The Portland Cement Association assigns the highest priority to full compliance with both the letter and the spirit of the antitrust laws, and it is vital that this meeting be conducted in a manner consistent with that policy. If at any time during the course of the meeting, PCA counsel or staff believe that a sensitive topic under the antitrust laws is being discussed, or is about to be discussed, they will so advise the meeting and halt further discussion. As attendees at this meeting, you should likewise not hesitate to voice any concerns you may have in this regard.

It is important to bear in mind that those in attendance at this meeting may be your competitors. Any discussions of commercial matters with one’s competitors may create the appearance of an antitrust violation, even though there is none. Therefore, such discussions should be avoided at all times before, during, and after this meeting.

Portland Cement Association
San Antonio Regional Economic Conference Agenda
September 10, 2019
Key Focus Area: Texas

Economic and Construction Outlooks

8:00 – 8:30 a.m. Continental Breakfast
8:30 – 8:45 a.m. Intro and Greeting (Ed Sullivan)
8:45 – 9:45 a.m. Moody’s Regional Economist (Bernard Yaros)
9:45 – 10:45 a.m. National Forecast (Ed Sullivan)
10:45 – 11:00 a.m. Break
11:00 – 12:00 p.m. Regional Outlook (Dave Zwicke)
Introduction:
Market Intelligence as a Resource
PCA Plant Information Summary

• Comprehensive information on every plant in the U.S. cement industry.

• Historical series on U.S. cement industry capacity, kiln counts, energy usage, and industry concentration ratio

• A page of information on each individual plant including clinker and grinding capacity, fuels used, cement types produced, and raw material sources

• Summary tables and ranking of capacity by company and state

• Important that we have accurate industry coverage
PCA Labor-Energy Input Survey

- Detailed energy and labor data collected annually by PCA.
- Labor efficiency metrics and trends including salaried, hourly, and contracted labor hours
- Detailed data on energy consumption, including volumes and efficiency metrics for primary and alternative fuels
- Summary pages that report on plants by capacity, age, and process type
- Higher response rate = more accurate
PCA Labor-Energy Input Survey

• Over the past 40 years, U.S. cement manufacturers have reduced their energy usage by over 40 percent.

• Data important for ENERGYSTAR Awards
Industry Impact Reports & Special Surveys

- PCA Market Intelligence regularly assesses the industry impacts of various legislative and regulatory proposals

- Requests on behalf of member committees or Washington D.C. office

- These reports will often be supplemented by special member surveys to get unique industry data specific to the issue at hand

- Reports in recent years have covered NAAQS, WOTUS, NESHAP, Fly Ash Storage, and gas tax Proposals
Industry-Specific Testimony

• PCA Chief Economist Ed Sullivan has testified on the floor of Congress during the 2009 recession on the need for fiscal stimulus in the form of infrastructure.

• Multiple meetings between PCA and OMB and EPA on the impacts of potential legislation or regulation on the cement industry

• Data PCA collects through surveys offers unique insight and credibility when advocating for the industry
Results

• Cumulatively, PCA analysis in the advocacy arena has saved the U.S. cement industry billions in compliance costs.

• Over the past few years, PCA has tackled NESHAP, WOTUS, NAAQS, CCR Storage, carbon tax, and a myriad of other potential regulations.

• In addition to defending against regulation, PCA has demonstrated the ability of the industry to supply infrastructure projects, argued for rule changes with the NTSB, and reported on the affects of highway bill and gas tax proposals.
Advocacy On the Horizon

- Coordinating a GHG strategy
- Leveraging industry data and expertise to form a proactive approach
- We are only as effective as the strength of the data we collect
U.S. Monitor

- Comprehensive report on all aspects of the economy relevant to the cement industry
- Cement consumption, production, and imports at the national and state level
- Real monthly & annual construction put-in-place
- Also includes:
  - Masonry Consumption
  - Clinker Imports
  - Housing permits by state
U.S. Consumption Trends Report

• Report provides a preliminary view of monthly cement consumption by state based on member shipments by destination

• Implied YTD growth rates are calculated using USGS data and two months of member dues estimates

• Report includes monthly and YTD precipitation maps
## State Cement & Construction Statistics

- Detailed statistics on every state
- Mixes industry survey data with outside data sources such as Annual Survey of Manufacturers and some modeling assumptions to arrive at dozens of metrics
- Data includes state economic profile, finances, demographics, highway profile, congestion and safety metrics, cement and construction profile, including number of people employed in both industries
- Twenty years of historical data

### California

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<thead>
<tr>
<th>Economic Profile</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<td>Economic Growth</td>
<td></td>
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<tr>
<td>Real Gross State Product</td>
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<td>2,401</td>
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<td>Annual Growth Rate (%)</td>
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<td>3.7%</td>
<td>3.9%</td>
<td>3.9%</td>
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<tr>
<td>Nominal Gross State Product (Dollars)</td>
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<td>2,603</td>
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<tr>
<td>Annual Growth Rate (%)</td>
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<td>4.7%</td>
<td>3.7%</td>
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<td>Total State Government Revenue (Dollars)</td>
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<td>392,894</td>
<td>357,467</td>
<td>352,239</td>
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<tr>
<td>Annual Growth Rate (%)</td>
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### Employment

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</table>
State Ranking Report

- States ranked monthly by residential, nonresidential and public construction fundamentals
  - **Residential**: mortgage delinquency rates, unemployment rates, home price growth
  - **Nonresidential**: manufacturing, office, retail, hospitality and total employment
  - **Public**: employment, long-term debt to GSP, transportation capital expenditure, tax revenues, unfunded pension obligations

Regional Analysis: Ranking Cement Market Fundamentals

Home appreciation decelerated slightly in June but remains elevated on the account of continued tight supplies. Cooling in home prices is healthy given emerging affordability concerns in some markets. However, home price appreciation will likely remain elevated in the near term as inventory-to-sales ratios are near historic lows. Homebuilders continue to cite lack of lot availability, labor shortages and rising material prices as constraints. Given that the market appreciation is driven more by tight supply rather than exuberant demand, residential construction appears much better positioned in this cycle.

In terms of construction spending outlook for 2018, recent patterns are expected to remain in place. Moderate growth is expected for residential with a slight decline in nonresidential. Public construction spending is expected to improve slightly from the decline in 2017 but growth is to remain tepid.

Market Ranking

The level and degree of the obstacles slowing the construction recovery vary widely by state and region. The purpose of this report is to provide insight into the economic behaviors that will help shape regional construction recoveries. The rankings are based on economic fundamentals which identify regional markets most favorable for improved cement consumption. Due to the broad nature of the criteria, individual state inconsistencies will likely emerge due to project type variation, cement intensity, policy/pricing actions, and other unique drivers.

Construction recovery will continue to emerge in local markets before being reflected in national numbers. Homebuilders, for example, are unlikely to significantly accelerate construction activity until two critical conditions are met: 1) low levels in inventories of stand new homes reflecting no higher than five months supply, and 2) stable or rising home prices. Both conditions are now increasingly being met and signaling the residential construction recovery however, labor shortages continue to influence the speed and magnitude of recovery which vary by region. Regions with weakest residential fundamentals will likely lead the market in rates of growth given years of under-building. PCA expects single family construction to take a more prominent role in residential construction in coming years.
U.S. Tracking Report

• Report tracks PCA National Forecast accuracy

• Provides transparency with regards to forecast

• SAAR trend line compared against national forecast data

• Graphs of 3 & 12 month moving averages for all forecast categories
Competitive Materials Report Update

• Monthly update of producer price indices of the competing materials of concrete: steel, lumber, and asphalt

• Features graphs charting the relative prices and cost indicators for concrete’s three main competitors

• Series include:
  • Canadian Lumber Imports
  • Steel Scrap PPI
  • West Texas Intermediate
  • U.S. Coking Capacity
Cement Consumption by User Groups

Precast Concrete: Data

Shipments of portland cement to U.S. precast manufacturers increased 6.3% to 205,850 mt during the fourth quarter of 2017 when compared to the year ago levels. Precast concrete accounted for 3.5% of total portland cement shipments in fourth quarter 2017. The Northeast region was the largest regional cement consumer in this category with 105,621 mt, followed by California with 71,625 mt.

Precast Concrete: Analysis

Precast concrete is concrete cast in forms in a controlled environment and allowed to achieve a specified strength prior to placement on location. Examples of precast include, but are not limited to, architecturally wall panels, batch basin covers, concrete furniture, and fence ties.

Precast Concrete (1000 mt) PCA Projection

<table>
<thead>
<tr>
<th>Year</th>
<th>2019</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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<td>Value</td>
<td>295</td>
<td>248</td>
<td>228</td>
<td>294</td>
<td>292</td>
<td>290</td>
</tr>
<tr>
<td>% Change</td>
<td>+12%</td>
<td>+19%</td>
<td>+13%</td>
<td>+10%</td>
<td>+7%</td>
<td>+5%</td>
</tr>
<tr>
<td>1st Quarter</td>
<td>105</td>
<td>730</td>
<td>730</td>
<td>791</td>
<td>791</td>
<td>791</td>
</tr>
<tr>
<td>% Change</td>
<td>15.7%</td>
<td>7.8%</td>
<td>-6.8%</td>
<td>6.0%</td>
<td>19.5%</td>
<td>19.5%</td>
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<tr>
<td>2nd Quarter</td>
<td>228</td>
<td>612</td>
<td>693</td>
<td>772</td>
<td>821</td>
<td>821</td>
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<tr>
<td>% Change</td>
<td>12.1%</td>
<td>-2.2%</td>
<td>6.7%</td>
<td>18.3%</td>
<td>6.3%</td>
<td>6.3%</td>
</tr>
<tr>
<td>3rd Quarter</td>
<td>292</td>
<td>791</td>
<td>791</td>
<td>791</td>
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<td>791</td>
</tr>
<tr>
<td>% Change</td>
<td>10.7%</td>
<td>7.4%</td>
<td>-2.5%</td>
<td>19.1%</td>
<td>7.2%</td>
<td>7.2%</td>
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<tr>
<td>4th Quarter</td>
<td>310</td>
<td>248</td>
<td>291</td>
<td>310</td>
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<tr>
<td>% Change</td>
<td>15.7%</td>
<td>7.4%</td>
<td>-2.5%</td>
<td>19.1%</td>
<td>7.2%</td>
<td>7.2%</td>
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<tr>
<td>Total</td>
<td>1,045</td>
<td>877</td>
<td>877</td>
<td>877</td>
<td>877</td>
<td>877</td>
</tr>
<tr>
<td>% Change</td>
<td>15.7%</td>
<td>7.4%</td>
<td>-2.5%</td>
<td>19.1%</td>
<td>7.2%</td>
<td>7.2%</td>
</tr>
</tbody>
</table>

With strong nonresidential construction spending in 2016, the precast segment was able to bounce back and grow nearly 50%. Construction spending for nonresidential in 2017 was not able to grow but it does not appear to have negative effects on cement consumption in the sector. Precast concrete consumption was up 1.7% compared to the prior year.

Cement consumed in nonresidential construction projects has been growing at a healthy pace. However, it seems that many large commercial projects have been completed or nonresidential construction spending slowed throughout 2017. Looking ahead, PCA forecasts a modest growth long-term in nonresidential spending near 2%, which will benefit the precast segment.

Precast concrete is also allocated five upwards of 4% toward public construction, which fell in 2017. The long-term outlook remains positive though with the likelihood of increased federal investment from an infrastructure bill. Public construction spending and cement consumption are expected to rebound and grow in 2018.

Precast concrete consumption finished 2017 with another strong year of growth. This segment was largely supported by gains in the nonresidential sector during the year. Looking to 2018, precast concrete is projected to experience more modest growth near 3% due to increased public and nonresidential spending.

Survey of Portland Cement Consumption: 4th Quarter 2017 | PCA Market Intelligence
U.S. Cement Industry Annual Yearbook

- Report provides detailed statistics from all facets of the cement industry

- 48 Data tables; 20-year historical time series

- Categories include:
  - Economic activity & construction drivers
  - Cement consumption
  - Infrastructure
  - Cement Supply
  - Operating characteristics
  - International cement markets
Rain. Said it all. Rain.

Monthly Precipitation Ranks

Year-to-Date Precipitation Ranks
The Good, the Bad, and the Ugly

Bernard Yaros, Economist, Research

September 10, 2019
1

U.S. Economy and Risks
Economic Expansion Hits a Milestone

Duration of expansion in years

- US 1982-1990
- US 2009-present
- Netherlands 1982-2008
- Australia 1992-present

Sources: NBER, Moody’s Analytics
The Good News? The Job Market

Unemployment rate, %

Sources: BLS, Moody’s Analytics
Bad News? The Trade War Intensifies…

U.S. effective tariff rate, %

Sources: U.S. Census Bureau, USTR, USITC, Moody’s Analytics
…Sending Chinese Imports on a Downward Spiral

Value of Texas goods imports, % change yr ago, 6-mo MA

Sources: Census Bureau, Moody’s Analytics
Texas Industries Are Exposed to Chinese Retaliation

% of GDP in industries at risk of Chinese retaliatory tariffs

Sources: BEA, Moody’s Analytics
Foolproof Predictor of Recession

3-month change in the unemployment rate, ppt

More than a quarter point change in unemployment rate in a 3-month period

Sources: BLS, Moody’s Analytics
2

Texas Economy
Texas Labor Market Defies Gravity

Employment, % change yr ago, 3-mo MA

Sources: BLS, Moody’s Analytics
High Wage Dominates Job Creation in Texas

Employment by wage cohort, % change yr ago, 3-mo MA, Jul 2019

Sources: BLS, BEA, Moody’s Analytics
Energy Employs Small Share of Jobs But Is High Paying

Sources: Baker Hughes, EIA, Moody’s Analytics
Heavy Industry Is Strong But Not Safe from Global Risks

Texas manufacturing

Sources: BLS, Federal Reserve of Dallas, Moody’s Analytics
Sky’s the Limit for White Collar Tech Jobs

Texas employment, indexed, 1970=100

Sources: BLS, Moody’s Analytics
Texas Homebuilding
The Good News? Household Formation…

Households, % change yr ago

Sources: Census Bureau, Moody’s Analytics
…And Pristine Mortgage Quality…

Texas, troubled first mortgage loans, ths

Sources: Equifax, Moody’s Analytics
...And Finally A Low Rental Burden

Rental burden index*, %, 2017

Sources: Census Bureau, Moody’s Analytics

*Median gross rent, % of recommended rent for median-income renter household

U.S. = 103.9

- 27 to 79.9
- 80 to 99.9
- 100 to 119.9
- 120 to 240
Austin and Dallas Lead Single-Family Comeback

Single-family permits, 4-qtr MA, 2006Q1=100

Sources: Census Bureau, Moody’s Analytics
Multifamily Explodes in Fort Worth and Dallas

Multi-family permits, 4-qtr MA, 2006Q1=100

Sources: Census Bureau, Moody’s Analytics
Bad News? Overvaluation

FHFA all-transactions index, % above equilibrium trend, 2018Q4

Sources: FHFA, BEA, Census Bureau, Moody’s Analytics
Inland South and Mountain: Overheating?

Residential land value index, 2009Q1=100

Sources: American Enterprise Institute, Moody’s Analytics
Declining Affordability Plagues Dallas and Others

Affordability index *, %, 4-qtr MA

*Median family income, % of qualifying income for median-price single-family home

Sources: Census Bureau, NAR, Moody’s Analytics
Home Prices Could Slow Dramatically…

Case-Shiller single-family aggregate home price index, % change yr ago

Sources: CoreLogic ® Case-Shiller ® Home Price Indexes, FHFA, Moody’s Analytics
…Weighing Further on Existing Home Sales

Texas, existing single-family home sales, ths, SAAR

Sources: NAR, Moody’s Analytics
Texas Commercial Real Estate
Private Service Industries Will Need More Office Space

Office-using employment, % change yr ago

- Austin
- Dallas
- Houston
- San Antonio
- U.S.
- Fort Worth

Sources: BLS, Moody’s Analytics
Is There Life After Retail? Yes

Texas employment, % change yr ago, 3-mo MA

Sources: BLS, Moody’s Analytics
Texas Public Infrastructure Spending
Texas Increases Spending on Transportation

Transportation expenditures, % of total state expenditures by fiscal year

Sources: NASBO, Moody’s Analytics
Texas Won’t Have to Cut Infrastructure in a Downturn

Rainy-day fund shortfall* as a % of GSP

*Difference between actual and necessary rainy-day balances under moderate recession

Sources: BEA, NASBO, Moody’s Analytics
## Contact Us: Content Solutions - Economics & Business Analytics Offices

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<th>Address</th>
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<td>121 North Walnut Street, Suite 500</td>
<td>USA</td>
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<td></td>
<td></td>
<td>West Chester PA 19380</td>
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<td>7 World Trade Center, 14th Floor</td>
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<td>London E34 5FA</td>
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<td></td>
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<td>United Kingdom</td>
<td></td>
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<tr>
<td>Toronto</td>
<td>+1.416.681.2133</td>
<td>200 Wellington Street West, 15th Floor</td>
<td>Canada</td>
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<tr>
<td></td>
<td></td>
<td>Toronto ON M5V 3C7</td>
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<tr>
<td>Prague</td>
<td>+420.22.422.2929</td>
<td>Washingtonova 17</td>
<td>Czech Republic</td>
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<tr>
<td>Singapore</td>
<td>+65.6511.4400</td>
<td>6 Shenton Way</td>
<td>Czech Republic</td>
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<td>#14-08 OUE Downtown 2</td>
<td>Singapore 068809</td>
</tr>
<tr>
<td>Sydney</td>
<td>+61.2.9270.8111</td>
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<td>Sydney, NSW, 2000</td>
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<tr>
<td>Shanghai</td>
<td>+86.21.6101.0172</td>
<td>Unit 2306, Citigroup Tower</td>
<td>China</td>
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<tr>
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<td>33 Huayuanahigqiao Road</td>
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<td>Pudong New Area, 200120</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>China</td>
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</tr>
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</table>
Strength & Duration of U.S. Recoveries

Real GDP Percentage Growth From Previous Trough

- 2009 - Current: 122 Months
- 1991-2000: 120 Months
- 1983-1990
- 1945-1953
- 1961-1969

Duration (# of Quarters)
Recession Indicators
The inverted yield curve - where the federal funds or 2 year treasury rate yield is higher than the 10-year bond yield. This can point to a recession because when investors pile into long-dated bonds it means they are becoming more risk-averse about the economy.

**Length and Magnitude** matter as a predictor.
ISM Manufacturing Index

Purchasing Manager’s Index

ISM Recent Performance

Since January, ISM has declined 9.5%. Since 1980 significant declines have occurred 12 times. Only 4 of those times correlated to recession.

Proper Reading

It is a diffusion index. Anything above 50 indicates expansion. While the index has declined, it stands at 52. At this time it is signaling a slowing, not a contraction.
New Unemployment Claims

An unemployment claim is a request made by an individual to the state government to receive temporary payments after having been laid off from a job. The United States Department of Labor keeps track of the number of weekly unemployment claims.

Unemployment claims typically exceed 450,000 new claims monthly during a recession. Currently, they are less than half that level and are not noticeably rising.

Proper Reading

If a recession is nearing, it has not materialized in the labor markets.
Economic Fundamentals
Labor Markets

Net Job Creation
Monthly Gain

Net Employment Gains (thousands):
172K During 2019 Months

Net Employment (Thousands):
2008-2009
8.6 Million Jobs Lost
2010-2018
19.4 Million Jobs Created
Labor Markets

Job Openings & Hirings
Monthly

Quit Rate
Monthly
Labor Markets

Unemployment Rate
U3 Measurement

Labor Costs
Quarterly Growth
Inflation Rates

Labor Costs
Quarterly Growth

Inflation Rate
CPUI, Annual % Change
Sentiment & Wealth

Home Prices
Thousand Current $

Consumer Confidence
1985=100
These Fundamentals are not going to Reverse Quickly….Unless…
The Potential for a Near Term Recession

- All these strengths will take time to unravel under normal cyclical conditions.

- Recessions typically occur because imbalances materialize, and there is a sectoral retreat in response to these excesses.
  - Nothing lies in the near term horizon that seems particularly threatening.

- This is an abnormal economic recovery, from an abnormal recession.
  - The pace of economic recovery has been extremely slow and perhaps has reduced the generation of excesses and imbalances.

- The possible factor that may lead to the next recession may be old age.
….Unless there is a Policy Shock…that Creates Uncertainty
• Some argue that aggressive Federal Reserve monetary policy tightening brings on recessions. But, monetary policy seems rather placid.

• Economic decisions have been made for over a decade based on an environment of declining or flat interest rates.

• They have been rising, from very low levels, and have not yet reached a threshold in which these economic decisions are significantly influenced.

• The recent Federal Reserve increases in the Federal Funds Rate have not been large enough to warrant a contraction in economic growth.
Regional Trade Exposure

Exports to China as a Percent of Total State Exports (2017)

Source: Census, PCA
Percent Share of Exports Under Trade Retaliation

Source: Brookings, Census
Percent Share of Exports Under Trade Retaliation

- 63% for Major Cities
- 18% for Large Cities
- 19% for Rural Towns
- 19% for Rural areas

Share of Total Cement Consumption

Source: Brookings, Census, PCA
US Near Term Forecast

**Construction**
Million Real $

2019  2020  2021  2022  2023  2024
1.5%  1.1%  0.9%  1.3%  1.7%  1.9%

**Cement Consumption**
Thousand Metric Tons

2019  2020  2021  2022  2023  2024
2.3%  1.7%  1.3%  1.7%  2.6%  2.7%
Cement/Concrete Market Segments

2014-18 Average

- Residential: 28%
- Buildings: 23%
- Highway & Streets: 29%
- Misc. Commercial: 11%
- Misc. Public: 9%

2019-2024 Average

- Residential: 28%
- Buildings: 19%
- Highway & Streets: 31%
- Misc. Commercial: 10%
- Misc. Public: 12%
Regional Markets

National growth rates mask the variances in regional performances.

- **Northeast & Great Lakes Regions** – are generally older communities and hubs of manufacturing. Characterized by a deterioration in population and economic bases reflected in slower cement consumption growth rates.

- **The Middle Regions** – are dominated by agriculture and energy industries. Ag industries tend to be less volatile and slow growing. Energy regions tend to be highly volatile and growth is influenced by oil prices.

- **Western & Southeastern Regions** – attract high tech and retirees. Dynamic job markets and population growth characterize these regions and reflected in strong cement consumption.
Longer Term Considerations
Population growth adds 58.8 million more persons by 2040.

Range: 140 to 150 MMT
Population growth adds 58.8 million more persons by 2040.
Medicare & Medicaid have grown from 8% of social benefit payments in 1965 to 45% in 2017.
Net Supply: Climate Change
Industrial Greenhouse Gas Emissions

Millions Metric Tons CO2e

Source: EPA
Net Supply
Cement Supply
Million Metric Tons.

Net Supply Capabilities
Million Metric Tons
Economic & Construction Outlook

Dave Zwicke, Sr. Director & Regional Economist

September 2019 | San Antonio, TX
Regional Cement Trends: Through 2019
Based on year-over-year % Growth

Source: PCA 2018 Summer State Forecast
Regional Cement Trends: Through 2020
Based on year-over-year % Growth

Exceed National | National Average | Subnational

Source: PCA 2019 Summer State Forecast
U.S. Total Net Migration
2015 through 2017

Source: U.S. Census Bureau
Total Net Migration
2015-2017 (000s)

Source: U.S. Census Bureau
Change in Net Migration
Change Between 2018/2017 (000s)

Source: U.S. Census Bureau
Total Net Migration
2016-2018 Average Percent of Population

- Strong Migration
- Positive Migration
- Slightly Positive Migration
- Little-to-Negative Migration
Regional Trade Exposure

Exports to China as a Percent of Total State Exports (2017)

Source: Census, PCA
Regional Trade Exposure

Exports to China as a Percent of Total State Exports (2017)

Source: Census, PCA
Regional Trade Exposure

Exports to China as a Percent of Total State Product (2017)

Source: Census, PCA
Economic Growth
Annual Percent Change, Real Gross State Product

Source: PCA

Average Annual Growth

<table>
<thead>
<tr>
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<th>Historical</th>
<th>Projected</th>
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<tbody>
<tr>
<td>Texas</td>
<td>3.0%</td>
<td>2.5%</td>
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<tr>
<td>National</td>
<td>1.5%</td>
<td>2.0%</td>
</tr>
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</table>
Residential
Single Family Construction – Texas

Single Family Permits, 6mma, SAAR

Source: Census, PCA

-6%
U.S. Demographics By Generation

Persons, thousands

Age: 5 15 25 35 45 55 65 75 85 95

Gen Z
Ages: 5-24
71 Million

Millennial
Ages: 25-39
72 Million

Gen X
Ages: 40-54
65 Million

Boomers
Ages: 55-75
75 Million

Silent Generation
Ages: 76-92
27 Million

Annual Growth
2017 2.2%
2018 8.1%
2019 3.6%
2020 2.3%
2021 -1.8%
2022 -0.1%
2023 1.6%

Source: U.S. Census Bureau, PCA
Home Price Relative to Household Income - 2019

Top 100 CBSA ranked by 2010 population (includes metro divisions)

Source: PCA
Structural Change in Homebuyers?

**Student Loan Debt as Share of all Debt**

- **2003:** $250 Billion
- **2017:** $1.5 Trillion

**Mortgage Debt as Share of all Debt**

- **2008:** 74%
- **2009:** 73%
- **2010:** 72%
- **2011:** 71%
- **2012:** 70%
- **2013:** 69%
- **2014:** 68%
- **2015:** 67%
- **2016:** 66%
- **2017:** 65%
- **2018:** 64%

Source: Federal Reserve Bank NY – Quarterly Report on Household Debt
Single Family Permits relative to Multi Family
Index, January 2018=100

Source: Census, PCA
Multifamily Construction – Texas

Multifamily Permits, 6mma

Source: Census, PCA
Texas: Single Family Housing Permits

Average Annual Growth

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Texas</td>
<td>1.6%</td>
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<tr>
<td>National</td>
<td>1.5%</td>
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</table>

Source: PCA
Rental Vacancy Rates Remain Low Throughout Region

4Q Moving Average, Percent

Source: Census – Current Population Survey
Texas: Multifamily Permits

Units

Average Annual Growth

Projected
Texas 1.6%
National 1.5%

Source: PCA
Texas: Residential Cement Outlook

Metric Tons

Annual Growth

- 2018: 6.5%
- 2019: 2.0%
- 2020: 2.4%
- 2021: 0.9%
- 2022: 2.1%
- 2023: 2.5%
- 2024: 3.2%

Source: PCA
Nonresidential: Building Trends
**Low-Rise** (1-5 Stories) — All Buildings

SQFT – Share of low to total construction activity

- **Average Concrete Share:** 31%
- **Long-term shift toward mid & high rise projects**

Source: McGraw Hill, PCA
Mid-Rise (6-10 Stories) – All Buildings

SQFT – Share of total construction activity

Segment traditionally has strong concrete share but is most at risk from competing materials

Average Concrete Share: 58%

Source: McGraw Hill, PCA
High-Rise (11+ Stories) – All Buildings - Texas

SQ FT – Share of total construction activity

Average Concrete Share: 78%

Source: McGraw Hill, PCA
Concrete Framing Shares: Texas
SQFT based, 2YMA

Regional Concrete Shares

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<tr>
<th>Category</th>
<th>3Y AVG</th>
<th>2018</th>
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<tbody>
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<td>Hotel/Motel</td>
<td>30%</td>
<td>26%</td>
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<tr>
<td>Office/Banks</td>
<td>37%</td>
<td>44%</td>
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<tr>
<td>Comm. Warehouse &amp; terminal</td>
<td>49%</td>
<td>70%</td>
</tr>
<tr>
<td>Hospitals</td>
<td>11%</td>
<td>20%</td>
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</tbody>
</table>

Source: Dodge Analytics, PCA
Concrete Framing Shares: Texas
SQFT based, 2YMA

Source: Dodge Analytics, PCA
Concrete Framing Shares: Texas
SQFT based, 2YMA

Source: Dodge Analytics, PCA
Wood Framing Share (Lodging)

Wood Framing Share (Lodging) is the percentage of total construction activity in the United States for lodging purposes (6-10 stories). The chart shows the trend from 1992 to 2018, indicating an increasing share in both Texas and the United States. The chart highlights the contribution of multifamily, hotel, and dormitories to total construction activity. 

Source: McGraw Hill, PCA
Nonresidential Outlook
Nonresidential Construction Spending: Texas

2009$s, Millions

Source: PCA
Nonresidential Construction Spending: Texas

2009$, Millions

Year-Over-Year

- Retail: -23%
- Office: 0%
- Industrial: -13%
- Medical: 13%

Source: PCA
Commercial Cement Consumption: Texas

Metric Tons

Source: PCA

Annual Growth
2018: 19.7%
2019: -15.1%
2020: 1.8%
2021: 1.6%
2022: 3.1%
2023: 3.8%
2024: 4.0%
Energy Outlook
Wind Energy Production: Texas

Megawatts

Source: PCA
Wind Energy Cost Competitiveness
Levelized Cost Per 2017 $/MWh

Between 2009-2017 wind energy costs ($/MW) have declined roughly 63%

Source: EIA, PCA
Texas well positioned for oil price volatility

Survey Question: “What WTI oil price does firm need to profitably drill a new well?”

- Permian (Midland): $47
- Permian (Delaware): $49
- Bakken: $50
- Permian (Other): $52
- SCOOP/STACK: $53
- Other U.S. (shale): $54
- Other U.S. (non-shale): $55

Source: Federal Reserve Bank of Dallas
Texas Oil Production

Source: Baker Hughes Inc.
Oil Cement Consumption: Texas

Metric Tons

<table>
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<th>Annual Growth</th>
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<tr>
<td>2018</td>
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<tr>
<td>2019</td>
<td>-11.1%</td>
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<td>2020</td>
<td>-0.7%</td>
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<td>2021</td>
<td>9.2%</td>
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<td>2022</td>
<td>3.5%</td>
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<tr>
<td>2023</td>
<td>5.0%</td>
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<tr>
<td>2024</td>
<td>4.3%</td>
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</table>

Source: PCA
Nonresidential Cement Consumption: Texas

Metric Tons

Annual Growth
- 2018: 28.0%
- 2019: -13.6%
- 2020: 0.9%
- 2021: 2.1%
- 2022: 2.1%
- 2023: 2.4%
- 2024: 2.6%

Source: PCA
Public Construction Outlook
Public Cement Consumption: Texas

Metric Tons

Policy has potential to greatly shape outlook:
- Timing?
- Size?
- Allocation?

Annual Growth
- 2016: 13.7%
- 2017: 5.3%
- 2018: -16.8%

Source: PCA
The Need for Infrastructure Funding

% Share of lane miles rated ‘poor’ based on IRI

National Average 12.8%

Source: FHWA – Table HM-64, PCA
State & Local capital investment in as a share of GDP has declined to a post WWII low.

Capital investment based on structures, i.e. schools & roads. Excludes equipments & software.
Medicare & Medicaid have grown from 8% of social benefit payments in 1965 to 45% in 2017.

Source: BEA, PCA
Unfunded State Pension Liabilities as Share of GSP

Unfunded State Pension Liabilities as Share of GDP (2018)

Source: ALEC
## Unfunded Liabilities of Public Pensions Plans

As of: 2017

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<th>Per Capita</th>
<th>Nat’l Rank</th>
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<td>$13,549</td>
<td>16</td>
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<td>14,260</td>
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<tr>
<td>Louisiana</td>
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Source: American Legislative Exchange Council (ALEC)
States are Increasingly Less Reliant on Federal Funds
Cents Per Gallon

Source: Federal Tax Administrators, FHWA, PCA
Prop 1; Prop 3

Source: American Legislative Exchange Council (ALEC)
Public Construction Spending: Texas
2009$, Millions, 6MMA

Total Public Construction Spending

Region YTD:
Total Public: +20%
Highway: +8%

Source: PCA
Highway Construction Spending:
2009$, Millions

Source: PCA
Oman Concrete Paving Shares
4Q Moving Average, Volume Based Share

Source: OMAN PCA
Public Cement Consumption: Texas

Metric Tons

Source: PCA

Annual Growth
2018: -16.8%
2019:  22.5%
2020:  3.6%
2021:  1.8%
2022:  1.9%
2023:  2.2%
2024:  2.3%
Total Cement Consumption – Texas

Metric Tons

2000-2024
CAGR: 2.3%

Source: USGS, PCA