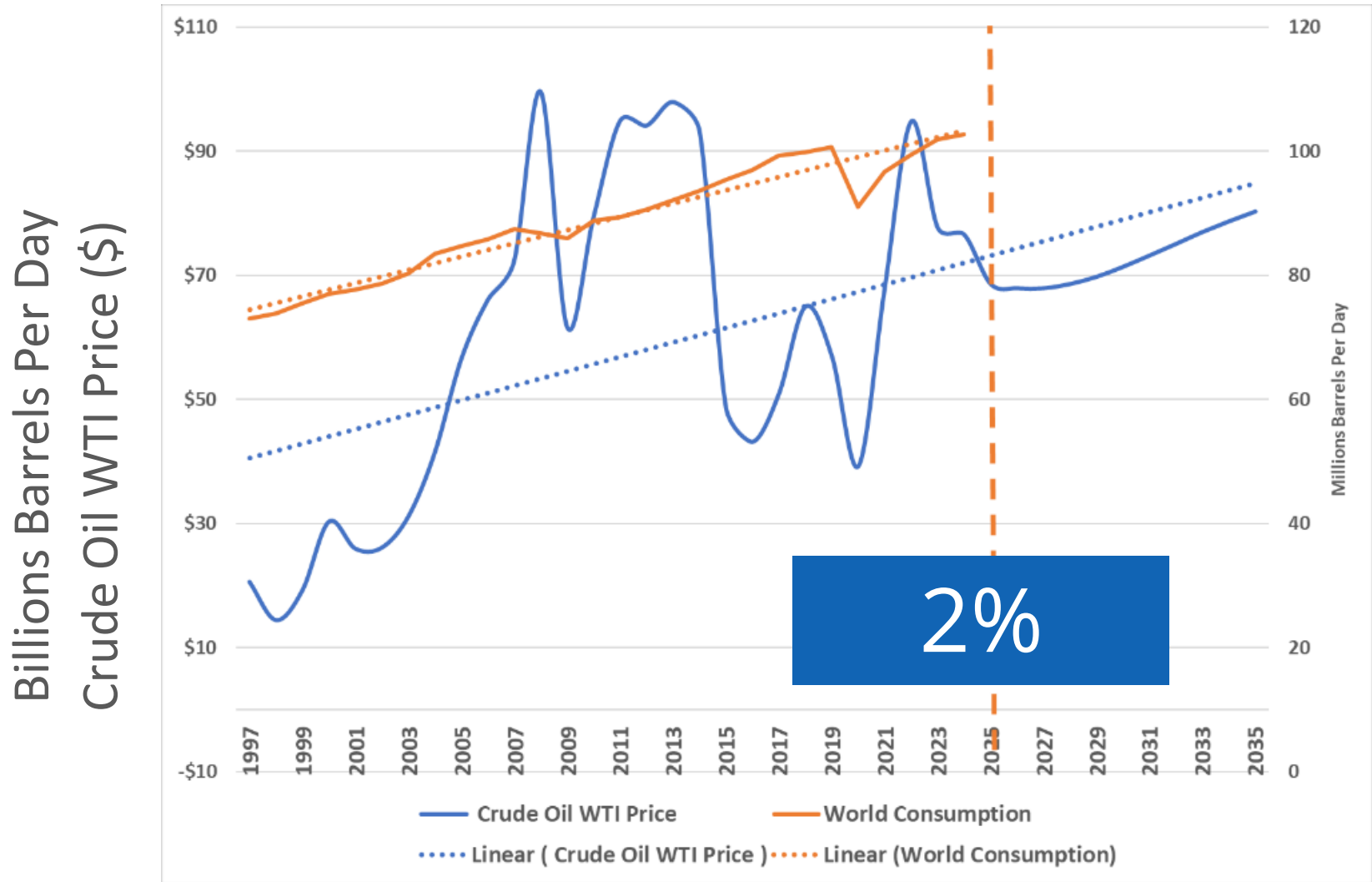
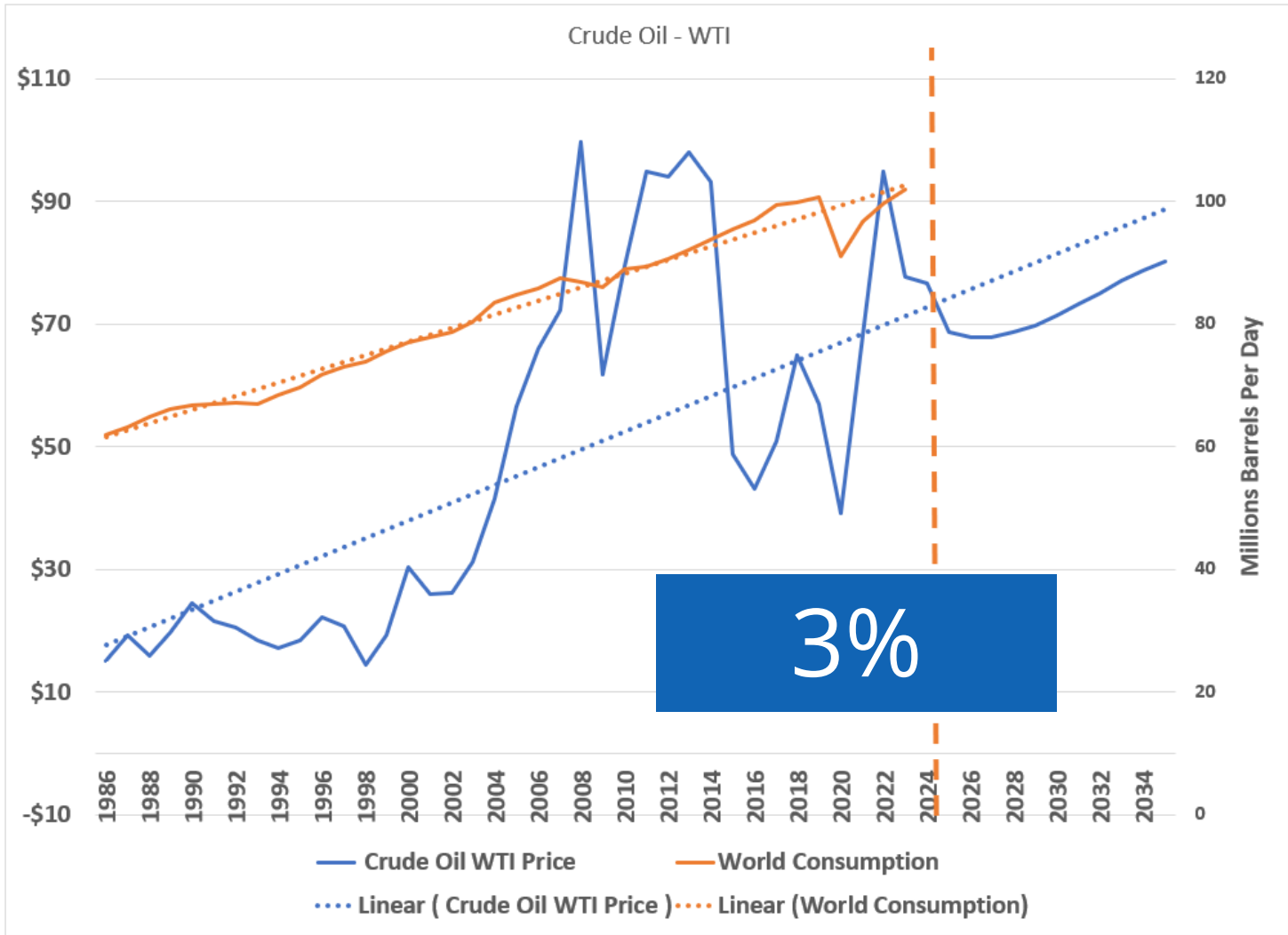


End Goal: Understand Bids

Historically, models have found that for every 10% increase in: DOTs saw an asphalt bid increase of:	Price of Crude	Non-Farm Employment	Price of Crushed Stone	Binder Price
	2.7%	8.1%	3.0%	3.7%
	Up 16% Y-o-Y	Flat Y-o-Y	Up 6% Y-o-Y	Up 40% Y-o-Y

Up 31%
YoY 2024-
2025

Oil – what's new?



Source: TBG Work Product, EIA.

5/1/2026

- UAE pulls out of OPEC, OPEC+
- UAE & Saudi Arabia only OPEC members with excess capacity

Implications

- Oil markets could become more volatile as OPEC's capacity to smooth supply imbalances diminishes.
- Future more likely to resemble most recent ten years

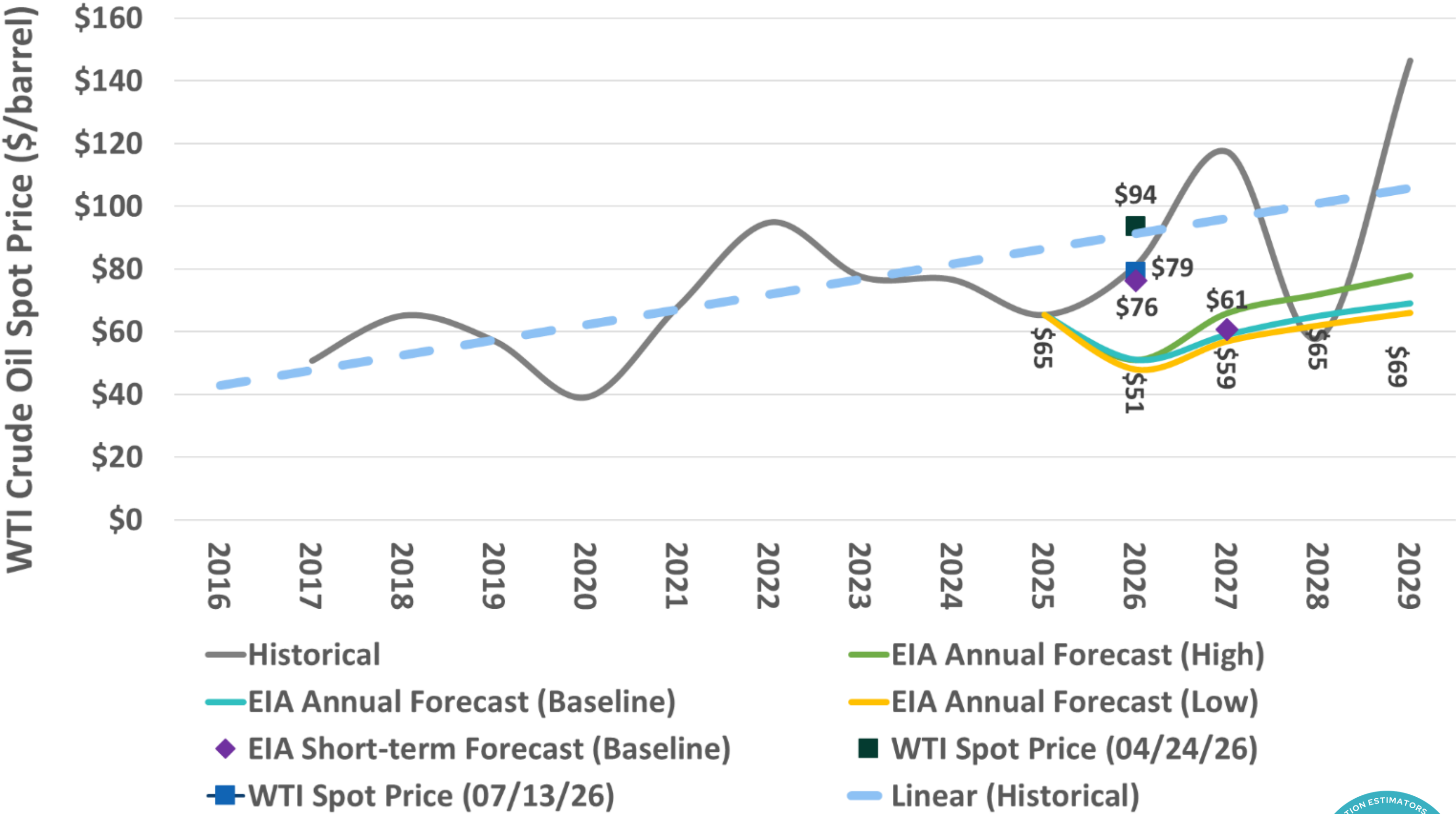
Oil - continued



Citibank	Goldman Sachs
May: Base Case: \$110 this qtr, \$80 by year end OR hits \$150 this quarter, averages \$130 next 2 qtrs., ends year at \$100. July: \$60-65 by year	May: Year end forecast \$90, up \$30 from before the Strait of Hormuz closure July: \$75-80 by yr end OR \$115 if cease fire fails Now expecting a 3M Barrel surplus

Markets responded
faster than
anticipated

More volatility could look like post-COVID swings
compressed into shorter cycles



Source: TBG Work Product, EIA.



Implications



Increased volatility in oil prices has ripple effects

Crews

Long Distances

Crews will be less interested in distance jobs

Fuel Index

Energy Costs

Fuel Surcharges

Materials Deliveries

10 – 15% surcharges hitting deliveries – without notice

Binder

Asphalt Binder

Costs up \$100-140/ton in less than a month from March to April, with prices still increasing

Asphalt & Fuel Indices

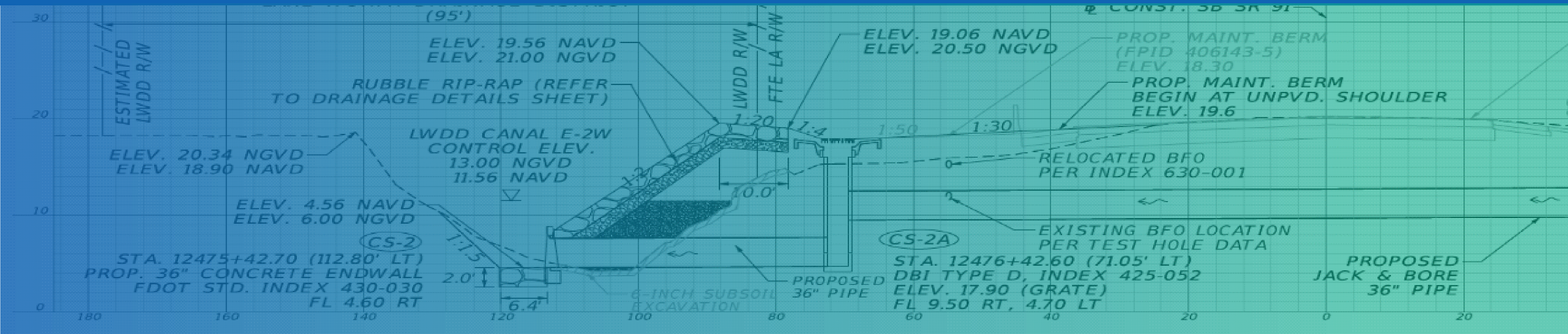
Budget for more payouts!

Context across Geographical Scale



Influencing Costs

- Internationally
- Nationally
- Regionally



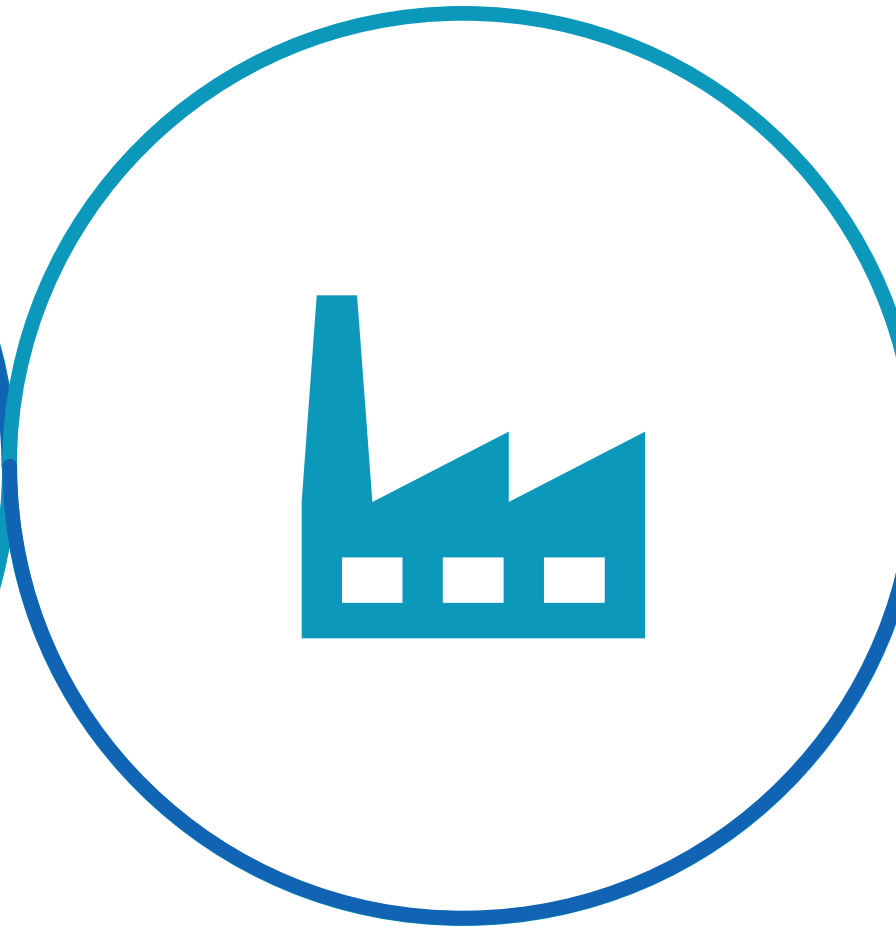
Supply Chain Resilience

Geopolitical conflict is having a series of ripple effects on global economy



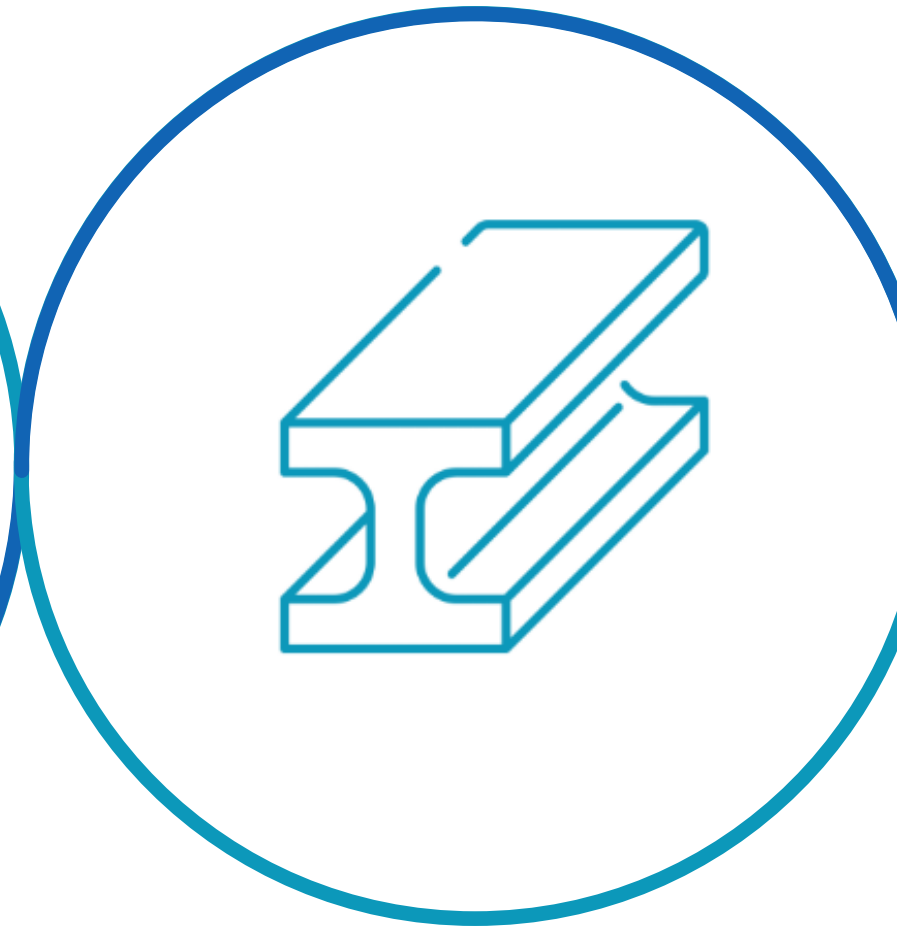
DOLLAR VALUE

Currency imbalance
from oil revenues
disruption – multiple
non-USD payments
systems in
development with 41
countries



INPUT COSTS

Manufacturers
report highest
input cost
increases since
1992



COMMODITIES

Aluminum prices
passed 2022 record
levels; steel prices
climbed since start
of 2026, restarting
capacity may take
time.



CARGO

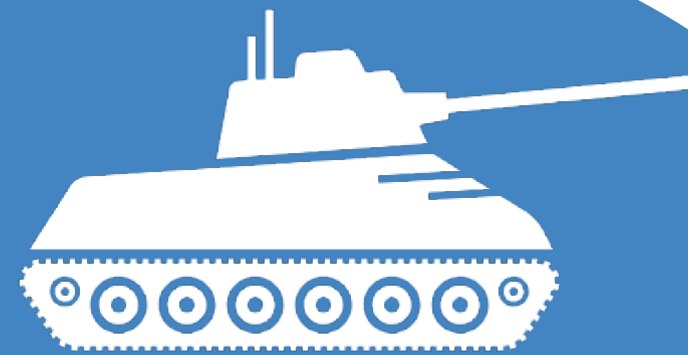
Half of all industrial
sulfur (copper);
ammonium nitrate
(blasting); graphite
(batteries), helium
(microchips), fertilizer

92% of
corporate
economists
reported
Iran
conflict
having
moderate
or
significant
negative
impact

Other Geopolitical Risks



Uncertainty on multiple fronts impacting supply chains, pricing, availability



Ukraine War

New EU steel quotas
due to influx of
Chinese supply and EU
supply chain

disruptions



Iran

Uncertain impacts on
oil, binder supply



Global Trade

Changing trade
relations, uncertain
future, USMCA

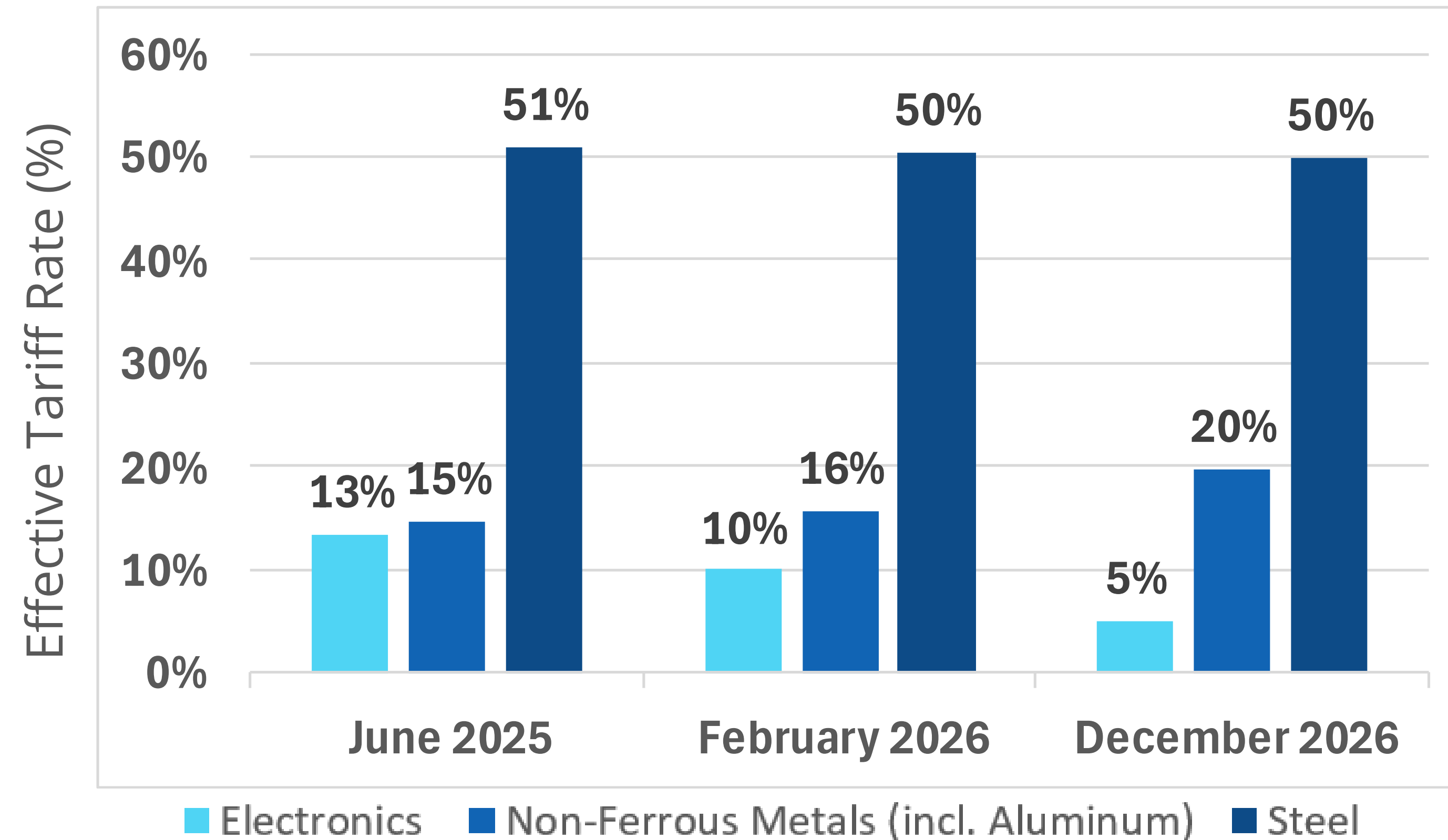
Tariff Effects



2024 Effective
Rate: **2.5%**

2025 Effective
Rate: **16.8%**

2026 Estimated
Rate: **18%**



- Steel and Aluminum carry **40% tariff** → has increased US production, but at higher price
- Industry experts (**76%**) perceive tariffs as **permanent** (vs. **40%** last year)

Source: U Penn Budget Model, Peterson Institute for International Economics, Institute for Supply Management, Yale Budget Lab

Tariff Effects



Frontloading of orders had multiple effects:

1

Low inventories, which now have to be restocked with post-War shipping prices

2

Restocking at higher (tariffed) prices, passing costs to customers

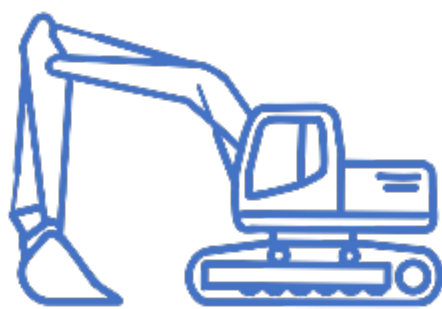
3

Expected global trade <1% (very low) rest of 2026 (slowing economy)



US manufacturing output

Expands by 1.1%



Construction output

Contracts by 2.5%



Mining output

Contracts by 1.0%



US Household Impact

Loss of \$750-\$1,500 annually, depending on tariff scenario



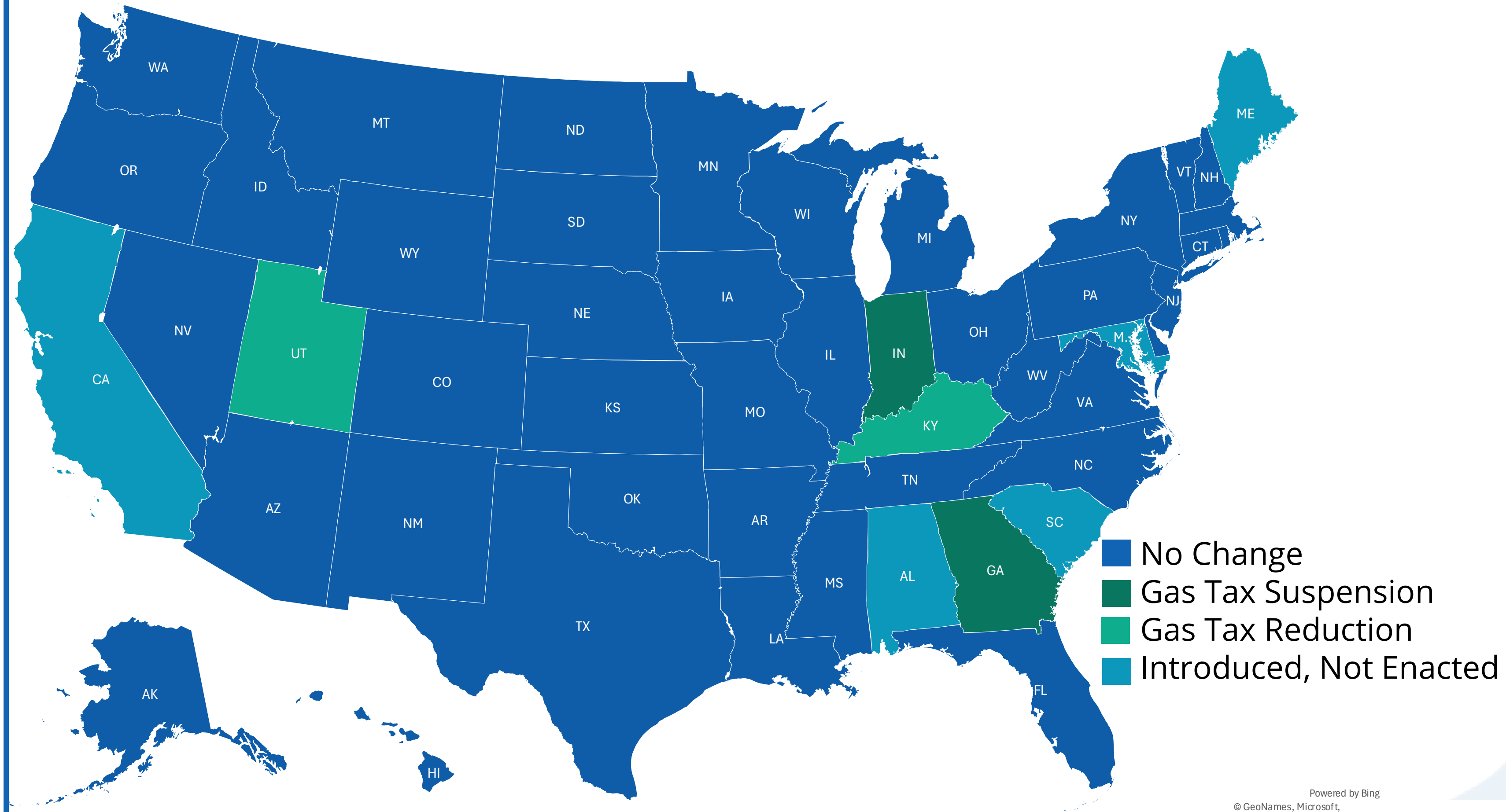
How States are responding

4 states have suspended or lowered gas taxes:

- **Georgia** – Suspended gas taxes through 6/2/26
- **Indiana** – Suspended gas taxes through 7/7/26
- **Utah** – Lowered gas taxes from the original **14.2%** to **\$0.32/gal** through 12/31/26
- **Kentucky** – Lowered gas taxes by **\$0.10/gal** from **\$0.25/gal** 5/11/26 through 6/30/26

5 states have **introduced** but bills never caught traction; Maine enacted a \$300 one-time payment for those affected by the excise taxes.

U.S. State Gas Tax Changes



Powered by Bing
© GeoNames, Microsoft

Source: State Government websites

TEA 2026 Conference

Work Program Shifts - 2026

Withdrawal of NEVI funding, IIJA drop-off in September 2026, and fuel and construction material increases have led to the suspension or withdrawal of some programs within state DOT highway work.

Oregon

Core Fix-It Program cut 40% versus previous report; Enhance and Mass Transit programs removed

Maine

Mismatch of \$130M in DOT; delayed projects for summer and reducing work plan next cycle by \$200M

California

Net reduction in funding from 2024 SHOPP; capacity to add new projects has been reduced

Colorado

State Bill cut funding to Multimodal Transportation and Mitigation Options Fund by \$71M in FY25-26 and \$57M in FY 26-27; delay/canceling of projects

Idaho

Removal of \$275M from Strategic Initiatives Fund for roads, bridges, etc.

New Hampshire

Current 10-yr plan is overprogrammed by \$400M; projected to remove/delay 50+ projects

Source: Various DOT Government Budgets, Reports

Immigration

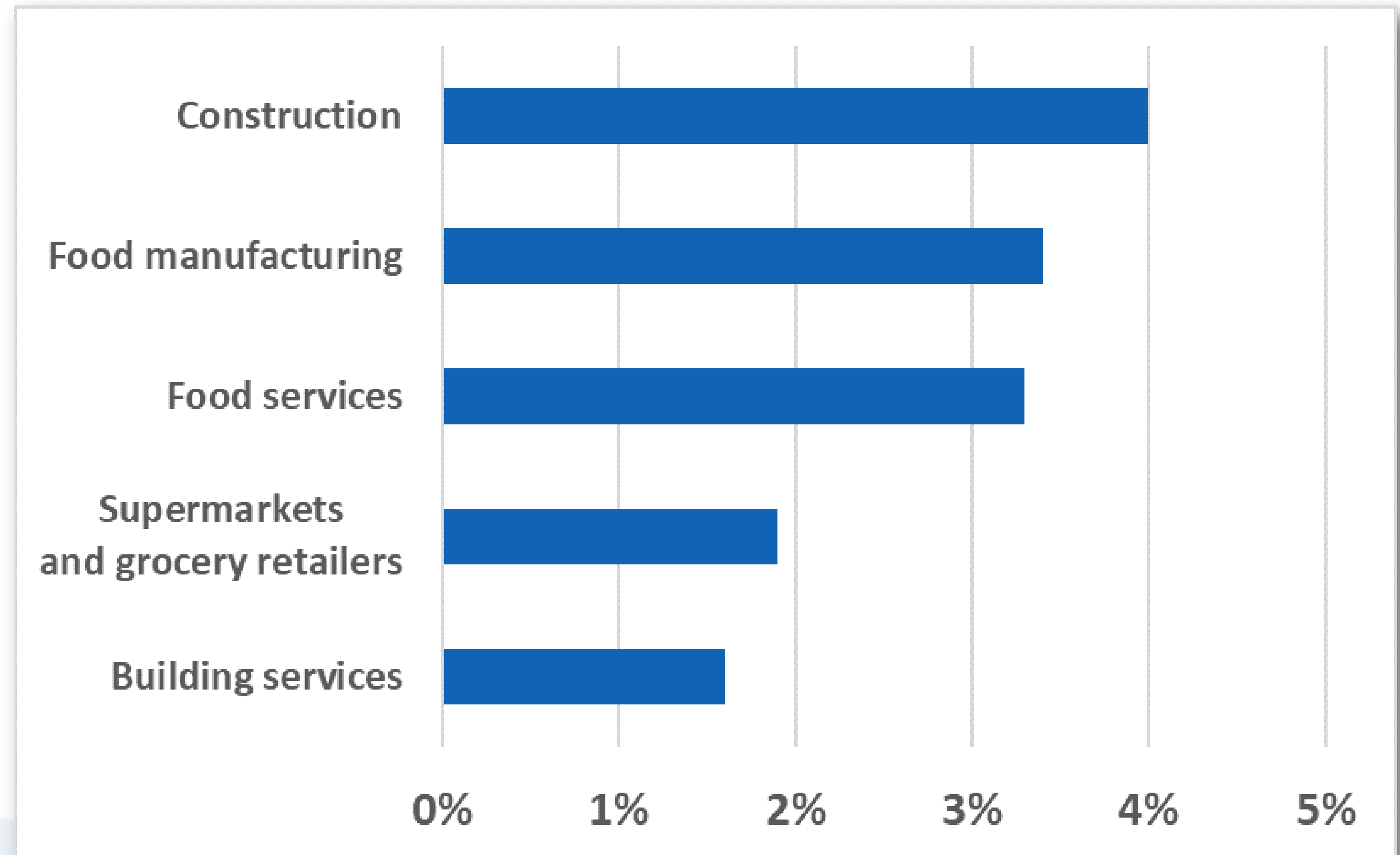
Construction industry had highest impact – through wage gains with a **4%** net effect

National mean annual wage:

- 2025: \$86,450
- 2019: \$71,440

Peer-reviewed research:

- stricter immigration policy boosts overall wages in the short-term
- but leads to wage declines, lower productivity and less new firm formation in the long-term.



Source: Wall Street Journal, NBER, BLS

Budget and Spending

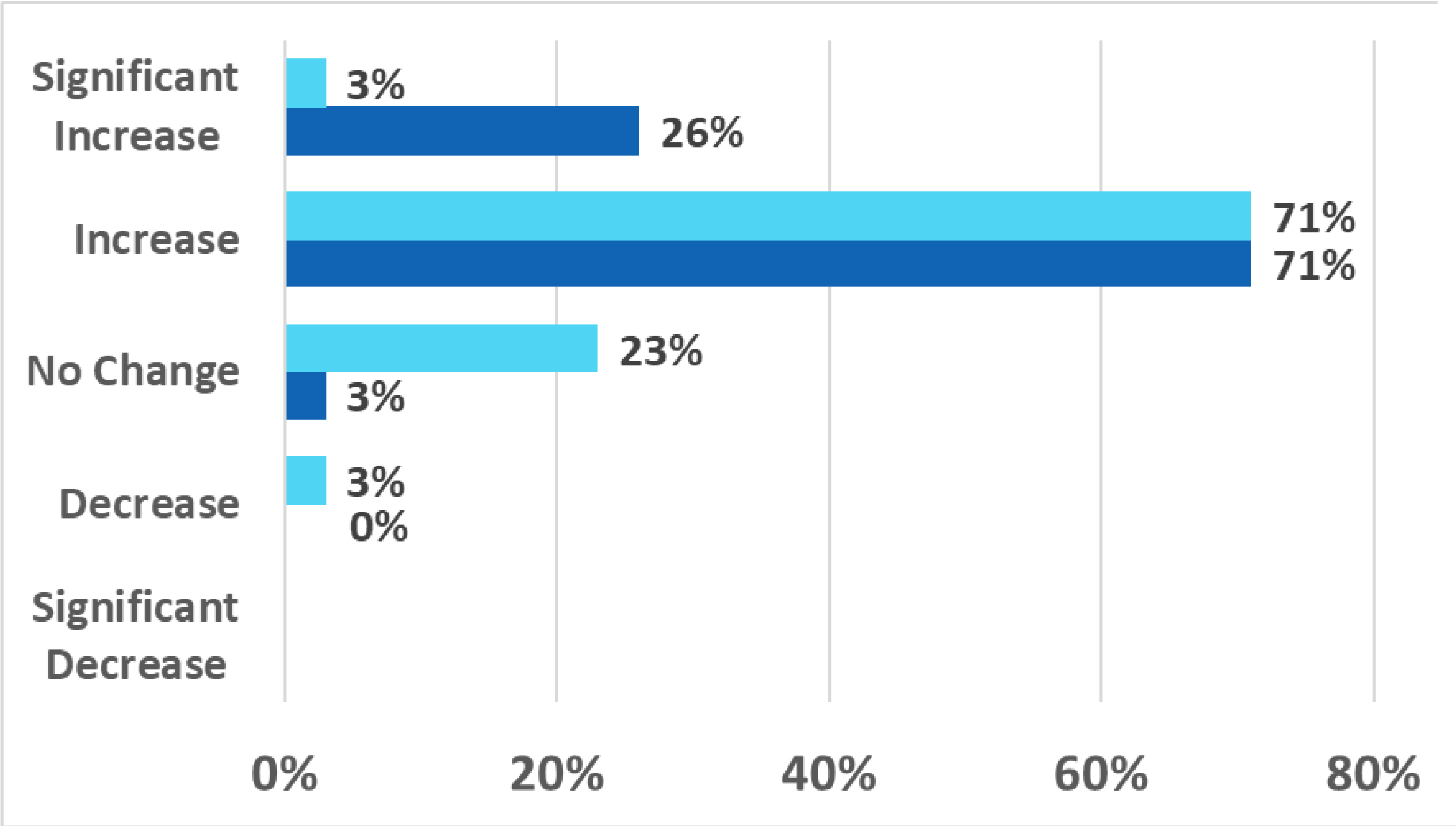


US Defense Budget

Budget request is for **\$1.5 trillion** for FY 2027

Global Military

Record spending reaching **\$2.9 trillion** in 2025



Percentage of Respondents



Source: Chief Economists Outlook January 2026



DEFENSE SPENDING

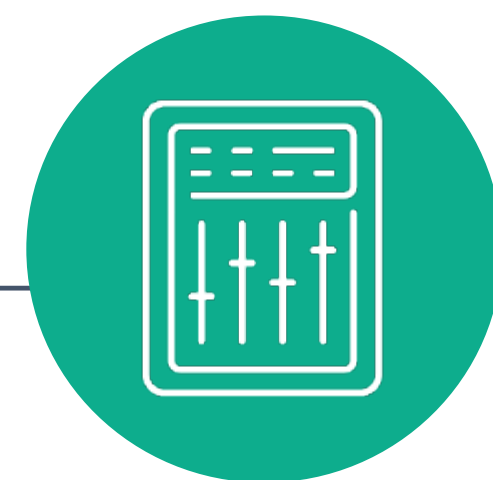
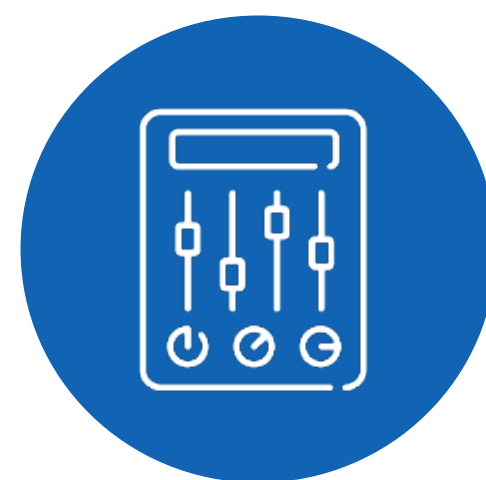
Military demand expected to crowd out some infrastructure spending while competing for resources

Military Demand

ELECTRONICS

Estimated \$150 billion

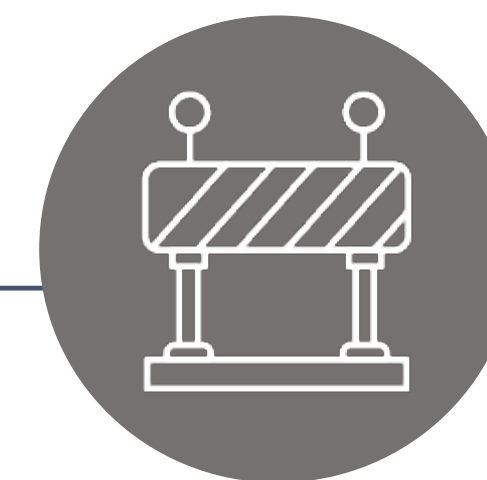
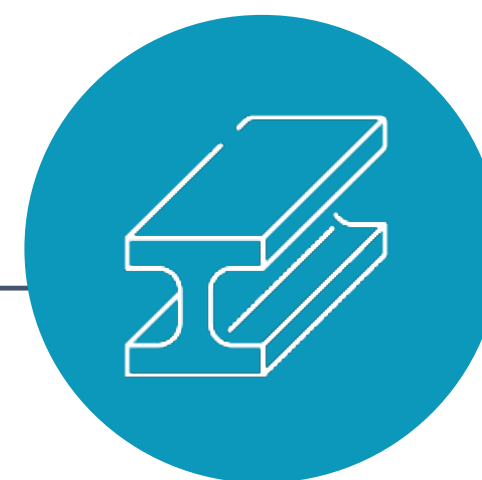
Radar, Avionics,
Semiconductors, etc.



STEEL

Estimated \$30 billion

3-5 million tons highly
specialized alloys



CONCRETE

Estimated \$30 billion in

peak years for rapid
facilities



Construction Demand

ELECTRONICS

Estimated \$20 billion

Hydraulic control systems,
displays, hybrid tech, semis

Fun fact: 15-30% of equipment
costs are for electronics

STEEL

Estimated \$15 billion

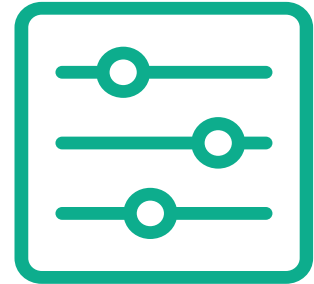
20 million tons rebar, structural
steel, pilings, signage,
guardrails – not fancy alloys

CONCRETE

Estimated \$30 billion

230 million tons
Not fancy and mostly
not quick

Data Centers



VOLUME

U.S. is home to an estimated 4,500 data centers, with a reported 700+ in planning phase.



CONCRETE

Average Hyperscale data center uses about 100,000 CY concrete (possibly half of what a large State DOT uses in a year)



STEEL

Estimated steel requirements of 15,000 tons per data center (about the amount of reinforcing steel a large DOT uses in a year)



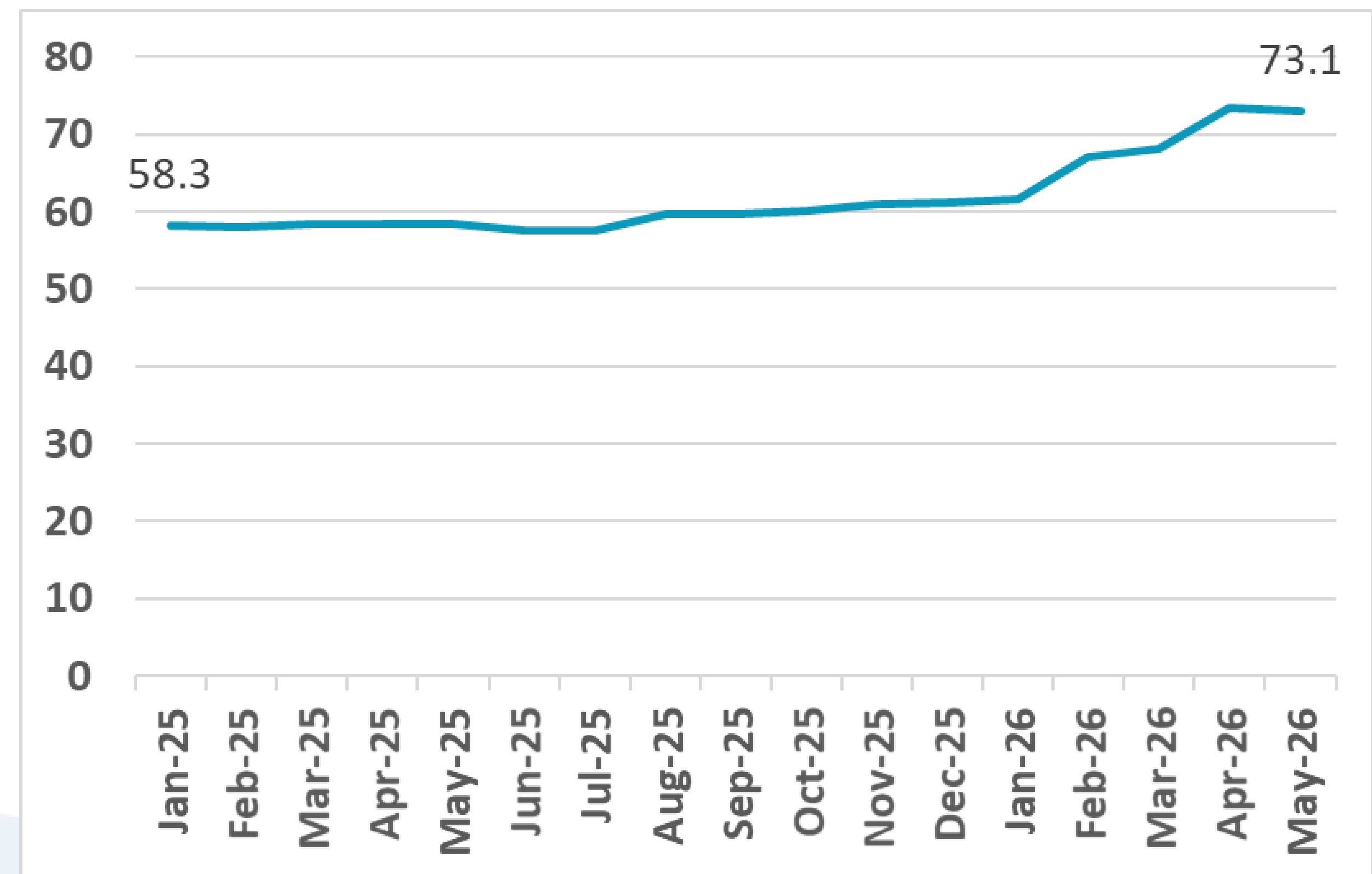
Demand for Resources – Data Centers & ITS



Intelligent Transportation Systems supply chains feeling pressure from data center infrastructure demands: semiconductors, chips, microprocessors, fiber optics

- For every dollar spent on data center infrastructure, approximately **54 cents** goes toward semiconductors
- Data centers' share of the electrical equipment market could reach **40%** from just a **2%** share in 2020

Producer Price Index – Semiconductors
Index increased by 19% since Jan 2025



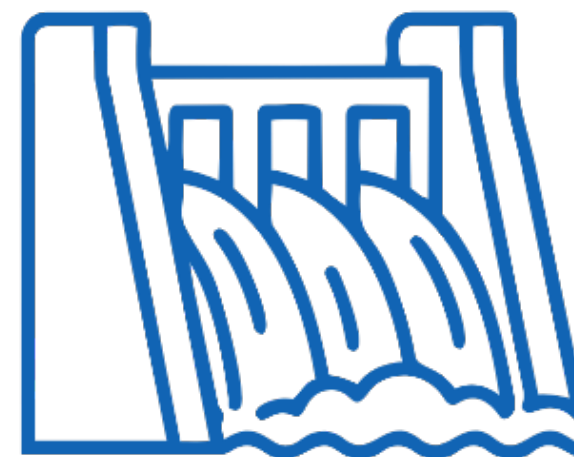
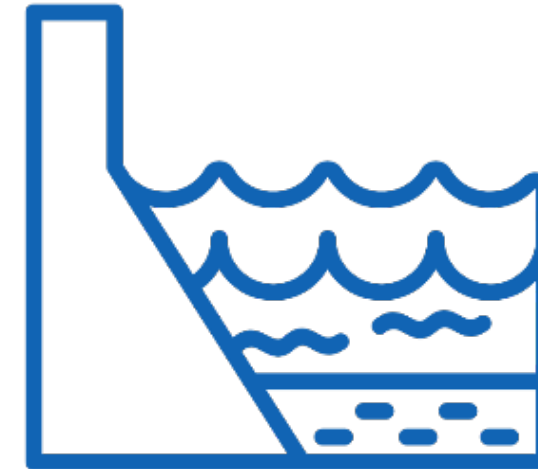
Source: FRED, Reuters, Center for Strategic and International Studies

Emerging Competition for Resources

Concrete can make up the majority of material content for common resilience infrastructure items including:

- Seawalls
- Floodwalls
- Surge barriers
- Pump stations
- Flood control structures

Roller-compacted concrete is common.



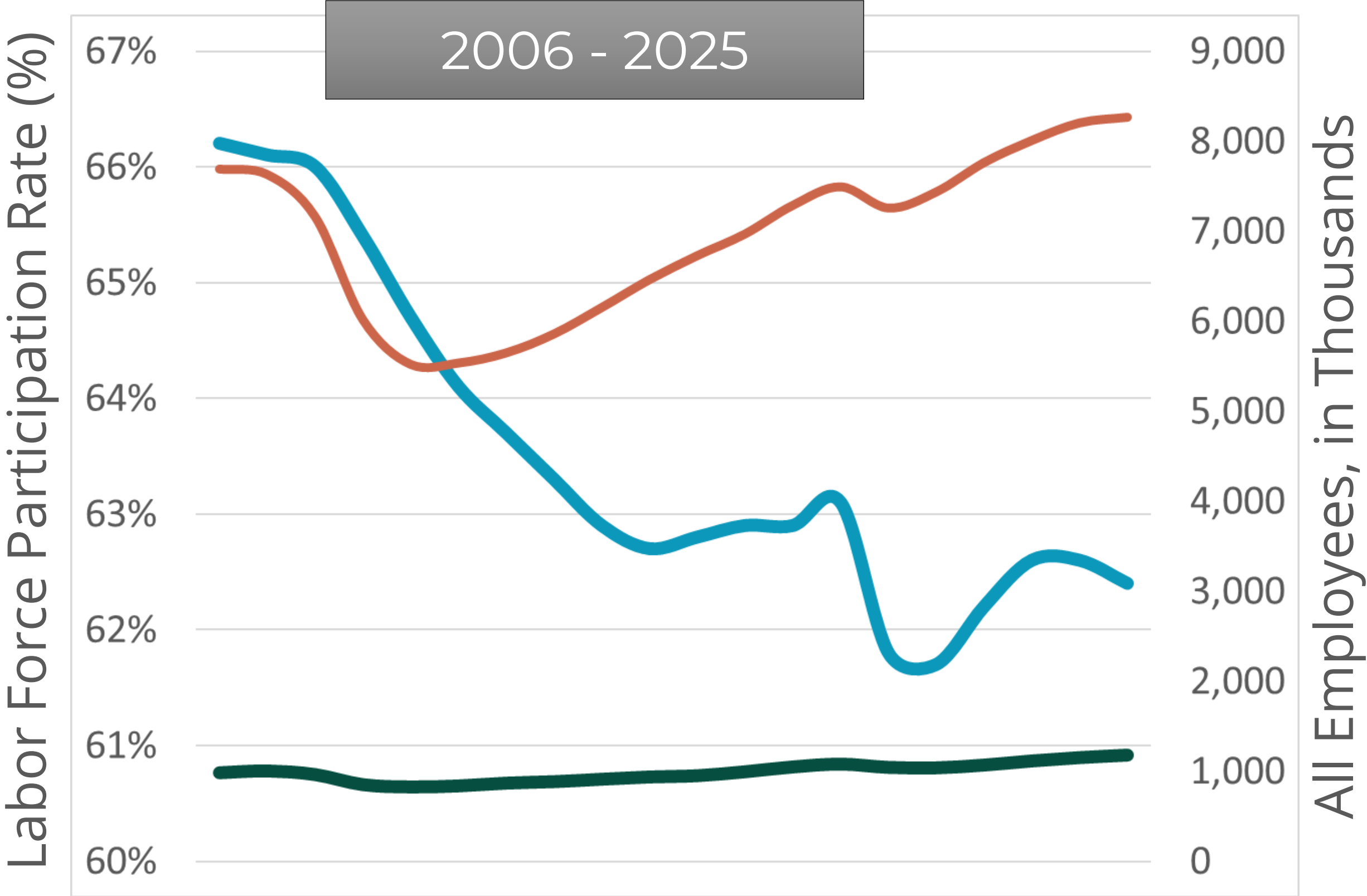
Climate risk promotes the building of new dams and repairing existing ones for heightened resilience to severe conditions

Source: Cement.org, FDEP, USACE

Multiple resiliency programs focused on flooding, coastal protection, etc. showcasing increased demand

- Resilient Florida Program - \$1.8 billion since 2021, focused on defense against sea level rise, coastal protection
- VA Beach Flood Protection Program – Has spent \$150 million to date. Additional funding pushes total available to ~ \$800 million, with large projects starting process.
- Texas Port Arthur Project – USACE awarded \$400 million contract for flood and hurricane protection, including floodwalls, levee raises, pump stations in 2025; under construction now

Workforce



Source: BLS, NAHB

- Labor Force Participation Rate
- Heavy & Civil
- All Construction

Confluence of Events



CONSTRUCTION EMPLOYMENT

Construction is adding jobs even as the workforce shrinks; employment is up **1%** since 2024 while labor force participation keeps falling - down **1%** Y-o-Y.

HEAVY & CIVIL

Continued steady increase after a dip in 2020

SECTOR DEMAND

Less competition from other sectors: US single-family starts down **11%** from Jan 2025 to Jan 2026, Y-o-Y.

NAHB survey shows 51% of builders chose building material prices as the most significant problem in 2025, with 56% expecting this to continue in 2026.

AI

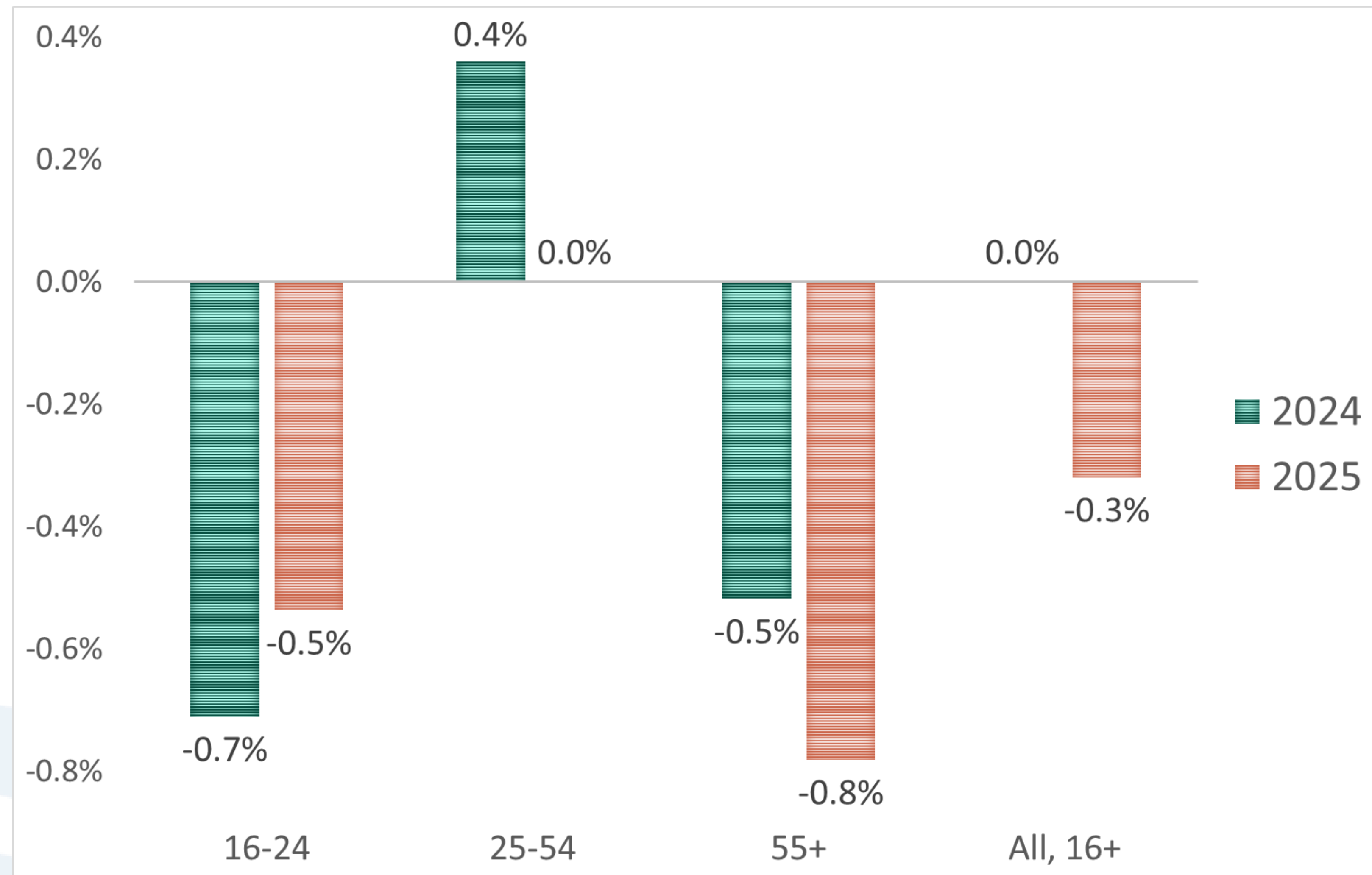
In 2026: **60%** of Gen Z workers planned to pursue skilled trades for job stability and AI-proofing vs **38%** in 2025

Labor Force Participation

Annual Percent Change in Labor Force Participation

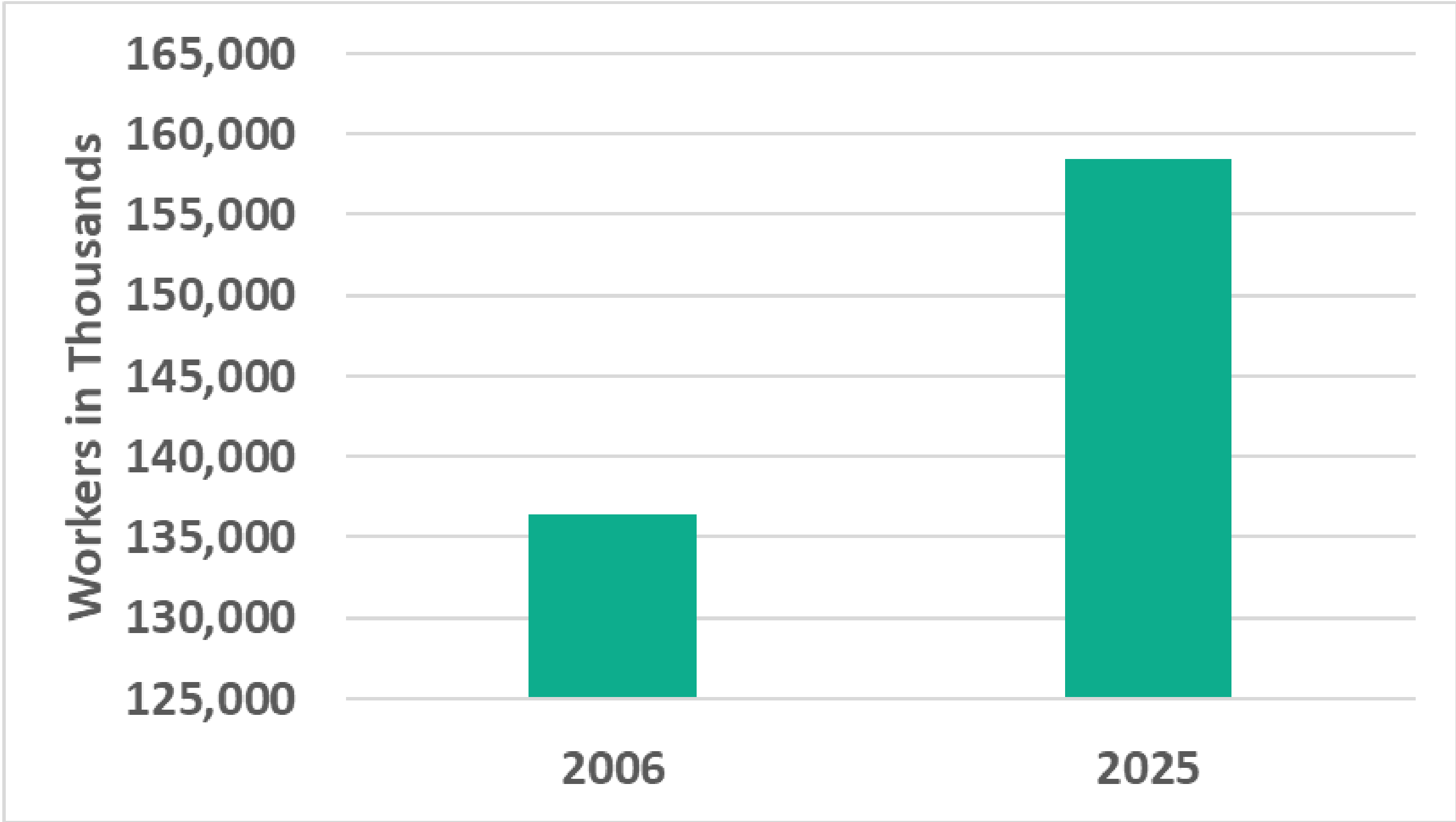
- Decreased from 62.6% in 2024 to 62.4% in 2025. This equates to a decline of **~2.6 million** workers in 2025.
- Projected to lose another **~310k** workers by end of 2026 then rebound by **~512k** by the end of 2027.
- Youngest and oldest workers

Source: BLS, GACRE June 2026 Report

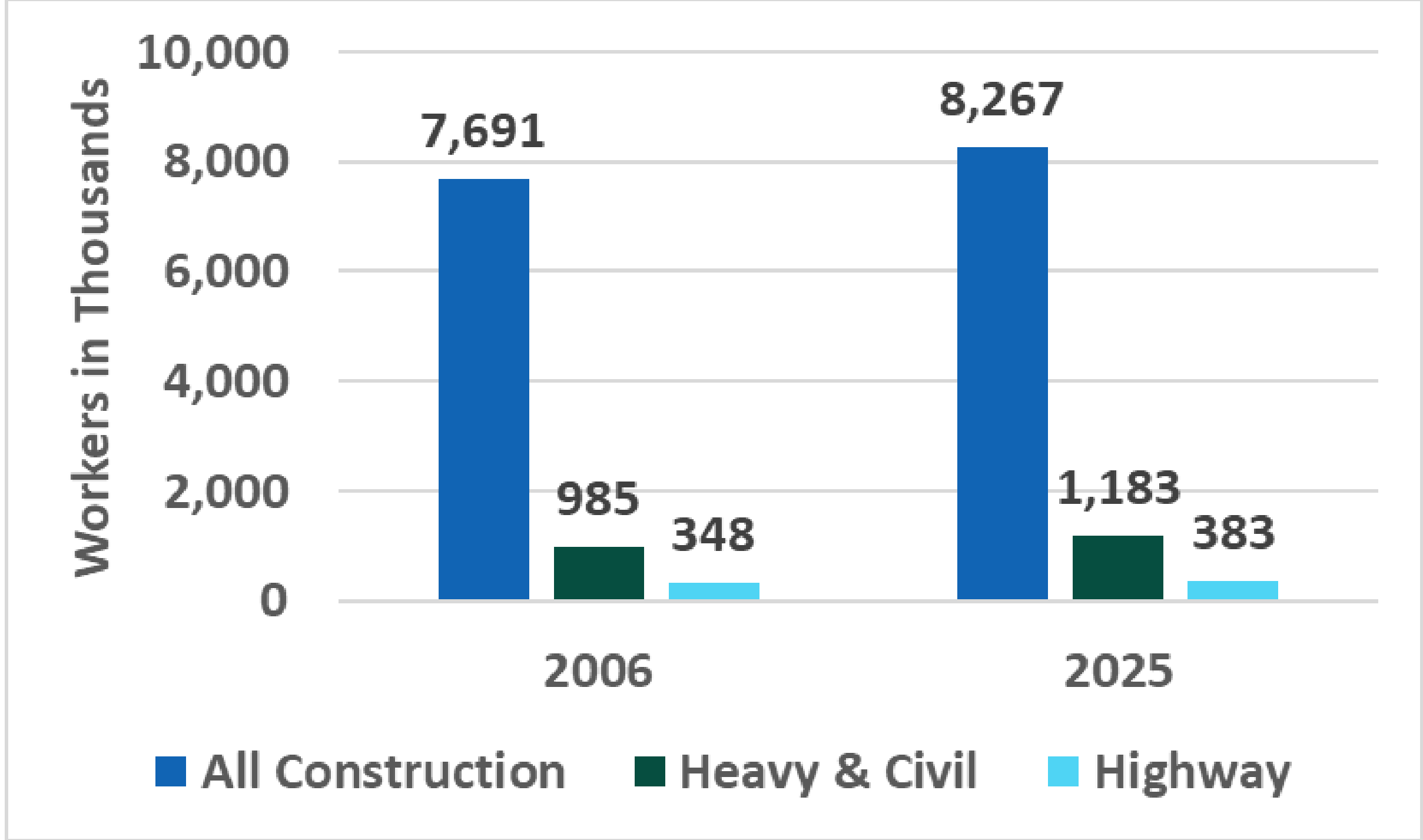


US Labor Market – Good & Bad News

U.S. Nonfarm Employment



U.S. Construction by Sector Employment



- US overall employment reached 2006 levels in 2013 and has grown by **16%** overall since 2006.
- Heavy & Civil recovered to 2006 levels in 2017 and has since increased by **20%** in 2025.
- Highway, Street, & Bridge hit 2006 levels in 2019 and has grown by **10%** overall since 2006.

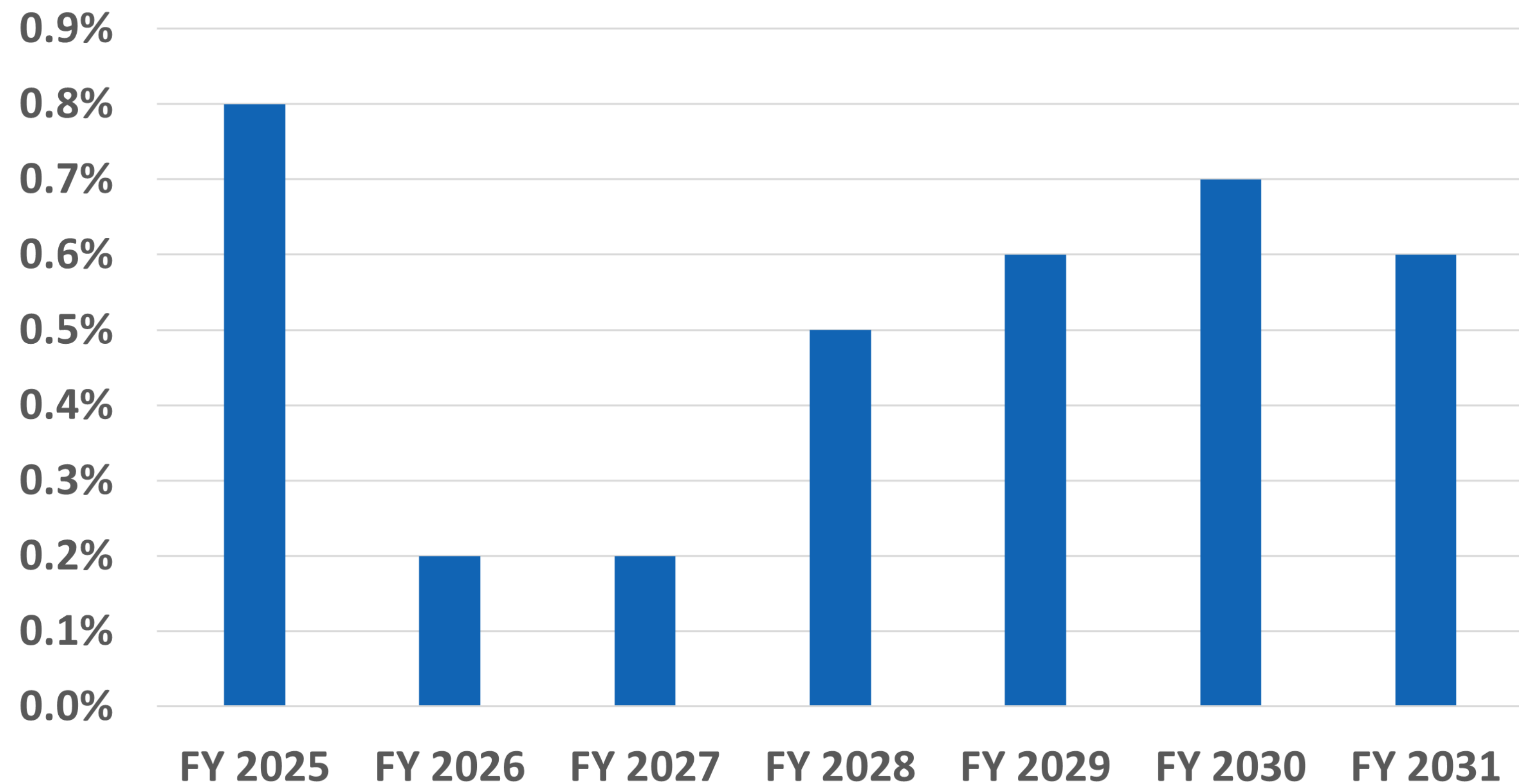
US Workforce – Next Three Years



- **Flat workforce** from 2025 levels
- **5.9%** increase in Real GDP
- Labor Force Participation Rate stays at **62.2%**

- No increase in labor force participation
- No increase in employment
- 6% increase in GDP from higher productivity

US Total Nonag Employment

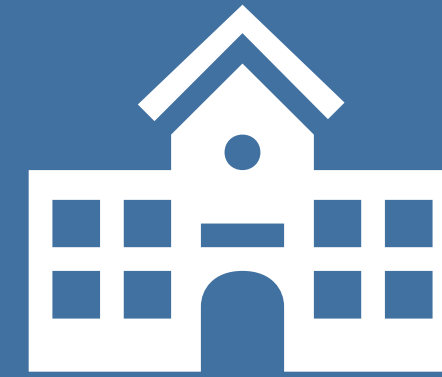


Source: GACRE June 2026 Report

Workforce – What does this mean?



Workforce may be gravitating toward Heavy and Civil more than in recent past



Continued vigilance in innovative recruiting (vocational, high school, apprenticeships) really important



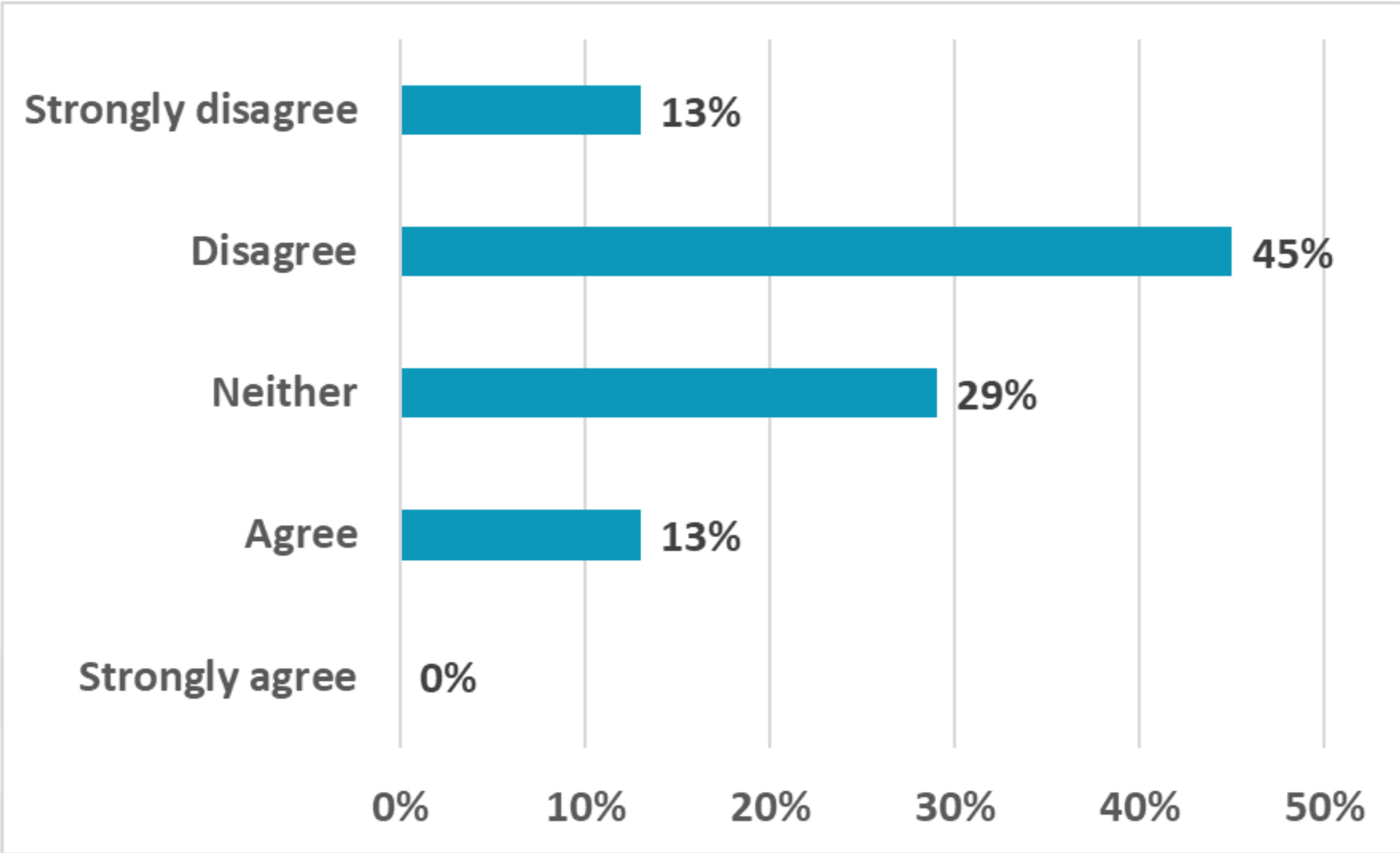
AI may both reduce some need for workers but also generate some workers - increased reliability?

US - Recession



World Economic Forum

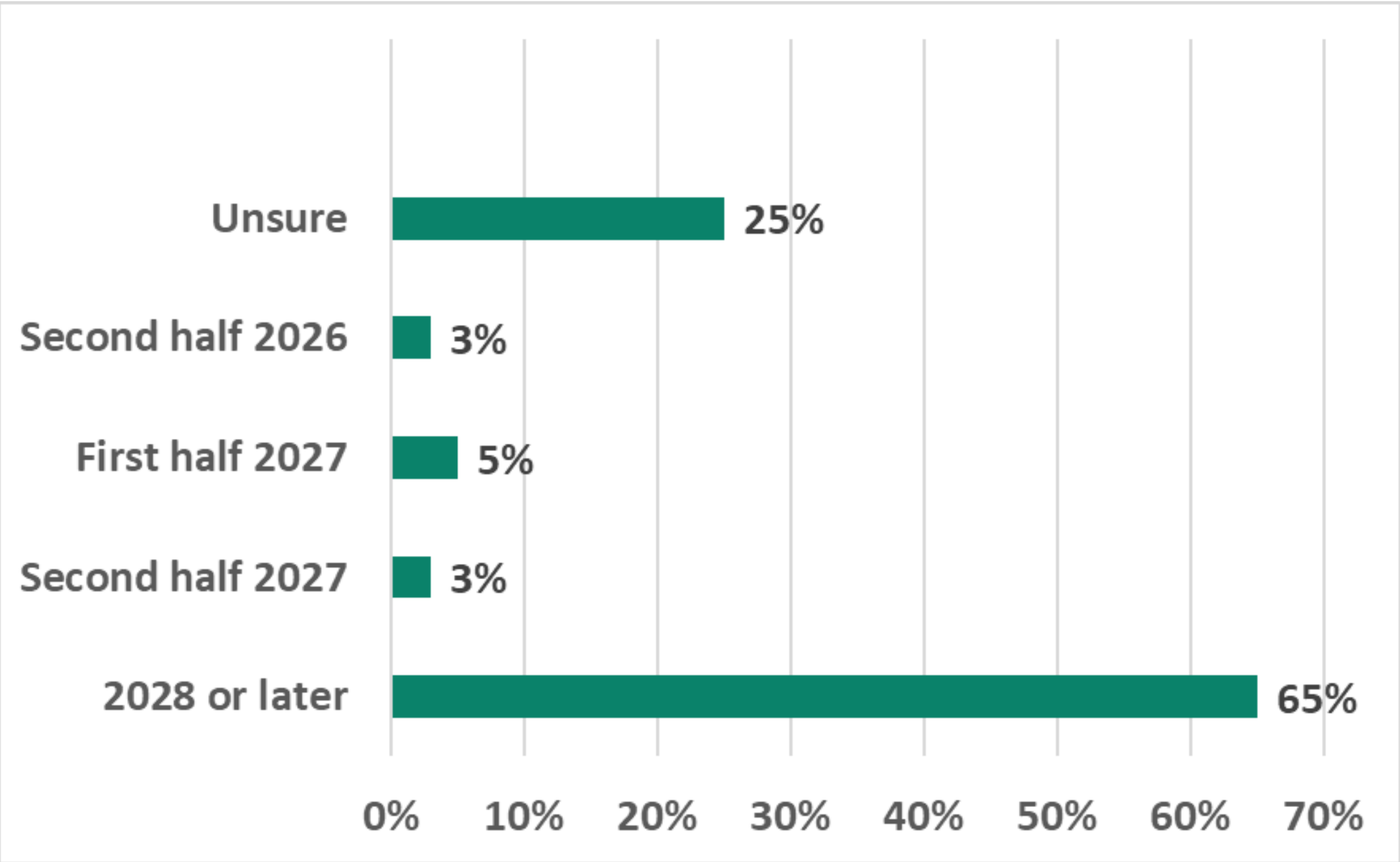
58% of respondents disagreed or strongly disagreed that a global recession would occur within the next 12 months



Source: World Economic Forum May 2026 Report

NABE

65% of respondents do not believe a recession will occur until 2028 or later; more confidence that the recession would occur later than previous reports (56% in March 2026)



Source: NABE June 2026 Outlook Survey

Financial markets



What's different this time? **AI boom**

Historically:

- Railway: Transformative technology
- Promised dramatic increases in speed and lower costs
- Built 170,000 miles of rail 1870 – 1890
- Rampant speculative investment with no immediate or early returns
- Panic in 1893 with a questionable loan set off series of bank failures,

1/4 of railways went bankrupt in 6 months, railway construction

dropped to **1/10th** of pace

CAPE yield: Cyclically adjusted P-E ratio (Robert J. Shiller)

Long term average: **17.8**

Three times the excess valuation has peaked:

- September 1929 – 32.6
- December 1999 – 44.2
- July 2026 – 41.4

When stocks are expensive, excess yields are low

When stocks are cheap, excess yields are high

Long-run average is 4.7%

Right now, 1.4%.

Source: Shiller Data

Financial markets



“Over-investment, destructive competition, waves of bankruptcies and painful consolidation” are a pattern of booms.
Buffet ratio – stocks now 200% of GDP

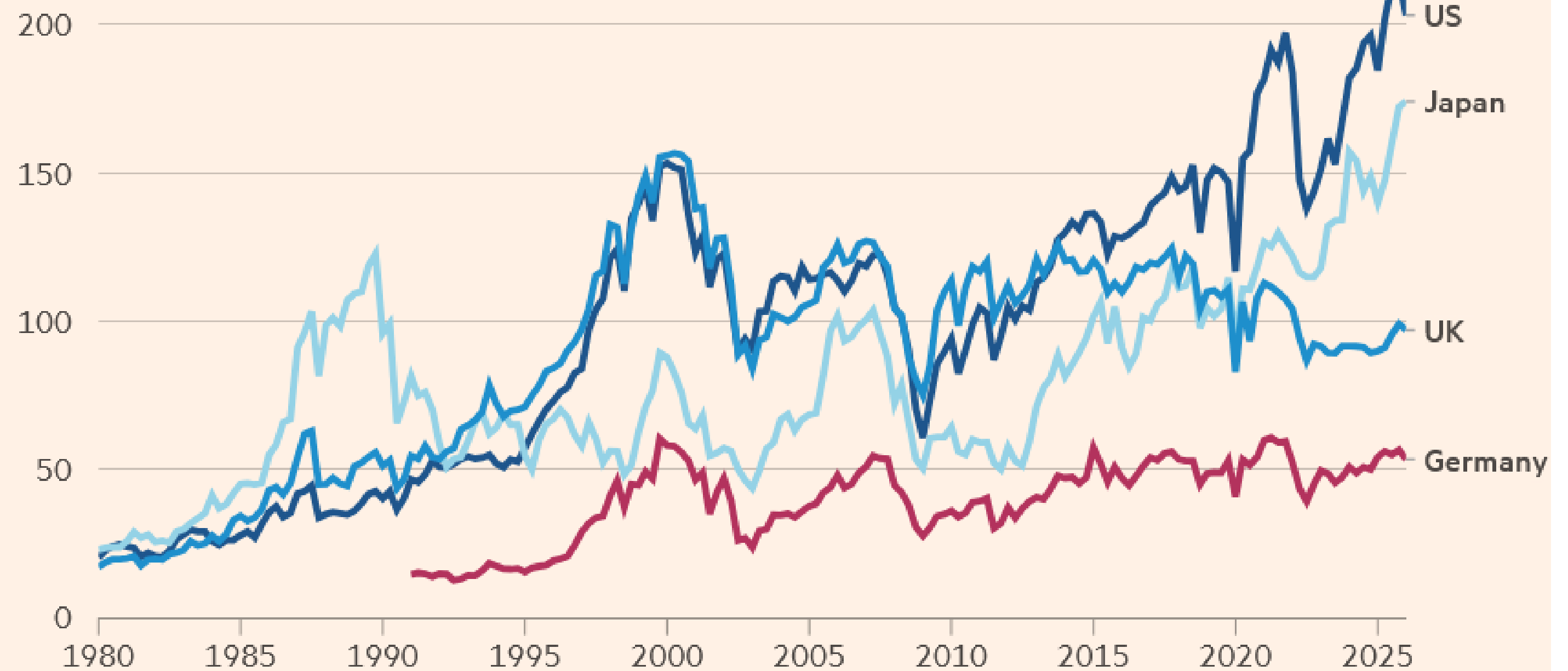
Solution?

1. Increased productivity
2. Shift from labor to capital

Source: Financial Times

The 'Buffett ratio' has reached exceptional heights in the US

Stock market value as a % of GDP



FINANCIAL TIMES

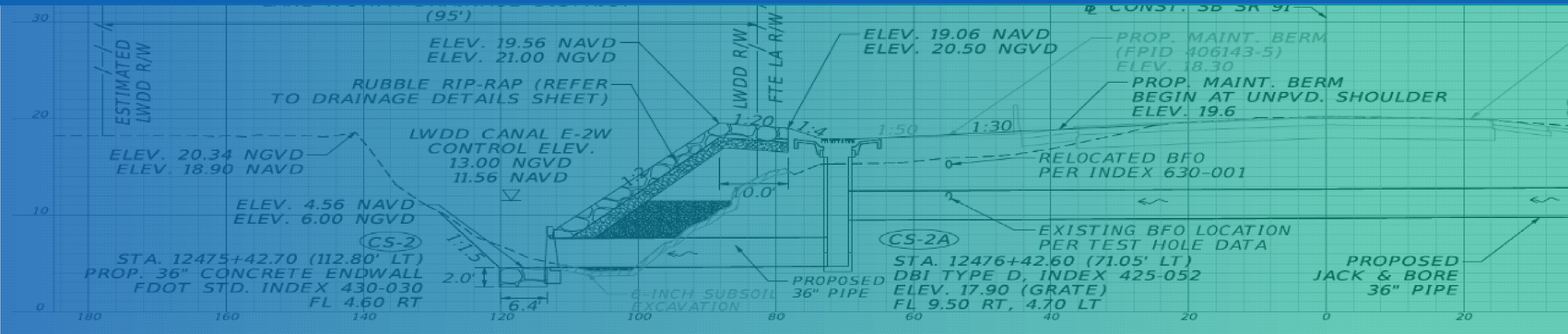
Source: LSEG; FT calculations • Value of Datastream Total Market indices divided by GDP. Japan uses a different GDP series from 1994 onwards

Contractor Perception & Expectations



Perception is reality... at bidding time

- Influencing their bids now
- What they expect

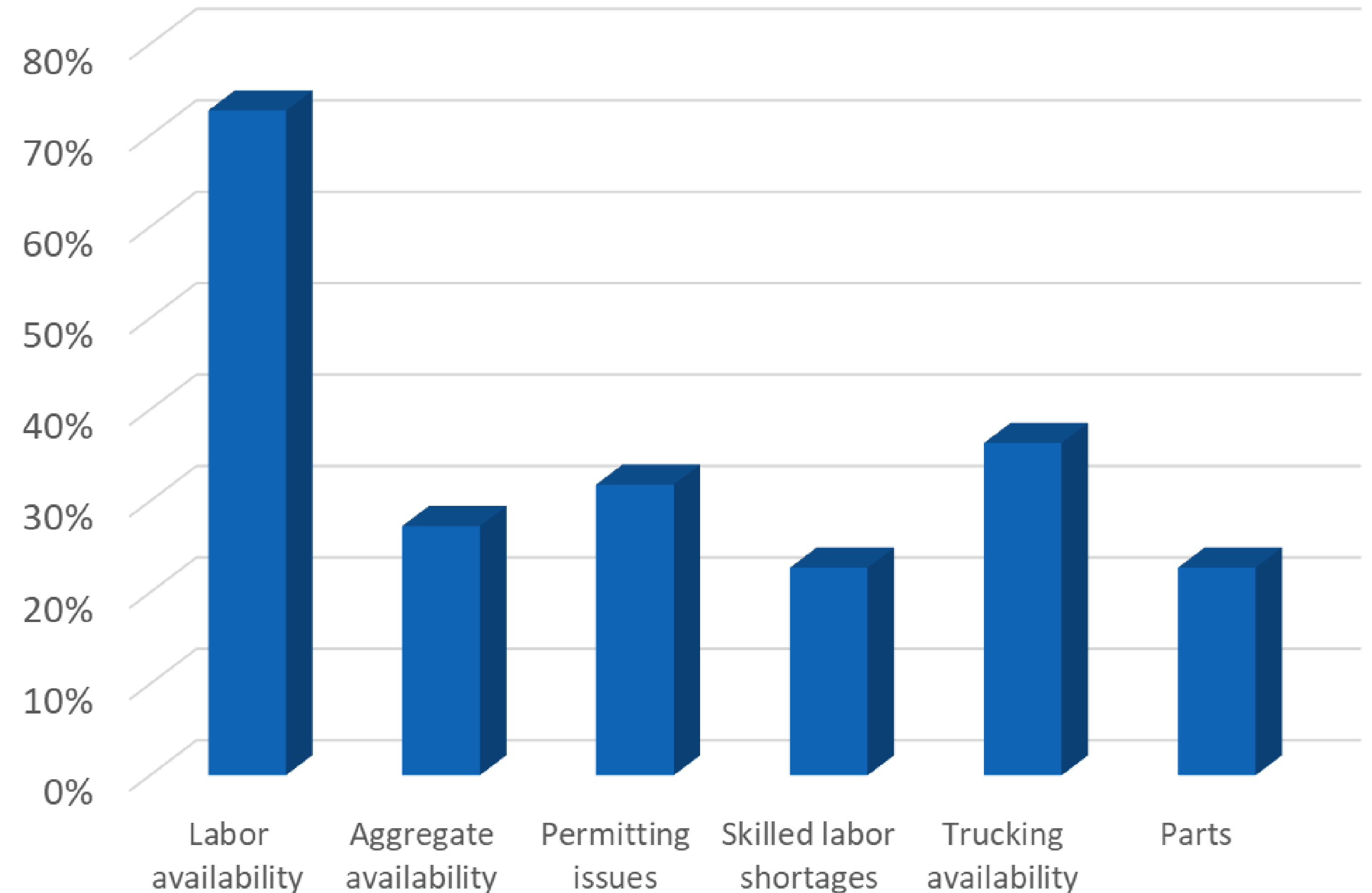


Top Concerns Meeting Market Demand – 2022



**77% expect
difficulty
meeting market
demand**

**23% said no
issues**



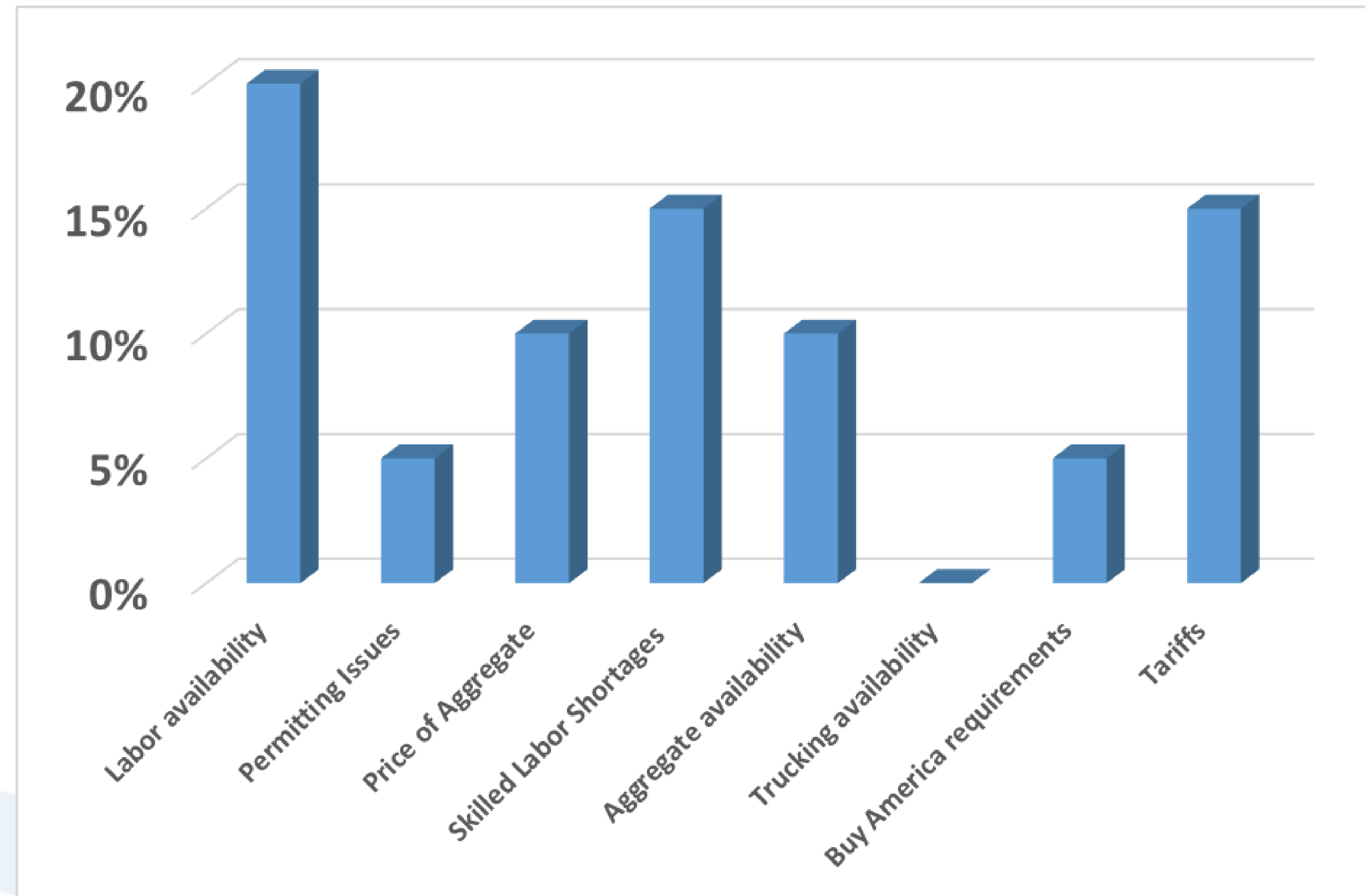
Top Concerns Meeting Market Demand – 2025



Top Concerns for Producers

48% expect difficulty meeting market demand

52% said no issues



Source: TBG Work Product, Interviews

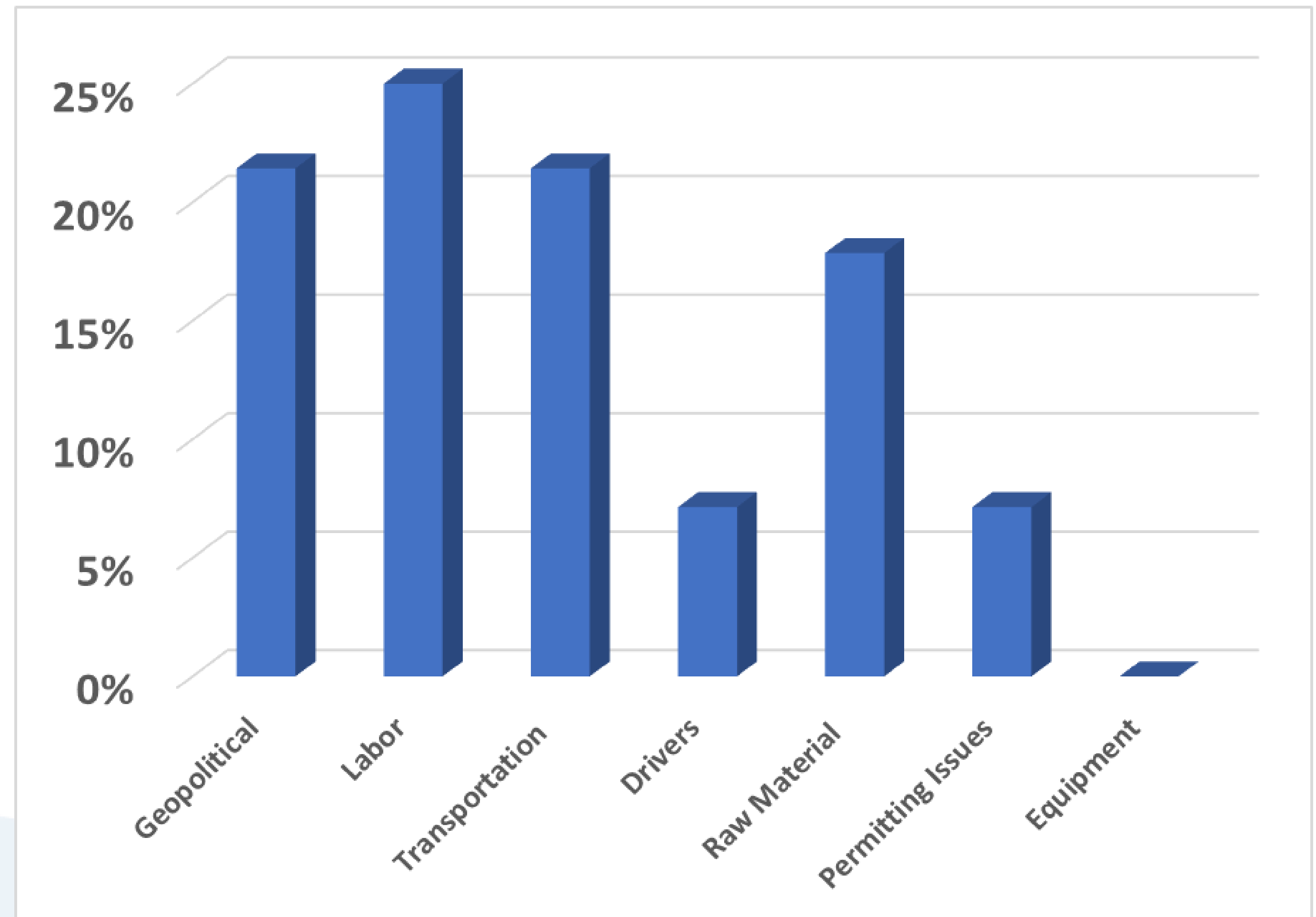
Top Concerns Meeting Market Demand – 2026



Top Concerns for Producers

88%
expected
issues

12% said no
issue meeting
market demand



Source: TBG Work Product,
Interviews

Top Concerns Meeting Market Demand - 2026



100%
report labor issues



Increases in applications are reported, but are overshadowed by ongoing issues.

Immigration changes have limited workforce programs for some companies. Some have reported minor improvements with training programs but ongoing problems are still a concern. A lack of interest and an aging workforce still remain primary problems.



Varies greatly by region – some are seeing slack develop, and wage increases relax, but not all.



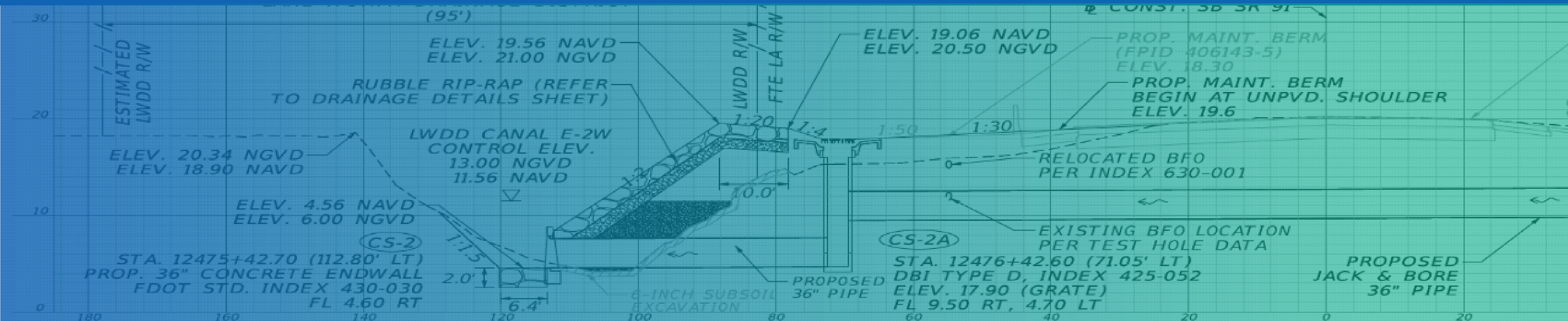
Data centers are not only absorbing a lot of material demand, but labor demand as is energy.

Construction Cost Indices & Estimating

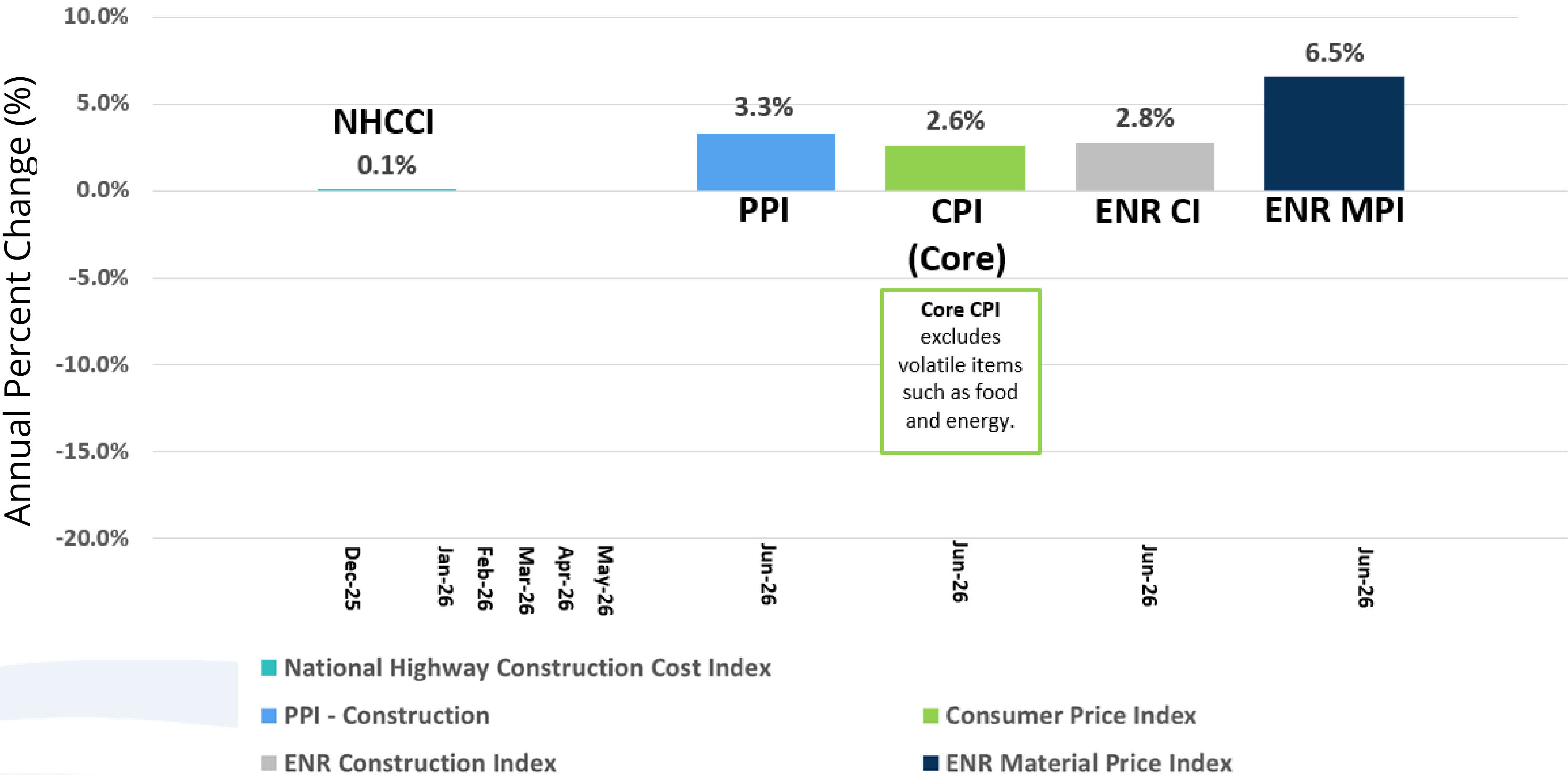


Interpretation

- What to make of the CCIs

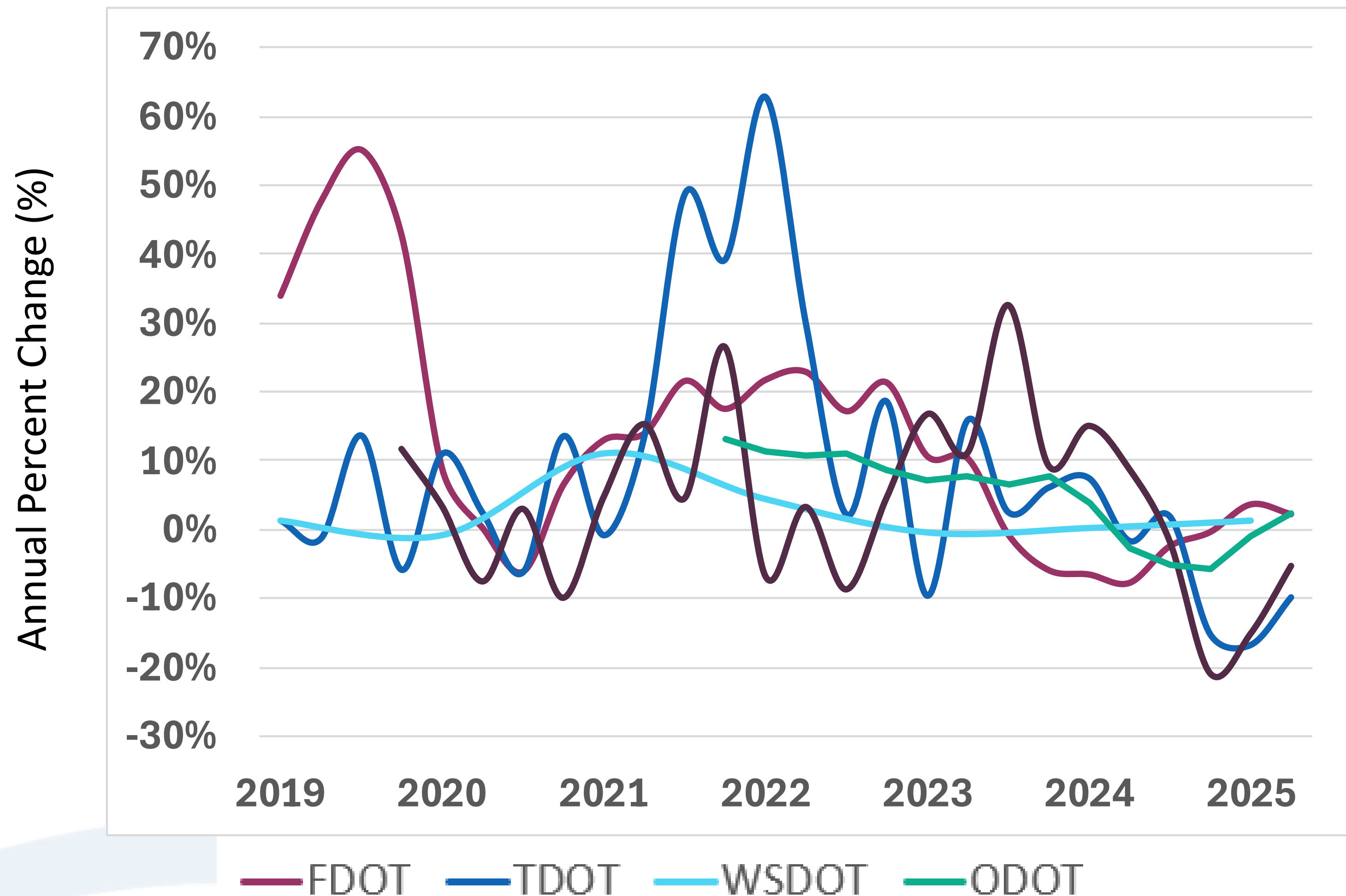


How helpful are Construction Cost Indices?



Source: TBG Work Product, BLS, ENR, Federal Highway Administration (FHWA).

DOTs see wildly different market responses



Source: TBG Work Product, FDOT, TDOT, WSDOT, ODOT

Texas CCI has had noticeable declines since CY 2025 Q3 year over year

Washington CCI has remained flat since 2023 Q4.

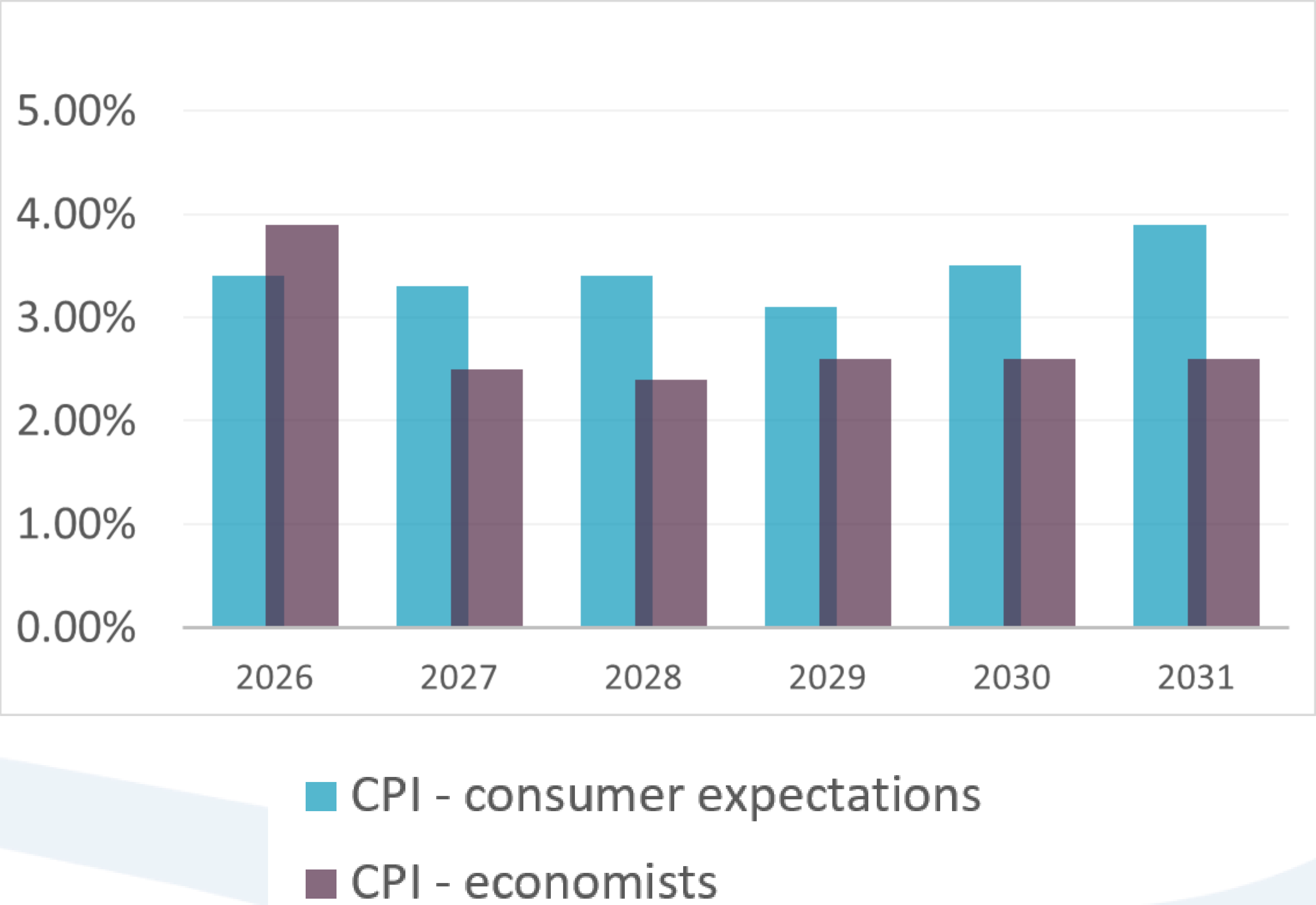
FDOT CCI and TDOT CCI have been the most volatile since 2019.

All CCI's have had either flat or declining annual percent changes

Overall Inflation

- 2026 prices expected to increase by 3.9% compared to 2025 levels
- 78% of economists: energy costs + 0.5%
- 81%: AI continues to add to inflation
- Consumers more pessimistic

US Inflation Forecast



Key Takeaways



Economics & Estimating

- How does this all come home to roost for estimators?

A photograph of a multi-level highway interchange with concrete pillars and guardrails, overlaid with a semi-transparent blue filter. A green highway sign is visible on the right side of the interchange.

**Big Picture:
What Matters?**

How do I use this information?

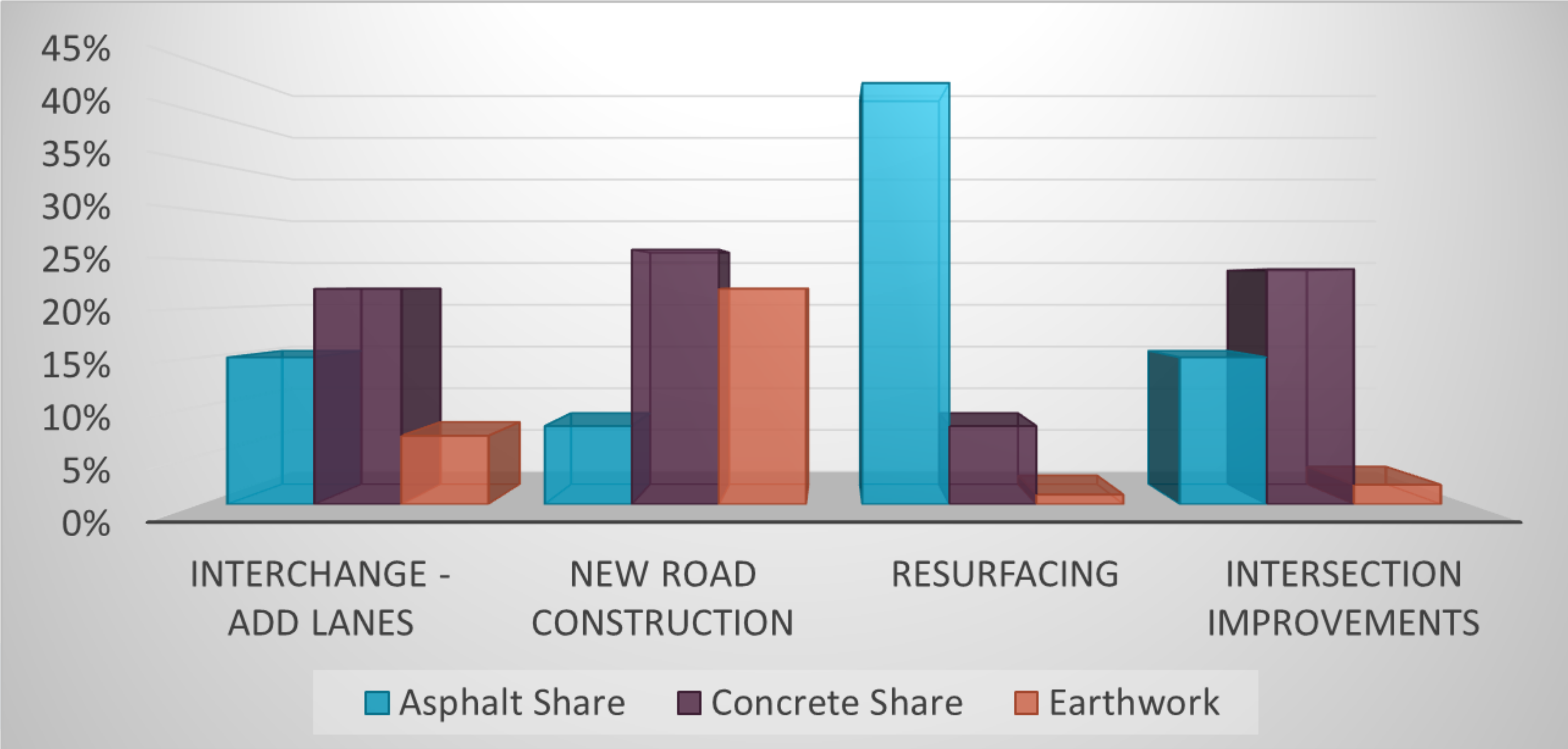


Cost Drivers for Different Project Types

Type of Work

Different project types have different cost drivers

Recognize which pay items are likely to be more sensitive to the type of project you are reviewing



Estimate Blow-out

20%

- Used weighted average bid price from similar projects
- Considered complexity of design
- Adjusted for time since prior bids

Lowest bid: 20% higher than estimate

Are there steps we could have taken to avoid this?

Did we consider Local Conditions?



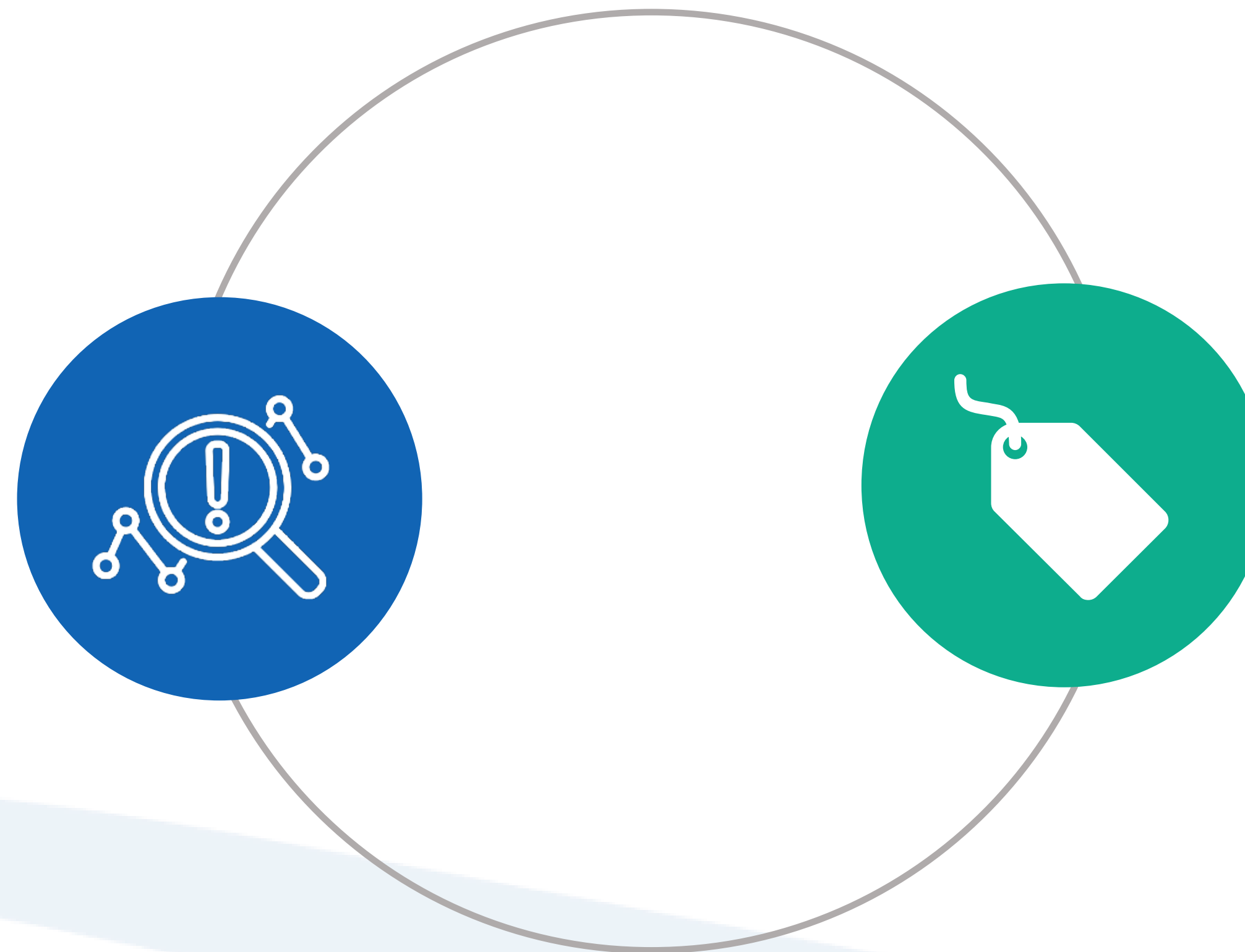
- Market conditions also reflect physical conditions
- Where is your project? Is it working in a high-density, urban area with lots of conflicts?
- Will they have to truck in a lot of fill? Cost factors are very different
- Is it in an area where materials and crews require long transport?



Are key pay items outliers?

Bid Estimates

- Historical bids provide guardrails around current estimates
- When should estimates go outside the guardrails?



Outlier Quantities

- Median quantity asphalt in a DOT DBB project: ~5,600 tons
- Median price, ~\$135/ton
- Quantities below 1,000 tons saw substantially higher unit prices
- Same is true for other materials

What else is going on?



Labor

Be aware of local **labor markets**, unemployment, increases and decreases

Are your friends getting laid off? Or getting

Materials Costs

Markets that rely heavily on imports – even if DOT does not use imports – will be volatile

Energy costs affect most materials – Is WTI/Brent Crude volatile?

Competition for Resources

Situational awareness of projects competing for resources in regional markets – data centers, housing

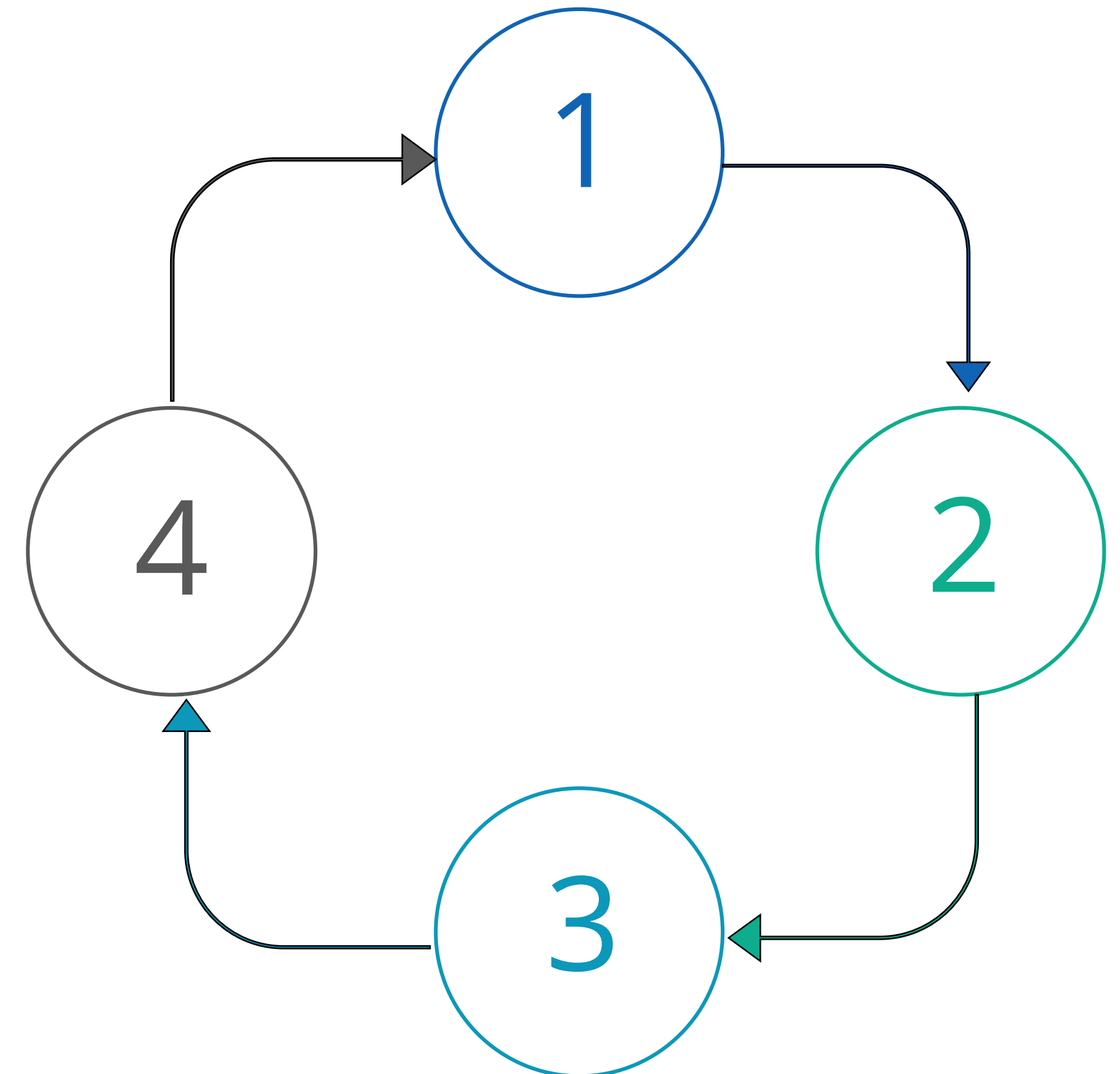
War or expanded conflicts can create competition for resources

Schedule

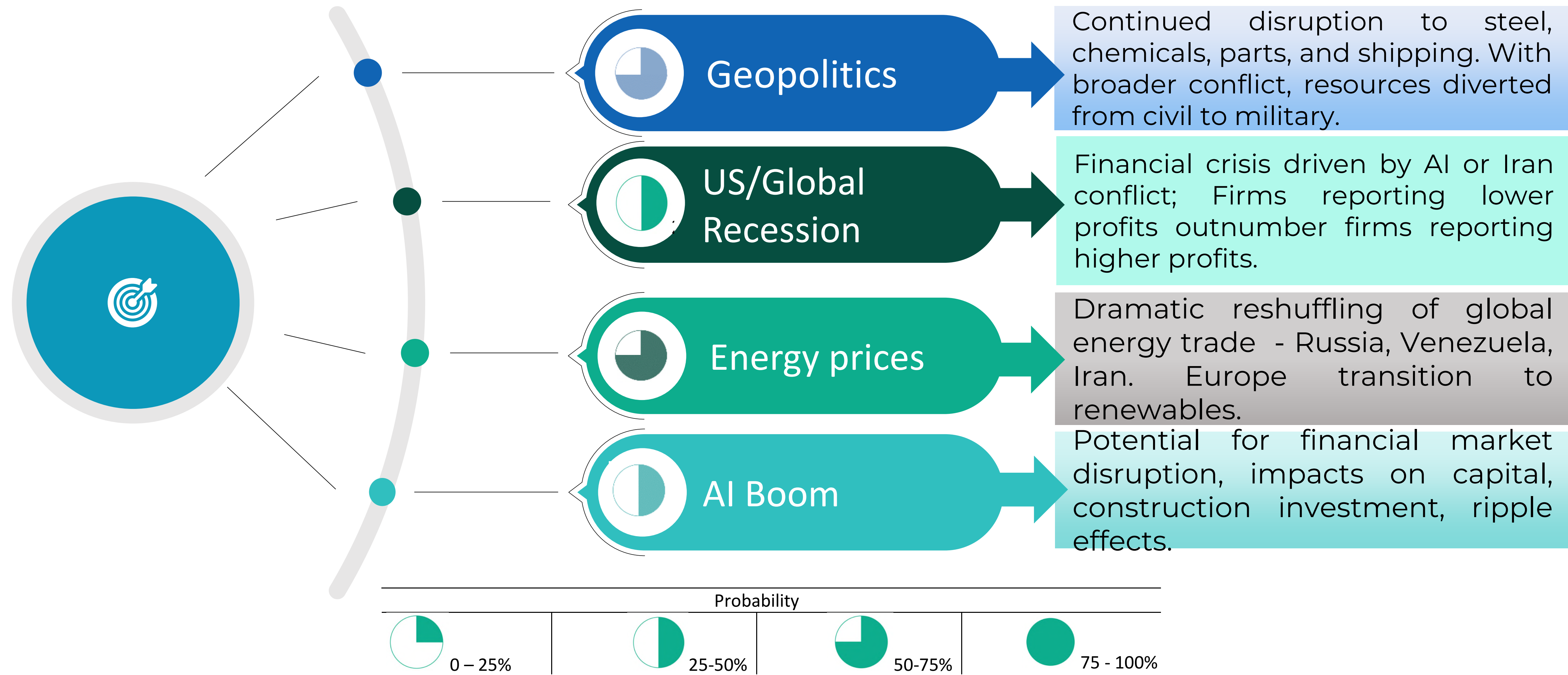
Is your schedule realistic and logical?

Will it deter **good market participation**?

Humans are bad at estimating low probability events



Things to Watch – Next 24 Months



Questions? Thank you!

Valerie Seidel

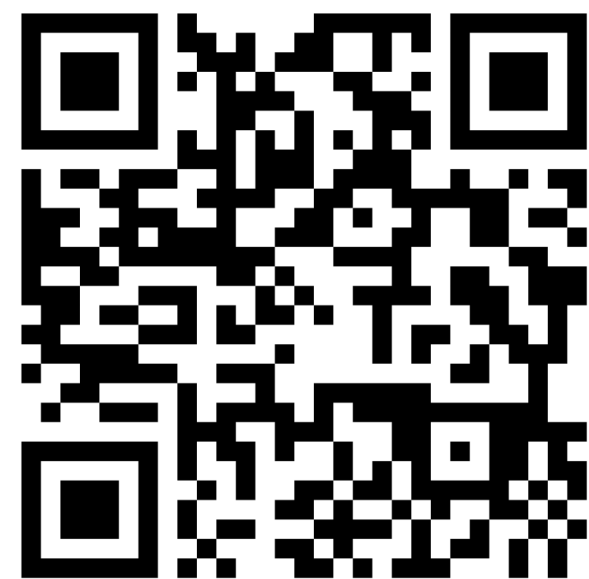
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