Introduction
Cement Consumption
% Implied YTD through August 2021

Growth Rates By Region
YTD – August

West North Central 2.0%
West South Central -1.2%
New England 2.0%
East North Central 1.5%
Middle Atlantic 8.2%
South Atlantic 8.7%
East South Central 11.1%
Pacific 5.9%
Mountain 5.3%

United States 4.5%
Very strong 4Q 2020 (favorable weather) comparisons implies the growth rate will likely edge down from August YTD 4.5%.

PCA expects 2021 to show 3.2% growth over 2020 – or roughly 105 MMT.

Note: In context of widespread economic disruption, cement consumption grew 2.0% in 2020.
Delta Virus Impacts on Economic Activity
Confirmed & Projected COVID Deaths
U.S. Coronavirus Deaths; 7-day moving average; IHME Projections

According to the economic scenario used by PCA, Covid/Variant concerns remain in place well into 2023.

The prospect of a new variant emerging and heightening the death rate is not contained in the forecast.

<table>
<thead>
<tr>
<th>Month</th>
<th>IHME Forecast</th>
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<tr>
<td>Jan</td>
<td>1018</td>
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<td>Feb</td>
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<td>May</td>
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<td>July</td>
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<td>Aug</td>
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<td>Oct</td>
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<td>Nov</td>
<td>355</td>
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<td>Dec</td>
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This assumption can have a significant impact on the macroeconomic outlook.
Delta has reached a threshold that has slowed the improvement in consumer comfort – but these hinderances may become less adverse in 2022.

Back to Normal
Increases in Delta impedes the “demand side” recovery and delays a complete return to pre-covid “normal” of consumer behavior.
Wide Spread Shutdowns are Unlikely

Rate of Daily Death Increase When Shutdowns Materialized
- Total Covid Deaths Rolling 10 Day Average

- Total Covid Deaths

Be careful of semantics.

This assessment applies only to shutdowns. And does not include expanded mask mandates and other initiatives aimed at slowing the viral spread.

Shut downs can have a large adverse impact on economic activity.

The other policy initiatives have a minimal adverse impact on economic activity.
Supply Side Constraints
The Economy Struggles to Reawaken

Shortages and supply chain issues characterize the nation’s ability to meet strengthening demand, impacting everything from computer chips to lumber to restaurant services. The reasons are typically:

- Strong demand
- Production cutbacks and delayed maintenance during Covid,
- Weather conditions that led to a disruption of production,
- Under-build of inventories
- Logistic hinderances on the roads, waterways and rails
- Labor force constraints & worker shortages.
Cement is Not Immune to these Economy Wide Supply-Side Hinderances

• Many states have reported market tightness.
  • Other states are teetering

• Under build of inventory is the crux of the problem
  • Strong demand
  • Covid-related production disruptions

• Logistic hinderances have slowed the flow of product to market
  • Trucking & waterborne

• Tightness reflects a unique period.
  • Common amongst many industries reawakening from Covid
  • Expected to persist through 2021, with an opportunity to rebuild inventories this winter.
Labor, Logistics & Product Markets
Labor Markets Remain Tight

Which of the following factors are slowing the economy in your area?

- Potential Policy Change (State/Local)
- Regulations
- Potential Policy Change (Federal)
- Uncertainty (Political, Business Cycle, …)
- COVID-19 Issues
- Lack of Available Workers

Reason behind non-urgent job search

- UI payments
- COVID fears
- Care responsibilities
- Spouse employed
- Financial cushion

Source: US Chamber of Commerce

Source: Indeed July 2021 Survey
Labor Force Growth Restraints
Household Survey, Willing & Able to Work

Labor Force Recovery Hinderances
• Health concerns due to Covid
• Child care
• Heightened unemployment & Covid relief benefits

Labor Shortages Relief
• Covid fear subsides/vaccinations increase.
• Schools reopen
• Unemployment & covid relief benefits disappear.

Timing of Relief
• Improvement expected to begin to materialize in 4Q.

The longer the labor shortages persist, the more the cost/price increases become structural.
Labor Contract Negotiations

- In the context of tight labor market conditions, several major labor negotiations take place.

- Selected sample covering more than 1 million workers
  - Health care workers
  - Municipal workers
  - State & county workers
  - Long shoremen
  - USPS
  - Kaiser Permanente
  - School Bus First
  - Kroger

- 17 Cement plants face labor negotiations in 2022.

- This helps move “transitory” inflation into “structural” inflation.
Logistics
Logistics Issues

- 70+ Ships (container & dry Bulk) in Port of Los Angeles
- 130+ Ships all ports.
- Workers loading/Unloading
- 20% of the Pacific fleet is reportedly idle

These logistic issues are not going to disappear soon.

Survey of port managers, for example, expect port strains to continue well into 2022 and persist until 2nd half of next year.

*This helps move “transitory” inflation into “structural” inflation.*
Product Markets
IHME Global Projections

Largest Exporters to USA
% of Total

- Mexico, 13.9%
- Canada, 12.6%
- China, 17.2%
- Japan, 5.0%
- Germany, 4.9%
- S.Korea, 3.4%
- Vietnam, 3.6%
- UK, 2.0%
- Taiwan, 2.7%
- Switzerland, 2.3%
- India, 2.5%
- Italy, 2.2%
- Ireland, 2.5%
- Netherland, 1.2%

Top 15 Exporters Account for 78% of Total US Imports

Daily Death Rate
Percentage of Past Peak, %

Covid/Variant is worldwide AND generally more severe outside the USA due to vaccination levels.

This lends itself to production disruptions due to worker issues arising from Covid & its variants.

Product shortfalls continue to materialize.

*This helps move “transitory” inflation into “structural” inflation.*
Inventories Remain Lean

Inventory-to-Sales Ratio

IS Ratio, Total:
Current: 1.26
-11.3% Compared to Pre-Covid
-5.8% Compared to 2000-2019 Average

- It will take awhile to rebuild inventories.
  - Implies selection limited
- Price pressures remain in place – for now.
- A fear is a longer than expected supply-side recovery could add to structural inflation.
Inflation Assessment & Federal Reserve Assumptions
Supply Chains are Global

The rapidity of the recovery, and the easement of “transitory” inflationary pressures, is partially determined by Covid conditions outside the United States.

- It is an error to think that Covid conditions in the USA are reflective of conditions among our critical trading partners.
- Worsening Covid among our key trading partners creates the potential of lengthening and deepening shortfalls in key sources of supply.
- This works to lengthen the time period of “transitory” supply disruptions that get reflected in inflation.
- The longer the “transitory” period extends, the greater the potential that the supply disruptions are more fully absorbed into longer term inflation.
- The Federal Reserve’s monetary policy, in part, reacts to longer term (structural inflation—not “transitory” inflation).
- At the same, the worsening of Covid among key foreign suppliers increases the possibility of parts shortages (such as chips). These shortfalls restrain US production and GDP. This restraint adversely impacts the improvement in the labor market.

How Much of Inflation Transitory?

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<td>ISM Mfg. Supplier Del.</td>
<td>57.3</td>
<td>65.0</td>
<td>76.0</td>
<td>68.0</td>
<td>56.9</td>
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<td>Taiwan Electronic Product Exports (YoY)</td>
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<td>21.8%</td>
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<td>Dry Van Rate Per Mile (YCY of 4-Wk. Mov. Avg.)</td>
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<td>Inventory-to-Sales Ratio (All Businesses)</td>
<td>1.42%</td>
<td>1.50%</td>
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<td>1.41%</td>
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<td>ISM Manufacturing Inventories Index</td>
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<td>30.8</td>
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<td>Inventory Too Low (Net % of Firms)</td>
<td>-3.5%</td>
<td>-1.5%</td>
<td>-6.5%</td>
<td>-4.5%</td>
<td>1.2%</td>
<td>1.3%</td>
<td>2.7%</td>
<td>4.8%</td>
<td>4.4%</td>
<td>4.9%</td>
<td>6.5%</td>
<td>5.3%</td>
<td>4.5%</td>
<td>2.5%</td>
<td>7.0%</td>
<td>7.0%</td>
<td>8.0%</td>
<td>11.0%</td>
<td>12.0%</td>
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<td>Production &amp; Manuf. Pts. (vs. Feb. 2020)</td>
<td>0.2%</td>
<td>1.3%</td>
<td>-30.0%</td>
<td>-31.6%</td>
<td>-23.7%</td>
<td>-13.8%</td>
<td>-6.1%</td>
<td>4.2%</td>
<td>12.5%</td>
<td>20.6%</td>
<td>27.4%</td>
<td>26.3%</td>
<td>18.2%</td>
<td>46.8%</td>
<td>63.8%</td>
<td>74.8%</td>
<td>76.7%</td>
<td>84.0%</td>
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<td>Loading &amp; Stocking Pts. (vs. Feb. 2020)</td>
<td>1.4%</td>
<td>-0.4%</td>
<td>-32.5%</td>
<td>-22.7%</td>
<td>-17.6%</td>
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<td>4.6%</td>
<td>12.3%</td>
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<td>38.9%</td>
<td>46.4%</td>
<td>61.7%</td>
<td>72.7%</td>
<td>76.0%</td>
<td>90.0%</td>
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PCA Has Increased its Near Term Inflation Outlook

• Previous Assessment: Suggests the heightening of inflation was temporary and not structural. That market forces will bring inflation back in line.
  • In this context, “transitory” generally defined as a one year or less.

• No Policy Action Required by the Fed

• Now: Inflation will likely be sticky downward due to the supply-side factors discussed. That means more of the inflation being experienced today is “structural”.

• This implies more urgent & somewhat faster response by the Federal Reserve.

• Earlier Tapering & Rate Hikes.
Monetary Policy: “Tapering”

- When Fed buys bonds, it adds liquidity to banking, and expands the money supply.
- The Fed has been buying of bonds, and increasing the Money Supply, in support of a fragile economy.
  - $120 Billion monthly, $8.3 trillion total.
- Fed “Tapering” means it will buy bonds at a slower rate. BUT – it is still buying.
- **Tapering expected to begin 4Q 2021**
- Tapering means the Money Supply will grow more slowly in the months ahead. But – it is still adding to growth in the Money Supply.
- In the initial stages “Tapering” supports growth – just at a lesser rate than before.
- Expansion of the Money Supply still adds to inflation – just at a lesser rate than before.
Monetary Policy: Rate Hikes

Fed Funds Rate

The Fed’s recent meeting show that officials expect to raise rates twice, to about 0.6%, by late 2023. 13 of the 18 Fed officials at the meeting said they expect to start lifting rates sometime in 2023, while seven of the policymakers penciled in a rate hike as early as 2022.

Dual Mandate: Stable labor markets (low unemployment), stable prices (low inflation).

Likely error on side of employment – slow retreat from accommodative MP.

Federal Funds Rate: Fed begins rate hikes Q4 2022. Consistent with recently released Fed Survey (October 2022)

Rate increases are small. Assume 25 basis point increases.

Rate hikes: 1 = 2022, 4=2023, 4=2024, 2=2025
Economy’s Sensitivity to Rate Increases

- **Gradual** describes Federal Reserve approach toward monetary policy tightening.
  - Tapering
  - Federal Funds Rate (FF Rate)

- **Increases likely to be small & digestible.** FF Rate – 25 basis points at a time.

- Small, gradual rate increases *built off historically low interest rate levels*.

- Business and consumer **sensitivity to rate increases** plays an important role on impact of economic and private construction growth.
  - Sensitivity is least with initial rate increases (2022) and as rates increase, sensitivity increases (2023-2025).
Fiscal Policy

Covid-19 Relief Spending

- Covid relief aimed at limiting economic "scarring" - keeping the most vulnerable in the game so that when the virus subsided, the economy had the ability to recover.

- Consumers income well supported, debt declined.
- Business support limited foreclosures & bankruptcies
- Banks stress limited and remain strong.

Stimulative Impact of $1.9 Trillion Covid Relief Program

- Basis Point Impact on GDP Growth Rate

Fiscal & Monetary Policies

- Since 2020 both Fiscal & Monetary Policies have been active in support US economic growth.
- During 2021-2023, those policies supports are expected to gradually be reduced.
Economic Setting
Economic Performance

Real GDP Growth
Annual Rate

Inflation Outlook
Annual Rate

-6.0%
-4.0%
-2.0%
0.0%
2.0%
4.0%
6.0%
8.0%

2019 2020 2021 2022 2023 2024 2025

Fall Summer

-6.0%
-4.0%
-2.0%
0.0%
2.0%
4.0%
6.0%
8.0%

2019 2020 2021 2022 2023 2024 2025

Fall Summer
Construction Sector Assessments

Residential
Residential Cement Consumption

Mortgage Interest Rates
Conventional, 30 Year, %

Average SF Monthly Payment

Monthly Payment  Average Annual Increases %

2005-2019:  1.9%
2020-2022 Q2:  2.3%
2022 Q3-2024:  11.6%

Favorable Demographics Should Temper the Adverse Reaction to Harsh Affordability Conditions
Ending Foreclosure & Eviction Moratoriums:
PCA’s analysis suggests due to tight housing supplies, little adverse impact will be suffered by either single and multifamily construction.
Nonresidential Projection
Nonresidential Recovery Process

Working Capital Factor:
The longer below “normal” economic conditions persist – the more pressure occurs on working capital and ability to stay open.

Structural Factors Contribute to Vacancy Rates:
- Work-At-Home
- E-Retail
- Virtual Meeting
- E-Learning
- Urban Trend Slows 1.5-2.5 MMT annual reduction

Nonresidential Construction
Real PIP, Y-O-Y Change

Nonresidential Construction Decline
Scarring & Bankruptcies
Vacancy Rates Increase
Sq Feet Vented onto Market
NOI Declines
Banks Tighten Lending Standards

Bank Lending Officer Survey:
More Banks Tightening Lending Standards Since 2008
Public Projection
Evolving State Fiscal Conditions

State Funding – FY2021
Percent Declines in General Fund Tax Revenues from Pre-COVID Levels

State Funding – FY2022
Percent Increases in General Fund Tax Revenues from Pre-COVID Levels

Covid Relief:
The latest Federal Covid Relief program included $350 Billion to support fiscal duress encountered by states, countries, cities and tribes.

State Funding Picture for Construction Impaired by Reduced VMT & Gas Tax Revenues.
May represent a longer term drag if work from home practices & EV usage become embedded.
If That is Where the Story Ends: No Infrastructure
Composition of Growth

- Residential
- Nonresidential
- Public
- Oil/Other

2023-2024 vs. 2021-2022
Cement Consumption Outlook: No Added Infrastructure

Y-O-Y %

Cement Consumption Growth
Annual, %

- 2020: 2.0%
- 2021: 3.2%
- 2022: 2.7%
- 2023: 1.1%
- 2024: 0.2%
- 2025: 0.5%
- 2026: 1.0%

Late Years of Horizon

- Interest rates increase.
- Private sector slows.
- Public sector growth largely a state phenomenon and supported by moderately growing economic conditions.

Growth slows to 1% or Less in out years of forecast horizon
Infrastructure Assumption
Spending by Construction Segment

$1.2 Trillion
$ 550 Billion New

- Roads & Bridges: $110.7
- Power & Grid: $67
- Rail: $66
- Broadband: $65
- Water: $55
- Resiliency: $47.6
- Public Transit: $39.2
- Airports: $25
- Legacy Pollution: $21
- Ports & Waterways: $17.4
- Safety: $10.5
- Western Water: $8.3
- Clean Buses & Ferries: $7.5
- Electric Vehicle Charging: $7.5
- Reconnecting Communities: $1
Cement Consumption by Construction Sector

46 Million Metric Tons Over Five Year Program
After Congressional Passage: There Will Be a Wait for Pouring to Begin

- House & Senate Passage: 4-9 Months
- Federal & State Paperwork: 4-12 Months
- Bid Letting & Review: 6-15 Months
- Contract Award to Construction: 6-21 Months

Average Construction Start: **Mid-2023**
# Infrastructure Timing Distribution

## Highway & Bridges

Process repeated across all construction segments that are impacted by the Infrastructure Program.

<table>
<thead>
<tr>
<th>Spending Allocation Billion $</th>
<th>Fiscal Year Spending</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>Total Spent</th>
<th>Total Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>$14</td>
<td>$3</td>
<td>$6</td>
<td>$3</td>
<td>$2</td>
<td>$14</td>
<td>100%</td>
</tr>
<tr>
<td>2024</td>
<td>$14</td>
<td>$3</td>
<td>$6</td>
<td>$3</td>
<td></td>
<td>$12</td>
<td>86%</td>
</tr>
<tr>
<td>2025</td>
<td>$14</td>
<td></td>
<td>$3</td>
<td>$6</td>
<td>$3</td>
<td>$9</td>
<td>64%</td>
</tr>
<tr>
<td>2026</td>
<td>$14</td>
<td></td>
<td></td>
<td>$3</td>
<td>$6</td>
<td>$3</td>
<td>21%</td>
</tr>
<tr>
<td>Total Spending</td>
<td>$70</td>
<td>$3</td>
<td>$9</td>
<td>$12</td>
<td>$14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
S&L Sterilization
Percentage Foregone

Utilities
Public Misc.
Conservation
Public Buildings
Highway
Bridges
Water
Shovel Ready

TEA/SAFETY-LU: 31%
ARRA: 81%
## Infrastructure Macroeconomic Impact on GDP

### Billions of $

<table>
<thead>
<tr>
<th></th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2023</td>
<td>X</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>2024</td>
<td>X</td>
<td>X</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>2025</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>2026</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>X</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>200</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>GDP Growth</th>
<th>X</th>
<th>+8BP</th>
<th>+13BP</th>
<th>+17BP</th>
<th>+25BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement Consumption</td>
<td>X</td>
<td>65,000 MT</td>
<td>130,000</td>
<td>195,000</td>
<td>260,000</td>
</tr>
</tbody>
</table>

- $1.2 Trillion Infrastructure Program Financed for 5 Years, or $240 Billion Annually.
- State & Local sterilization assumed to equal 20%.
- Annual allocations ($240 billion) spread over four years.
- Equates to roughly $50 Billion per allocation year ($48 Billion).
Cement Outlook Summary
Baseline Summary: With Infrastructure

Cement Consumption Growth
Y-O-Y % Change

<table>
<thead>
<tr>
<th>Year</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>2.0%</td>
</tr>
<tr>
<td>2021</td>
<td>3.2%</td>
</tr>
<tr>
<td>2022</td>
<td>2.5%</td>
</tr>
<tr>
<td>2023</td>
<td>1.7%</td>
</tr>
<tr>
<td>2024</td>
<td>3.7%</td>
</tr>
<tr>
<td>2025</td>
<td>2.4%</td>
</tr>
<tr>
<td>2026</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Cement Imports
Thousand Metric Tons

Synchronized World Growth?

- Does Covid reset growth worldwide onto similar recovery starting dates?
  - Dry Bulk Shipbuilding is lean.
- 2005-2006?
Risks
Risk: Covid’s Path

Global Daily Death
January 1st 2022

United States Daily Death
January 1st 2022
"Human Infrastructure" Cement Consumption

Based on $1.75 Trillion
13 MMT Over 10 years
Climate Change
Extremely Important to Address

Macroeconomic Summary
does not take into
consideration climate change
initiative that could
disrupt/alter economic growth.

Does not fully take into
consideration longer term
impacts of climate change on
construction activity.

“Green” Construction
• $100 Billion Annually & Rising Rapidly (11% annual rate).
  • CO2 Reduction
  • Energy Savings
• Perhaps greater use of Life Cycle Analysis

“Defensive” Construction
• Rising water levels & Floods
  • Alternative Power
  • Fire Resistance
  • Wind Resistance
  • Insurance

Source: Resources for the Future
New Market Development Feature

The MI Dashboard

Live Now
Sign into PCA’s Website. Go to Economics